Permitting Decisions- Variation

We have decided to grant the variation for Ravenhead Insulation Works operated by Knauf Insulation Limited.

The variation number is EPR/BQ4335IC/V009.

The permit was issued on 10/04/2026.

The operator, Knauf Insulation Limited (KI) applied for a permit variation to incorporate the following changes to site operation:

- Rebuilding and expansion of the melting furnace to increase glass production from 251 tonnes/day to 330 tonnes/day (31%) with associated expansion of the low density (LD) production line to increase the production throughput and allow production of products with higher thermal performance. As of Q1 2026, the HD production line will be mothballed for a number of years.
- Installation of new ancillary systems including more efficient bagging machines and an additional bagging line.
- An increase in installation boundary, primarily to the northwest of the site, allowing more land for non-process activities such as final product storage.
- Introduction of emission point, W1, which is uncontaminated surface water discharged into the on-site Ravenhead Dam.
- Removal of emission points (A110 – A116) from a building that has been demolished.
- Redefinition of ‘abnormal operation’ for use of the wet electrostatic precipitator such that it aligns with the definition of ‘abnormal operation for the dry electrostatic precipitator:
    - *on a wet* Electrostatic Precipitator means *non-operation of the* Electrostatic Precipitator *(either planned or unplanned).*

During the determination process, the operator requested that a further different definition of “abnormal operation” be used for the wet electrostatic precipitator:

- *‘on the HD production line means a greater than 30% reduction in the abatement capacity of the wet Electrostatic Precipitator’*.

We have also made the following change to the environmental permit as a result of an Environment Agency initiated variation:

- Addition of operations now regulated as medium combustion plant activities.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

Purpose of this document

This decision document provides a record of the decision-making process. It

- highlights key issues in the determination
- summarises the decision making process in the decision considerations section to show how the main relevant factors have been taken into account
- explains why we have also made an Environment Agency initiated variation
- shows how we have considered the consultation responses

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Read the permitting decisions in conjunction with the environmental permit and the variation notice.

Key issues of the decision

Air Quality Assessment.

The operator submitted an Air Quality Assessment Report which evaluated any impact of increased production on the emissions from the site, including those relating to the proposed variation, under normal and abnormal operations on human health and ecological receptors.

The Report proposed that:

- exceedances of any Air Quality Standard (AQS)/Air Quality Objective (AQO)/Environmental Assessment Level (EAL) were unlikely at local receptors identified to protect human health
- no exceedances of the ambient pollution concentration and deposition levels were predicted at ecological receptors within the screening distances.

We have carried out a detailed audit of the data and conclusions in the operator's Air Quality Assessment Report and we conclude that:

- the proposed normal and abnormal operational scenarios, including increases in production capacity, are unlikely to make a significant contribution to, or cause an exceedance of, an environmental standard at human health receptors
- the proposed normal and abnormal operational scenarios are unlikely to make a significant contribution to, or cause an exceedance of, relevant critical levels or critical loads at ecological receptors.

Basis for Modelling Assessment.

The operator used meteorological data for 2017 - 2021 from Liverpool Airport located approximately 13.7km south-west of the facility. We agree that the meteorological conditions experienced at this location are likely to be representative of those receptor locations modelled.

The operator used background air concentrations from nearby automated monitoring stations and diffusion tubes managed by St. Helens District Borough Council alongside Pollution Climate Mapping modelled data from DEFRA and national monitoring networks. We have assessed these background concentrations and consider them to be representative or reasonably conservative for the area in which the facility is located.

The operator assessed predicted long-term and short-term impacts of emissions of the following pollutants at human health and/or ecological receptors as appropriate:

- oxides of nitrogen (NOx), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), Particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), Hydrogen chloride (HCl) and Hydrogen fluoride (HF)

- total metals including As, Co, Ni, Cd, Se, Cr (VI), Sb, Pb, Cr (III), Cu, Mn, V, Sn and their compounds
- phenol, formaldehyde, ammonia (NH_3) and volatile organic compounds (VOCs).

Three operational scenarios were assessed:

- current emissions from the facility
- emissions from the facility after implementation of the operational changes authorised by this permit variation
- an abnormal scenario for future emissions when the dry electrostatic precipitator abatement is not operational.

For the current and future scenarios, the operator modelled emission concentrations consistent with either the existing emission limit values (ELVs) in the current permit, or the BAT Associated Emission Levels (BAT-AELs) obtained from the 2012 BAT-conclusions for the Manufacture of Glass BREF.

The consultant used a concentration of 2 mg/Nm^3 to assess metal impacts for both the current and future scenarios. This total concentration included arsenic (As), cobalt (Co), nickel (Ni), cadmium (Cd), selenium (Se), chromium VI (Cr (VI)) and their compounds, antimony (Sb), lead (Pb), chromium III (Cr (III)), copper (Cu), manganese (Mn), vanadium (V) and tin (Sn). For all metals except Cr (VI), the consultant factored the predicted metal process contributions (PCs) using metal speciation percentages calculated from measured metal concentrations in dust samples from the dry electrostatic precipitator. For Cr (VI), the consultant factored the PC using the Cr (VI) metal percentage of the IED group 3 ELV in the Environment Agency waste incinerator Group 3 metal impact assessment guidance which we consider the most appropriate methodology with which to assess these emissions. In carrying out our checks, we applied the same assumptions as the consultant.

In the case of total volatile organic compounds (TVOCs), the operator assumed they were all emitted as benzene, representing a worst-case scenario, and assessed their emissions against the benzene environmental standards as outlined in Environment Agency risk assessment guidance for air emissions.

Human Health Receptors.

The facility is located in a semi-industrial, suburban area of St. Helens. The operator assessed predicted concentrations of pollutants at the 26 human health receptors. These included residential, educational and religious buildings. We assessed those locations and considered them reasonably representative of exposure – however, we also included a further 13 human health receptor locations in our detailed audit.

Ecological Receptors.

There are no Special Protection Areas (SPA), Special Areas of Conservation (SAC) or Ramsar sites within the 10km screening distance for European sites. Although the operator assessed only a 5km radius from the Knauf site, we have expanded that search to the 10km screening distance and agree that no sites are present in the wider screening distance. There are also no Sites of Special Scientific Interest (SSSI) within the designated screening distance for these sites.

