RWE Markinch Limited
Markinch Power Station

Permit Variation

Permit Number PPC/A/1096556/VAR02

Contents

How to use this form
Purpose of the document - This document is intended to demonstrate transparency of the determination process to all interested parties. It should record all significant issues, decisions made, actions taken, and rationale for the approach adopted. It should be sufficiently detailed to demonstrate that all legal requirements were adhered to and provide the basis for defending any appeal. **Language used –** You should use non-technical language as far as practicable, avoiding unexplained acronyms and technical terms. While aiming to be comprehensive, it must also be as brief as possible, consistent with the overriding need for clarity and accuracy. Officers should bear in mind that much of the document may be available publicly under the Freedom of Information Act etc. **Timely recording of information -** Completion of the various forms should be done on a progressive basis rather than at the end of the process. **Level of detail -** Officers should use their professional judgement as to the level of detail required which will depend on the complexity of the process. Officers must consider why the information is required and ensure appropriate detail is included. Each table is designed to be expanded as text is added and will obviously allow the insertion of additional rows where necessary **Applicability of any Section -** Do not delete whole sections of the form unless directed to do so. If something is not applicable to your determination please record this on the form and give a justification if appropriate indicating you have considered the issue and not just missed it.

1 Non-Technical Summary of Determination

Provide a non-technical summary of the process and determination

SEPA issued PPC Permit Ref. PPC/A/1096556 to RWE for Markinch Power Station on 26 June 2012. The plant was initially constructed as a Combined Heat and Power (CHP) plant burning a combination of virgin wood and waste wood to provide steam to the adjacent Tullis Russell Paper Mill and electricity to the National Grid via a steam turbine. The Permitted Installation also included 3 gas-fired package boilers for back up steam generation.

Tullis Russell went into administration on 1 April 2015 as Markinch Power Station became fully operational and the package boilers were decommissioned as steam demand dropped. Electricity continued to be exported to the National Grid and some steam was delivered to the smaller Glenrothes Paper mill.

Since 2019, hot water has been delivered to the Glenrothes District Heating Network where it is utilised by local housing and businesses via the Glenrothes Energy Centre (GEC) constructed at the Power station in 2018. GEC has hot-water storage and back up boilers to enable hot water to continue to be supplied to the local heat network when the Power Station is off-line.

RWE have applied for a substantial variation to the permit to install and operate two containerised natural gas-fired generating engines as part of the Standby Support System (SSS) project. The SSS project will provide emergency back-up power to the existing CHP and GEC units which will be located on land belonging to RWE Markinch.

This variation follows on from a previous variation issued 5 October 2018 to support the Glenrothes Energy Centre (GEC) District Heating scheme. That variation introduced a schedule which detailed the conditions for the Energy Centre, and this has been varied to include engines and associated equipment for the SSS project.

Variation VAR02 adds the SSS Engines as installations, adds medium combustion plant reporting requirements for this installation and adds additional requirements of the SSS Engines.

Glossary of Terms

AQS - Air Quality Standard
BAT - Best Available Techniques
BREF – Best Available Techniques Reference Document
BAT-C – Best Available Technique Conclusions
CHP - Combined Heat and Power
ELV – Emission Limit Value
SSS – Standby Support System
CO – Coordinating Officer
MCPD – Medium Combustion Plant Directive
MWth - Mega Watts Thermal, this is the thermal input capacity
LCPD – Large Combustion Plant Directive
SSSI – Site of Special Scientific Interest
PC – Process Contribution
PEC - Predicted Environmental Contribution
GEC – Glenrothes Energy Centre

2 External Consultation and SEPA's response

Guidance:
In general Public Consultation, PPC Statutory Consultation and the Public Participation Process is required if you are processing a new permit or a substantial variation to a permit. Further information on this is provided in the interim procedure for the Part A process that you are determining.

Is Public Consultation Required? (if no delete rows below)		**Yes**
Advertisement Check:	**Date**	**Compliance with advertising requirements**
Completed	28/04/2025	Suggested SEPA wording used to draft advertisement
Officer Checking advert: [redacted]		
No of responses received	Zero	
Summary of responses and how they were taken into account during the determination:		
Not applicable		
Summary of responses withheld from the public register on request and how they were taken into account during the determination:		
Not applicable		

Is PPC Statutory Consultation Required? (if no delete rows below)	**Yes**
Food Standards Agency:	Yes
Health Board:	Yes
Local Authority	Yes
Scottish Water	No
Health and Safety Executive	No
NatureScot	Yes

Discretionary Consultation required? (if yes provide justification and details below, otherwise delete row)	**Yes**

Previously performed for Energy from Waste or co-incinerators, site has fairly high profile in the area, mainly due to noise complaints and local community councils and MSP have expressed an interest.

Community Councils
North Glenrothes
Thornton
General Secretary for Markinch Community Council when it was running

Local Government
Councillor [redacted]
MSP
[redacted], MSP Mid Fife and Glenrothes Constituency

Advert to be placed in Edinburgh Gazette and local paper and documentation to go on the SEPA website due to previous noise complaints.

Responses received from Discretionary Consultation:

General Secretary for Markinch Community Council emailed 19 February 2025 to confirm that this community council is no longer in place.

Lead Officer – Environmental Health (Public Protection), Protective Services, Fife Council emailed 24 February 2025 stating on behalf of Fife council:

I've read the supporting document provided but have some concerns regarding noise. Fife Council still regularly receives complaints about noise from the site, which we forward onto yourselves. As such I would make the following comments

- I do not recognise the site description in pp1.2 – While the land to the south is predominantly commercial, there is housing to the West and North and to the East over the A92, a housing development from which many of the complaints originate.
- How confident are your noise specialists that the gas generators will not compromise nearby residents?

The site description was queried with the SEPA air modellers and noise specialists, and they were confident that the modelled terrain reflected the local area. The noise specialists did identify some questions requiring additional information that will satisfy Fife Councils question, and these were put to RWE in a Further Information Notice on the 9 May 2025 specifically asking:

Provide further evidence to show there will be no low frequency noise impact off site.
Provide further evidence to show no tonal noise impact off site.

