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<b>Pollution Prevention and Control (Scotland) Regulations 2012</b>	Issue Number	V2.0
<b>OFFICIAL</b>	Document Owner	[REDACTED]
<b>Application for a Permit or Variation to a PPC Part A Permit Decision Document</b>	Date of Issue	
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**Aberdeen City Council**  
**Energy Centre, The Event Complex, Forrit Burn Road Bucksburn Aberdeen.**

**Permit Application**

**PPC/A/5009808**

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## 1 Non-Technical Summary of Determination

### Provide a non-technical summary of the process and determination

The Energy Centre facility will produce hydrogen by the electrolysis of water.

The Energy Centre has two 500kW hydrogen electrolyser units that may be used to produce up to 400 kg per day of hydrogen. The produced hydrogen is compressed and stored onsite within transport compliant containers. All hydrogen produced will be transported off-site for dispensing into the hydrogen bus fleet.

Water supply - water is supplied from the Scottish Water mains supply.

Electricity for the electrolysis process is provided via a connection to the national grid.

Water emissions – wastewater from the hydrogen production installation will be discharged to Scottish Water sewer.

Air emissions – the hydrogen manufacturing process will release oxygen on a continuous basis and hydrogen and nitrogen during start-up and shutdown periods.

Odour – the hydrogen manufacturing process is not expected to be odorous.

Noise - the hydrogen manufacturing process equipment is located in enclosures so should not cause noise nuisance.

SEPA has assessed the application and considers that the proposal meets the requirements of the Pollution Prevention and Control (Scotland) Regulations 2012 and as such is minded to issue a permit.

### Glossary of Terms

BAT - Best Available Techniques

BAT-AEL - Emission levels associated with the best available techniques

BREF – Best Available Techniques Reference Document

BAT-C – Best Available Technique Conclusions

CO – Coordinating Officer

CWW BATC - Commission Implementing Decision (EU) 2016/902 of 30 May 2016 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for common waste water and waste gas treatment/management systems in the chemical sector

ELV – Emission Limit Value

H1 Risk Assessment Tool – is available at [H1 Tool | ADMLC](#).

NGR – National Grid Reference

OTNOC - Other than Normal Operating Conditions

PC – Process Contribution

Relevant Hazardous Substances - hazardous substances that are capable of contaminating soil and groundwater based upon consideration of the chemical and physical properties of the substance.