The operator assessed impact at the designated Local Wildlife Sites (LWS) and Local Nature Reserves (LNR) within the designated 2km screening distance. We confirmed that they had included all relevant local nature sites, and we added some additional receptors representative of the nearest locations of exposure in our check assessment.

Results of Check Auditing of Modelling Report.

Human Health.

The operator's monthly HF, annual formaldehyde and 30-minute formaldehyde PCs are 1000 times lower than they should be, as they did not convert PCs from mg/m^3 to $\mu g/m^3$ before comparing against the relevant environmental standard. However, we have checked this at the correct conversion factors, and we are satisfied that the future scenario PCs for these pollutants are likely to be insignificant (<1% for Long Term or <10% for Short Term) or the Predicted Environmental Concentrations (PEC) are unlikely to exceed the environmental standard.

At the maximum impacted receptor, we predicted the abnormal scenario 24-hour 90.41st percentile of PM10 PEC to exceed the environmental standard when calculating the PEC with local monitored background data. The operator did choose the abnormal emission concentration for PM10 to be the monitored emission concentration for total particulate matter (rather than PM10 specifically). In addition, the PEC is likely to contain a degree of double-counting as the background concentrations include impacts from the existing facility. Using PM10 backgrounds predicted by Defra, we are satisfied that the PEC is unlikely to exceed the environmental standard.

For all other pollutants, we are satisfied that the maximum predicted future and abnormal scenario PCs are either insignificant (<1% for Long Term and <10% for Short Term) or the PECs are unlikely to exceed their relevant environmental standard.

Ecological.

We are satisfied that the maximum predicted annual NOx, daily NOx, annual SO_2, annual NH_3, daily HF and weekly HF process contributions are insignificant (<100%) against the relevant critical levels at all local nature sites.

We are also satisfied that the maximum predicted nutrient nitrogen and acid deposition process contributions are insignificant (<100%) against the relevant critical loads at all local nature sites.

Future operation.

We are satisfied that, although predicted maximum process contributions increase in future scenarios with the expected increase in manufacturing capacity of the LD product, this will not lead to any exceedances of relevant environmental standards, critical levels or critical loads.

Assessment of Aqueous Discharges.

The permit variation adds discharge point, W1, for aqueous releases into the on-site Ravenhead Dam. The operator noted that they had described this emission point in their original permit application in 2002, but this cannot be confirmed. W1 was never included in the permit issued on 05/02/2003 nor in any subsequent variation until this current variation. This is a surface water discharges from the newly added areas of land which will be used primarily for final product or raw material storage. The new land will neither be used for processing activities nor for storage of any hazardous substances. An improvement condition, IC21, is included in the permit variation notice requiring the operator to propose timescales for the installation of an oil/water separator on the route of the discharge to W1.

The site has a permitted sewer discharge, S1, for which there are no monitoring requirements or pollutant emission limit values in the existing permit. As the nature of this discharge will not change as a result of the process changes permitted by this variation, there is no change proposed in the regulation of discharges to S1.

When discharges have been made to sewer historically, this has been due to excess water in the system caused by a failure in wash water management, which led to additional clean water being added to the system, resulting in high levels in the wash water system that had to be removed by discharge to sewer. The modifications undertaken as part of the furnace rebuild are expected to prevent this from occurring in the future. For example, the old binder centrifuge has been replaced with three new centrifuges (in a duty-standby-spare arrangement).

Whilst the rebuilt furnace increases glass melting capacity, this will not result in a corresponding increase in the volume of effluent discharged. This is on the basis that:

- Improvements in the wash water system are anticipated to eliminate the need for discharges to sewer (as discussed above).

- The system is a net user of water, and the design basis is for closed loop operation, with the only emissions being evaporative losses via the stack.

- The wash water system should not be operated at full water capacity, allowing retention within the system. On a typical day, the wash water system has a working water volume of around 232 m^3, against a system capacity of 768 m^3, which includes the two wash water sedimentation pits provide up to 290 m^3 additional contingency for storage.

- Discharge to sewer is retained only as an option of last resort, in the highly unlikely case the two wash water sedimentation pits are both filled due to a failure of the system. Excess water would be discharged to sewer in accordance with the current Trade Effluent Consent.

In addition, the increase in melting capacity of the furnace will not cause an increase in any pollutant concentrations within the aqueous discharge to sewer.

This is because:

- The only foreseeable reason for a discharge of water to sewer is over-addition of clean water to the wash water system, due to a system failure, which would lead to a dilution of the pollutants within the system (as noted above).

- The most significant component of pollutants in the wash water are fibres and binder (which are non-hazardous). The fibre will continue to be removed by the drum screen (which has suitable capacity to treat all wash water) with the wash water then returned to the system to either produce the binder or be recycled for further washing.

We have included an improvement condition (IC23) requiring the operator to sample and analyse discharge to sewer when it occurs and, using the analytical data obtained, confirm the conclusion in the permit variation application that there would be no adverse impact on the receiving environment by using a risk assessment methodology such as the Environment Agency's H1 assessment tool (or equivalent).

Re-Definition of 'Abnormal Operation' for Wet Electrostatic Precipitator (WESP).

The previous permit defined 'abnormal operation' for the Wet Electrostatic Precipitator as *'a greater than 30% reduction in abatement capacity of the wet electrostatic precipitator*'.

This definition meant that the Operator believed they were required to notify the Environment Agency of events that would ordinarily not be regarded as abnormal.

The Operator originally proposed to change the definition of 'abnormal operation' for the Wet Electrostatic Precipitator to '*non-operation of the wet Electrostatic Precipitator*'.

This definition aligned with the approach taken for the dry Electrostatic Precipitator.

It reflected a review of analytical data that the Operator claimed confirmed emissions continued to be effectively abated while the facility operated in single sided mode as shown in Element Stack Testing Reports for the LD and HD WESPs undertaken in response to Improvement Condition 20 (IC20) on the V007 permit. They contended that operations undertaken within that definition of an abnormal event did not give rise to exceedances of emission limit values in the Environmental Permit or adverse environmental impacts.

At the time of duly making this application EPR/BQ4335IC/V009, the Area Regulatory Officer confirmed that IC20 (relating to abnormal operation from a previous definition) was not considered complete. This improvement condition is now referenced in the varied permit as ‘superceded by IC28’. This new improvement condition, IC28, requires the operator to assess impact using the new definition of abnormal operation for two circumstances – if the HD wet electrostatic precipitator is in abnormal mode for 7 consecutive days and if the HD wet precipitator is in abnormal mode for 20 days in a calendar year. Dependent on the predicted impact, the operator may have to carry out improvements or modifications to timescales they propose and are agreed by the Environment Agency.

