Environment Agency permitting decisions

Bespoke permit

We have decided to grant the permit for **Drakelands Mineral Processing Facility** operated by **Wolf Minerals (UK) Limited**.

The permit number is **EPR/GP3531EX**

The application was Duly Made on 05 February 2014.

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.

Other operations taking place in the context of the wider and integrated mining and mineral extraction development at the site.

The development at the site consists of three main elements

- The mining, quarrying and base mineral extraction operation to be carried out under Planning Authorisation 9/42/49/0542/85/3, as amended by 49/0691/14/CM and subject to the control of **Devon County Council.**
- The deposit of unwanted waste material from the base mineral mining extraction operation and waste produced by the Mineral Processing Facility in a Mining Waste Facility controlled by the **Environment Agency** under Mining Waste Permit reference **EPR/FB3639RK**.
- This Mineral Processing Facility, subject to control by the **Environment Agency**, that takes extracted base mineral from the mining/quarry operation to produce ore concentrates that are exported from the site for final metal extraction and refining elsewhere.

Other environmental permits granted to and held by the applicant in relation to this site are:

Water Discharges

EPR/QP3420XX	Dewatering & Surface Water Discharge Permit

Water Abstractions

SW/047/0002/001	Tory Pond Abstraction Licence
SW/047/0002/003	Tory Pond Reservoir Impoundment Licence
SW/047/0002/004	Loughter Mill Abstraction Licence
SW/047/0002/005	Loughter Mill Impoundment Licence
SW/047/0002/006	Smallhanger North Storage System Abstraction Licence
SW/047/0002/007	Smallhanger South Storage System Abstraction Licence

Brief description of the activities taking place within the Installation

The primary EPR listed activity taking place within the installation is Section 2.1 A(1)(a) – Roasting or sintering metal ore, including sulphide ore, or any mixture of iron ore with or without other minerals.

Tungsten and tin metal compounds are naturally present with iron oxide deposits within the extracted base mineral material, and it is the iron content within the extracted mineral that enables the final stages of separation into tungsten and tin ore concentrates.

Mined mineral extracted from the mining operation is first processed in a primary crushing/screening plant [EPR Schedule 2 activity reference S3.5 Part B(a)] to reduce the physical size of the ore material for subsequent processing. This operation takes place in an enclosed building equipped with a bag filter system to control dust emissions from the building ventilation system.

The size reduced mineral ore then undergoes a series of further physical treatment and separation processes within the main process building. These operations are essentially progressive water based suspension separation techniques which include dense media separation and froth flotation. The physical separation processes produce an ore pre-concentrate for subsequent drying and processing in the Reduction Kiln stage of the plant (the primary listed activity of the installation). The output from the Reduction Kiln is subject to further physical separation and drying operations to produce separate tungsten and tin ore concentrates which are then transported away from the site for refining into final metal products at separate off-site facilities.

Although the initial mined mineral input to the process is up to 500 tonnes per hour, the resultant ore pre-concentrate for processing through the dryer plant and Reduction Kiln elements of the process is less than 3 tonnes per hour. The dryer plant and Reduction Kiln utilise diesel or Liquified Petroleum Gas fired combustion processes with the combustion flue gasses being vented via 25 and 30m flue stacks. Emissions from the Reduction Kiln are treated

though a wet scrubber abatement system prior to release to air. Emissions from the pre-concentrate and tin concentrate dryer systems are treated through a bag filters prior to release to air.
The water based physical separation processes for the incoming crushed primary ore material involves high volumes and circulation flow rates through the various stages of the process (up to 2,200 m^3 per hour). To maintain the process requirements within the various process stages the facility also includes a Water Treatment Plant (WTP) [EPR Schedule 2 activity reference S5.4 A(1)(a)(ii)] that can treat up to 500 m^3 per hour of the circulating flow and return the cleaned process water to the system. The WTP also produces a solid filter cake waste that is collected and removed from the site for appropriate disposal. However, there are no process water discharges from the installation, the installation is a net consumer of water, mainly as a result of water losses included in the 'tailings' waste material transferred to the Mining Waste Facility (MWF).

Structure of this document

- Key issues
- Annex 1 the decision checklist
- Annex 2 the consultation, web publicising and newspaper advertising responses

Key issues of the decision

1. Emissions to air and their potential impact on human and ecological receptors.
2. Potential in-combination impacts with other operations taking place at the site.
3. Water usage, consumption and containment of process water.
4. Site condition and baseline data.
5. Noise impact.

1. Emissions to air and their potential impact on human and ecological receptors

There are four point source emissions to air from the installation which are summarised below along with the predicted composition and associated abatement control for the release.

(a) **Primary Crusher Plant.** The crusher plant is enclosed within a building which is ventilated via a bag filter abatement plant for dust particulate control and which discharges horizontally at a height of 5m. The only associated release is particulate matter.

(b) **Pre-concentrate Ore Drying Plant.** This is a rotary drum drying system for pre drying the ore concentrate prior to processing in the Reduction Kiln. The dryer heating is powered by the combustion of either diesel or LPG fuel and the exhaust is treated via a bag filter abatement system prior to release to air via a 25m exhaust stack. The associated release pollutants are therefore Nitrogen Oxides (NOx), Carbon Monoxide (CO), Sulphur Dioxide (SO_2) and particulate.