STU - Stationary Technical Unit

VOC – volatile organic compounds

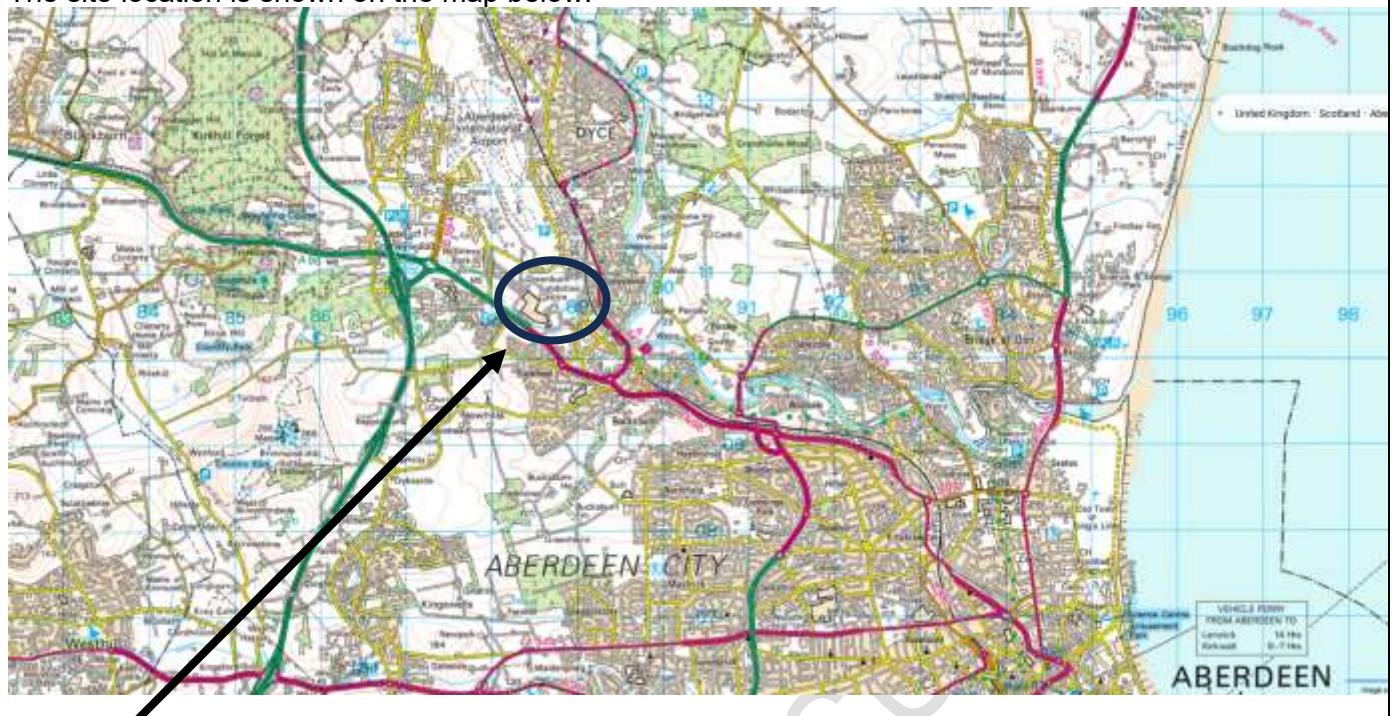
2 External Consultation and SEPA's response				
<b>Is Public Consultation Required?</b>		<b>Yes</b>		
<b>Advertisement Check:</b>	<b>Date</b>	<b>Compliance with advertising requirements</b>		
Press and Journal	08 May 2025	Yes		
Edinburgh Gazette	09 May 2025	Yes		
<b>Officer Checking advert:</b>				
<b>No of responses received</b>	None			
<b>Summary of responses and how they were taken into account during the determination:</b>				
Not applicable – no responses received				
<b>Summary of responses withheld from the public register on request and how they were taken into account during the determination:</b>				
Not applicable – no responses received				
<b>Is PPC Statutory Consultation Required?</b>		<b>Yes</b>		
Food Standards Agency:	Sent 27 March 2025 – no response received			
Health Board:	Sent 27 March 2025 – no response received			
Local Authority	Sent 27 March 2025 Response received on 01 April 2025 - "The Council in its capacity as planning authority has no comment to make on the permit application."			
Scottish Water	Sent 27 March 2025 Response received on 01 April 2025 – "Drinking Water Protected Areas A review of our records indicates that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity."			
Health and Safety Executive	Not required to be consulted as (i) it is not a nuclear site licence is required under section 1 of the Nuclear Installations Act 1965, (ii) a major accident prevention policy document is not required under regulation 5 of the Control of Major Accident Hazards Regulations 1999 and (iii) a safety report is not required under regulation 7 of those Regulations.			
NatureScot	Not required to be consulted as site will not affect a site in Scotland			
<b>Discretionary Consultation required?</b> (if yes provide justification and details below, otherwise delete row)		<b>No</b>		
<b>Enhanced SEPA Consultation required?</b> (if yes provide justification and details below, otherwise delete row)		<b>No</b>		
<b>"Off site" consultation required</b> (if yes provide justification and details below, otherwise delete row)		<b>No</b>		
<b>Transboundary Consultation required?</b> (if yes provide justification and details below, otherwise delete row)		<b>No</b>		
<b>Is Public Participation Consultation Required?</b> (if yes provide justification and details below, otherwise delete rows below)		<b>Yes</b>		
Public Participation Consultation required for new permits.				

<b>Date SEPA notified applicant of draft determination</b>	16 December 2025.
<b>Date draft determination placed on SEPA's Website</b>	See SEPA consultation hub page
<b>Details of any other 'appropriate means' used to advertise the draft.</b>	Not applicable
<b>Date public consultation on draft permit opened</b>	See SEPA consultation hub page
<b>Date public consultation on draft permit consultation closed</b>	See SEPA consultation hub page
<b>Number of representations received to the consultation</b>	To be completed post consultation
<b>Date final determination placed on the SEPA's Website</b>	To be completed once final determination completed
<b>Summary of responses and how they were taken into account during the determination:</b>	
To be completed post consultation	