During determination of the permit variation application, a further change was requested to the definition of ‘abnormal operation’.

The Operator noted that the capacity for diversion of all LD (low density) production flows to a single side of the LD WESP had now been removed. In the event one side of the WESP is non-operational, the associated forming fans will now cease to operate. On this basis, they advocated that the definition of abnormal operation outlined in Schedule 6 of the permit notice should be varied to refer only to the HD WESP.

To enable maintenance of the WESP, the Operator previously diverted the flow from all four forming fans, the curing ovens and cooling zones to the online side of the unit. Whilst they acknowledged there was an increase in emissions during these events, the single side of the WESP provided effective abatement of emissions, compliant with the emission limit values (ELVs) in the permit notice. Although these operations were scheduled and controlled, the definition of abnormal events specified in the permit required the Operator to notify the Environment Agency of these occurrences. Furthermore, previous permit (V007) specified the durations for which these conditions are permitted, in terms of a single continuous period and the total duration.

Under the new operating conditions, maintenance activities that require one side of the WESP to be removed from service will also require the three associated forming fans to also be taken offline, thereby halving the production throughput. The curing and cooling emissions would be automatically diverted to the operational side of the WESP.

This operating mode would produce a lower flow rate of glass (i.e. lower pollutant load) and lower extraction flowrate (i.e. higher residence time in the WESP) than the current single sided operation defined in Schedule 6 of the permit (V007) as ‘abnormal operation’ although this had previously been demonstrated to be effectively abated.

On the basis that it will no longer be possible for full production to continue when the WESP is operating with only one single side operating, the Operator requested that the definition of abnormal operation in Schedule 6 be amended to “*on the HD production line means a greater than 30% reduction in the abatement capacity of the wet Electrostatic Precipitator*”.

Schedule 6 of the permit has been varied to reflect this change.

In January 2026, KI informed the Environment Agency that they would be moth-balling the HD production line for ‘multiple years’, probably at least three years. During this time, only the LD line will operate. Therefore, as the definition of abnormal operation for the WESP now references the HD line, there will be no abnormal operation reported for the WESP whilst the HD line is moth balled. The existing abnormal operation definition and reporting requirements will continue for the Dry Electrostatic Precipitator.

Best Available Techniques (BAT)

The operator assessed their proposed operation against the BAT-conclusions for the Manufacture of Glass. Where the site operation was assessed as compliant against these BAT-conclusions in the permit review process that resulted in issue of variation notice EPR/BQ4335IC/V007 in 2015 and that operation was not changing as a result of this current variation, then it was agreed with the operator that they would remain in compliance with those BAT-conclusions.

General BAT conclusions for manufacture of glass (BAT1 - BAT15).

BAT 1: BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the named features.

Compliant: Certified EMS in place which incorporates all the requirements of BAT1.

BAT2: BAT is to reduce the specific energy consumption by using one or a combination of named techniques.

Compliant: KI operate a monitoring and management system to control the furnace and downstream processes with the ability to manipulate operating parameters to manage energy efficiency. Named techniques (i), (ii) and (v), deemed compliant at permit review, are still applied at the site and the approach to their implementation has not changed because of this variation.

BAT3: BAT is to prevent, or where that is not practicable, to reduce diffuse dust emissions from the storage and handling of solid materials by using one or a combination of named techniques.

Compliant: All solid materials will be stored within designated storage areas at the site that have been accepted as compliant with BAT at previous permit review. The additional land being added to the installation boundary as a result of this permit variation could be used for the storage of (pre-cleaned) cullet to provide buffer stock against future demand. While the cullet is not considered to be a dusty material, it will be stored under cover in accordance with BATc 3 1(iii). The current arrangements for the handling and transfer of cullet, that have been accepted as compliant with BAT at previous permit review, will be extended to these areas (when used).

There will be two additional batch feeders to transport batched raw materials from the existing batch plant to the melting furnace. Two enclosed screw conveyors will be used for this purpose in line with BATc 3 2(vii).

BAT4: BAT is to prevent, or where that is not practicable, to reduce diffuse gaseous emissions from the storage and handling of volatile raw materials by using one or a combination of named techniques.

Compliant: KI operation is compliant with the following named techniques whilst other named techniques are not applicable to the KI operation.

(i) All storage tanks are either within buildings or internally bunded via a double skin system, painted with reflective paint or unpainted galvanised steel that will minimise loss of material due to solar radiation.

(iv) Inventory management carried out by propriety software-controlled system for minimum order volume.

(vi) Vapour return line is installed on the ammonia tank.

(viii) Pressure/Vacuum valve installed on the ammonia tank.

BAT5: BAT is to reduce energy consumption and emissions to air by carrying out a constant monitoring of the operational parameters and a programmed maintenance of the melting furnace.

Compliant: KI monitors furnace operational parameters and has a maintenance programme to maintain furnace performance.

BAT6: BAT is to carry out a careful selection and control of all substances and raw materials entering the melting furnace in order to reduce or prevent emissions to air by using one or a combination of named techniques.

Compliant: The project constituting this current permit variation does not materially alter the approach to compliance with BAT demonstrated at permit review. The composition of cullet and any other raw materials entering the rebuilt furnace will not change.

BAT7: BAT is to carry out monitoring of emissions and/or other relevant process parameters on a regular basis, including named techniques.

Compliant: The project constituting this current permit variation will not materially alter the approach to complying with BAT7 demonstrated at permit review on the basis the emissions inventory will not require reconsideration or require a change to monitoring arrangements.

(i) & (ii) Operational parameters are continually monitored for air flow, electrical current and raw material loading rate. Furnace temperature and CEMS data for particulates, CO, NOx and SOx are constantly monitored via SCADA linked system.

(iii) Continuous emissions monitoring (CEMS) is fitted on the furnace stack for particulates, CO, NOx and SOx. This is in addition to half yearly MCERTS monitoring as required by the permit. For other release points included in the permit, half yearly or yearly monitoring is undertaken as required by the permit. For other release points, surrogate parameters such as water jet impinger flows, which are alarmed at a pre-set flow limit, electrostatic precipitator fan speed/current, electrostatic precipitator unit voltages and pressure drop across filters, etc, are used to indicate the correct operation of the relevant abatement systems. Failure of such critical systems would alarm in the relevant control room.