RWE's noise consultants responded to this stating that the absolute predicted overall dB(A) specific sound level contribution from the SSS at all residential positions is in the range 18-30 dB $L_{Aeq,T}$, which is low in absolute terms and that the predicted specific $L_{Aeq,T}$ sound levels are significantly below the residual $L_{Aeq,T}$ levels (45-52 dB $L_{Aeq,T}$), and also the background $L_{A90,T}$ levels (42-47 dB $L_{A90,T}$) during non-operation at all positions.

Tonal noise was stated to be mitigated to a sufficiently low level so that no prominent tones would be present at receptors and although there may be a degree of tonality in noise from the equipment, as would be expected for rotating machinery, this will only be audible when relatively close to the equipment in comparison with the noise sensitive receptors, with the ambient sound level ($L_{Aeq,T}$) and also the background sound level ($L_{A90,T}$) at the nearest sensitive receptor are both significantly higher than the predicted overall dB(A) from the proposed SSS plant.

NHS Fife emailed on the 12 March 2025 stating that granting of permission for this development would not create significant health risks.

Chemical Contaminants Advisor for Food Standards Scotland emailed a letter on the 14 March 2025 which stated:

Based on the application and provided that the applicant complies with the relevant SEPA Guidance and all other relevant PPC Guidance Notes and Regulations, Food Standards Scotland considers it unlikely that there will be any unacceptable effects on the human food chain from the emissions from this installation provided that all relevant environmental and food safety regulations are followed.

Operations Officer for nature.scot emailed 17 March 2025 stating:

We are satisfied that there will be no likely significant effect on designated sites in the area, in particular the Firth of Forth SPA, and therefore an appropriate assessment will not be necessary. We are of the opinion based on the data provided that there will be no impacts on the nearby Site of Special Scientific Interest (SSSI) of Star Moss notified for its birch woodland, transition and lowland neutral grassland habitats.

Secretary for Thornton Community Council emailed on the 20 March 2025 to state:
We raised this application at our March meeting and have no comment to make.

No other responses were received

Enhanced SEPA Consultation required?	**No**

(if yes provide justification and details below, otherwise delete row)	
"Off site" consultation required (if yes provide justification and details below, otherwise delete row)	**No**
Transboundary Consultation required? (if yes provide justification and details below, otherwise delete row)	**No**
Is Public Participation Consultation Required? (if yes provide justification and details below, otherwise delete rows below)	**Yes**

STATEMENT ON THE PUBLIC PARTICIPATION PROCESS

The Pollution Prevention and Control (Public participation) (Scotland) Regulations 2005 requires that SEPA's draft determination of this application be placed on SEPA's website and public register and be subject to 28 days' public consultation. The dates between which this consultation took place, the number of representations received and SEPA's response to these are outlined below.

Date SEPA notified applicant of draft determination	27/08/2025
Date draft determination placed on SEPA's Website	
Details of any other 'appropriate means' used to advertise the draft. Seek advice from the communication department	
Date public consultation on draft permit opened	
Date public consultation on draft permit consultation closed	
Number of representations received to the consultation	
Date final determination placed on the SEPA's Website	

Summary of responses and how they were taken into account during the determination:

Summary of responses withheld from the public register on request and how they were taken into account during the determination:

REMOVE THIS BOX FROM ANY VERSION OF THIS DOCUMENT TO BE PLACED ON THE WEBSITE OR PUBLIC REGISTER. RETAIN IN THE VERSION FOR THE WORKING FILE.

None

Officer:	[redacted]

3 Administrative determinations

Determination of the Schedule 1 Activity

a) The incineration of non-hazardous waste with the exception of waste which is biomass or animal carcasses in an incineration or co-incineration plant as described in Part 1 of Schedule 1, Chapter 5 Section 5.1 Part A (b) of the Regulations.

b) The burning of any fuel in a medium combustion plant with a net rated thermal input equal to or greater than 1 megawatt and less than or equal to 20 megawatts, as described in Part 1 of Schedule 1, Chapter 1 Section 1.1 Part B (d) of the Regulations.

b) still applies despite the addition of the SSS system bringing the total net rated thermal input to above 20 MWth as the GEC and SSS operate independently of each other and are located as separate installations.

Determination of the Stationary Technical Unit to be permitted

As detailed in the application – See Schedule 1 of Permit – added new paragraph 1.1.4 (n) –

(n) Standby Support System (SSS) providing emergency back-up power to the site comprising:

(i) two containerised Jenbacher natural gas-fired generators each rated at 6.83 MWth venting through independent 7.59 metre stacks located on the top of the 4.55 metre enclosure (stack height from ground to tip is 12.27m) – generator rating confirmed in response to further information notice received 06/06/2025

(ii) A dedicated / modular control system, which controls all engines and associated equipment and allows remote engine control from the RWE central Markinch control room. Normal operation will be via the RWE central Markinch control room.

Determination of Directly Associated Activities

No changes – See Schedule 1 of Permit – no additional DAA's included with VAR02

Determination of Site Boundary

No changes – See Schedule 1 of Permit – site boundary has not changed in VAR02

Officer:	[redacted]

4 Introduction and Background

4.1 Historical Background to the activity and variation

The Permit Ref. PPC/A/1096556 was issued for Markinch Power Station on 26 June 2012. The plant was initially constructed as a Combined Heat and Power (CHP) plant comprising a 168MWth input circulating fluidised bed boiler burning a combination of virgin wood and IED Chapter IV waste wood to provide steam to the adjacent Tullis Russell Paper Mill and electricity to the National Grid via a 49.9 MWe steam turbine. The Permitted Installation also included 3 gas-fired package boilers. The capacity of the steam turbine was increased to 65 MWe by a Section 36 Consent from the Scottish Government under the Electricity Act 1989, and Schedule 1 of the Permit was updated to reflect this change in Variation (VN) 02 issued on 5/12/2013.