<b>3 Administrative determinations</b>
<b>Determination of the Schedule 1 Activity</b>
The application is for a facility to manufacture hydrogen, this is covered by Section 4.2 Inorganic Chemicals Part A (a) (i) "Producing inorganic chemicals including – inorganic substances, including those in gaseous form, such as ... hydrogen ..."
<b>Determination of the Stationary Technical Unit to be permitted</b>
The Stationary Technical Unit (or STU) comprises water purification, an alkaline electrolyser system (2 x 500 kW) capable of producing up to 400 kg of hydrogen per day and hydrogen compression and compressed gas storage.
<b>Determination of Directly Associated Activities</b>
The Directly Associated Activities (or DAAs) includes the provision of services to the stationary technical unit (including electricity import).
On this basis the following will be inserted into Schedule 1 of the Permit as Table 1:
<b>Table 1 Installation</b>
<b>Activities:</b>
The production of hydrogen by the electrolysis of water and any directly associated activities as further detailed in this authorisation falling within Schedule 1, Part 1 Chapter 4 Part A Section 4.2 (a) (i) of the Regulations.
<b>Stationary Technical Unit:</b>
Water purification. Alkaline electrolyser system (2 x 500 kW) capable of producing up to 400 kg of hydrogen per day. Hydrogen compression and compressed gas storage.
<b>Directly Associated Activities:</b>
The provision of services to the stationary technical unit (including electricity import).

## Determination of Site Boundary

The site location is shown on the map below:



### Site location

The PPC installation is shown in red on the site plan attached as Appendix B to this document. This plan has been included in the permit as Appendix 1 – Plan of the Authorised Place.

A plan showing the location of emission points to air is attached as Appendix C to this document. This plan has been included in the permit as Appendix 2 – Emission point location plan.

## 4 Introduction and Background

### 4.1 Historical Background to the activity and variation

This is a new application.

### 4.2 Description of activity

The site is located on the north eastern side of Aberdeen City.

The Energy Centre has two 500kW hydrogen alkaline electrolyser units that may be used to produce up to 400 kg per day of hydrogen. The produced hydrogen is compressed and stored onsite within transport compliant containers. The storage will be filled and transported to First Bus King St depot for dispensing into the hydrogen bus fleet.

### 4.3 Outline details of the Variation applied for

Not applicable – this is a new application.

### 4.4 Guidance/directions issued to SEPA by the Scottish Ministers under Reg.60 or 61.

Not applicable.

### 4.5 Identification of important and sensitive receptors

The facility is located close to the city of Aberdeen.

## 5 Key Environmental Issues

### 5.1 Summary of significant environmental impacts

Due to the nature of the process, routine impacts from the facility should be limited to wastewater emitted to sewer, oxygen emitted to the air and noise from the process equipment (limited by it being in a designed enclosure).

During start-up and shutdown, hydrogen and nitrogen will also be emitted to air.

### 5.2 Emissions to Air

Point Source emission to air:

The emission points from the facility are listed in the table below and locations are shown on the site plan in Appendix B:

There are 7 emission points to air:

- P1 – electrolyser 1 vent (Hydrogen and Nitrogen)
- P2 – electrolyser 1 vent (oxygen)
- P3 – electrolyser 2 vent (Hydrogen and Nitrogen)
- P4 – electrolyser 2 vent (oxygen)
- P5 – PSV compressor (hydrogen)
- P6 – ISP container PSV (hydrogen)
- P7 – filler panel vent (hydrogen and nitrogen)

#### Routine emissions:

There are only 2 routine point source emissions to air from the facility (P2 and P4), one for each electrolyser.

Emissions will be oxygen, which is generated through the splitting of water into hydrogen and oxygen by electrolysis. There are no environmental assessment levels for oxygen in the H1 risk assessment tool and as oxygen and nitrogen are the main constituents of air, the releases would not cause any significant changes to the air quality in the local area. Oxygen will need to be released in a controlled manner in order to meet health and safety guidelines.

#### Non-routine emissions:

Emissions via emission points P1, P3, P5, P6 & P7 will be infrequent emissions of hydrogen and nitrogen. Hydrogen will be released in the event of start-up, shut-down and emergency scenarios, nitrogen will be released during purging operations (e.g. start-up, shut-down, prior to and post maintenance or emergency scenarios).