(iv) Not applicable to KI as neither SCR nor SNCR techniques are employed.

(v) CO is monitored through CEMS and half yearly MCERTS tests as required by the permit.

(vi) Emissions are routinely tested using an MCERTs test team twice per year apart from metals which are tested annually

(vii) For such release points, surrogate parameters such as electrostatic precipitator fan speed/current and electrostatic precipitator unit voltages are used to indicate the correct operation of the dry electrostatic precipitator (EP) abatement systems. Failure of such critical systems would alarm in the relevant control room.

BAT8: BAT is to operate the waste gas treatment systems during normal operating conditions at optimal capacity and availability in order to prevent or reduce emissions.

Compliant: The Project will not materially alter the approach to compliance previously accepted by the Environment Agency at permit review.

The waste gas treatment systems, abating the pollutant loadings from the melting furnace and low density production line, will operate closer to their design capacity (optimal capacity) as a result of the increased throughput resulting from the larger rebuilt furnace and ancillary systems.

In the case of the LD production line, the flow through the WESP on the LD Production line will be increased from typically 304,000 (average monitored result 2019-2022) Nm^3/h by 58% to 480,000 Nm^3/h with the stack emission velocity increased to 12.3 m/s. When the WESP was initially installed, it was oversized to allow for future expansion, and increased flows will be within rated design capacity of the WESP and closer to its design capacity to better facilitate reduction in emissions.

In the case of the dry electrostatic precipitator abating emissions from the rebuilt furnace, flow will be variable depending on utilisation of the furnace and percent usage of cullet. Greater cullet usage will lead to lower flows and velocities in furnace abatement, the worst case is 50% cullet but this is not a normal operational mode. In the worst case, flows from the melting furnace will be increased from typically 24,188 (average monitored result 2020-2022) Nm^3/h by 38% to 30,800 Nm^3/h (dry) with the stack emission velocity increased to 18.2 m/s. When the Dry EP was initially installed, it was oversized to allow for future expansion, and the increased flows are within the rated design capacity of the Dry EP and again closer to its design capacity to better facilitate reduction in emissions.

BAT9: BAT is to limit carbon monoxide (CO) emissions from the melting furnace, when applying primary techniques or chemical reduction by fuel, for the reduction of NOx emissions.

Compliant: The project constituting this current permit variation will implement the same approach i.e. low NOx burners with an oxy-gas fuel source, with electrical boost as is currently carried out on site. KI is confident that this arrangement and type of burner provided the best available NOx control for technologies which are currently proven in the glass wool application.

The electrical booster heating available will be increased as part of the project to allow better control of furnace temperature and NOx emissions.

BAT10: BAT is to limit ammonia (NH_3) emissions, when applying selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) techniques for a high efficiency NOx emissions reduction.

Not Applicable: Neither SCR nor SNCR are used at KI site.

BAT11: BAT is to reduce boron emissions from the melting furnace, when boron compounds are used in the batch formulation, by using one or a combination of named techniques.

Compliant: The named techniques within BAT11 are use of a filtration system at suitable temperature; use of dry or semi-dry scrubbing or use of wet scrubbing. The operator will continue to utilise the existing dry electrostatic precipitator which has been accepted by the Environment Agency at previous permit review as a filtration system that effectively abates particulate phase boron within suitable temperature parameters. The operator has also completed a previous Improvement Condition (IC19) and submitted this to the EA to demonstrate the techniques applied on site are BAT for the reduction of boron emissions from the furnace. We have accepted this.

The operator has defined that the rebuilt furnace has an equivalent specific melting rate (calculated as the production capacity of the furnace divided by the surface area of the melter) as the existing unit. This melt rate is strongly correlated to dust concentration in the exhaust gases (of which boron is a component), such that the initial concentration of pollutants in the exhaust gases will be no higher than the existing furnace.

The operator noted that use of Borax (synthetic sodium borate) is attributable for releases of boron to atmosphere. They noted that the BREF Note for Manufacture of Glass acknowledges the effectiveness of Borax in reducing the glass expansion co-efficient and its reliability at changing viscosity and liquidity in fibres to enhance fiberisation and water resistance of the product. The BREF Note also acknowledges boron emissions may constitute 85-90% of dust emissions. The operator has reviewed performance of their dry EP and confirmed that between 0.001% - 0.22% of boron added to the process was released as particulate. Of the dust captured by the dry EP, 33-45% of the dust by mass is boron.

See further comments below on the use of existing abatement systems within the rebuilt larger melting furnace.

BAT12: BAT is to reduce water consumption by using one or a combination of named techniques.

Compliant: The project constituting this current permit variation does not propose to change the operating techniques for the water systems on site, but these will be partially expanded to accommodate additional cooling and wash water flows.

The extension of the wash water system includes an additional water return sump, solids removal system and water storage tank (30m³). Upgraded dewatering screws are installed to the new and existing parts of the wash water system to decrease water content in the waste materials and recycle this water into the closed loop system. With the exception of the dewatering screws, which are an improvement, the same techniques will be applied as previously assessed as BAT in the previous permit review process.

The cooling water system is extended using the same techniques as the existing system to provide additional flows to the expanded melting furnace and additional fiberisers.

The site water systems which were previously accepted as BAT at permit review process, operate using a cascade approach where water is continually cleaned and reused sequentially for tasks requiring a lower grade of water. The systems are essentially closed loop systems, except for the loss of wash water via the WESP stacks (A2 and A4) and cooling water via the cooling towers. Other than the improved dewatering described above, the operator does not consider it technically feasible to increase reuse of water.

KI operates an inspection and maintenance system which ensures leaks or spills from the system are minimised through a combination of proactive and reactive operations.

BAT13: BAT is to reduce the emission load of pollutants in the waste water discharges by using one or a combination of named waste water treatment systems.

Compliant: The project constituting this current permit variation will not generate wastewater for release to environment, nor will it require modification of current arrangements for management of waste water. There will be no increases in discharges of trade effluent (volume or composition).

BAT14: BAT is to reduce the production of solid waste to be disposed of by using one or a combination of named techniques.

Compliant: The project constituting this current permit variation will lead to a slight increase in solid waste in line with increased glass wool production. It will not create any significant new waste streams. It will not change arrangements for the management of solid waste, that have been accepted as BAT at previous permit review.