(c) **Reduction Kiln.** Pre dried ore concentrate is heated with coal (carbon) reductant in a rotary kiln using diesel or LPG as the combustion fuel source. Flue gas from the kiln is sequentially treated by cyclone, thermal oxidiser and wet alkali scrubber abatement systems. As well as oxides of iron, tungsten and tin, the ore concentrate also contains arsenic which is present with these compounds in the extracted base mineral material. The cyclone and wet scrubber systems are designed to remove the majority of the arsenic content from the flue gas stream, but a small amounts may still be released to air via a 30m exhaust stack. The associated release pollutants from this source are therefore Nitrogen Oxides (NOx), Carbon Monoxide (CO), Sulphur Dioxide (SO_2), particulate and arsenic (likely to be mainly present in the particulate element of the release).

(d) **Tin Concentrate Drying Plant**. A small rotary drying plant for the separated tin ore concentrate fraction of the final product. Dryer heating is supplied by the combustion of either diesel or LPG fuel and the exhaust flue gas is treated via a bag filter abatement system prior to release to air via a 25m exhaust stack. The associated release pollutants are therefore Nitrogen Oxides (NOx), Carbon Monoxide (CO), Sulphur Dioxide (SO_2) and particulate.

The Applicant's assessment of the impact of air quality is set out in Section 6, Appendices 'A' and 'C' of the 'Supporting Information' to the Application. The assessment comprises:

- An H1 screening assessment of emissions to air from the operation of the plant.

- Dispersion modelling of emissions to air from the operation of the plant.
- A study of the impact of emissions on nearby sensitive habitat / conservation sites.

The applicant has provided a detailed dispersion modelling study utilising the BREEZE AERMOD v7 software modelling tool and 5 years of Met Data from Plymouth Mountbatten Meteorological Observation Station.

The dispersion model study used pollutant release rates taken from the emission benchmarks included in the Environment Agency Sector Guidance Note *'EPR 2.03 – Non Ferrous Metals and the Production of Carbon and Graphite'* for the Reduction Kiln emissions. Benchmark emission values obtained from the DEFRA Guidance '*Process Guidance Note 3/18(12) – Statutory Guidance for Mineral Drying and Cooling (September 2012)'* were used for the model input release rates for the ore drying plants. Modelled release rates for the Primary Crushing Plant were obtained from DEFRA Guidance *'Process Guidance Note 3/08(12) – Statutory Guidance for Quarry Processes (September 2012)'.*

Air Quality Background data has been obtained from the DEFRA 1km x 1km grid pollutant concentration mapping, other than for Arsenic, where data from the UK Heavy Metals Monitoring Network station at Yarner Wood (approx 30 km to the north of the site) has been used.

The model study considered local topography, terrain, surface roughness and adjacent building downwash effects and provided predictions for both maximum off-site ground level concentration impacts and at specific human and ecological receptor locations across the modelled grid. The applicant's dispersion modelling study and corresponding air quality impact assessment report has been reviewed by our Air Quality Modelling and Assessment Unit (AQMAU) specialists and they have concluded that the model study and impact report form a reasonable basis to consider the impacts from the installation on the local environment.

Predicted impacts on relevant human receptor locations

Maximum off-site ground level impacts and those at the most significantly impacted human receptor location are summarised in the tables below.

Table 1 – Maximum off-site ground level impact concentrations

Pollutant	EQS / EAL µg/m^3	Background Conc. µg/m^3	Process Contribution (PC) µg/m^3	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC) µg/m^3	PEC as % EQS / EAL
NO_2 (Annual)	40	8.6	0.9	2	9.5	24

Pollutant	EQS / EAL µg/m^3	Background Conc. µg/m^3	Process Contribution (PC) µg/m^3	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC) µg/m^3	PEC as % EQS / EAL
NO_2 (Hourly)	200	17.2	9.0	4	26.2	13
SO_2 (Hourly)	350	3.3	23.3	7	26.6	8
PM_{10} (Annual)	40	14.5	4.4	11	18.9	47
PM_{10} (24 hour)	50	17.1	13	26	30.1	60
$PM_{2.5}$ (Annual)	25	8.2	4.4	18	12.6	50
Arsenic (Annual)	0.003	0.00044	0.0018	59	0.00224	75

Table 2 – Maximum impact concentration at most highly impacted human receptor location (Receptor R1 – Scrap Yard, approx 650m SW of the installation)

Pollutant	EQS / EAL µg/m^3	Background Conc. µg/m^3	Process Contribution (PC) µg/m^3	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC) µg/m^3	PEC as % EQS / EAL
NO_2 (Annual)	40	8.6	0.2	<1.0	8.8	22
NO_2 (Hourly)	200	17.2	4.0	2	21.2	10.6
SO_2 (Hourly)	350	3.3	10.3	3	13.6	3.9
PM_{10} (Annual)	40	14.5	1.6	4	16.1	40
PM_{10} (24 hour)	50	17.1	4.9	10	22.0	44
$PM_{2.5}$ (Annual)	25	8.2	1.6	6	9.8	39
Arsenic (Annual)	0.003	0.00044	0.00035	12	0.00079	26

Note: In the tables above, a conservative assumption has been made that all of the particulate release is at either the PM_{10} or $PM_{2.5}$ particle size fraction to compare against the relevant AQ standards.

