Cyfoeth Naturiol Cymru
Natural Resources Wales

Natural Resources Wales permitting decisions

Knauf Insulation Ltd, Queensferry Mineral Fibres Works

Contents

Substantial Variation of existing permit

The variation number is: **EPR/BR9383ID**

The operator is: **Knauf Insulation Limited**

The Installation is located at: **Queensferry Mineral Fibre Works, Chemistry Lane, Deeside, Flintshire, CH5 2DA**

We are minded to issue the variation for Queensferry Mineral Fibre Works operated by Knauf Insulation Limited.

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:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

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

Key issues of the decision

Receipt of application

What the application is for

The site is proposing to increase the nominal width of its production line from 1.8 metres to 2 metres which will allow the manufacture of other products primarily to Germany and other European Markets. This will be achieved by modifying the blanket forming process, and subsequent process steps to accommodate the wider product.

The curing zone will be refurbished with new seals to minimise leakages around the blanket. Following curing, the new products need to be sanded to remove marks. As a result, a grinding machine will be installed between the foil facing equipment and the band saw. This will require the curing zone conveyer to be shortened. A larger fan and revised extraction configuration will be installed to offset the effect of the shortened conveyor. The typical volume of extracted air may increase from approximately 15,000 m^3/hr to 30,000 m^3/hr. The new cooling zone fan speed will be adjusted automatically to a pre-set speed based on the curing oven speed. Air below the mat at the exit of the cooling zone will be controlled to ensure it is less than 40°C. There is an alarm if the temperature of the air below the slab exceeds 40°C and the operators have the ability to manually control cooling if they detect insufficient cooling.

Dust from the grinder will be handled by the existing dust extraction system that treats air from the toothed saw and cross cut saw units, however the capacity of the filtration system will be increased slightly. The use of bag filters means that there will be no significant change to the way dust generated in the process is handled. The filter extension will include 96 extra bags capable of achieving emissions of less than 10mg/m^3. The existing dust extraction system re-circulates the extracted filtered air back into the main process building, however due to the increased throughput, the filtered air will be discharged to atmosphere via a new release point Y.

The end of line packaging equipment will be modified to incorporate a new larger stretch hooding machine suitable for the new products.

Consultation

The consultation requirements for this application were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements.

A copy of the Application and all other documents relevant to our determination (see below) were available for the public to view. Anyone wishing to see these documents could arrange for copies to be made.

The draft decision consultation started on **30/06/17** and ended on **28/07/17**.

We advertised our draft decision by placing an advert on our website.

The site

The facility is located on Chemistry Lane, near to Deeside in North Wales at National Grid reference: SJ323679. The North Wales Coast Railway Line runs adjacent to the northern boundary of the site.

The nearest residential properties are located approximately 100 metres south of the site boundary and approximately 220 metres south of the main stack. The nearest ecological receptor is the River Dee and Bala Lake Special Area of Conservation (SAC) located approximately 500 metres to the north of the site.

Biodiversity, Heritage, Landscape and Nature Conservation

The operations are within the relevant distance criteria of the following European Designated Sites under the EU Habitats Directive:

- Dee Estuary SAC
- Dee Estuary SPA
- Dee Estuary RAMSAR Site
- River Dee and Bala Lake SAC
- River Dee and Bala Lake Ramsar
- Deeside and Buckely Newt Sites.

A full assessment of the application and its potential to affect the protected habitats has been carried out as part of the permitting process. We consider that the application will not affect the features of the protected habitats.

A Habitats Regulations Assessment was carried out using Form 1 of NRW's Operational Guidance Note 200 - Record of a Habitats Regulations Assessment of a project. NRW considered that it could not rule out adverse effects on certain features within the designated sites. This meant that NRW needed to carry out an Appropriate Assessment of the effects. The Process Contribution (PC) at the River Dee and Bala Lake SAC was sufficient that it could be considered at risk from the additional PC alone because increased nutrient deposition can lead to eutrophication which can

have a serious detrimental effect on water quality and plant and invertebrate species diversity. Despite the existing nutrient nitrogen deposition already exceeding the upper critical load and is projected to increase by an extra 5.4% according to modelling, NRW decided that at a distance of<10 km from the emission point, there is likely to be a strong tidal influence which will aid with dispersal of any nutrient depositions. Furthermore, the prevailing wind direction for the Knauf site means that for the majority of the time, emissions will be blown in the opposite direction to the River Dee and Bala Lake SAC.