BAT15: BAT is to reduce noise emissions by using one or a combination of named techniques.

Compliant: Noise rating of all equipment is included within the specification for procurement. The majority of the changes represent upgrades or expansion of existing equipment. However, it is accepted that the equipment will have a larger capacity and may be located closer to residential receptors. Although there will be an increase in vehicle movements and material handling, loading and operational hours for noisy activities will not change.

KI have carried out a Noise Impact Assessment and proposed that the noise experienced at off-site receptors will remain acceptable.

We have audited that Assessment and agree with its conclusions in relation to the changes being permitted in this variation application (see separate section of this document on noise).

BAT conclusions for container glass manufacturing (BAT16 - BAT23) – Not Applicable.

BAT conclusions for flat glass manufacturing (BAT24 - BAT31)- Not Applicable.

BAT conclusions for continuous filament glass fibre (BAT32 - BAT37) – Not Applicable.

BAT conclusions for domestic glass manufacturing (BAT38 - BAT47) – Not Applicable.

BAT conclusions for special glass manufacturing (BAT48 - BAT55) – Not Applicable.

BAT conclusions for mineral wool manufacturing (BAT56 – BAT63).

BAT56: BAT is to reduce dust emissions from the waste gases of the melting furnace by applying an electrostatic precipitator (EP) or a bag filter system.

Compliant: KI will continue to abate emissions using a Dry EP. KI engineering calculations have confirmed predicted future flows, and pollutant loads from the melting furnace are within the rated design capacity of the Dry EP and will therefore be operated in optimal conditions. KI will not change the current Dry EP installed to abate emissions from the furnace.

BAT57: BAT is to reduce NOx emissions from the melting furnace by using one or a combination of named techniques.

Compliant: As the melting furnace was being entirely rebuilt, the operator considered compliance with this BAT-conclusion as requiring a more detailed justification.

The operator justifies that reduction of NOx is best achieved by the use of low-NOx type oxy-gas burners (BAT57e). Based upon the experience of the operator from several glass plants operated in Europe regulated by the Industrial Emissions Directive, they have selected the Eclipse Primefire 400 burners as the most suitable burners for this current application. Their due diligence has confirmed these burners provide the best control over NOx generation through the use of partial gas cracking to increase flame luminosity and heat transfer and reduce flame temperature. They also utilise a flat flame geometry to promote heat transfer without increasing flame temperature (and therefore thermal NOx).

They note that BAT57(ii) does define electric melting as not applicable to large volume glass production as will be the case at the St. Helens site. They also state that it is not appropriate for furnaces with high turndown which also applies at the St. Helens site. They will however include electrical boost heating within the furnace design. These electrical heating elements will be present at a low level in the furnace and will be utilised to ensure a more even heat distribution as the oxy-gas burners and refractory largely apply heat to the surface of the molten glass. This should reduce further the direct emissions from the furnace.

They confirm that BAT57(iii) is applicable as the burner will use an oxy-gas fuel.

They also note that the rebuild project will provide a new furnace with improved integrity over the current system. There are currently some areas of air ingress in the existing furnace which lead to NOx generation, and these will be removed as part of the rebuild.

On the basis that they utilise oxy-gas fuel for combustion in low NOx burners, supported by electrical boost heating, then they are compliant with BAT57.

We are satisfied that this demonstrates BAT57 compliance.

BAT58: BAT is to reduce NOx emissions by using one or a combination of named techniques when nitrates are used in the batch formulation for glass wool production.

Not Applicable: Nitrates are not added to batch formulations.

BAT59: BAT is to reduce SOx emissions from the melting furnace by using one or a combination of named techniques.

Compliant: As the melting furnace was being entirely rebuilt, the operator considered compliance with this BAT-conclusion as requiring a more detailed justification.

(i) The batch formulation is not changed by the new project so is still considered as BAT as there is no change from the previously agreed approach to BAT.

(ii) The rebuilt furnace will continue to be fuelled by natural gas and oxygen which have an inherent low sulphur content.

(iii) Dry electrostatic precipitation is used to abate the emissions from the furnace.

(iv) Wet scrubbing is not employed to abate emissions from the furnace. Over the previous three years, the highest SOx emission monitored (expressed as SO_2) was 6.09 mg/m^3 against a permitted emission limit value of $150mg/m^3$. Air dispersion modelling has also screened out emissions of SOx as not causing adverse impact on either human health or ecological receptors.

On the basis that the batch formulation has not changed substantially, the same low sulphur fuels will be used and the same effective air abatement (dry electrostatic precipitator) will be used to abate the furnace emissions, it is considered that the operator meets BAT and no implementation of BAT 59(iv) is required.

BAT60: BAT is to reduce HCl and HF emissions from the melting furnace by using one or a combination of named techniques.

Compliant: KI does not propose to change the approach to compliance with BAT60 accepted as meeting BAT in the permit review namely that the batch formulation has low chlorine/fluorine content as no salts added and the existing dry electrostatic precipitator is applied to the furnace exhaust emissions in accordance with BAT60(ii).

BAT61: BAT is to reduce H_2S emissions from the melting furnace by applying a waste gas incineration system to oxidise hydrogen sulphide to SO_2.

Not Applicable: Not relevant to the operation of KI glass wool facility.

BAT62: BAT is to reduce metal emissions from the melting furnace by using one or a combination of named techniques.

Compliant: KI does not propose to change the approach to compliance with BAT62 accepted as meeting BAT in the permit review. i.e. that KI has an external cullet specification that includes metal content and quality control of the feedstock is monitored through the Quality Management System and that the dry EP is applied to furnace exhaust emissions and will reduce all particulates including metals.

BAT63: BAT is to reduce emissions from downstream processes by using one or a combination of named techniques.

Compliant: The permitted variation does not propose to change the approach to compliance with BATc 63 as presented and accepted by the Environment Agency in the previous permit review process.

(i) The emissions captured from the downstream processes are abated using a minimum of multiple impact jets and cyclones and wet electrostatic precipitators. The blowing wool line uses a combination of impact jets, drop out boxes and cyclones The process water from the impact jets is recycled.

(ii) Not applicable

(iii) The emissions from the low density and high density fibre lines are abated using impact jets, cyclones and wet electrostatic precipitators.

(iv) & (v) Neither are used at KI.

