Installation Information

Report Ref: ITM - EP001 - 007

Submitted to:

Environment Agency

In Support of Permit Application Ref:

EPR/HP3640QD/A001 & EPR/AP3225SE/P001

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1. Introduction

1.1 Document Scope

This document provides information in support of the Environmental Permit application for ITM Power PLC, located Sheffield, Yorkshire.

The following details are provided for the applicant (as listed on the accompanying application forms):

Table 1.1: Installation Details	
Company Name	ITM Power PLC
Company Registration number	05059407
Site Address	Unit 2 & 3 Bessemer Park, Shepcote Lane, Sheffield, S9 1DZ
Grid references for the sites	SK 39894 90515 & SK 39842 90409
Environment Agency Permit Reference	EPR/HP3640QD/A001 & EPR/AP3225SE/P001

1.2 Background

ITM Power operates a hydrogen electrolyser manufacturing facility which is located off Shepcote Lane in Sheffield. The main activity undertaken at the facility is the production and testing of hydrogen electrolysers.

1.3 Permitting Requirements

The facility is required to apply for an Environmental Permit (EP) in order to ensure compliance with the Environmental Permitting (England and Wales) Regulations 2016, SI 2016/1154, as amended.

Table 1.2 below details the listed activities that currently take place at the site:

Table 1.2 – Listed Activities		
EPR Schedule Reference	**Description**	**Site Activity**
S4.2 A(1)(b)	Unless falling within any other Section, any manufacturing activity which is likely to result in the release into the air of any hydrogen halide (other than the manufacture of glass or the coating, plating or surface treatment of metal) or which is likely to result in the release into the air or water of any halogen or any of the compounds mentioned in paragraph (a)(vi) (other than the treatment of water).	The hydrochloric acid chemical milling process for removal of the metal oxide layer.
S4.2 A(1)(c)	Unless falling within any other Section, any manufacturing activity (other than the application of a glaze or vitreous enamel) involving the use of, or the use	The process using platinum-based electroplating solution for coating metal sinters.

	or recovery of, any compound of any of the following elements— (i)antimony, (ii)arsenic, (iii)beryllium, (iv)gallium, (v)indium, (vi)lead, (vii)palladium, (viii)platinum, (ix)selenium, (x)tellurium, (xi)thallium, where the activity may result in the release into the air of any of those elements or compounds or the release into water of any substance listed in paragraph 7(1) of Part 1 of this Schedule.	
S4.2 A(1)(c)	As above	Production of the catalyst coated membrane (CCM) using in-house formulated precious metal-based ink powders to print onto a non-metal substrate.

1.4 Relevant Guidance Documents

The following sector guidance documents have been considered during preparation of this application:

- Environment Agency guidance, Develop a management system: environmental permits, https://www.gov.uk/guidance/develop-a-management-system-environmental-permits;
- EA risk assessment guidance: https://www.gov.uk/guidance/risk-assessments-for-yourenvironmental-permit;
- Environment Agency guidance, Control and monitor emissions for your environmental permit
- Fugitive hydrogen emissions in a future hydrogen economy - GOV.UK (www.gov.uk) (As advised in pre-application advice ref: EPR/HP3640QD/A001)
- Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016
- Inorganic Chemicals sector (EPR 4.03) guidance available from this link: Technical guidance for regulated industry sectors: environmental permitting - GOV.UK (www.gov.uk) (As advised in pre-application advice ref: EPR/HP3640QD/A001)
- 2007 European BAT Reference document (BREF) for Production of Speciality Inorganic Chemicals published 2007
- https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit. EA risk assessment guidance: https://www.gov.uk/guidance/risk-assessments-for-yourenvironmental-Permit
- Environment Agency guidance, Control and monitor emissions for your environmental permit, https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit.

1.5 Application Structure

1.5.1 Application Documents

This application comprises a number of documents.