The Environment Agency H1 Impact Assessment Guidance indicates that Process Contributions (PC) can be considered **insignificant** if:

- the long-term process contribution is less than **1%** of the relevant long-term EQS; and

- the short-term process contribution is less than **10%** of the relevant short-term EQS.

Therefore from Table 2 above it can be seen that the impact of emissions of Nitrogen Dioxide, Sulphur Dioxide and PM10 against the short term AQ standard, and Nitrogen Dioxide against the long term AQ standard, can be considered insignificant at the most highly impacted receptor location. And although the impact of emissions of PM10, PM2.5 and Arsenic are not able to be considered as insignificant, by reference to the PEC (Predicted

Environmental Concentration = PC + Background), it is demonstrated that these releases are unlikely to give rise to significant pollution as there is substantial headroom relative to their respective AQ Standards.

Predicted impacts on relevant ecological receptor sites

There are three European Habitats Directive sites within 10km of the installation:

- **Dartmoor SAC UK0012929** (approx **4.0 km** from the installation)
- **South Dartmoor Woods SAC UK0012749** (approx **5.4** km from the installation)
- **Plymouth Sound & Estuaries SAC UK0013111** (approx **8.5 km** from the installation)

There are no SSSI sites within 2km of the installation.

There are several Local Wildlife Sites (LWS) without statutory designation within 2km of the installation.

Critical Load (CLo) values for N Deposition and Acidification have been obtained from the apis website. Background air concentration values and deposition rates have been obtained from the apis website. Critical Level (CLe) values are as recorded in Annex F of our H1 Guidance document.

The maximum predicted impact values at South Dartmoor Woods SAC and Dartmoor SAC are summarised in the tables below. These two sites are closest to the installation and given the dominant prevailing wind direction and sensitivity of their features, will be the most susceptible to emissions from the installation.

Table 3 – Predicted direct and deposition impacts at South Dartmoor Woods SAC

Impact Summary – South Dartmoor Woods SAC (5.4 km NW)						
Pollutant and Benchmark Unit	Benchmark CLe or CLo	Process Contribution (PC)	PC/EAL %	Back-ground	PEC(1)	PEC/EAL %
Direct Impacts						
NOx (µg/m³)	30	0.01	<0.1	6.36	N/A	N/A
NOx (µg/m³) (Daily Mean)	75	0.58	0.8	12.7	N/A	N/A
SOx (µg/m³)	10(2)	0.01	0.1	0.66	N/A	N/A
Deposition Impacts - (old sessile oak woods feature)						
N Deposition (kg N/ha/yr)	10 - 15	0.002	<0.1	41	N/A	N/A
Acidification - Nitrogen Dep (Keq/ha/yr)	1.54	<0.001	<0.1	2.96	N/A	N/A
Acidification Sulphur Dep (Keq/ha/yr)	1.25	0.002	0.2	0.7	N/A	N/A

Table 4 - Predicted direct and deposition impacts at Dartmoor SAC

Impact Summary – Dartmoor SAC (4.0 km NE)						
Pollutant and Benchmark Unit	Benchmark CLe or CLo	Process Contribution (PC)	PC/EAL %	Back-ground	PEC[(1)]	PEC/EAL %
Direct Impacts						
NOx (µg/m³)	30	<0.01	<0.1	6.04	N/A	N/A
NOx (µg/m³) (Daily Mean)	75	0.16	0.2	12.1	N/A	N/A
SOx (µg/m³)	10[(2)]	0.01	0.1	0.67	N/A	N/A
Deposition Impacts - (blanket bog feature)						
N Deposition (kg N/ha/yr)	5 - 10	0.001	<0.1	18	N/A	N/A
Acidification - Nitrogen Dep (Keq/ha/yr)	0.83	<0.001	0.1	1.29	N/A	N/A
Acidification Sulphur Dep (Keq/ha/yr)	0.51	0.002	0.4	0.36	N/A	N/A

Note 1: In accordance with Environment Agency H1 Methodology consideration of PEC is only necessary if PC is greater than 1%.
Note 2: Given the sensitivity of the features of this site, a precautionary SO_2 Critical Level value appropriate to lichen and bryophyte has been assigned.

The predicted process contribution impacts are all less than 1% of the relevant Critical Level/Load benchmarks (long term), or less than 10% of the relevant short term Critical Level values, and can therefore be considered insignificant.

An Appendix 11 assessment was submitted to Natural England for their consultation and they subsequently responded by confirming their approval of our assessment conclusions.

Although there are several Local Wildlife Sites and areas of ancient woodland assignment within 2km of the installation, giving consideration to their distance and location from the installation and the features and species likely to be present within these sites, the following two tables provide a representative summary of the likely 'worst case' impact consideration of sites within the relevant screening distance.