There are no environmental assessment levels for hydrogen, or nitrogen in the H1 risk assessment tool and as oxygen and nitrogen are the main constituents of air, the nitrogen releases would not cause any significant changes to the air quality in the local area. Hydrogen will need to be released in a controlled manner in order to meet health and safety guidelines and again is not expected to cause any significant changes to the air quality in the local area. It is recognised that hydrogen is an indirect greenhouse gas.

There are no specific emission limit values associated with emissions of oxygen, hydrogen or nitrogen. However, the Regulation 22 (i) states that "It is a condition of a permit for a Part A...installation...that the operator must use the best available techniques for preventing or, where that is not practicable, reducing emissions from an installation or mobile plant."

Further controls to minimise emissions of hydrogen and nitrogen are present in the restrictions on start-up and shut down via Conditions 3.1.1 and 3.1.2;

3.1.1 The number of start-ups and shut-downs should be kept to the minimum that is reasonably practicable.

3.1.2 All reasonable steps must be taken to minimise emissions during start up and shut-down.

The emission points above will be specified in the permit as table 2 below:

**Table 2 Emissions: limits and monitoring requirements – Air**

Substance	Emission Limit Value (Units)	Emission point reference number	Emission source	Operational mode	Monitoring frequency	Reference period	Monitoring method
Hydrogen	No limit set	P1	Electrolyser 1	Purging, recommissioning, de-pressurisation and emergency venting	-	-	-
		P3	Electrolyser 2	Purging, recommissioning, de-pressurisation and emergency venting	-	-	-
		P5	Compressor	Recommissioning, de-pressurisation and emergency venting	-	-	-
		P6	Hydrogen storage	Emergency venting	-	-	-
		P7	Hydrogen storage	Storage commissioning & maintenance	-	-	-
Oxygen	No limit set	P2	Electrolyser 1	Normal operation	-	-	-
Oxygen	No limit set	P4	Electrolyser 2	Normal operation	-	-	-
Nitrogen	No limit set	P1	Electrolyser 1	Purging	-	-	-
Nitrogen	No limit set	P3	Electrolyser 2	Purging	-	-	-
Nitrogen	No limit set	P7	Hydrogen storage	Storage commissioning & maintenance	-	-	-

Given the nature of the facility i.e. the commercial production of hydrogen for transport, it is expected that the Operator will take all appropriate and reasonable measures to minimise venting of hydrogen in line with Regulation 22 (i). This is required by the standard permit condition 2.5.1:

2.5.1 The authorised activities must be undertaken in a manner that uses resources efficiently and minimises the production of waste.

The Operator will be expected to demonstrate that they are monitoring resource use by reporting annual mass emissions data specified in the permit as table 3 below:

**Table 3 Mass emissions: reporting requirements – Air**

Substance	Combined Emissions Points	Method (Summary)	Mass Emissions result to be recorded as:
Hydrogen	P1, P3, P5, P6 & P7	Amount of hydrogen produced minus the sum of the amount of hydrogen exported and the amount of fugitive hydrogen emissions.	kg
Oxygen	P2 & P4	Calculated from the amount of hydrogen produced.	kg
Nitrogen	P1, P3 & P7	Amount of nitrogen used for purging.	kg

## Fugitive emissions to air:

Regulation 22 (i) states that "It is a condition of a permit for a Part A...installation...that the operator must use the best available techniques for preventing or, where that is not practicable, reducing emissions from an installation or mobile plant."

As regards fugitive emissions the Operator must demonstrate that fugitive emissions are prevented or, where that is not practicable, reduced. This is required by the standard template conditions 3.8.1 and 3.8.2:

3.8.1 Measures must be taken to ensure that fugitive emissions or leaks of hydrogen are prevented.

3.8.2 An ongoing on-going annual Leak Detection and Repair Programme (LDAR) designed to reduce fugitive emissions to air from the production plants, pipes and tanks must be implemented and maintained.

## Odour:

There are no anticipated odour sources, therefore the standard template requirements for odour control in conditions 3.2.1 and 3.2.3 will be used:

3.2.1 Measures must be taken to prevent, or where that is not practicable, minimise:

(a) odour;  
(b) noise;  
arising from the authorised/permited activities; and

3.2.3 Offensive odours from the authorised activities as perceived by a SEPA officer must not be emitted beyond the boundary of the authorised place.