Tullis Russell went into administration on 1 April 2015 as Markinch Power Station became fully operational and the package boilers were decommissioned. Following closure of Tullis Russell, electricity continued to be exported to the National Grid and some steam was delivered to the smaller Glenrothes Papermill. Since 2019, hot water has also been delivered to Glenrothes District Heating Network via Glenrothes Energy Centre (GEC) constructed at the Power station in 2018 (Ref. VN03) increasing the overall energy efficiency of the Power Station. GEC has hot-water storage and back up boilers to enable hot water to continue to be supplied when the Power Station is off-line, for example for maintenance outages. The gas-fired package boilers initially permitted were removed from the permit by VN03.

The permit has been varied in 2012, 2013, 2018, 2019, 2021 and 2023.

The activities carried out at the site include:

(a) Incineration of non-hazardous waste with the exception of waste which is biomass or animal carcasses in an incineration or co-incineration plant as described in Part 1 of Schedule 1, Chapter 5 Section 5.1 Part A (b) of the Regulations.

(b) Burning any fuel in a medium combustion plant with a rated thermal input equal to or greater than 1 megawatt and less than or equal to 20 megawatts, as described in Part 1 of Schedule 1, Chapter 1 Section 1.1 Part B (d) of the Regulations.

The proposed variation will provide emergency back-up power to the existing site in the form of two gas engines powering generators. The generators will form the Standby Support System (SSS) and will be located on land belonging to the existing RWE Markinch CHP Biomass plant site and within the existing PPC permit installation boundary.

The SSS comprises of two containerised natural gas-fired engines powering generators, each rated at 6.83 MWth input and each being served by an independent 7.59 m stack located on top of the 4.55 m engine enclosure (total stack height from ground to stack tip is 12.27 m), with associated radiators and clean/waste oil bulk storage tanks.

The SSS project is to be designed so that when operational, it can be connected to the main power station's electrical auxiliary system to supply the works power requirements by some of the main generating plant; as well as being capable of operating independently of any services from the main generating station. The SSS will not be capable of augmenting the power exported from the power station and the engines would only be operated for not more than a maximum of 1,500 hours each per year. This was agreed by RWE with the Electricity Supply Network during the initial development phase of the SSS so therefore the 500-hour exception of oxides of nitrogen emission limit values as stated in the Medium Combustion Plant Directive, Article 6, Paragraph 8 does not apply.

The generators operate sequentially and together to provide sufficient load to allow startup of the Markinch Site. The equipment can operate in grid parallel and island operation modes.

The Installation is driven by a necessity to fill the gap left by the closure of coal-fired power stations, which previously provided essential emergency start capabilities for the UK's electricity grid.

4.2 Description of activity

Co-incineration of virgin wood with IED Chapter IV waste wood. The Permitted Installation provides electricity to the National Grid and heat in the form of hot water to Glenrothes District Heating Network via Glenrothes Energy Centre.

4.3 Outline details of the Variation applied for

Substantial variation to add two natural gas fired generator installations each with a rated Thermal Input of 6.83 MWth under the activity described by Part 1 of Schedule 1, Chapter 1 Section 1.1 Part B (d) of the PPC (Scotland) Regulations (2012), as amended and monitoring requirements as specified in the Medium Combustion Plant Directive (2018) and implemented.

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

None

4.5 Identification of important and sensitive receptors

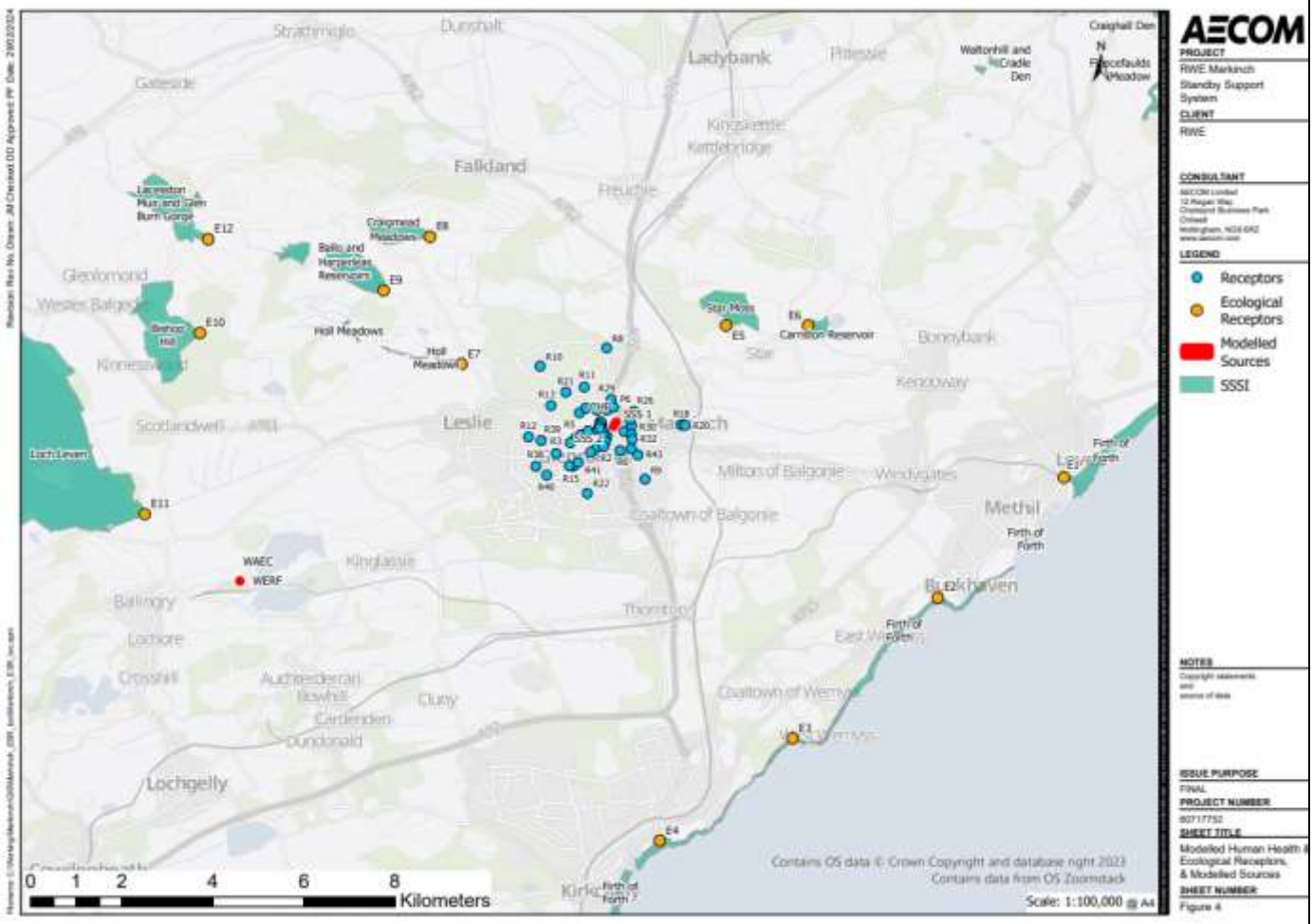
Key residential receptors where complaints of a low frequency tonal noise have arisen are located on Cadham Road, Glenrothes, and in Markinch on Mount Frost Drive, Prestonhall Avenue and Prestonhall Road. In addition to these, new developments to the southwest of the Site Boundary have been identified in the Noise Impact Assessment as a residential receptor for noise (Markinch CHP Power Station, Standby Support System, Noise Impact Assessment to Support Screening Opinion, Request, Report Reference PJ4227/23288, Spectrum Acoustic Consultants, 22 February 2024).