Table 5 – Predicted impact on Hookesbury Wood (LWS and ancient woodland)

Impact Summary – Hookesbury Wood (approx 1.5 km NW)						
Pollutant and Benchmark Unit	Benchmark CLe or CLo	Process Contribution (PC)	PC/EAL %	Back-ground	PEC[(1)]	PEC/EAL %
Direct Impacts						
NOx (µg/m³)	30	0.03	<0.1	14	N/A	N/A
NOx (µg/m³) (Daily Mean)	75	1.12	1.5	28	N/A	N/A
SOx (µg/m³)	10[(2)]	0.04	0.4	0.67	N/A	N/A
Deposition Impacts - (deciduous woodland feature)						
N Deposition (kg N/ha/yr)	10 - 20	0.01	0.1	33	N/A	N/A
Acidification - Nitrogen Dep (Keq/ha/yr)	1.43	0.001	<0.1	2.3	N/A	N/A
Acidification Sulphur Dep (Keq/ha/yr)	1.15	0.008	0.7	0.35	N/A	N/A

Table 6 – Predicted impact on Bottle Hill Woodland (priority habitat)

Impact Summary – Bottle Hill Woodland (approx 0.75km SW)						
Pollutant and Benchmark Unit	Benchmark CLe or CLo	Process Contribution (PC)	PC/EAL %	Back-ground	PEC[(1)]	PEC/EAL %
Direct Impacts						
NOx (µg/m³)	30	0.3	1.0	11.1	N/A	N/A
NOx (µg/m³) (Daily Mean)	75	4.85	6.5	22.2	N/A	N/A
SOx (µg/m³)	10[(2)]	0.47	4.7	0.45	0.92	9
Deposition Impacts - (deciduous woodland feature)						
N Deposition (kg N/ha/yr)	10 - 20	0.143	1.4	31	N/A	N/A
Acidification - Nitrogen Dep (Keq/ha/yr)	1.91	0.01	0.5	2.23	N/A	N/A
Acidification Sulphur Dep (Keq/ha/yr)	1.77	0.11	6.2	0.22	0.33	18.6

Although not all of the predicted impacts at local wildlife sites can be described as insignificant against the established H1 criteria, all of the impacts are within the guideline criteria described in our Operational Instruction OI 66_12 '*Simple assessment of the impact of aerial emissions from new or expanding IPPC regulated industry for impacts on nature conservation'*, and are therefore unlikely to give rise to significant pollution or cause damage to the features of the sites.

2. Potential in-combination impacts with other operations taking place at the site.

Although there are no point source emissions to air from either the Mining Waste Facility operation or the mining/quarry mineral extraction operations that will be part of the wider development activities taking place at the site, there is the possibility of fugitive dust emissions from these activities forming an in-combination impact with point source particulate releases from the Mineral Processing Facility installation.

A detailed dispersion modelling assessment of the combined potential fugitive dust emissions from the MWF and mining extraction operations was produced by the applicant and assessed as part of the permit application for the Mining Waste Facility. This study and assessment has now been updated to include the point source emissions from the MPF installation, and a prediction of the combined particulate and arsenic impacts on local receptors. The in-combination impact data for the most highly impacted human receptor location (R1) is summarised in the table below.

Table 7 – Combined predicted particulate and arsenic emission impacts at receptor location R1 (Scrap Yard).

Pollutant	EQS / EAL µg/m^3	Background Conc. µg/m^3	Process Contribution (PC) µg/m^3	PC as % of EQS / EAL	Predicted Environmental Concentration (PEC) µg/m^3	PEC as % EQS / EAL
PM_{10} (Annual)	40	14.5	5.39	13.5	19.9	49.8
PM_{10} (24 hour)	50	17.1	16.98	33.9	34.1	68.2
$PM_{2.5}$ (Annual)	25	8.2	5.39	21.5	13.6	54.4
Arsenic (Annual)	0.003	0.00044	0.00037	12.3	0.00081	27.0

Although the in-combination impact from all sources of emissions of PM10, PM2.5 and Arsenic are not able to be considered as insignificant**,** reference to the PEC values confirms that there is sufficient headroom relative to the EQS/EAL standards for us to conclude that it is unlikely that operation of the installation will cause any breach of an EQS or environmental standard.

However, as the impact of particulate and arsenic eleases from the installation activities cannot be described as insignificant, we have included a monitoring and reporting requirement for these releases in the permit. An improvement condition (IC1) has also been included for the operator to establish the efficiency performance and key control parameters for the Reduction Kiln scrubber performance.

Total Dust and Arsenic Deposition on surrounding land

As part of the in-combination assessment of both fugitive and point source particulate releases that might take place as part of the wider development

activities taking place at the site, the applicant has undertaken an assessment of the potential deposition impact resulting from those particulate emissions.

The assessment considered source term release rates from the various activities and operations taking place at the site (drilling/blasting, material extraction and handling, entrainment from vehicle transportation, wind erosion, crushing and screening, reduction kiln operations etc.) and the predicted particle size for each of these expected releases. Given the nature of the process activities taking place at the site there is the potential for arsenic to be present as a component in some of these particulate release sources. Dust resulting from wind erosion of tailings deposited to the MWF and any residual particle release from the reduction kiln abatement plant are expected to contain the most significant arsenic content. As part of the impact assessment, the applicant conducted a laboratory study utilising samples of base ore baring granite from the site to simulate tailings production within the process and their resultant arsenic content.

This collective data was then used to provide inputs and parameters for a dispersion modelling study to establish the maximum predicted off-site deposition impacts at nearby receptor locations. Total dust deposition rates and the arsenic content of that deposition are summarised in the Table 8 below.

