

BAT Assessment

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Environment Agency

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EPR/HP3640QD/A001 & EPR/AP3225SE/P001

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1. Introduction

The tables below provide the Best Available Technique requirements for the operations at the installation with details on how these are met. The BAT requirements have been taken from relevant guidance documents as specified below:

- Table 2.1: Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016
- Table 2.2: Inorganic Chemicals sector (EPR 4.03) guidance
- Table 2.3: 2007 European BAT Reference document (BREF) for Production of Speciality Inorganic Chemicals published 2007

In relation to the generic and management system guidance on the ‘Gov.uk’ website, their requirements outlined have been considered throughout all of the supporting documents submitted with this application. This report should be read in conjunction with the other application documents (see ITM-EP001-007 for more information), where much of the detail is provided on the facility.

2. BAT Assessment

2.1 BAT Assessment – Common Wastewater and Waste Gas Treatment in the Chemical sector

This section of the report only compares the site operations included as part of the variation against the BAT requirements as specified in *Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016*.

The comparison has been undertaken by listing the relevant BAT requirements and detailing how the site meets the criteria; the assessment is presented in Table 2.1 below. Where BAT clauses are deemed not applicable, ‘N/A’ has been inserted in the ‘Site Assessment’ column.

Table 2.1 – Best Available Techniques Assessment:		
Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016.		
BAT No.	BAT Description	Site Assessment
Environmental Management System		
BAT 1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS)	EMS certified to 14001 implemented on site.
BAT 2	BAT is to establish and to maintain an inventory of waste water and waste gas streams	Complied with – See ITM - EP001 – 011 Emissions to Water Management Plan and ITM - EP001 – 010 Emissions to Air Management Plan.
Monitoring		
BAT 3	For relevant emissions to water as identified by the inventory of waste water streams (see BAT 2), BAT is to monitor key process parameters (including continuous monitoring of waste water flow, pH and temperature) at key locations (e.g. influent to pretreatment and influent to final treatment).	Complied with - See ITM - EP001 – 011 Emissions to Water Management Plan.

Table 2.1 – Best Available Techniques Assessment:		
Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016.		
BAT 4	BAT is to monitor emissions to water in accordance with EN standards with at least the minimum frequency	Effluent covered under Trade Effluent consent with Yorkshire Water is monitored in line with requirements of the consent.
BAT 5	BAT is to periodically monitor diffuse VOC emissions to air from relevant sources by using an appropriate combination of techniques	Diffuse emissions are monitored once per year via optical gas imaging methods.
BAT 6	BAT is to periodically monitor odour emissions from relevant sources in accordance with EN standards.	n/a
Emissions to Water		
BAT 7	BAT is to reduce the volume and/or pollutant load of waste water streams, to enhance the reuse of waste water within the production process and to recover and reuse raw materials.	Water usage is reduced where possible via improvements in production processes.
BAT 8	BAT is to segregate uncontaminated waste water streams from waste water streams that require treatment	Complied with – segregated surface and effluent drains
BAT 9	BAT is to provide an appropriate buffer storage capacity for waste water incurred during other than normal operating conditions based on a risk assessment	Complied with – all process effluent is captured into IBC’s and stored in secondary containment. Buffer stock of empty IBC’s kept on site for emergencies. Surface water attention tank is present beneath the carpark and acts as buffer tank for fire water runoff in the event of an emergency.
Waste water treatment		
BAT 10	BAT is to use an integrated waste water management and treatment strategy that includes an appropriate combination of the techniques	Water usage is reduced where possible via improvements in production processes.
BAT 11	BAT is to pretreat waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment by using appropriate techniques	No pre-treatment on site, all effluent waste is processed via waste disposal company or managed under Trade Effluent consent via Yorkshire Water treatment plants.

Table 2.1 – Best Available Techniques Assessment:		
Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016.		
BAT 12	BAT is to use an appropriate combination of final waste water treatment techniques	Treatment of waste water occurs at Yorkshire Water treatment plants for water that leaves the installation under the Trade Effluent Consent. And for waste water that is removed from site in IBC's, this is treated by the waste disposal company.
Waste		
BAT 13	BAT is to set up and implement a waste management plan as part of the environmental management system	Waste Management Plan forms part of EMS which is certified to 14001 standard.
BAT 14	Use techniques to reduce volume of sludge requiring further treatment	N/a
Emissions to Air – Was Gas collection		
BAT 15	BAT is to enclose the emission sources and to treat the emissions, where possible.	Complied with see ITM - EP001 - 010
Emission to Air – Waste Gas Treatment		
BAT 16	BAT is to use an integrated waste gas management and treatment strategy that includes process-integrated and waste gas treatment techniques.	Complied with see ITM - EP001 - 010
Emission to Air - Flaring		
BAT 17	BAT is to use flaring only for safety reasons or non-routine operational conditions	N/a
BAT 18	Reduce emissions from flaring	N/a
Diffuse VOC Emissions		
BAT 19	Reduce VOC Emissions using a combination of techniques	Number of emission sources are limited to the Natgraph tunnel oven. All VOC emissions contained within extraction system for this oven. Oven has a programme of Planned Preventative Maintenance. Equipment undergoes pre-use inspections before each shift which checks the status of extraction system. Emissions test confirm no abatement required as VOC levels are below limit.
Odour Emissions		

Table 2.1 – Best Available Techniques Assessment:

Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016.