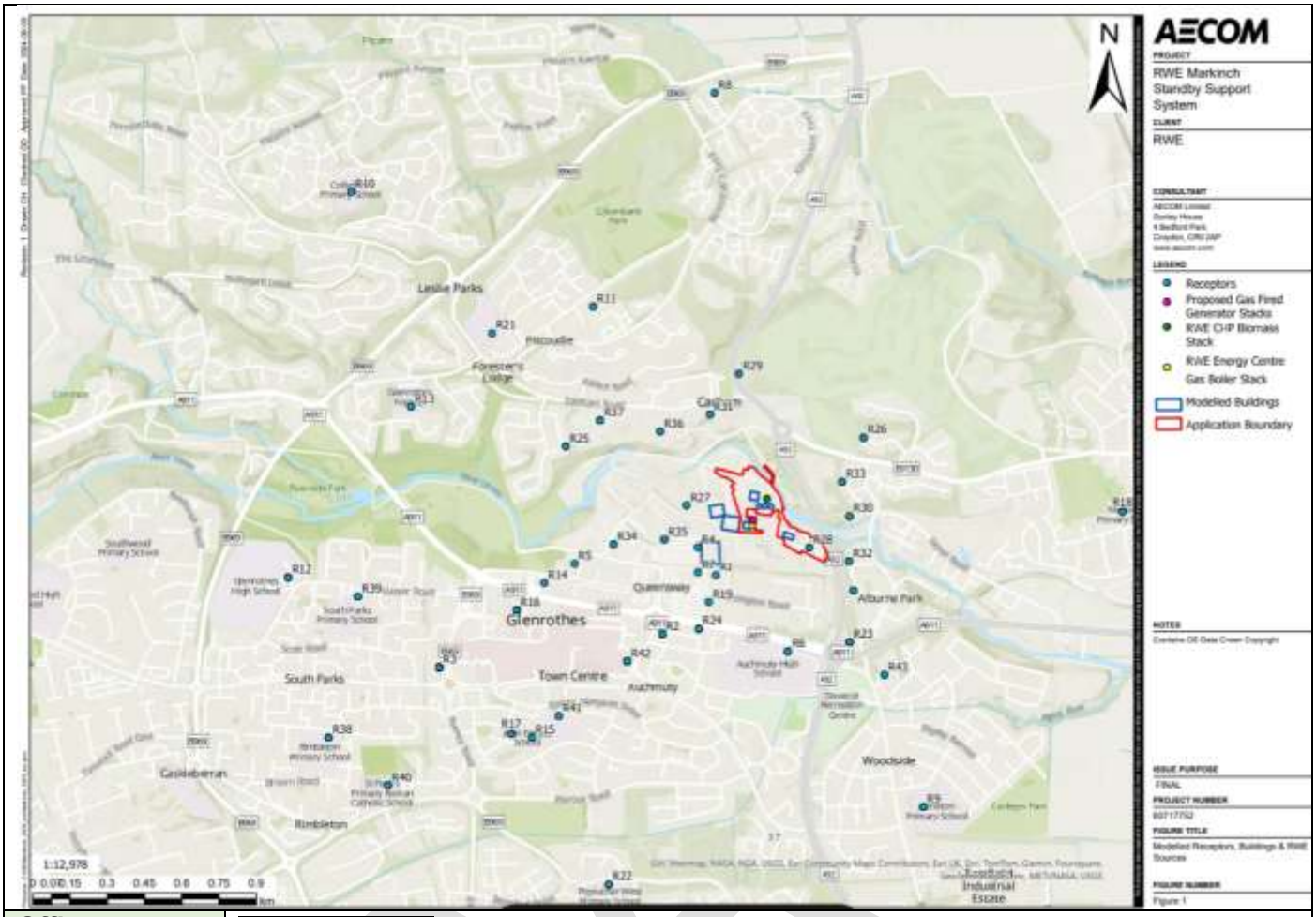
Ecological receptors were identified in the Air Quality Impact Assessment (Markinch Standby Support System, Air Quality Impact Assessment, Project number: 60703816, AECOM consultancy, February 2024):
Loch Leven National Nature Reserve, Ramsar site & SSSI
Bishop Hill SSSI
Lacesston Muir and Glen Burn Gorge SSSI

Ballo and Harperleas Reservoirs SSSI
Craigmead Meadows SSSI
Holl Meadows SSSI
Star Moss SSSI
Carriston Reservoir SSSI
Firth of Forth Ramsar site & SSSI

In addition to the ecological receptors multiple human health receptors including Glenrothes Hospital, schools in Glenrothes and residential, retail and businesses were identified in the Air Quality Impact Assessment.