Table 8 – Total dust and arsenic deposition rates at nearest receptors

Receptor	Total Dust Deposition ($mg/m^2/day$)			Arsenic Deposition ($mg/m^2/day$)		
	Background[1]	Proc Cont	Total	MDR (H1)[2]	Proc Cont	% MDR
Site Boundary	30	0.62	30.6	0.02	0.0006	3
R1 Scrap Yard (Workplace)	30	0.02	30.0	0.02	0.00002	0.1
R2 Mumford Cottage (Residential)	30	0.11	30.1	0.02	0.0001	0.5
R8 Clay Shoot (Workplace)	30	0.02	30.0	0.02	0.00002	0.1
Hooksbury Wood (Ecological)	30	3.3	33.3	0.02	0.00005	0.3
Fernhill Wood (Ecological)	30	2.8	32.8	0.02	0.00004	0.2
Bootle Hill (Ecological)	30	17.1	47.1	0.02	0.00003	0.2

Note 1: Background value based on an average of monitoring studies undertaken at 5 local receptor locations, Aug 2011 – Feb 2012.
Note 2: Maximum Deposition Rate (MDR) for protection of soils for agricultural use – Environment Agency H1 Guidance, Annex F. Daily rate based on cumulative impact over 50 year lifetime of contributing source operation.

Total dust deposition rate is significantly less than indicative nuisance value indicators for human receptor locations or criteria for impairment of higher plant ecological receptors.

Although the arsenic deposition rate is slightly above the H1 insignificance criteria threshold at the most highly impacted off-site receptor, the MPF and MWF emission sources are expected to only have a 15 year operational lifespan at this location, rather than the 50 year projection included in the H1 reference standard, and the benchmark standard does not make any allowance for ongoing degradation or other depletion processes for the inorganic content of the contaminant from the soil and land in the surrounding area. Taking account of these factors, we believe the deposition rate of arsenic resulting from the predicted dust emissions from the combined wider operations taking place at the site can be considered insignificant, and are therefore unlikely to cause any deterioration of local land condition.

3. Water usage, consumption and containment of process water.

Water usage and consumption

The mineral processing facility utilises large volumes of water as part of the initial and intermediate material treatment separation stages of the process. Typically 2,200 m^3 per hour of process water will circulate through the various ore separation and treatment processes in order to achieve an approximate quantity of 1.6 tonnes per hour of ore concentrate for input and processing through the reduction kiln activity. The plant design includes a Water Treatment Plant (WTP) which continuously treats a proportion of the circulating process water (up to 120 m^3/hour) so that the quality of the circulating process water is maintained to meet the requirements of the various separation techniques within the process, and to remove the accumulation of arsenic compounds from the process water stream. Spent liquor from the reduction kiln scrubber plant is also treated as part of the WTP activity. The WTP involves a number of physico chemical treatment stages including oxidation, flocculation, precipitation and clarification with the cleaned water being returned to the process and the separated solids being pressed into a filter cake (approx 5 tonne/day) for off-site disposal.

Water is lost from the process, mainly as part of and as a result of the tailings slurry that is discharged to the MWF (up to 200 m^3/hour). Smaller quantities are also lost as a result of the ore drying and reduction kiln processes, and in the residual filter cake output from the WTP). However, after settlement within the engineered tailings pond system of the MWF, a significant proportion (40 – 50%) of the water within the tailings slurry that is discharged to the MWF is collected and returned to the MPF for re-use within the process. The plant is therefore a net consumer of water. Storm water falling on the surfaced areas of the installation is collected and collated in two on-site sump ponds for reuse within the process. Although these sump ponds have an engineered overflow system for use in storm conditions, for the majority of time the plant is reliant on the import of water from several separately authorised off-site impoundment and abstraction sources, and therefore there is limited release from these collection sump ponds. Any discharge from these collection ponds is directed to the off-site Smallhanger settlement pond and then subsequently to the Smallhanger discharge pond, both of which are part of the designed surface water management system for the mining and

mineral extraction operation taking place at the site. There are no releases of process water from the installation other than the tailings slurry discharge to the MWF.

We are therefore satisfied that the various treatment, retention, collection and re-use of water arrangements within the activities at the site represent BAT for water utilisation within the installation. The operator is required to monitor imported water usage within the facility and to report usage relative to the quantity of ore concentrate produced.

Containment

The main process building and the area occupied by the WTP will be constructed with an impervious concrete base. The process building is designed with a series of gradients and falls to sealed collection drains and blind sumps such that any spillages or releases from the process can be contained and collected within the building and then removed by pumping and return to the process.

The WTP includes a series of 30 and 40 m^3 treatment tanks within a bunded area and a reagent storage area with bunded tank storage for ferrous chloride solution and sodium hydroxide, and for other reagents stored in drums and IBC's. As well as the primary and secondary containment provided by the tanks and bunds, further tertiary containment is provided by the surrounding surfacing and site drainage collection which is routed to the on-site sump ponds.

Whilst we are satisfied that these drainage and containment proposals form a suitable arrangement for managing the risk from activities taking place within the installation, we have included a pre-operational condition (PO04) within the permit that requires the operator to provide an 'as installed' drainage plan for the installation, with an inventory and confirmation of storage tank and bunding capacities, as some details of the WTP infrastructure have yet to be finalised.

We have also considered the volume and rate of discharge of the residual 'tailings' slurry material from the Mineral Processing Facility to the Mining Waste Facility, and are satisfied that the volumes indicated in the application and now included in the permit, are consistent with the containment proposals and flood risk assessment included as part of the determination of the Mining Waste Facility permit.