This Installation Information report, (ITM-EP001-007), should be read in conjunction with the following documents:

Table 1.5 Supporting Documents	
Document Reference	**Document Title**
EPR/HP3640QD/A001	EA pre-application advice response letter
EA Form Part A	About You
EA Form Part B2	General New Bespoke Permit
EA Form Part B3	New bespoke Installation
EA Form Part F1	Charges and declarations
ITM-EP001-000	Confidentiality supporting statement
ITM-EP001-001	Directors Details & DOB
ITM-EP001-002	Installation Activities
ITM-EP001-003	Site Condition Report unit 2
L15-7326	NOVA Site Inspection Report 2019
18012J-03	Discovery Ground Investigation Report 2018
L19-3070	NOVA Water Remediation Plan 2019
ITM-EP001-003A	Site Condition Report unit 3
18012J-03	Discovery Ground Investigation Report 2018
L19-3070	Phase 2 Area, site investigation, risk assessment and remediation statement
L19-3070	Phase 2 Area, controlled waters remediation methodology
L19-3070	Phase 2 Area Groundwater Remediation Validation Report
ITM-EP001-004	Site Location Plan
ITM-EP001-005	Environmental Risk Assessment
ITM-EP001-006	Environmental Accident Management Plan
ITM-EP001-007	Installation Information
ITM-EP001-008	EMS Summary
ITM-EP001-009	Non-Technical Summary
ITM-EP001-010	Emissions to Air Management Plan
ES-1429, EP1 – Acid Rinse LEV 06	Emissions Testing Report
ES-1429, EP2 – Master Etch LEV 07	Emissions Testing Report
ES-1429, EP3 – Natgraph Tunnel Oven	Emissions Testing Report
ITM-EP001-011	Emissions to Water Management Plan
ITM-EP001-011	TE Consent T-5016-23C
ITM-EP001-012	BAT Technical Standards
ITM-EP001-013	Habitat Assessment (Nature & Heritage Conservation Screening Assessment)
ITM-EP001-014	BAT Assessment
ITM-EP001-016	Noise Assessment
17220	Environmental noise report
18293	Environmental noise report (BS4142:2014+A1:2019)

ITM-EP001-018	Chemicals sector (EPR 4.03) guidance available from this link: Technical guidance for regulated industry sectors: environmental permitting - GOV.UK (www.gov.uk)
ITM-EP001-019	2007 European BAT Reference document (BREF) for Production of Speciality Inorganic Chemicals published 2007
ITM-EP001-020	Common Wastewater and Waste Gas Treatment/Management Systems in the Chemical Sector (CWW) BREF and associated BAT conclusions (BATc) published 2016

1.5.2 Report Format

This application document – Installation Information – is structured as follows:

- Introduction
- Process Description
- Emissions & Monitoring
- Raw Material Utilisation
- Wastes
- Fugitive Emissions

1.5.3 Diagrams and Plans

Report reference ITM-EP001-004 contains drawings and plans of the installation highlighting the installation boundary and further plans that show the site layout, sensitive receptors, site drainage plan and emission points.

1.5.4 Permitted Installation Boundary

The Permit Installation Boundary is shown on the 'Installation Boundary Plan' within the drawing report referenced ITM - EP001 – 004.

External yards and car parks are covered by hardstanding and served by sealed drainage systems.

2. Process Description

2.1 Process Information

ITM Power operate a hydrogen electrolyser manufacturing facility. The main activity undertaken at the facility is the production and testing of hydrogen electrolysers.

The facility can operate up to 24 hours per day, 7 days a week and 52 weeks per year. Although, the main shift patterns comprise 6am-6pm (Mon-Fri) with optional weekend working. Ancillary services such as refrigeration units operate 24/7.

The basic process steps involved in this manufacturing process are outlined in more detail below.

2.2 Basic Process Steps

1. Production of Catalyst Inks
2. Production of Catalyst Coated Membranes
3. Production of electrodes by etching, plating and welding
4. Assembly of electrolyser stacks
5. Testing of electrolyser stacks
6. Assembly of electrolyser skids
7. Assembly of electrolysers container and balance of plant
8. Testing of electrolyser

Processes 1-3 encompass all of the regulated activities that occur at the Installation, detailed flow charts for these processes and for process 4 are included in Appendices 1&2.