For the Dee Estuary SAC, SPA and RAMSAR and the Deeside and Buckley Newt Site SAC even though the PC was <1% and therefore considered insignificant, an in-combination assessment was carried out with Parc Adfer Municipal Waste Incinerator. For the Deeside and Buckley Newt Site, it was ascertained that there would be no likely significant effect on the integrity of the SAC because even when considered in combination, the nutrient nitrogen deposition is <1% of the critical load. The Knauf installation and Parc Adfer incinerator both have the potential to affect the Dee Estuary SAC, SPA and RAMSAR. However, even though the process contribution from two facilities combined is approximately 3% of the Critical load, prevailing environmental factors mean that the emissions from the two facilities are unlikely to act in combination; the weather monitoring from Parc Adfer incinerator indicates that emissions form this facility will largely disperse in a north easterly direction. This means that pollutants will be blown away from the European Habitats Sites. Wind-rose data from Hawarden Airport has been used as representative for Knauf. This data shows that the prevailing wind direction is from the south east and north west. This means that the wind will disperse pollutants both to and from the Dee Estuary SAC in almost equal measures. NRW concluded that given the disparity between the wind directions affecting the two sites, actual in-combination effects are likely to be infrequent and short-lived. NRW therefore concluded in its Record of a Habitats Regulations Assessment of a Project, that the proposals will not adversely affect the integrity of any Natura 2000 sites, either alone or in combination with other plans or projects.

The operations are also within 2000 metres of the Dee Estuary SSSI and River Dee SSSI. Consultation was not carried out with regards to the Dee Estuary and River

Dee SSSI because the activities being carried out by the operator are not on the Operations Likely to Damage list for the SSSI.

Environmental Risk Assessment

Air

This section of the decision document deals primarily with the dispersion modelling of emissions to air from the stack and its impact on local air quality.

The Applicant has assessed the installation's potential emissions to air against the relevant air quality standards, and the potential impact upon human health. These assessments predict the potential effects on local air quality from the installation's stack emissions.

The main release points to air are Points A to D, F to H, M, P1 to P7, Q, R, T, V and X. The proposed activities will result in a new release point to air (Y) from the cold end dust extraction system No.2. Introducing a new grinder will increase the quantity of dust handled by the modified dust extraction. Due to the increased volumetric flow this extraction system will discharge to atmosphere, the use of bag filters is expected to reduce emissions to atmosphere.

There are also changes to emission releases from release point G due to a new fan on the cooling zone. The proposed installation of a grinding machine between the foil facing equipment and the band saw will require the cooling conveyor to be shortened. Because a larger fan will be installed to increase the cooling volumetric flow rate, emission volumes and stack release velocity will increase.

The air impact assessments, and the dispersion modelling has been based on the installation operating continuously at the relevant long-term or short-term emission limit values, i.e. the maximum permitted emission rate. We are in agreement with this approach.

Table 1 shows the relevant Air Quality Standards (AQS), Air Quality Objectives (AQO) and Environmental Assessment Levels (EAL) relevant to emissions from the revised process.

Pollutant	AQO/EAL	Averaging Period	Value ($\mu g\ m^{-3}$)
PM_{10}	AQO	Annual mean	40
	AQO	24-hour mean, not more than 35 exceedences per year (90.41 percentile)	50
$PM_{2.5}$	AQS	Annual mean	25
Volatile Organic Compounds (as Benzene)	AQO	Annual mean	5
	EAL	1-hour mean	195
Ammonia (NH_3)	EAL	Annual mean	180
	EAL	1-hour mean	2500
Ammonia (NH_3) – ecological receptors	EAL	Annual mean	3
Formaldehyde (CH_2O)	EAL	Annual mean	5
	EAL	1-hour mean	100
Phenol (C_6H_5OH)	EAL	Annual mean	200
	EAL	1-hour mean	3900