See figures below for details on receptors in relation to the RWE site.





Officer:	[redacted]

5 Key Environmental Issues

5.1 Summary of significant environmental impacts

None expected – see sections below for information

5.2 Emissions to Air

Point Source emission to air:

Proposed emissions from the generators are likely to be oxides of nitrogen (as nitrogen dioxide) and carbon monoxide through both gas-fired generator stacks, expected emissions per unit are 95 mg/Nm^3 oxides of nitrogen (as NO_2) and 393 mg/Nm^3 carbon monoxide corrected to 273 Kelvin, dry gas and 15% oxygen.

The Air Quality Impact Assessment modelled the air emissions from the SSS operating as a “worst case scenario” based on the SSS operating for 24 hours per day all year adjusted to reflect the expected maximum of 1500 hours of operation a year. RWE have confirmed that the SSS is not likely to operate more than 500 hours per year meaning the modelling was carried out as a very conservative assessment.

The existing on-site Combined Heat & Power (CHP) biomass plant, Energy Centre and other modelled cumulative sources have been modelled as operating continuously all year at their maximum emission limits, as set out in the PPC Permit and variations as a worst-case. The results of the modelling were compared to the following significance thresholds for screening out of low-risk pollutants in SEPA Guidance (Ref. https://www.sepa.org.uk/regulations/pollution-prevention-and-control/guidance/air-emissions-risk-assessment-for-environmental-permits/):

Screening criteria:

- For the tool to screen out a process contribution (PC) for any substance, the PC must meet both of the following criteria:
  - the short-term PC is less than 10% of the short-term environmental standard for the substance
  - the long-term PC is less than 1% of the long-term environmental standard for the substance
- If either of the above criteria are not met, then the tool carries out a second stage of screening to determine the impact of the predicted environmental concentration (PEC). For the tool to screen out a PEC for any substance, the PEC must meet both of the following criteria:
  - the short-term PC is less than 20% of the short-term environmental standard minus twice the long-term background concentration for the substance
  - the long-term PEC is less than 70% of the long-term environmental standard for the substance

The Air Quality Impact Assessment identified that when considering the SSS in isolation, both long-term and short-term oxides of nitrogen concentrations are predicted to be insignificant at all locations where members of the public are most likely to be present and annual contributions from the modelled emission sources are not significant. The inclusion of the existing CHP Biomass plant and Energy Centre gas boilers in the normal and cumulative Process Contributions is considered conservative given that these are existing sources and so would realistically form part of the background if local monitoring were available.

Annual mean and short-term oxides of nitrogen concentrations, acid and nitrogen deposition at all modelled ecological receptors were judged to be insignificant during the SSS only scenario - that is the Process Contribution (PC) was less than 1% of the long-term Air Quality Standard (AQS) for NOx and less than 10% of relevant short-term AQS for oxides of nitrogen concentrations, acid and nitrogen deposition. Likewise, daily mean oxides of nitrogen concentrations at designated sites in the normal operations and cumulative scenarios are predicted to represent less than 10% of the Critical Level so can be considered insignificant.

The predicted long-term effects of nitrogen dioxide from normal operations and cumulative scenarios showed that the Process Contribution (PC) was more than 1% of the Air Quality Standard (AQS) at most modelled receptors. However, the total Predicted Environmental Concentration (PEC) was still well below 70% of the AQS objective so can be screened out as low risk.

For short-term nitrogen dioxide impacts, the predicted Process Contribution (PC) at some receptors are greater than 10% of the AQS objective in both the normal and cumulative modelling scenarios and are therefore not insignificant. However, the PC represents less than 20% of the AQS objective, minus double the background concentration. The predicted process contributions are therefore deemed as low-risk. It should be noted that the short-term modelling has assumed that all sources operate at full load, 24 hours a day all year. As such the predicted concentrations are very conservative as it assumes that all sources will be operational during the hours that result in the worst ground-level concentrations.

Predicted carbon monoxide contributions are predicted to be below the relevant significance criteria, with the maximum 1-hour Process Contribution representing less than 10% of the Air Quality Standard objective in all scenarios and the maximum 8-hour Process Contribution less than 20% of the Air Quality Standard objective in all scenarios.

Operational phase impacts for the SSS scenario were assessed for NO_2, CO and NO_x. Stack height sensitivity testing was undertaken for the SSS looking at increases in stack height of 1m for each model run between 5.3 m and 30.3 m above ground level. The stack height modelling showed that most

building downwash effects were overcome at 8 m above ground level. The proposed stack height of 12.3m is, therefore, considered appropriate to minimise ground-level concentrations as much as practicable and is consistent with the 12 m stack serving the Energy Centre gas boilers.

Fugitive emissions to air:

None

Odour:

None

5.3 Emissions to Water

Point Source Emissions to Surface Water and Sewer:

Discharges to sewer take place from discharge points W3, W4 and W5 from the existing permitted activities. The SSS gas fired generators will not need to discharge to sewer, and no changes proposed as part of the variation.

Discharges of clean and uncontaminated surface water takes place through an attenuation sump and interceptor to the River Leven. Discharge takes place from discharge points W1 and W2 (uncontaminated surface and roof water from north and south of site respectively) and from W6 (uncontaminated surface water from the Glenrothes Energy Centre). The SSS uncontaminated surface water will feed into discharge point W6 and will consist only of rainwater run-off.

Point Source Emissions to Groundwater:

None expected from SSS

Fugitive Emissions to Water:

Spillage of fuels, water treatment chemicals or maintenance materials on surface run-off from pavements, roads and hardstanding are already referenced in risk assessment documentation for the existing installations, the new SSS generators are not expected to change the potential for fugitive releases. No additional oil is expected to be stored for the SSS, the only oil used by the SSS will be lubrication oil that will be changed during routine servicing with the engineers bringing the lubrication oil to the units and removing the old oil from site. The manufacturers design filling capacity is for approximately 765 litres of lubrication oil per engine which will be constantly circulated within the engines whilst in operation, oil leaks should not occur. If oil leakage does occur this will be contained within the containers housing the engines with spill kit procedures and equipment available to ensure effective containment and allow appropriate clean up. This will be audited once operational.