As the facility emissions monitoring has shown that the facility can meet the existing permitted limits, and the abatement systems have the capacity to treat any increases in throughput or pollutant concentration, the facility is still considered to meet BAT63.

BAT64 - BAT70 (conclusions for high temperature insulation wool) – Not Applicable

BAT71 - BAT76 (conclusions for frits manufacture) – Not Applicable.

Use of existing abatement systems within the rebuilt larger melting furnace.

The operator intends to utilise the existing abatement systems for off-gases from the melting furnace although the rebuilt furnace will be larger with an increased glass wool production capacity and potentially increased throughput of gases into the abatement system.

They have submitted evidence to demonstrate that the existing abatement systems have capacity to handle increased gas flows with potentially increased pollutant loadings.

Dry Electrostatic Precipitator.

The existing dry electrostatic precipitator has a design flow capacity of 56,000Am^3/hour within an operating temperature range of 170 - 250^{0}C. the technical design parameters for the unit specify a particulate removal efficiency of about 92% to provide effective abatement and comply with existing emission limit values.

The design basis for the rebuilt melting furnace indicates that the expected gaseous flowrate will be 54,600Am^3/hour at 240^{0}C which is within the design capacity of the existing dry electrostatic precipitator.

The operator has evaluated emissions data from 2019-2021 to confirm the operation of the dry electrostatic precipitator and to determine if any modifications were required to the abatement system as a result of the new rebuilt furnace. This review showed that the dry electrostatic precipitator had been operating at flows of 35,266 – 50,212Am^3/hour and temperatures of 226 – 248^{0}C.

The flow rate through the dry EP is dependent on a number of factors including the volume of cooling air applied and the proportion of cullet processed.

Wet Electrostatic Precipitator (WESP) (Low Density Line).

This production line previously operated with up to 4 forming fans and a valve was used to divert the flow from the fans across the two sides of the WESP or to a single side. The operator has reviewed the design basis of the WESP to confirm if changes to its infrastructure or operating techniques were required as part of the LD line expansion.

The expanded LD line will have two additional forming fans (now six in total) when run at full capacity. Three forming fans will be routed to each side of the WESP. The diversion valve will be removed to prevent backflow and the associated safety hazard. The modified configuration will now ensure that in the event one side of the WESP is offline:

- The associated forming fans will be shutdown.
- The curing oven and cooling zone extraction flows will be automatically diverted to the online side of the WESP if these are required to operate.

In this event, the cooling and curing demand will be greatly decreased as only half of the LD production (forming) capacity be available.

The future production capacity of the LD line will be 8500 kg/h with a flowrate through the WESP (both sides combined) of 555,000 Am³/h with six forming fans in operation. This is equivalent to a capacity of 4,250 kg/h and flow of 277,500 m³/h abated per side of the WESP.

In order to assess the effectiveness of the LD WESP, the operator undertook a trial to confirm whether it will have sufficient spare abatement capacity to effectively abate emissions under the rebuilt conditions. The trial used four forming fans operating via a single side of the LD WESP to extract 299,549 m³/h with capacity of 5660 kg/h. This is a higher production rate and higher extraction flowrate than will be required under the rebuilt operating case.

During the trial, a total particulate matter concentration of 7.6 mg/m³ was monitored. This is significantly below the ELV of 30 mg/m³ for emission point A4.

As the test conditions were more onerous than the proposed operating basis, the operator concluded that the existing LD WESP in conjunction with primary and secondary abatement systems will effectively abate emissions released via emission point A4 to enable ongoing compliance with the BAT AEL and the ELV.

Noise

The facility does have many noise sensitive receptors (NSRs) in close proximity to the site – houses in Factory Row and Ravenhead Road are within 30m to the south of the site and there is a large area of housing to the northeast of the site called The Shires.

The operator has submitted a Noise Impact Assessment (NIA) and Noise Management Plan (NMP) which we have audited.

The original noise measurements that supported the NIA were carried out with the existing KI site operational and hence contributing to the background noise levels. Environment Agency guidance, “Noise and vibration management: environmental permits”, states that “*When considering overall site impact, you must make sure background sound levels at NSRs are not influenced by site noise*”.

As the site was later to shut down whilst the new furnace was installed, we agreed to allow the operator to carry out noise monitoring when the plant was off-line and hence not contributing to background noise levels. Despite much liaison with the operator during this process, the noise monitoring and potential choice of alternative monitoring locations remained less than perfect to satisfy fully the requirements of our guidance and BS4142:2014+A1:2019, “Methods for rating and assessing industrial and commercial sound’ to quantify the level of environmental noise impact from industrial processes”.

However, we were of the view that we had sufficient information to undertake a BS 4142 assessment to progress the variation to the environmental permit. Due to this approach, we have made certain assumptions regarding source sound levels, acoustic feature corrections and context to assess the impact. We have audited the revised NIA and agree that these deficiencies in the methodology are not sufficient to cast doubt on the conclusions we derived from our audit of the NIA submitted. Our audit of the NIA indicated that, although the overall site operation had a potential to cause 'significant adverse' noise, this noise had not been increased by any of the changes made as part of this current permit variation application. We accept that the noise impacts from the site changes as a result of this permit variation are acceptable provided the site is working to Best Available Techniques (BAT) for noise within these changes.

Noise measurements were undertaken at Factory Row and used as a proxy location for Ravenhead Road, while a proxy location on the Knauf site was used for measurement of the background sound level at The Shires. High background sound levels were noted at Factory Row whilst the site was shut down for production. This was due to the fact that, during the shutdown, generators were located near to Factory Row to provide power to temporary portacabins set up during the works period. Due to these extraneous noise source, measurements undertaken at Factory Row have been discounted. For background sound levels, we have used measurements undertaken for The Shires as a proxy location due to the operator not providing suitable alternative data. This does lead to some uncertainty in the assessment. It is our opinion this uncertainty is unlikely to change the outcome of our audit due the high specific sound levels from existing operations at the Knauf site.

Based on the data provided, it is our opinion that prior to the operation of the plant that forms the current permit variation, a numerically high significant adverse impact was occurring at Factory Row, Ravenhead Road and adverse impacts occurring at The Shires. At Factory Row and Ravenhead Road, a rating level of LAr,Tr +15 dB is calculated and at The Shires, a rating level of LAr,Tr +9 dB is calculated.