Table 1 Air Quality Standards, Air Quality Objectives and Environmental Assessment Levels

The submitted modelling report acknowledges that while there is an increase in impact at all receptors following the change in process, there were no exceedances of AQS, AQO or EAL there at human receptors. However whilst this is acknowledged, the increase of pollutants is significant. This is especially true of particulates which have an increase over 700%, Ammonia, which has almost a 70% increase in annual mean emissions, formaldehyde which has a 64% increase in annual mean emissions, and phenol which has 100% increase of annual mean emissions. Table 2 shows the increase in emissions from current operating conditions (Scenario 1) to the proposed operating conditions (Scenario 2).

However, to put these results into context, these are the maximum predicted emission concentrations and are not concentrations predicted at any sensitive receptors.

Pollutant	Averaging Period	Scenario 1	Scenario 2	Increase (%)
PM_{10}	Annual mean	0.5	4.34	768%
	90.41 %-ile 24-hour mean	1.54	13.68	788%
$PM_{2.5}$	Annual mean	0.5	4.34	768%
VOC	Annual mean	0.03	0.04	33%
	Maximum 1-hour mean	0.37	0.49	32%
Ammonia	Annual mean	0.65	1.1	69%
	Maximum 1-hour mean	9.56	12.62	32%
Formaldehyde	Annual mean	0.14	0.23	64%
	Maximum 1-hour mean	2	2.64	32%
Phenol	Annual mean	0.02	0.04	100%
	Maximum 1-hour mean	0.32	0.42	31%
Amine	Maximum 1-hour mean	0.07	0.1	43%

Table 2 - emissions increase from current operations to proposed operations

When viewed alongside the AQS's, AQO's and EAL's it is apparent that the actual Process Contribution (PC) is significantly less that the AQO. For example, the AQO for PM_{10} is 40 µg/m^3, yet the PC from the new emission point is almost ten times less at 4.34 µg/m^3. When compared with predicted emissions at sensitive human receptors the context within which to view such increases becomes even more apparent. The maximum annual mean PM_{10} Predicted Environmental Contribution (PEC) is predicted to be 19.2 µg/m^3 (48% of the EAL). The maximum 90.41 percentile 24-hour mean PM_{10} PEC is predicted to be 43.41 µg/m^3 which is ~ 87% of the EAL. The predicted increase in the 90.41 percentile daily mean PC from emission points G and Y was approximately 24% of the EAL at Chester Road receptor and approximately 50% of the existing background. However it was noted that the parameters used in the mod-elling assessment used a figure of 50 mg/Nm^3 when in fact the application stated that

an extra 96 bag filters will achieve emissions of less than 10 mg/m^3. This means that the modelling results could be reduced by a factor of 5 and the emission limit of 10mg/m^3 be placed in the permit. This effectively means that the PC is 2.7 µg/m^3 and the PEC is 17.6 µg/m^3. This equates to 35% of the daily mean EAL. The maximum annual mean $PM_{2.5}$ PEC is predicted as 15.32 µg/m^3 (61% of the EAL). The maximum annual mean NH_3 is predicted at 3.45 µg/m^3 which is < 2% of the EAL. The maximum 1 hour mean NH_3 is predicted at 17.32 µg/m^3 (<1% of the EAL).

Modelling indicated that increase in PCs of NH_3 from emission point G at environmental receptors was between <1% to 3.4% of the relevant Critical Level (Cle). Increases in acid deposition PC from emission point G as a result of proposed changes were between <1% to 1.8% of the relevant Critical Load (CLo) (CLmaxN) while increases in nitrogen deposition PC from emission point G were <1% of the receptors maximum CLo at all receptors except for the River Dee and Bala Lake SAC where the increase was 5.4% of the maximum CLo.