5.4 Noise

Noise modelling has been submitted by RWE who used Spectrum Consultants and has been checked by SEPA noise specialists. The noise modelling was identified to have been run using BS ISO 9613-2:1996, it was requested that it be re-run using the most recent version (BS ISO 9613-2:2024). The results of the re-run showed only a small increase of 1dB(A) at receptors Z3 – Coater Road (south end of road) and Z4 - Town Park Way (south end of road) but the overall levels were considered not significant with regards to the SSS system.

The noise experts confirmed they used a program called **iNoise**, which follows the requirements set out in the **ISO 9613-2:2024** standard reference method. This standard is an international guideline for predicting how sound travels outdoors. The software correctly handles how sound is absorbed by the ground and blocked by barriers, and it doesn't subtract the effect of ground absorption when calculating how much sound is blocked by obstacles (referred to as **Dz**, which stands for barrier attenuation).

It is stated in the noise report that the SSS units will be contained in dedicated containers, there was some questions regarding the design of this building, which was confirmed by Spectrum and RWE to be in a building enclosure of precast concrete construction comprising individual sections housing each unit. Acoustic doors will be fitted to doors opening into noisy areas of the building. Ventilation to each enclosure within the building will be provided by dedicated air intake / discharge system incorporating

high-performance attenuators. Dry air coolers will comprise low-noise fans and motors and each engine stack will be fitted with a high-performance silencer.

Evidence on no low frequency noise impact off site was requested and details on current octave levels versus predicted octave levels (third octave if possible) at receptor locations, including octave/third octave frequency bands below 63Hz (using the most suitable methodology) requested. The consultants provided comparison between predicted specific octave band sound levels and measured ambient sound levels, at low frequencies. The ambient sound levels used were the mean values during the worst-case (quietest) late evening SSS operating period (20:00-22:00), from the September 2023 survey, when the CHP plant was not operational and there were calm wind conditions.

This data demonstrates that the absolute predicted overall dB(A) specific sound level contribution from the SSS at all residential positions is in the range 18-30 dB $L_{Aeq,T}$, which is low in absolute terms. Further to this, the predicted specific $L_{Aeq,T}$ sound levels are significantly below the residual $L_{Aeq,T}$ levels (45-52 dB $L_{Aeq,T}$), and also the background $L_{A90,T}$ levels (42-47 dB $L_{A90,T}$) during non-operation at all positions.

Additionally, the data demonstrates that predicted SSS low frequency octave band levels are also significantly below the measured ambient levels at all locations, except Prestonhall, where ambient levels are particularly low. However, when considering the 'A' weighted values of individual octave bands, they are very low (13/23/21 dB at 31/63/125 Hz respectively).

Noise monitoring will be required once the engines have been commissioned, if nuisance noise is detected beyond the PPC boundary additional noise suppression equipment will be required to be installed. Non-compliance with the noise conditions of the PPC permit will not be acceptable and all actions up to and including enforcement actions will be undertaken by SEPA.

RWE noise consultants have confirmed that, although there may be a degree of tonality in noise from the equipment, as would be expected for rotating machinery, this will only be audible when relatively close to the equipment in comparison with the noise sensitive receptors (NSR).

Regarding tonality, the methodologies described in BS4142 for tonal assessment are based on analysis of measured narrow band or 1/3 octave band data. This is information is not available at this stage of the project, and it is unusual for it to be made available by the original equipment manufacturer (OEM).

The information requirements for noise emissions and their control from the SSS are considered to have been met and no increase in noise impact is predicted. VAR02 conditions 3.1.8 and 3.1.9 introduce requirements to prevent tonal and offensive noise and vibration beyond the permitted boundary and condition 9.4.1 requires RWE to perform the measurement of noise emissions from the operation of SSS including specific measurements for tonal noise and low frequency noise.

The noise report shall require a comparison of the results of the post-commissioning noise monitoring of the SSS to the noise assessment and associated predictions made in all noise reports submitted in support of the Application for Variation. These include, but are not limited to, supplementary noise information received by SEPA in support of the application for variation for SSS 29 January 2025 (Noise Impact Assessment "Markinch CHP Power Station, Standby Support System, Noise Impact Assessment to Support Screening Opinion Request, Report ref. PJ4227/23288, Spectrum Acoustic Consultants, dated 22 February 2024; and an interpretation of the results, to include a comparison between actual and predicted noise emissions including tonal and low frequency noise; together with proposals for improvement with associated timescales for implementation where a discrepancy exists between the actual and predicted noise emission data.

5.5 Resource Utilisation

Water use

None

Energy use and generation

Based on H1 assessment tool the consumption of natural gas for the SSS system is 20,490 Mwh per year, this is the equivalent of 3893.1 tonne/year of carbon dioxide.

Raw Materials Selection and Use

The expected raw materials are natural gas and lubrication oil. The SSS generators may be suitable for hydrogen / natural gas mixture should a supply of this be available in the future. However, the selection of natural gas is considered BAT at the time of application from an efficiency and emission point of view when compared to gas oil.

5.6 Waste Management and Handling

Waste Minimisation

None

Waste Handling

No waste is expected to be generated by the SSS system, other than spent lubrication oil for the engines. Spent lubricating oil will be replaced during servicing and disposed of by the service engineers in line with waste management duty of care legal requirements.

Waste Recovery or Disposal

As above

5.7 Management of the site

Environmental Management System

Site has ISO 14001 certified Environmental Management System; this will be amended to incorporate the SSS Engines with updates to be made to the procedures covering: the organisational structure, operating procedures, housekeeping, emissions management and monitoring, maintenance, emergencies, incidents, dealing with non-compliance and complaints management.