BAT 20 of the CWW BAT-C, requires that the EMS to contain an odour management plan and so one does not need to be specified in the permit conditions.

## 5.3 Emissions to Water

### Point Source Emissions to Surface Water and Sewer:

There is one point source emission point from the installation to the Scottish water sewer system.  
Emission point NGR: NJ 88365 10511.

Scottish Water issued a discharge authorisation (80989A/01/LOA) on 23 July 2025 based on a maximum discharge of up to 2.75 m<sup>3</sup>/day. This is less than the amount applied for (120 l/h i.e. 2.88 m<sup>3</sup>/day).

Scottish Water have not required any monitoring to be undertaken.

The authorisation contains the following restrictions:

- The effluent shall consist solely of wastewaters derived from deionised water production at the hydrogen plant.
- There shall be eliminated from the effluent before it enters the sewer, any matter or constituent which, either alone or in combination with any matter with which it is likely to come into contact while passing through any sewers, would be likely to injure or obstruct those sewers or make specially difficult or expensive the treatment or disposal of the sewage from those sewers, or be prejudicial to health.
- The effluent shall be free from petroleum spirit, solvents and any other flammable materials.

It is a requirement of BAT that the discharge and treatment of any effluent discharged to sewer is equivalent to the requirements of the Commission Implementing Decision (EU) 2016/902 of 30 May 2016 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for common wastewater and waste gas treatment/management systems in the chemical sector [subsequently referred to as the CWW BATC].

The CWW BATC specify BAT-AELs which apply where emissions are above mass emission trigger limits.

The applicant has reviewed emissions against these trigger limits. This assessment shown in the table below uses maximum expected design figures:

	Max. reject stream composition (mg/l)	Trigger level (kg/yr)	Annual emission (kg/yr)	Does the annual emission exceed the trigger level?
Total organic carbon	5.4	3300	5.7	No
Chemical oxygen demand	0	10000	0.0	No
Total suspended solids	0	3500	0.0	No
Total nitrogen	8.1	2500	8.5	No
Total inorganic nitrogen	8.1	2000	8.5	No
Total phosphorus	0	300	0.0	No
Adsorbable organically bound halogens	0.4	100	0.42	No

	Max. reject stream composition (µg/l)	Trigger level (kg/yr)	Annual emission (kg/yr)	Does the annual emission exceed the trigger level?
Chromium	1.8	2.5	0.0	No
Copper	390	5	0.4	No
Nickel	2.4	5	0.0	No
Zinc	0	30	0.0	No

As the trigger limits are not exceeded there is no requirement for SEPA to set ELVs based on the Emission levels associated with the Best Available Techniques (BAT-AELs) as they do not apply. Provided that the effluent consists solely of wastewaters derived from deionised water production at the hydrogen plant then a discharge consent in this permit is not considered to be necessary.

#### Point Source Emissions to Groundwater:

Not applicable – there are no point source emissions to Groundwater.

#### Fugitive Emissions to Water:

Not applicable – surface water is captured and discharged to Sewer.

#### 5.4 Noise

##### Normal operation:

The applicant has carried out a Noise Impact Assessment (NIA) in line with a range of methodologies including BS 4142:2014 as part of an assessment of a wider proposal for the Exhibition and Conference Centre (see Chapter 14 of the Environmental Impact Assessment). Due to their small scale, the fact that the hydrogen units are containerised and the range of other noise sources at the Exhibition centre site, it is not expected that noise emissions will impact of local receptors.

The design of the facility is in line with the techniques indicated in the CWG BAT-C BAT 22 (see Appendix A below).

The standard template clearly sets out the requirements for noise control in conditions 3.2.1 and 3.2.4: 3.2.1 Measures must be taken to prevent, or where that is not practicable, minimise:

- (a) odour;
- (b) noise;

arising from the authorised/permited activities.

3.2.4 Noise from the authorised activities, which has a significant impact on the environment, people or property, must not be emitted beyond the boundary of the authorised place.

BAT 22 of the CWW BAT-C, requires the EMS to contain a noise management plan and so one does not need to be specified in the permit conditions.