Based on measurements post-implementation of changes forming the variation, no change in the numerically significant adverse impact is noted at Factory Row and Ravenshead Road. At The Shires, an adverse impact is calculated, but there is a level of uncertainty in this outcome due to method of data collection undertaken by the consultant.

We compared the measured specific sound levels post-variation against the calculated specific sound level of the variation changes only. At Factory Row and Ravenhead Road, no significant increase was seen due to the variation. At The Shires, operation of the plant as part of the variation could be contributing 1 dB to the specific sound level measured. It should be noted that there is uncertainty in this outcome due to noise levels being measured at a proxy location on the site. We undertook distance attenuation calculations to calculate a level at NSRs at The Shires which has used assumptions based on the data provided.

During the determination of the permit variation application, the operator and the Environment Agency Area regulatory team received a number of complaints from local residents over the amount of noise they were experiencing from the existing facility. No representations on noise were received as part of the variation application – relating to the changes proposed.

The complaints received by the local Environment Agency Area regulatory team relate to the existing site operation, rather than the changed operation applied for within this variation.

It is our view that they are not caused by any change being permitted in this variation application.

These complaints appear to result from operations on the HD side of the process which were not changing as a result of this variation, V009.

We are aware of the operator's proposal to implement changes to the HD production line at the existing facility (not linked to this variation) with the aim to address noise issues raised within the complaints.

We have included an improvement condition, IC22, to require the Operator to update their Noise Management Plan taking into account the findings of their updated NIA for this variation application, any ongoing process and operational changes as a result of the ongoing dialogue with the Environment Agency on the cause of and mitigation against external complaints and the new processing envelope should the operator implement the changes to the HD line that they have proposed.

Addition of new land to the Installation boundary.

The Operator applied to add a newly acquired area of land to the north of the site to the Installation boundary. This land would primarily be used for storage of finished product but may also be used for storage of cullet (recycled glass to be fed into the melting furnace) and for temporary parking of heavy goods vehicles accessing that area. It will not be used for the storage of hazardous materials.

The new area is designated within the green boundary with the existing installation defined within the red boundary.

Because of the risk of fuel or oil spills from these vehicles being directed through site drains to the new release point into Ravenhead Dam, W1, we have included an improvement condition, IC21, to propose installation of an oil/water separator (as discussed earlier).

During the determination, the Operator applied to add a further small area of land adjacent to Alexandra Lake to the installation boundary – an area shown to the west of the drawing below:

Although the site plan included in Schedule 7 appears not to include the sliver of land close to Alexandra Lake, the operator has confirmed on 05/03/2026 that this site installation boundary is correct.

We have included a series of improvement conditions, IC24 – 27, requiring the Operator to carry out further assessment of the pollution potential in these new areas including completion of a Stage 1-3 Assessment in line with the EC Commission Guidance concerning baseline reports (2014/C 136/03) dated 6th May 2016, the designation of any further baseline monitoring required and the updating of a consolidated Site Condition Report to address all the findings of these improvement conditions.

We have included these requirements as improvement conditions rather than pre-operational conditions which must be implemented before use of the new land because the operator has a history of completion of improvement conditions and because the new land is proposed for use as storage of final product and cullet which Environment Agency Area Regulation officers could take enforcement action to prevent should these improvement conditions not be completed.

Decision considerations

Confidential information

A claim for commercial or industrial confidentiality has not been made.

The decision was taken in accordance with our guidance on confidentiality.

Identifying confidential information

We have not identified information provided as part of the application that we consider to be confidential.

The decision was taken in accordance with our guidance on confidentiality.

Consultation

The consultation requirements were identified in accordance with the Environmental Permitting (England and Wales) Regulations (2016) and our public participation statement.

The application was publicised on the GOV.UK website.

We consulted the following organisations:

- St. Helens Borough Council Environmental Health Department.
- St. Helens Borough Council Planning Department.
- Health and Safety Executive (HSE).
- United Kingdon Health Security Agency (UKHSA).

The comments and our responses are summarised in the consultation responses section.

The regulated facility

We considered the extent and nature of the facility at the site in accordance with RGN2 ‘Understanding the meaning of regulated facility’, Appendix 2 of RGN2 ‘Defining the scope of the installation’ and, Appendix 1 of RGN 2 ‘Interpretation of Schedule 1’.

The operator has provided the grid reference for the emission point from the medium combustion plant.

The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.

The site

The operator has provided a plan which we consider to be satisfactory.

These show the extent of the site of the facility.

The plan is included in the permit.

Site condition report

The operator has provided a description of the condition of the site, which we consider is satisfactory. The decision was taken in accordance with our guidance on site condition reports.

We have included an Improvement Condition, IC27, requiring the operator to consolidate the site condition report submitted for the addition of new land to the permit boundary in this variation application within the overall Site Condition Report for the site itself. This is to ensure that there is only one Site Condition Report that encompasses all the permitted site.

Nature conservation, landscape, heritage and protected species and habitat designations

We have checked the location of the application to assess if it is within the screening distances we consider relevant for impacts on nature conservation, landscape, heritage and protected species and habitat designations. The application is within our screening distances for these designations.

The site is not within the screening distance for any Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar site, Site of Special Scientific Interest (SSSI) or Marine Conservation Zone (MCZ). It is within the screening distances for several Local Nature Reserves (LNR) and Local Wildlife Sites (LWS).

We have assessed the application and its potential to affect sites of nature conservation, landscape, heritage and protected species and habitat designations identified in the nature conservation screening report as part of the permitting process.

We consider that the application will not affect any site of nature conservation, landscape and heritage, and/or protected species or habitats identified.

We have not consulted Natural England.

The decision was taken in accordance with our guidance.

Environmental risk

We have reviewed the operator's assessment of the environmental risk from the facility.

The operator’s risk assessment is satisfactory.

General operating techniques

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility.

The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.

Operating techniques for emissions that screen out as insignificant

Emissions of the following pollutants have been screened out as insignificant following air dispersion modelling and so we agree that the applicant's proposed techniques are Best Available Techniques (BAT) for the installation.

- oxides of nitrogen (NOx), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), Particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), Hydrogen chloride (HCl) and Hydrogen fluoride (HF)
- total metals including As, Co, Ni, Cd, Se, Cr (VI), Sb, Pb, Cr (III), Cu, Mn, V, Sn and their compounds

We consider that the emission limits included in the installation permit reflect the BAT for the sector.