2.3 Ancillary Production Processes

2.3.1 Refrigeration Systems

Refrigeration systems are present on site to provide air conditioning for the offices and cooling for some of the production machinery.

2.3.1.1 Refrigeration Equipment – Maintenance and Inspection

Maintenance will be undertaken by site engineers or by appointed contracted refrigeration engineers. Site engineers perform checks on the plant on a routine basis to ensure that emergency situations do not arise.

The combination of site engineer's checks and contract checks will provide the following inspections/checks:

- Cover for all breakdown requirements
- 12 monthly servicing of all fixed F-gas units

2.3.1.2 Refrigerant Losses

There will be no storage of refrigerants on site other than what is actively used within the refrigeration plant. Records of maintenance activities will be kept on site and used to record the quantities of refrigerant gases that are used to 'top up' the various plant on site. This mass balance approach acts as an effective method of understanding what refrigerant losses there will be from the systems on site.

2.3.1.3 Records and Review

All maintenance and repair work will be logged. Records of the refrigeration gas top-up per refrigeration plant are also logged. All records are held on site. The refrigeration usage will be reviewed annually together with an assessment of the effectiveness of the maintenance contract.

2.3.2 Boilers

Heat for the offices is generated by natural gas fired boilers this is the only use of boilers on site. Production processes do not require heat or hot water and no industrial scale boilers are present on site.

2.3.3 Transformers and Switch gear

The company has their own switchgear on site. This is regularly inspected and maintained by appointed contractors and forms part of the planned preventative maintenance systems on site.

2.3.4 Extraction and Ventilation Systems

The Technology Centre and the stack assembly rooms are fitted with ventilation and extraction units. Due to the nature of the material processed, minimal odour generation occurs and extraction to odour abatement plant is not required. All equipment is maintained by either specialist contractors &/or the site engineers and forms part of the planned preventative maintenance systems on site.

2.3.5 Maintenance

Site engineers are responsible for undertaking the maintenance activities on site. Maintenance takes the form of reactive maintenance activities (reacting to breakdowns etc) and planned preventive maintenance (routine scheduling of maintenance, servicing and inspection in order to reduce breakdowns and down time). Where appropriate, the site employees suitably qualified contractors to undertake specialised items of maintenance, including PPM.

3. Emissions and Monitoring

3.1 Introduction

This section of the report identifies potential emissions from the facility and details the monitoring methods to be implement, where relevant.

3.2 Emissions to Air

Report ITM-EP001-010 Emissions to Air Management Plan provides information on the point source releases to air. The report identifies the nature of each release and also includes a location reference for those emission points, details of applicable limits and abatement measured required.

3.3 Fugitive Emissions to Air

Fugitive emissions to air for varied operations are expected to be minimal. Further detail and assessment of fugitive releases has been dealt with in the Environmental Risk Assessment (ITM-EP001-005), Environmental Accident Management Plan (ITM-EP001-006). The Environmental Management System implemented on site will include routine and documented inspections to ensure that fugitive releases are identified and rectified accordingly.

3.4 Point Source Releases to Water

There are no direct discharges of trade effluent from site to ground or surface waters. All point source releases of trade effluent are to sewer. The point source releases to sewer from site are shown on the Drainage Plan, in report reference ITM-EP001-004. A description of these is provided below.

3.4.1 Discharge Points

A summary of all drainage discharge points from site can be found in ITM-EP001-011 *Emissions to Water Management Plan.*

3.4.2 Surface Water Discharge System

The clean factory yards and road areas are covered with an impermeable surface and laid to fall to dedicated gullies fitted to the surface water drainage system. This discharges, together with roof water, direct to combined sewer.

3.4.3 Trade Effluent Discharges

Process Effluent is generated from the following areas:

- Component washing in the Turbex and Technowash parts washing machines

The process effluent is discharged to a combined sewer managed by Yorkshire Water. A trade effluent consent application for this trade effluent was submitted to Yorkshire Water via Business Stream on 26th Jan 2023. A

copy of the trade effluent application form is provided in ITM-EP001-011 Emissions to Water Management Plan.