## 5.5 Resource Utilisation

### Water use

Water is the raw material for the manufacture of hydrogen using electrolyser technologies. The standard template condition already contains condition 2.4.1 that requires that water be used efficiently:

2.4.1 The authorised activities must be undertaken in a manner that uses resources efficiently and minimises the production of waste.

No further conditions are considered to be required.

### Energy use and generation

The TECA facility will be powered by electricity from the mains supply.

The Operator is required to record and report electricity use as part of the resource efficiency requirements of Conditions 7.2.

No further conditions are considered to be required.

### Raw Materials Selection and Use

There are a limited number of raw materials, most of which are required due the technology chosen (alkaline electrolyser) - water, potassium hydroxide solution [also called lye solution], nitrogen, oils and potentially water purifier cleaning products. Therefore, alternatives are not possible.

## 5.6 Waste Management and Handling

### Waste Minimisation

Other than municipal type waste generated by staff working on the site the only waste produced by the site will be during maintenance. Wastes produced by maintenance should be managed through appropriate maintenance procedures, developed as required, to reflect the maintenance activities to be undertaken at the time.

BAT 1 of the CWG BAT-Cs require the EMS to contain a waste management plan, so there is no need to specify one in permit conditions.

### Waste Handling

See waste minimisation.

### Waste Recovery or Disposal

See waste minimisation.

## 5.7 Management of the site

### Environmental Management System

FES FM Limited manage the day to day running of the Installation under Aberdeen City Council's control. Therefore, Aberdeen City Council are the Operator.

FES FM Limited have an Environmental Management System (EMS) which is compliant with ISO 14001. The application indicates that the EMS will be in line with the requirements of BAT 1 of both the CWW and CWG BAT-C (see Appendix A below).

Standard conditions 2.2 Management Systems will be included as follows:

2.2.1 The Permitted Installation must be managed and operated in accordance with a written management system.

2.2.2 The written management system required by Condition 2.2.1 must be implemented immediately after Commissioning has concluded.

2.2.3 The written management system must be reviewed as required and at least once every 4 years. All reviews must be recorded, and the results of any review incorporated into the written management systems, and implemented, within a period of three months from the end of the review.

#### Accidents and their Consequences

The PPC Regulations contain a general principle that “— installations should be operated in such a way that ... the necessary measures are taken to prevent accidents and limit their consequences.” FES FM Limited’s Environmental Management System (EMS) clearly identifies a commitment to “Dealing with environmental emergencies by developing emergency procedures.” An emergency plan and a fire risk assessment were provided as part of the application package.

The main accident risk from an environmental perspective is a release of potassium hydroxide solution, during any temporary storage (replacement, refresh etc during maintenance activities). The containment arrangements for these maintenance activities will be inspected when the facility is brought into operation.

To cover this circumstance the standard liquid storage condition 5.1.1 has been included as follows:

5.1.1 Containers used for the storage of liquids must be stored within a bund / secondary containment system that must:

a. hold at least:

- (i) for a single container, 110% of its total capacity; or
- (ii) for two or more containers the greater of:
  - 1) 110% of the capacity of the largest container; or
  - 2) 25% of the capacity of all containers together.

b. catch all spills from the container(s) and related parts;

c. be leak-proof;

d. be located and/or protected, to prevent damage as far as reasonably practicable;

e. be stored away from sources of heat; and

f. have any spills and/or rainwater removed as soon as reasonably practicable.

BAT 1 of the CWG BAT-Cs require the EMS to contain an OTNOC management plan for emissions to air, so there is no need to specify one in permit conditions.

Additional requirements may be triggered by the Control of Major Accident Hazards (COMAH) Regulations 2015 if the quantity of hydrogen stored on site exceeded the lower tier threshold of 5 tonnes. The standard condition in the “low-risk production of hydrogen by electrolysis of water” template is that “the volume of hydrogen stored at the installation at any one time must not exceed 2 tonnes” as there are no extra precautions that need to be put in place to allow the storage of less than 1 tonne (1000 kg), Condition 5.2.1 has been changed to the following:

5.2.1 The volume of hydrogen stored at the installation at any one time must not exceed 1000 kg.

#### Closure

There are no specific closure/decommissioning requirements arising at this time so the standard conditions will be inserted into the permit as follows:

#### 2.3 Decommissioning

2.3.1 SEPA must be notified if there is a planned cessation of all, or any part of authorised activities for any period exceeding 12 months.