BAT 20	BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system	N/a
BAT 21	Reduce Odour emission from waste water collection and treatment	N/a
Noise Emissions		
BAT 22	BAT is to set up and implement a noise management plan, as part of the environmental management system	N/a – No Noise impacts from the installation
BAT 23	Prevent or reduce noise emissions using a combination of techniques	N/a

2.2 BAT Assessment – Inorganic Chemicals sector (EPR 4.03) guidance

This section of the report only compares the site operations included as part of the variation against the BAT requirements as specified in Inorganic Chemicals sector (EPR 4.03) guidance.

The comparison has been undertaken by listing the relevant BAT requirements and detailing how the site meets the criteria; the assessment is presented in Table 2.2 below. Where BAT clauses are deemed not applicable, ‘N/A’ has been inserted in the ‘Site Assessment’ column.

Table 2.2 – Best Available Techniques Assessment:		
Inorganic Chemicals sector (EPR 4.03) guidance.		
BAT No.	BAT Description	Site Assessment
1. Managing Activities		
1.1	Environmental Performance Indicators	Environmental performance monitored by KPI's reviewed annually in annual report
1.2	Accident Management	Environmental Accident Management Plan forms part of the EMS
1.3	Energy Efficiency	Energy is monitored monthly to review usage, energy is reduced by reducing product testing times. Equipment maintained under PPM schedule to uphold the efficiency of equipment.
1.4	Efficient use of raw materials and water	Complied with – Use of scarce PGM materials has been reduced each year in ITM products, recycling programs for PGM's have been implemented and reduction efforts are ongoing. Process improvements have driven reduction in water usage, water is recycled in testing of products.
1.5	Avoidance, recovery and disposal of wastes	Complied with – Waste Management Plan forms part of the EMS.
2. Operations		

Environmental Permit Application

Reference Number: EPR/HP3640QD/A001 & EPR/AP3225SE/P001



2.1	Design of a new process	New production processes undergo an engineering gateway process. Within this process environmental considerations are in-built at various stage gates. The lifecycle of the process is assessed for environmental impacts and mitigations for any environmental impacts are designed before the process is finalised.
2.2	Storage and handling of raw materials, products and wastes	All chemicals are stored in appropriate safe storage systems, including flammable cabinets and or bunded cabinets. Location of chemical stores are considered in relation to on site drainage and any sensitive receptors. Normal operating conditions are considered alongside emergency situation when designing appropriate storage facilities.
2.3	Plant systems and equipment	Any emissions that require abatement are fed to abatement systems. The only emissions to air from ITM Power that require abatement are acid emissions from an etching process. These emissions are fed through a wet gas scrubber as described in IMT-EP001-010 (Emissions to Air Management Plan).
2.4	Reaction Stage	All emissions to air and water from chemical reactions during the production of Ink are captured into extraction systems or IBC's. Any new processes go through the engineering gateway process, through which all environmental emissions are considered.
2.5	Separation Stage	Solvent separation process generates liquid effluent which is captured in a sealed system and removed from site as hazardous waste to be treated by a licenced waste facility. There is no discharge to drain from this process.
2.6	Purification Stage	N/a – No purification stage

Environmental Permit Application

Reference Number: EPR/HP3640QD/A001 & EPR/AP3225SE/P001



2.7	Chemical process controls	Process controls are monitored on every batch of ink produced. Process controls ensure the quality of the ink and in turn the efficient use of raw materials. Process is stopped if the process goes outside of the required controls.
2.8	Analysis	
3. Emissions and monitoring		
3.1	Point source emissions to air	Complied with – See ITM-EP001-010 Emission to Air Management Plan
3.2	Point source emissions to water	Process effluent leaves the facility by two routes, vis foul drain under trade effluent consent and vis IBC’s to be processed by water treatment and disposal companies. Treatment of waste water occurs at Yorkshire Water treatment plants for water that leaves the installation under the Trade Effluent Consent. And for waste water that is removed from site in IBC’s, this is treated by the waste disposal company.
3.3	Point source emissions to land	No direct point source emissions to land. Hazardous waste is generated and a small percentage is sent to landfill, the waste hierarchy is followed to try and eliminate hazardous waste before reducing it. Waste management plan is part of the EMS.
3.4	Fugitive Emissions to air	Fugitive emissions monitoring programme forms part of the EMS.
3.5	Odour	N/a
3.6	Noise & Vibration	N/a – No Noise impacts from the installation
3.7	Monitoring	Emissions to air are monitored as per ITM-EP001-010 Emissions Management Plan. Energy and waste are monitored monthly.