Existing background NH_3 currently exceed the CLe at the Dee Estuary SAC and Ancient Woodland sites. Our check modelling for increased NH_3 at environmental receptors as a result of the proposed changes indicated that annual mean PCs are likely to contribute to an increased load at these receptors. The magnitude of increases in NH_3 PC at these receptors relative to their respective CLe's was ≤1%. Increases in PCs at all other environmental receptors were between <1% to 3.4% of their respective CLe. Existing background nutrient nitrogen deposition at ancient woodland sites already exceeds the upper CLo. Modelling indicates that the increase in nutrient nitrogen deposition PC due to the proposed changes will be <1% of the upper CLo. Increase in acid deposition PC from emission points G & Y will be 1.8% of the CLo due to nitrogen (CLmaxN).

Existing background nutrient nitrogen deposition at the Dee Estuary SAC already exceeds the upper CLo for the most sensitive features. Our check modelling indicates that the increase in nutrient nitrogen deposition PC from emission points G & Y due to the proposed changes will be <1% of the upper CLo. While the existing background acid deposition exceeds the lower CLo of the most sensitive features, it remains below

the upper CLo. Modelling indicates that increase in acid deposition PC will be <1% of the CLo due to nitrogen (maximumCLmaxN).

Existing background nutrient nitrogen deposition at the Dee Estuary SPA already exceeds the lower CLo for all sensitive features but remains below the upper CLo. Modelling indicates that the increase in nutrient nitrogen deposition PC from emission points G & Y due to the proposed changes will be <1% of the upper CLo. While the existing background acid deposition exceeds the lower CLo of the most sensitive features, it remains below the upper CLo. Modelling indicates that Increase in acid deposition PC will be <1% of the CLo due to nitrogen (maximumCLmaxN).

Existing background nutrient nitrogen deposition at the Dee & Bala Lake SAC already exceeds the upper CLo for the most sensitive feature. Modelling indicates that the increase in nutrient nitrogen deposition PC due to the proposed changes will be 5.4% of the upper CLo. There are no features sensitive to acid deposition associated with the Dee & Bala Lake SAC.

Existing background nutrient nitrogen deposition at the Deeside & Buckley Newt Sites SAC already exceeds the upper CLo of the most sensitive features. Modelling indicates that the increase in nutrient nitrogen deposition due to the proposed changes will be <1% of the upper CLo. While the existing background acid deposition exceeds the lower CLo of the most sensitive features, it remains below the upper CLo. Modelling indicates that Increase in acid deposition PC will be <1% of the CLo due to nitrogen (maximumCLmaxN). Although CLo's are already exceeded, the proposed change in PC is predicted as <1%, in line with current guidance on air emissions, the additions are therefore considered insignificant. The above section entitled Biodiversity, Heritage, Landscape and Nature Conservation explains in more detail why we are satisfied that there is unlikely to be an adverse effect on the integrity of any Natura 2000 sites.

Emission limits

The site has not been compliant with several emission limit values (ELV's) recently, however the most recent monitoring results identify that the site is now back in compliance with all ELV's. The HCl emission limit value of 10mg/m^3 at emission point A

has been breached for the past three years. The Best Available Technique (BAT) document from the Official Journal of the European Union section 1.7.4 states that 'BAT is to reduce HCl emissions from the melting furnace using one or a combination of the following techniques: (i) selection of raw materials…with a low content of chlorine, and (ii) dry or semi-dry scrubbing, in combination with a filtration system.' Taking this into consideration an improvement condition will be imposed for the operator to either select raw materials with a lower chlorine content or to introduce improved abatement.

Particulate and ammonia have been breached or have been close to limit for the main-line forming stack emission point C. However the most recent round of monitoring did show an improvement and was within the emission limit values.

The Knauf installation has already been subject to a review in accordance with the revise BAT conclusions published 2012. As a result of this review, emission limit values were already set in accordance with BAT AELS.

Because a new emission point is being added, it has been identified that particulates are being emitted in significant quantities, therefore ELVs have been set based on BAT AELS for those substances. An ELV of 10 mg/Nm^3 has been set at emission point Y. The ELV has been set at the lower range of the BAT AEL's because the operator have claimed that an extra 96 bag filters will be installed which will mean that they can achieve emissions of less than 10 mg/Nm^3.

It is considered that the ELVs and measures described above will ensure that significant pollution of the environment is prevented and a high level of protection for the environment secured.