Effluent from all other processes is currently captured in Intermediate Bulk Containers (IBC's) and removed from site as hazardous waste as described in ITM-EP001-011 Emissions to water Management Plan.

3.5 Fugitive Releases to Land and Water

The installation will undertake a thorough infrastructure monitoring programme that has been designed to ensure there is no loss of integrity to the systems designed to prevent fugitive emissions to land and to controlled waters. The infrastructure monitoring programme will form part of the Fugitive Emissions Monitoring Programme within the EMS and incorporates the elements listed below:

- Bulk storage facilities
- Impermeable surfaces
- Drainage systems

Where deficiencies are encountered these will be reported as part of the EMS using the incident and corrective action structure and repairs will be instigated.

Further detail and assessment of fugitive releases has been dealt with in the Environmental Risk Assessment (ITM-EP001-005) and Environmental Accident Management Plan (ref: ITM-EP001-006), as referenced in Section 1.5.1 of this report.

3.6 Emission Controls

Further details on the various level of control which may be required for the emissions identified above have been dealt with in more detail within the Environmental Risk Assessment (ref: ITM-EP001-005).

4. Wastes

The systems in place on site for documenting, handling and storing waste meet all BAT requirements.

4.1 Wastes

The list of waste streams identified below represents those materials which are routinely transferred off site for recovery, further treatment or disposal. The company will keep an annual inventory of waste streams within the waste management component of the EMS.

All wastes produced on site will be stored in containers that are durable for the substances stored and incompatible waste types will be kept separate. Table 4.1 below provides an overview of the waste storage facilities.

Table 4.1 - Waste streams and storage			
E.W.C	Nature of the Waste	Storage container details and location reference	Final destination
20 03 01	General Waste	40 Yard compactor	Disposal
15 01 06	Dry mixed recycling	40 Yard compactor	MRF for recycling
20 01 38	Wood Waste	40 yard RORO Skip	Recycling
17 04 07	Mixed Metals	8 yard skip	Recycling
Various*	Various Effluent waste streams	See ITM-EP001-011 Emissions to Water Management Plan	Treatment & disposal
15 01 10*	Platinum/ Iridium coated membranes	Stored in dedicated tubs in a flammable cabinet	Recovery of precious metal by evaporation & incineration

Notes:
*: Denotes 'hazardous' waste streams

4.2 Documentation

Waste documentation control forms part of the EMS on site. All waste contractors carrying and receiving waste and hazardous waste on behalf of the company will be licensed waste carriers, as appropriate.

Duty of Care transfer notes, hazardous waste documents are maintained on site and incorporated within the management system detailed in document reference ITM-EP001-008 EMS Summary.

5 Fugitive Emissions

5.1 Introduction

The following sections discuss source and control techniques for noise, dust, and odour emissions. The risk of other fugitive emissions has been dealt with in report ref ITM-EP001-005, Environmental Risk Assessment.

5.2 Noise

The installation is not inherently noisy, and noise is not considered to be an issue at this facility. The majority of process operations occur within enclosed buildings, which restricts the possibility of noise transmission.

A noise assessment has been carried out for the Installation and can be found in ITM-EP001-016 *Noise Assessment.*

5.3 Vibration

The installation is not anticipated to be a source of vibration noticeable off-site. Basically, the installation does not use equipment of the type known to be a source of external vibration, e.g., large rotating equipment (fans etc) and impulse driven machinery (hammer mills etc). What equipment there is will be installed in accordance with manufacturer's instructions to ensure that it remains well balanced and does not create vibration due to out-of-balance forces. The preventative maintenance regime will supplement this to ensure that equipment remains correctly balanced and adjusted to prevent vibrations developing.

5.4 Dust

Dust emissions are not considered to be an issue at this facility. There are no significant sources of dust at the facility from either materials or activities or due to infrastructure.

5.5 Odour

Odour is not considered to be an issue at this facility. There are no significant sources of dust at the facility from either materials or activities or due to infrastructure.