Accidents and their Consequences

See above

Closure

None

5.8 Site Condition report

The baseline report from November 2019 was submitted as evidence for the site condition as the area used for the SSS has not changed since 2019. This concluded that no significant contaminant concentrations have been identified at the site that may be associated directly with the Relevant Hazardous Substances / permitted activities at the site, and that these concentrations indicate the baseline / background conditions at the site. The report stated no additional investigation and / or monitoring would be required at the site in the location of the SSS which is inside the existing site boundary for the Permitted Installation.

However, one existing groundwater monitoring borehole required by the Permit is to be relocated to enable construction of the foundations for the SSS buildings.

5.9 Monitoring

Air

Emissions monitoring of the SSS Engines will be as required as specified in the Medium Combustion Plant Annex II, Part 2, Table 2 for new engines operating on natural gas.
This is covered in detail in the updated Schedule 9 in VAR02

Water

None

Soil and Groundwater

No additional soil and groundwater monitoring locations will be required by the SSS installation as the impact on soil and groundwater from the installation is expected to be minimal. Any oil used will be for lubrication of the generators only and will not be stored at the generator location.

However as discussed above, one existing groundwater monitoring borehole required by the Permit is to be relocated to enable construction of the foundations for the SSS. The proposals for the relocation are being considered separately to the variation.

Waste

None

5.10 Consideration of BAT and compliance with BAT-Cs if appropriate

As there is no specific Best Available Techniques (BAT) guidance for MCP, the RWE BAT assessment refers to "PG1/1 For Combustion Plant of 20 – 50MWth Capacity" as the most suitable guidance.

Evidence presented by RWE on how combustion optimisation will be maintained for CO & NO_x emissions. BAT is to ensure:

- efficient mixing of the fuel and combustion air
- combustion control, based on the continuous monitoring and automated control
- of appropriate combustion parameters (for example O2, CO, fuel to air ratio and unburnt substances)

RWE will achieve this by ensuring the plant will be operated be operated by an automated control system, which will ensure combustion is optimised. Any non-conformance or deviation in normal operating parameters shall be identified by the Distributed Control System (DCS) to allow operators to take action to avoid a breach of permitted emission levels. Performance tests measuring the load, fuel used, and power output to calculate overall efficiencies shall be undertaken in accordance with applicable BS EN standards and existing site procedures (amended to include proposed installation). The fuel usage at the Site will be recorded by the Operator annually to ensure effective combustion is maintained.

Evidence presented on how to minimise and control NOx emissions to air from combustion plants.

The SSS engines powering the generators will be of modern design and will use natural gas as its fuel, this is considered BAT as natural gas has a low content of potential pollution generating compounds (for example lower sulphur, ash or nitrogen content in the fuel).

The plant will be operated be operated by an automated control system, which will ensure combustion is optimised. Any non-conformance or deviation in normal operating parameters shall be identified by the DCS to allow operators to take action to avoid a breach of permitted emission levels.

Emissions levels will be maintained below the oxides of nitrogen emission limit values as set out in the Medium Combustion Plant directive and stated in the variation, and annual mass emissions will be controlled by only using the engines for a maximum of 1,500 hours/year.

As it is expected that emissions of oxides of nitrogen will be below the emission limit value using these techniques Selective catalytic reduction (SCR) and Selective non-catalytic reduction (SNCR) have not been applied.

The SSS engines will use natural gas as BAT is to use a gaseous fuel instead of liquid fuel or solid fuel and no dust emissions are expected. Natural gas has a low sulphur content, and this will prevent or reduce sulphur dioxide emissions. Natural gas also has no associated ash residue.

Air quality, dispersion and dilution was demonstrated using the dispersion assessment and modelling of the SSS engines and showed that Air Quality Standards were not exceeded.

Emissions monitoring of the SSS engines will be completed in accordance with relevant standard reference methods.

For Environmental Management Systems (EMS) see above. Site already has ISO 14401 accreditation and this will be extended to include the SSS engines.

The Medium Combustion Plant Directive (MCPD) states for energy efficiency - medium combustion plants should be developed and operated in such a way as to promote energy efficiency. RWE have presented evidence that they will operate the SSS Engines to meet the requirements of Energy Efficiency BAT conclusions as stated in the Large Combustion Plant Directive (LCPD) BAT Conclusions, specifically through the management system, performance monitoring and effective control of the SSS systems.

6 Other Legislation Considered

Nature Conservation (Scotland) Act 2004 & Conservation (Natural Habitats &c.) Regulations 1994

Is there any possibility that the proposal will have any impact on site designated under the above legislation? If yes, provide information on the action and justification below:	**No**
Air modelling confirmed by SEPA Airmod shows the SSS Engines will have negligible impact	
Screening distance(s) used	15 Km – stated in RWE Air Quality Impact Assessment, Scope of Assessment, paragraph 1.7.
Is there any other legislation that was considered during determination of the permit (for example installations that may be impacted by the requirements of legislation involving Animal By Products, Food Standards, Waste, WEEE regulations etc). If yes, provide information on the legislation, action and justification below:	**No**
Officer	[redacted]

7 Environmental Impact Assessment and COMAH

Guidance Notes:
The PPC Regulations require that under certain circumstances SEPA take into consideration the information in any statutory Environmental Impact Assessment carried out as part of the planning process or a Safety Report produced under the Control of Major Accident Hazards Regulations.

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

N/A

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

N/A – site is not classified as a COMAH site

Officer:	[redacted]

8 Details of the permit

Guidance Notes:
All non-standard conditions should be discussed with an appropriate specialist and legal to ensure they are appropriate and enforceable.

All non-standard conditions and, in the case of a permit variation, changes to existing text, tables or diagrams should be outlined and justified below. Where a group of related conditions are included, these can be included in one section and a single justification provided. Justifications can be linked to sections above, and/or the draft permit/variation schedule.