Fugitive emissions

Based upon the information in the application, we are satisfied that the appropriate measures will be in place to prevent, or where that is not practicable, to minimise fugitive emissions and to prevent pollution from fugitive emissions.

Monitoring

We have decided that monitoring frequencies should be increased to quarterly for the parameters listed in the permit. This is because the site has previously been in breach of permitted limits for HCl, NH3 and particulate matter. Increased monitoring frequencies will enable the operator to identify increasing emissions and take measures to prevent emission limit breaches, thus helping to ensure continued compliance.

Operating techniques

We have reviewed the techniques used by the operator and compared these with the relevant guidance notes.

The proposed techniques are in line with measures specified in BAT and emission levels in line with BAT AEL's. They are therefore considered appropriate for the facility.

The permit conditions

Updating permit conditions during consolidation

We have updated previous permit conditions as part of permit consolidation. The new conditions have the same meaning as those in the previous permit. The operator has agreed that the new conditions are acceptable.

Improvement conditions

Based on the application information, we will impose improvement conditions. Details can be found in Annex 1

Incorporating the application

We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process. We have specified that the document submitted in support of the application entitled "Technical Supporting Information Report" shall be incorporated into the permit. This document contains descriptions of the proposed changes,

emission and monitoring and how they meet BAT and how the activities will be managed.

These descriptions are specified in the Operating Techniques table in the permit.

OPRA

The OPRA score at permit issue is 88. This score will be carried forward and used to determine the subsistence score for the site.

ANNEX 1: Improvement Conditions

IC 38 was not complete from the previous variation granted, therefore the condition was amended as follows:

If storing Priority Hazardous Substances on site, the Operator must carry out the following assessments with reference to the Environment Agency's guidance document H1 Annex D1 'Assessment of hazardous pollutants within surface water discharges',

- Phase 1 Part A screening tests for mercury, cadmium, nickel, lead, benzene, polyaromatic hydrocarbons and any other relevant substances.
- Phase 1 Part B screening tests for mercury, cadmium, polyaromatic hydrocarbons and any other relevant priority hazardous substances. For any substance which is not screened out by the Phase 1 Part A or Part B screening tests the Operator will also need to carry out Phase 2 modelling, as described in H1 Annex D1.

The Operator must provide Natural Resources Wales with the results of the emissions monitoring, the results from the screening tests and the results from any Phase 2 modelling. The Operator may use the Environment Agency's H1 electronic screening tool to present the emissions data and to carry out the Phase 1 screening tests.

Note: With regard to the Phase 1 Part A screening - a full list of relevant substances is provided in Tables 1 and 2 of Appendix 1 of the Environment Agency's H1 Annex D1 guidance. The Operator must review the list and carry out the screening for any substances, in addition to those specified in the notice that may be present in the installations discharges to surface water. With regard to the Phase 1 Part B screening for priority hazardous pollutants, Table 1 in section 2.3.2 of H1 Annex D1 provides a full list of relevant priority hazardous substances and their associated annual significant loads.

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- The Improvement condition requires an assessment for mercury, cadmium, nickel, lead, benzene, PAH and any other relevant priority hazardous substances discharged to surface water **and sewer**. 'Any other' shall be determined based on an assessment of substances potentially present at the installation that may enter surface water drainage including diffuse runoff from process / yard areas and point source emissions. For example substances contained within raw materials, fuels, process wastes.

A spreadsheet containing a list of all priority hazardous substances and the associated Annual Average Environmental Quality Standards (AA-EQS) and Maximum Allowable Concentration Environmental Quality Standards (MAC-EQS) can be found at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/601586/Freshwater_PHS__PH_and_other_pollutants.csv

Collect representative samples of the discharge and analyse for the required priority hazardous substances as determined in point 1 above. Samples should be sent to a UKAS accredited laboratory.

Submit a report your findings to NRW including the rationale for the substances assessed/not assessed, results from your H1 Assessment screening & sample analysis results.

IC 39 has been included which requests that the operator shall take measures to reduce HCl emissions by either the selection of raw materials with a lower chlorine content or to introduce improved abatement.
A report shall be sent to NRW for approval. The notification requirements of condition 2.4.2 will be deemed to have been complied with on submission of the report.

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