2.3.2 On final cessation of activities, measures must be taken to return to the installation to a satisfactory state.

## 5.8 Site Condition report

The authorised location is a brownfield site which comprises land incorporating space associated with the Rowett Institute (University of Aberdeen) and other organisations.

A site condition report was provided with the application (See both the Aberdeen Exhibition and Conference Centre – Environmental Impact Assessment and the Ground Investigation documents provided with the application).

There will be limited relevant hazardous substances present on site: potassium hydroxide solution, oils. The applicant has not installed boreholes and it is noted that there are no specific test method standards for potassium hydroxide.

Due to the fact that the unit is containerised and on hardstanding, it is not expected that the installation will have any emissions to soil and groundwater. To ensure that the hardstanding is kept in good condition the following standard condition is included in the permit:

7.3.1 At least every four years, an assessment of the condition of the installation and infrastructure designed to prevent emissions from the installation to soil and groundwater must be undertaken and reported to SEPA. The assessment report must include:

- (a) a review of the effectiveness of the infrastructure designed to prevent emissions to soil and groundwater;
- (b) a review of records of any management actions or procedures used to prevent emissions to soil and groundwater and an assessment of their effectiveness;
- (c) details of any actions required to maintain the infrastructure so that it prevents emissions to soil and groundwater;
- (d) a CCTV, video or appropriate equivalent survey of the drainage systems and process area to ensure their structural integrity and to identify any remedial actions required;
- (e) the details of corrective actions required to remedy any contamination that has occurred as a result of the authorised activities; and
- (f) the details of any additional measures that are required to prevent emissions to soil and groundwater.

## 5.9 Monitoring

### Air

Hydrogen production system – no monitoring required to be specified in the permit. The Operator may carry out monitoring for the purposes of efficient and safe operation.

Conditions 3.4.3 and 3.4.4 will be inserted into the permit requiring the Operator to report on mass emissions of hydrogen and oxygen to air so that the overall impact of the facility can be reviewed:

3.4.3 The Operator shall record and report the mass emission results for the parameters of the combined emissions specified in Table 3 using the method agreed in writing with SEPA (as summarised in Table 3). This information shall be reported in a format agreed in writing with SEPA.

3.4.4 Information used to estimate mass emissions in compliance with Condition 3.4.3 shall be recorded for each estimate.

Table 3 – Mass emissions: reporting requirements - Air

Substance	Combined Emissions Points	Method (Summary)	Mass Emissions result to be recorded as:
Hydrogen	P1, P3, P5, P6 & P7	Amount of hydrogen produced minus the sum of the amount of hydrogen exported and the amount of fugitive hydrogen emissions.	kg
Oxygen	P2 & P4	Calculated from the amount of hydrogen produced.	kg
Nitrogen	P1, P3 & P7	Amount of nitrogen used for purging.	kg

Water

No monitoring required to be specified in the permit. The Operator may carry out monitoring for the purposes of efficient and safe operation.

Soil and Groundwater

The standard soil and groundwater monitoring conditions are included as condition 4.2 of the permit. Due to the limited relevant hazardous substances present on site: potassium hydroxide solution and the nature of the site it is considered that an appropriate monitoring period for groundwater is every five years and soil every 10 years – these have been incorporated into the standard conditions.

Waste

See section 5.6 above.

**5.10 Consideration of BAT and compliance with BAT-Cs if appropriate**

See appendix A.

**6 Other Legislation Considered**

**Nature Conservation (Scotland) Act 2004 & Conservation (Natural Habitats &c.) Regulations 1994**

**Is there any possibility that the proposal will have any impact on site designated under the above legislation?**

No

If yes, provide information on the action and justification below:

The potential impact on Habitats sites was considered. NatureScot were not consulted on the application (see section 2) as it was not considered that any designated sites would be impacted from emissions from the installation, as follows:

Air emissions:

In this application the only pollutants realised by the hydrogen production process to air are hydrogen, oxygen and nitrogen, none of these are the main pollutants of concern for a Habitats assessment.

Water emissions

There are no direct emissions to water.