4. Site Condition and baseline ground condition characterisation.

The Site Condition Report (SCR) provided with the application identifies that the site lies in an area characterised by current and historic quarrying and mining operations. Several short periods of mining and mineral processing have taken place at the site since the presence of tungsten was first discovered in 1867. The most recent being the operation of a large scale pilot plant development in the 1980's. The SCR also includes Phase 1 and Phase 2 risk assessment and land quality and investigative study reports produced by Ecospan Environmental in 2011 and 2013. These reports identify varying degrees of land and groundwater contamination across the wider extent of the

site, mainly resulting from the historic mining and mineral processing operations that have taken place at the location. However, only a small percentage of the risk assessment survey and intrusive investigation data collected for these reports relates to the land and groundwater quality within the extent of the land on which the Mineral Processing Facility installation will be constructed.

A further and more detailed investigative study was therefore commissioned by the operator and undertaken by AMEC Earth and Environmental UK Ltd during July/August 2013. This study involved analysis of extractive samples taken from 16 bore holes and 17 trial pits created within the perimeter of the proposed installation area. The soil and groundwater analysis data contained within the report resulting from this study (AMEC - A103-13-R2165 [07 January 2014]) is therefore considered to represent the baseline condition of land and groundwater at the site for any subsequent risk assessments undertaken to comply with conditions of the permit.

5. Noise impact assessment and control.

The applicant has undertaken a noise modelling study and impact assessment for the predicted noise emissions from the installation. This study has been reviewed by our noise modelling and assessment specialists and we consider that it forms a suitable assessment of the likely noise impacts from the installation.

It is a requirement of the planning authorisation that a number of the residential dwellings in the near vicinity of the mining site will no longer be allowed to be occupied for human occupation once mining operations commence at the site, and for the subsequent life of the mine. Given the distance to the nearest relevant occupied residential receptor locations that will result from the implementation of this planning requirement, we are satisfied that noise emissions from the installation are unlikely to cause annoyance at these locations. Local noise impacts will be dominated by emissions from the mining extraction activities once this becomes operational and these operations are subject to specific noise control conditions included in the amended planning authorisation. An initial Noise Management Scheme has been prepared by the applicant in conjunction with Planning Authority for the mine, Devon County Council, and the Environment Agency. We are therefore satisfied that our normal permit template noise condition is appropriate for inclusion within the permit, and that it will enable suitable control for any noise emissions from the MPF installation and the operation of its activities.

Annex 1: decision checklist

This document should be read in conjunction with the Duly Making checklist, the application and supporting information and permit/ notice.

Aspect considered	Justification / Detail	Criteria met Yes
Receipt of submission		
Confidential information	No claim for commercial or industrial confidentiality has been made.	✓
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 commercial confidentiality.	✓
Consultation		
Scope of consultation	The consultation requirements 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.	✓
Responses to consultation, web publicising and newspaper advertising	The web publicising, consultation and newspaper advertising responses (Annex 2) were taken into account in the decision. Although Consultation and Public Notification was initially undertaken in accordance with '*RGN 6 – Determinations involving sites of high public interest*' - as described above, as part of the determination we formally reviewed the extent of any ongoing public interest being expressed in relation to the site, and the responses made by members of the public and other local organisations or stakeholder groups relative to the public notification of this application As a result of this we have concluded that the site is no longer considered to have SHPI status, and has therefore been removed from our listing of such sites. In this circumstance it has been concluded that it is no longer appropriate to undertake an additional period of 'minded to' pubic consultation with our draft decision before completion of determination of the application.	✓
Operator		
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the	✓

Aspect considered	Justification / Detail	Criteria met Yes
	facility after the grant of the permit. The decision was taken in accordance with EPR RGN 1 Understanding the meaning of operator.	
The facility		
The regulated facility	The regulated facility is an installation which comprises the following activities listed in Part 2 of Schedule 1 to the Environmental Permitting Regulations and the following directly associated activities. • S2.1 A(1)(a) - Roasting or sintering metal ore, including sulphide ore, or any mixture of iron ore with or without other minerals. • S5.4 A(1)(a)(ii) – Treatment of non-hazardous waste in a plant with a capacity of more than 50 tonnes per day by physico-chemical treatment. • S3.5 Part B (a) – Crushing , grinding or other size reduction of any designated mineral or mineral product. In addition to the above listed activities, several directly associated activities also take place at the site. These mainly relate to various mineral separation processes to produce an ore concentrate from the primary extracted mineral material produced from the primary crushing plant.	✓
European Directives		
Applicable directives	All applicable European directives have been considered in the determination of the application.	✓
The site		
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary.	✓
Site condition report	The operator has provided a description of the condition of the site. We consider this description is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under IED– guidance and templates (H5). See Section 4 of Key Issues above.	✓
Biodiversity, Heritage,	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or	✓

Aspect considered	Justification / Detail	Criteria met Yes
Landscape and Nature Conservation	protected species or habitat . A full assessment of the application and its potential to affect relevant habitat sites has been carried out as part of the permitting process. We consider that operation of the proposed application activities will not affect the features of those habitat sites. Formal consultation has been carried out with Natural England through submission of an Appendix 11 assessment. After review of this assessment they responded by confirming agreement with our conclusion that operation of the proposed activities within the installation would not have any significant effect on the features of those habitat sites.	
Environmental Risk Assessment and operating techniques		
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. The operator's risk assessment is satisfactory. The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment, all emissions may be categorised as environmentally insignificant or unlikely to cause excedance of any environmental standard. See Sections 1 and 2 of the 'Key Issues' section above.	✓
Operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in the relevant TGN's and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs and BAT Conclusions, and ELVs deliver compliance with BAT-AELs. The following TGN's and Pollution Prevention Guidance Notes (PGN) have been considered in the assessment of the proposed operating techniques to be used at the installation : EPR2.03, EPR6.14, EPR4.03 , PGN 3/08(12) and PGN 3/18(12).	✓