National Air Pollution Control Programme

We have considered the National Air Pollution Control Programme as required by the National Emissions Ceilings Regulations 2018. By setting emission limit values in line with technical guidance, we are minimising emissions to air. This will aid the delivery of national air quality targets. We do not consider that we need to include any additional conditions in this permit.

Noise and vibration management

We have reviewed the noise and vibration management plan in accordance with our guidance on noise assessment and control.

Because of on-going changes to plant operation, such as the moth-balling of the HD production line, and on-going noise impact assessments as a result of the Operator's response to off-site noise complaints, we have included an improvement condition, IC22, for the Operator to submit an updated noise and vibration management plan to incorporate all the process changes and their impact on the management of site noise and vibration.

The applicant should keep the plans under constant review and revise them annually or if necessary, sooner if there have been complaints arising from operations on site or if circumstances change. This is in accordance with our guidance 'Control and monitor emissions for your environmental permit'.

Updating permit conditions during consolidation

We have updated permit conditions to those in the current generic permit template as part of permit consolidation. The conditions will provide the same level of protection as those in the previous permit.

Changes to the permit conditions due to an Environment Agency initiated variation

We have varied the permit as stated in the variation notice.

We have carried out an Environment Agency initiated variation to incorporate the requirements of the Medium Combustion Plant Directive in relation to new directly associated activity, AR7, the use of a 1.371MW gas oil-fired back- up generator.

The medium combustion plant will operate as a limited hours operating plant and has been permitted accordingly. It will supply electrical power in the event of a site power supply failure.

A second boiler is rated at 0.513MW and is not regulated as a medium combustion plant.

We have also made an Environment Agency initiated variation to update the permit to the current template.

Raw materials

We have specified limits and controls on the use of raw materials and fuels.

Improvement programme

Based on the information on the application, we consider that we need to include an improvement programme.

See the Key Issues section for further information on the new Improvement Conditions included in the permit variation notice.

Emission limits

Emission Limit Values (ELVs) have been added for the following substances:

- Oil in newly permitted internal discharge W1.

This ELV has been included in order to ensure that the discharge to W1 remains uncontaminated surface water from the newly permitted land being used for only final product and raw material storage.

We have included an ELV of 5mg/l oil in discharge to W1 to be consistent with the oil ELVs on existing permitted discharges to W2 – W5.

Monitoring

We have decided that monitoring should be added for the following parameters, using the methods detailed and to the frequencies specified:

- Monthly monitoring of oil in newly permitted internal discharge, W1.

These monitoring requirements have been included in order to ensure that the discharge to W1 remains uncontaminated surface water from the newly permitted land being used for only final product and raw material storage.

We have included monthly monitoring of oil in discharge to W1 to be consistent with the monitoring requirements for oil on existing permitted discharges to W2 – W5.

Reporting

We have added reporting in the permit for the following parameters:

- Reporting every three months on the oil content in newly permitted internal discharge W1.

We made this decision on reporting of the monitoring of oil in W1 to be consistent with the reporting requirements for monitoring oil in existing permitted discharges, W2 – W5.

Management system

We are not aware of any reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.

The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.

Growth duty

We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit variation.

Paragraph 1.3 of the guidance says:

“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”

We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.

We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.

Consultation Responses

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public and the way in which we have considered these in the determination process.

Responses from organisations listed in the consultation section

Response received from: **UKHSA**.

Brief summary of issues raised: The consultee noted that the main emissions of potential concern were point source emissions released to air from stacks on site. They stated that reducing public exposure to non-threshold pollutants, such as particulate matter, below air quality standards had public health benefits and they supported the minimisation and mitigation of these releases.

They asked that the Environment Agency consider:

(i) Whether, as it appeared the PEC of AQALs for arsenic, chromium VI, manganese, nickel, and $PM_{2.5}$ were above the EAs guidance value of 70%, the EA would wish to address this with the applicant and determine if further assessment of these pollutants is required.

(ii) As, in the air quality assessment it appeared the process contributions (PC) of AQAL values had been calculated using existing concentrations rather than proposed concentrations and therefore was representative of existing emissions rather than proposed ones, the EA would wish to enquire with the applicant around this as they believed the PCs could not be used to assess air quality impacts for the proposed variation as they stand.

(iii) Whether there would be point source emissions to water requiring assessment because, although the applicant outlined that the modifications will not give rise to any new regulated releases of trade effluent to surface water, they also referred to monthly monitoring of surface water run-off to meet the emission limit value of 5mg/l for oil. The consultee was unclear if this is part of the variation or the pre-existing permit or from where surface run-off containing hydrocarbons was coming.

(iv) In the applicant's accident scenario assessment, they provided information regarding hazards, risk mitigation, probability, effect, and overall risk. The applicant in some places on the accident scenario assessment had listed exposure probability, effect, and overall risk as "none" for some items which was inconsistent with other entries. The consultee was unclear why this was or what this meant in relation to other scenarios and suggested that the EA may wish to clarify this with the applicant.

Summary of actions taken:

(i) We have subjected the applicant's air dispersion report to a detailed audit, and we are satisfied that the proposed normal and abnormal operational scenarios are unlikely to make a significant contribution to, or cause an exceedance of, an environmental

standard at human health receptors. No further assessment of these pollutants is required.

(ii) The modelling report uses either existing emission limit values or BAT-AEL standards as the emission concentrations to be assessed of the pollutants concerned. As these emission limit values or BAT-AELs are not being reduced in the varied permit, they continue to represent a worst-case scenario of pollutant emissions.

(iii) There are existing discharges into on-site Ravenhead Dam defined as W2 – W5. These are surface water discharges from storage areas, roadways and drains (W2, W4, W5) or from cullet quench water (W3) and these are not changing because of the current variation application. The new aqueous discharge to Ravenhead Dam permitted in the current variation application is W1 and it is the surface water run-off from the new land being added to the installation boundary for material storage. There will be no processing activities carried out in this new area of land and no process effluent that can be discharged through W1. As there is the potential for heavy goods delivery vehicles accessing the new area, there is a potential for leaks of diesel or oil – hence the inclusion of the improvement condition requiring an oil/water separator to be added to the discharge route to W1 and the oil emission limit value. That emission limit value does not indicate that oil is expected to be discharged through W1, and it replicates the existing oil emission limit values on W2 – W5.

(iv) We are satisfied that the applicant has appropriately assessed risk from the activities they will be carrying out and the risk methodology adopted is appropriately robust and consistent.