Do you propose placing any non-standard conditions in the Permit?	**No**
Do you propose making changes to existing text, tables or diagrams within the permit?	**Yes**

Outline the changes required and provide justification below:

Proposed Condition Number:	**Proposed Change:**	**Justification:**
Interpretations of Terms	Addition of Noise Management Plan to the interpretation of terms	The Noise and Vibration management plan is a requirement of existing Condition's 3.1.2 to 3.1.4. Because potential noise impacts have been assessed as part of the application for variation the opportunity has been taken to insert this term into the Permit. This explains that the NVMP should be written in line with SEPA Guidance.
1.1.4	A new sub paragraph (n) is inserted	Description of new installation – namely the gas-fired generator units and control systems
Annex 1 to schedule 1	Existing site plan is deleted and replaced with updated site plan	New site plan containing SSS location
Table 2.1	Table 2.1 is updated with and replaced with a new line	New reporting requirements for MCP periodic monitoring are added
3.1.7	Condition 3.1.7 has been updated	Updated so existing requirement to maintain the main generator acoustic enclosure in good working order is extended to include maintaining the SSS system acoustic enclosure in good working. Required to ensure maintenance of acoustic enclosures and to prevent their deterioration in the future which could lead to an increase in noise emissions.
3.1.8	Condition 3.1.8 has been added to require that "Noise and vibration emissions associated with the Permitted Activities shall not contain any audible tonal noise (assessed using narrow band analysis defined in Annex D of BS4142) beyond the Permitted Installation boundary."	Tonal noise emissions have been a historic problem at the Permitted Installation. Use of this Condition provides alignment with Conditions used in other EfW Permits.
3.1.9	Condition 3.1.9 has been added	Mandatory noise condition from most recent permit template.
Table 3.1	New row 7 is added	To add the silencers on the SSS generators exhausts as a Noise Source Reference

Schedule 9 Title	The title is deleted and replaced with the new title	New title as schedule 9 now covers the operation of the Glenrothes Energy Centre and Standby Support System
9.1.4	Condition 9.1.4 has been deleted and replaced	9.1.4 has been amended to reflect the correction factors for emission points A5, A6 & A7 as 273K, 101.3kPa and 3% oxygen v/v, dry gas and correction factors for A8 & A9 as 273K, 101.3kPa and 15% oxygen v/v, dry gas.
9.1.10	Condition 9.1.10 has been added	Added to state the record keeping requirements relating to operation of any Medium Combustion Plant
9.2.2	Condition 9.2.2 has been deleted and replaced	Condition 9.2.2 replaced with condition referencing emissions of contaminated surface water or process effluent from Glenrothes Energy Centre and Standby Support System
9.3.1	Condition 9.3.1 has been deleted and replaced	Condition 9.3.1 amended to add minimising start up and shut down of installations including 1.1.4 (n) which is the SSS Engines.
9.3.2	Condition 9.3.2 has been deleted and replaced	Condition 9.3.2 amended to add no fuels other than natural gas to be used by plant including 1.1.4 (n) which is the SSS Engines
9.3.3	Condition 9.3.3 has been deleted and replaced	Condition 9.3.3 amended to add to record fuel quantity and type with total hours of operation for each combustion plant including 1.1.4 (n) which is the SSS Engines
9.3.4	Condition 9.3.4 has been deleted and replaced	Condition 9.3.4 amended to include records for 9.1.10 which refers to the SSS Engines shall be retained for at least six years
9.4	Condition 9.4 has been added – includes conditions 9.4.1 and 9.4.2	Condition 9.4 added regarding commissioning of the SSS Engines with specific regard to noise and emissions to air monitoring First monitoring of emissions to be carried out no later than 4 months after the start of operation as required by MCDP, Annex III, Part 1, Paragraph 4
9.5	Condition 9.5 has been added	Condition 9.5 added to confirm that the SSS Engines shall only be operated when necessary to provide standby support to restart the CHP in the event of a

		grid power failure or for testing and to ensure they are not operated for other reasons, in order to minimise air and noise emissions
Table 9.1	Table 9.1 has been deleted and replaced	Table 9.1 amended to include SSS Engines emission point details as emission points A8 and A9 as well as clarifying that the boilers are part of the GEC
Table 9.2	Table 9.2 has been deleted and replaced	Table 9.2 amended to include separate row for emission points A8 & A9 for oxides of nitrogen for SSS engines operating on natural gas – Emission Limit Value (ELV) required as RWE confirmed plant expected to operate up to 1500 hours per year, ELVs assigned based on Table 2 of in Annex II, Part 2 of Medium Combustion Plant Directive. 95 mg/m^3 used as engines will operate purely on natural gas, no dual fuel Emission points A8 & A9 added to existing rows for carbon monoxide and smoke emissions
Table 9.3	Table 9.3 has been deleted and replaced	Column 2 amended to add emission points A8 & A9 Column 5 amended to state boiler / engine Volumetric flow units amended to normalised cubic metres an hour to remove ambiguity on how this data is reported
Table 9.4	Column 2 in Table 9.4 is deleted and replaced	Column 2 amended to add emission points A8 & A9
Officer:	[redacted]	

9 Emission Limit Values or Equivalent Technical Parameters/Measures	
Are you are dealing with either a permit application, or a permit variation which would involve a review of existing ELVs or equivalent technical parameters?	**No**
Outline the changes required and provide justification below:	
Variation is for new natural gas-powered engines in an existing installation with their emission limit values based on the Annex II, Part 2, Table 2 of the Medium Combustion Plant Directive	
Officer:	[redacted]

10 Peer Review	
Has the determination and draft permit been Peer Reviewed?	**Yes**

Comments made:	
Various comments made to correct typos or add further explanation or provide clarification.	
Officer:	[redacted]

11 Final Determination
Issue of a Permit - Based on the information available at the time
Issue a Permit – Based on the information available at the time of the determination SEPA is satisfied that • The applicant will be the person who will have control over the operation of the installation/mobile plant, • The applicant will ensure that the installation/mobile plant is operated so as to comply with the conditions of the Permit, • The applicant is a fit and proper person (specified waste management activities only), • Planning permission for the activity is in force (specified waste management activities only), • That the operator is in a position to use all appropriate preventative measures against pollution, in particular through the application of best available techniques. • That no significant pollution should be caused.