2.3 BAT Assessment – 2007 European BAT Reference document (BREF) for Production of Speciality Inorganic Chemicals

This section of the report only compares the site operations included as part of the variation against the BAT requirements as specified in 2007 European BAT Reference document (BREF) for Production of Speciality Inorganic Chemicals.

The comparison has been undertaken by listing the relevant BAT requirements and detailing how the site meets the criteria; the assessment is presented in Table 2.3 below. Where BAT clauses are deemed not applicable, ‘N/A’ has been inserted in the ‘Site Assessment’ column.

Table 2.3 – Best Available Techniques Assessment:		
2007 European BAT Reference document (BREF) for Production of Speciality Inorganic Chemicals		
BAT No.	BAT Description	Site Assessment
Generic BAT		
Raw and auxiliary materials supply, storage, handling and preparation	BAT is to reduce the amount of packaging materials disposed of by, e.g. recycling ‘hard’ and ‘soft’ used packaging materials, unless safety or hazard considerations prevent it.	All waste is processed following the waste hierarchy. Ems contains a waste management plan.
Synthesis/reaction/calcination	BAT is to reduce emissions and the amount of residues generated by implementing one or a combination of the following measures: using high purity feedstock; improving reactor efficiencies; improving catalyst systems.	Process of catalyst ink production is continually improved to reduce the amount of residue and reduce the amount of raw material used within each product.
Product handling and storage	BAT is to reduce the amount of residues generated, for example by using returnable product transportation containers/drums	Reusable jars are used within the process and product drums are sent for processing to recover raw materials back into the supply chain.
Waste gas emissions abatement	BAT conclusions and associated emission levels for the abatement of HCN, NH3, HCl and Particulate Matters (PM).	Waste HCL and H2SO4 gases are abated using a wet gas scrubber.

Environmental Permit Application

Reference Number: EPR/HP3640QD/A001 & EPR/AP3225SE/P001



Waste water management and water emissions abatement	BAT is to allocate contaminated waste water streams according to their pollutant load. Inorganic waste water without relevant organic components is segregated from organic waste water and ducted to special treatment facilities.	Complied with – segregated surface and effluent drains.
Infrastructure	BAT is to minimise diffuse dust emissions in particular from the storage and handling of materials/products	N/a – No dust emissions
Energy	BAT is to reduce the consumption of energy by optimising plant design, construction and operation, for example by using pinch methodology, unless safety issues prevent it.	Energy is monitored monthly to review usage, energy is reduced by reducing product testing times. Equipment maintained under PPM schedule to uphold the efficiency of equipment.
Cross-boundary techniques	BAT is to minimise soil and groundwater pollution by designing, building, operating and maintaining facilities, in such a way that material escapes are minimised.	Complied with see ITM-EP001-05 Environmental Risk Assessment.
Cross-boundary techniques	BAT is to have a high level of education and continuous training of personnel	The business contains a wealth of experts in Environmental systems, Health & Safety, hazardous areas, engineering, design and maintenance. A full programme of training is undertaken annually in order to maintain competency in these areas.
Cross-boundary techniques	BAT is to apply the principles of an Industry Code if available. This includes the following: applying very high standards for safety, environmental and quality aspects in the production of the SIC; carrying out activities such as auditing, certification, training of plant personnel	ITM Power maintains an integrated management certified to ISO 14001, ISO 45001 and ISO 9001.
Cross-boundary techniques	BAT is to carry out a structured safety assessment for normal operation and to take into account effects due to deviations of the chemical process and deviations in the operation of the plant. In order to ensure that a process can be controlled adequately, BAT is to apply one or more of the following techniques: organisational measures, control engineering techniques, reaction stoppers, emergency cooling, pressure resistant construction, pressure relief systems.	Full site risk assessments and HAZOPS have been conducted for all eventualities, and on-site processes designed to mitigate risks.

Environmental Permit Application

Reference Number: EPR/HP3640QD/A001 & EPR/AP3225SE/P001



Cross-boundary techniques	BAT is to implement and adhere to an EMS that incorporates, as appropriate to individual circumstances, features that include the definition of an environmental policy, planning, establishing and implementing procedures, checking performance and taking corrective action, having the management system and audit procedure examined and validated by an accredited certification body or an external EMS verifier.	EMS certified to ISO 14001 is maintained by ITM Power.
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