Aspect considered	Justification / Detail	Criteria met Yes
The permit conditions		
Raw materials	We have specified limits and controls on the use of raw materials and fuels. We have specified a limit of 0.1% sulphur content in the liquid fuel to be used in the ore drying units and reduction kiln and thermal oxidiser plant.	✓
Pre-operational conditions	Based on the information in the application, we consider that we need to impose pre-operational conditions. Pre-operational conditions have been included in the permit to: • to provide a commissioning plan for the installation activities. • to provide a protocol for establishing the hazard status of the filter cake material produced by the water treatment plant so that appropriate disposal or further off-site treatment arrangements are established. • to establish and confirm details of the as installed site drainage arrangements and associated infrastructure. • To ensure that the site Emergency Plan is updated to include hazards and risks associated with the new activities and that these are appropriately integrated with those for the MWF described in the current plan.	✓
Improvement conditions	Based on the information on the application, we consider that we need to impose improvement conditions. We have imposed improvement conditions to ensure that: • once the plant is operational, the operator undertakes a study to establish the optimal performance and control measures for the reduction kiln scrubber plant so that emissions of arsenic from the process are minimised. • the operator undertakes a study to investigate the potential for release or subsequent entrainment of any radioactive material (radon gas) from the primary crushing plant activity at the site.	✓
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.	✓

Aspect considered	Justification / Detail	Criteria met Yes
	These descriptions are specified in the Operating Techniques table in the permit.	
Emission limits	We have decided that emission limits should be set for the parameters listed in the permit. It is considered that the ELVs and technical measures described above will ensure that significant pollution of the environment is prevented and a high level of protection for the environment secured.	✓
Monitoring	We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified. These monitoring requirements have been imposed in order to demonstrate compliance with conditions and limits contained in the permit and to verify that the operating techniques proposed in the application represent BAT for the activities taking place within the installation. We made these decisions in accordance with the following TGN's and Pollution Prevention Guidance Notes (PGN): EPR2.03, EPR6.14, EPR4.03 , PGN 3/08(12) and PGN 3/18(12). Based on the information in the application we are satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.	✓
Reporting	We have specified the following reporting requirements in the permit. • Emissions to air and discharge of 'tailings' to the MWF. • Water usage and performance. • Energy usage and performance. • Input of ROM base material. • Production of ore concentrate. These reporting requirements have been included to ensure compliance with other conditions of the permit.	✓
Operator Competence		
Environment	There is no known reason to consider that the operator	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
management system	will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.	

Annex 2: Consultation, web publicising and newspaper advertising responses

Copies of the application were sent to the following organisations for Consultation:

- Public Health England
- Food Standards Agency
- Health and Safety Executive
- South Hams District Council (Planning Department)
- South Hams District Council (Environmental Health Department)
- Plymouth NHS (Director of Public Health) [ex PCT equivalent]
- Plymouth City Council
- Devon County Council - Mineral Planning Authority
- South West Water
- Dartmoor National Park
- Devon Wildlife Trust
- English Heritage

Details of the receipt of the application were also published on our website from 07 March 2014 to 04 April 2014. Receipt of the application was also advertised in the 'South Hams Gazette' on 07 March 2014. A briefing note in respect to the pending consultation period for the application was also circulated to local organisations and stakeholders whose details we held as a result of previous consultation and feedback received in relation to the permit application for the Mining Waste Facility operation.

In view of the public interest shown in the previous Mining Waste Facility application for this site, this application was initially considered on the basis of being a Site of High Public Interest (SHPI), and was considered accordingly with reference to *'RGN 6 – Determinations involving sites of high public interest'.* Receipt of the application was therefore advertised in the local press and an additional briefing note circulated for further information in relation to its receipt as detailed above.

As part of the determination process we have formally reviewed the extent of any ongoing public interest being expressed in relation to the site, and have considered the extent of responses made by members of the public and other local organisations or stakeholder groups relative to the public notification of this application. (This is detailed and recorded below)

As a result of this we have concluded that the site is no longer considered to have SHPI status, and has therefore been removed from our listing of such sites. In this circumstance it has been concluded that it is no longer appropriate to undertake an additional period of 'minded to' pubic consultation with our draft decision, before completion of determination of the application.

Summary of responses to consultation, web publication and newspaper advertising and the way in which we have taken these into account in the determination process. (Newspaper advertising is only carried out for certain application types, in line with our guidance.)

Response received from: **Public Health England (PHE)**
Brief summary of issues raised
1. There are very few residential properties close to the site as a result of the Section 52 planning requirement that prohibits residential habitation within 250m of the mining site operation, therefore direct risks to public health from the permitted activities should be small. 2. Concerns raised in regarding hazards associated with asbestos , arsenic, radon and dust identified as part of the Phase 2 Survey include in the Site Condition Report and how these should be taken into account when considering the construction and building development of the plant. 3. Concern relating to emissions of dust and their potential to cause nuisance and risk to health for particulate matter less than 10µm in size. Consideration should be given for implementation of a dust management action plan to be enforced by the Local authority. 4. The dust has the potential to contain high levels of arsenic (applicant has used a value of 920 mg/m3 for the concentration in the deposited tailings waste. As higher values at one section of the site were identified in the Phase 2 survey report, the risk assessment for potential impact should be reconsidered. 5. Due to the heterogeneous and potentially hazardous nature of materials at the site the regulator should ensure there is an appropriate level of monitoring at the site to demonstrate that the activities are under control.
Summary of actions taken or show how this has been covered
1. No further action required. Planning conditions require that habitation of several properties close to the extent of the mining operation site is discontinued before mining operations commence. 2. These issues relate to the constructional aspects of the development rather than its ongoing operation once built. Historical waste and land contamination issues identified in the Phase 2 Report of the SCR will be remediated prior to construction of the plant. Improvement condition IC2 of the permit requires the operator to undertake a study to investigate the potential release or subsequent entrainment of any radioactive substance from the primary crushing plant operation at the installation. 3. The combined impact of dust emissions from all of the activities taking place as part of the wider site operations has been assessed and is recorded in Section 2 of the 'Key Issues' section of this document. We are satisfied that although the combined impact of PM10 sized particulate releases cannot be described as insignificant, their impact at any local receptor locations will not cause an excedance of any Air Quality Standard (AQS). Potential releases of particulate from the point source emissions at the installation are controlled through bag filters or wet scrubbing systems, which we consider to be BAT for those processes. 4. We are satisfied that the laboratory study and investigation undertaken by

the applicant to establish the predicted arsenic content of the 'tailings' material discharged to the MWF forms a reasonable basis for the data used in the modelling study of dust and arsenic impacts. The higher arsenic concentrations identified in the Phase 2 Survey Report of the SCR relate to an area of the site noted to have contamination resulting from historic mining and ore processing operations at the site, and are not considered to be representative of the 'tailings' that will be produced by the proposed mineral processing operation at the site. (See Section 2 of the Key Issues section of this document above). 5. The permit includes monitoring requirements and emission limits for the defined release points from the process activities of the installation. We are satisfied that these and the process design and control measures for these activities provide suitable arrangements for these operations.

Response received from: **South Hams District Council**
Brief summary of issues raised
1. Noted that air quality impact assessment included in the application records that the impacts from emissions of NO2 and Particulate are indicated to be insignificant and this is accepted. 2. Abatement plant utilised to abate emissions to air should employ BAT and include warning systems to indicate if the systems are failing. 3. Emissions of arsenic do not fall under control of the LAQMR and would therefore recommend that impact study results are are checked through by experts at the EA and PHE. 4. The noise impact assessment indicates that noise levels at all occupied properties will be less than those levels in the planning consent for the mine development, these levels are therefore accepted.
Summary of actions taken or show how this has been covered
1. No further action required. 2. We are satisfied that low NOx burners and fabric bag filters represent BAT for control of emissions to air. The bag filter systems are equipped a differential pressure alarm system. The reduction kiln is equipped with a sequential cyclone, thermal oxidizer and wet scrubber abatement system which we consider represents BAT for control of emissions from the reduction kiln. Improvement condition IC1 has been included in the permit to provide information and confirmation of the efficiency of the reduction kiln abatement plant. 3. The air quality impact assessment has been reviewed by our Air Quality Modelling and Assessment Unit (AQMAU) who considered its content and conclusions suitable assessment of emissions from the plant. PHE were consulted with a copy of the application and their observations are recorded above. 4. No further action required.

Response received from: **Devon County Council (DCC)**
Brief summary of issues raised
Acknowledged that the development was subject to an amendment to the original Planning Authorisation. Copy of the previously modified Planning Permission provided along with a copy of a Noise Monitoring Scheme approved in conjunction with the current Amendment Application.
Summary of actions taken or show how this has been covered
Content of modified Planning Permission and Noise Monitoring Scheme noted and considered as part of permit application assessment, but no conflicting requirements identified.

Response received from: **English Heritage**
Brief summary of issues raised
Requested CD copy of the application having been advised of its submission as a result of the briefing note communication.
Summary of actions taken or show how this has been covered
CD copy of the application sent to English Heritage for review, but no further comments or response received from them. No further action required.

Response received from: **South West Water**
Brief summary of issues raised
Have reviewed the information provided in the application and have concluded that as the activities do not involve any water abstractions, waste water discharges or trade effluent discharges it presents no direct concerns for the company. Acknowledged tht they had previously commented on the water abstraction application proposals made in July 2012.
Summary of actions taken or show how this has been covered
No further action required.

Natural England were also consulted by submission of an Appendix 11 Assessment which considered potential impacts on relevant Habitat Sites. After review of this assessment they responded by confirming agreement with our conclusion that operation of the proposed activities within the installation would not have any significant effect on the features of those habitat sites.

No consultation responses were received from : Food Standards Agency (FSA), Health and Safety Executive (HSE), Plymouth NHS, Plymouth City Council, Dartmoor National Park or Devon Wildlife Trust.

No responses were received from members of the public or other local organisations as a result of publicising and advertising receipt of the application or the corresponding briefing note sent to local stakeholder groups and individuals at that time.