**Is there any other legislation that was considered during determination of the permit (for example installations that may be impacted by the requirements of legislation involving Animal By Products, Food Standards, Waste, WEEE regulations etc).**

No

If yes, provide information on the legislation, action and justification below:

## 7 Environmental Impact Assessment and COMAH

**How has any relevant information obtained or conclusion arrived at pursuant to Articles 5, 6 and 7 of Council Directive 85/337/EEC on the assessment of the effects certain public and private projects on the environment been taken into account?**

Not applicable

**How has any information contained within a safety report within the meaning of Regulation 7 (safety report) of the Control of Major Accident Hazards Regulations 1999 been taken into account?**

Not applicable – the site does not exceed the qualifying thresholds in the Control of Major Accident Hazards Regulations or the requirement for a Hazardous Substances Consent.

## 8 Details of the permit

**Do you propose placing any non standard conditions in the Permit?**

**No**

**Do you propose making changes to existing text, tables or diagrams within the permit?**

**No**

## 9 Emission Limit Values or Equivalent Technical Parameters/Measures

**Are you are dealing with either a permit application, or a permit variation which would involve a review of existing ELVs or equivalent technical parameters?**

**No**

## 10 Peer Review

**Has the determination and draft permit been Peer Reviewed?**

**Yes**

## 11 Final Determination

**Issue a Permit** – Based on the information available at the time of the determination SEPA is satisfied that

- The applicant will be the person who will have control over the operation of the installation/mobile plant;
- The applicant will ensure that the installation/mobile plant is operated so as to comply with the conditions of the Permit;
- That the operator is in a position to use all appropriate preventative measures against pollution, in particular through the application of best available techniques; and
- That no significant pollution should be caused.

## Appendix A – Compliance with relevant BAT Conclusions

### 1. Primary Activity

The primary activity at the installation is the production of hydrogen by electrolysis of water as described in Schedule 1, Part 1, Chapter 4, Section 4.2 (a)(i) of the Regulations. This activity is covered by a number of BAT Conclusions (BATC).

The Large Volume Inorganic Chemicals BATCs have not yet been published but the following applicable BATCs have been published and are reviewed below:

[Common waste gas management and treatment systems in the chemical sector](#)

[Common waste water and waste gas treatment/management systems in the chemical sector](#)

### 2. Common waste gas management and treatment systems in the chemical sector BAT-C compliance assessment:

BATC	Description	Summary of BATC and discussion	Complies with BATC?
1	Environmental Management Systems (EMS)	In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates all of the listed features. See section 5.7 of main document.	Yes
2	Inventory of air emissions	In order to facilitate the reduction of emissions to air, BAT is to establish, maintain and regularly review (including when a substantial change occurs) an inventory of channelled and diffuse emissions to air, as part of the environmental management system (see BAT 1), that incorporates all of the listed features. See section 5.2 of main document.	Yes
3	Other than Normal Operating Conditions (OTNOC).	In order to reduce the frequency of the occurrence of OTNOC and to reduce emissions to air during OTNOC, BAT is to set up and implement a risk-based OTNOC management plan as part of the environmental management system (see BAT 1) that includes all of the listed features. The hydrogen production process is a relatively simple process, hydrogen production can be stopped by cutting off the supply of electricity to the electrolyzers, so other than normal operating conditions should be very limited. An EMS is required by Conditions 2.2, this should be inspected to ensure that it includes all relevant features as a relevant risk based OTNOC management plan.	Yes
4	Integrated waste gas management and treatment strategy.	In order to reduce channelled emissions to air, BAT is to use an integrated waste gas management and treatment strategy that includes, in order of priority, process integrated recovery and abatement techniques. See section 5.2 of main document. The hydrogen	Yes

<b>BATC</b>	<b>Description</b>	<b>Summary of BATC and discussion</b>	<b>Complies with BATC?</b>
		production process is a relatively simple process with limited air emissions of substances which although they have process safety concerns, are relatively benign to the environment. As such waste gas treatment is not required	
5	Minimisation of emission points.	In order to facilitate the recovery of materials and the reduction of channelled emissions to air, as well as to increase energy efficiency, BAT is to combine waste gas streams with similar characteristics, thus minimising the number of emission points. See section 5.2 of main document.	Yes
6	Waste gas treatment system design.	In order to reduce channelled emissions to air, BAT is to ensure that the waste gas treatment systems are appropriately designed (e.g. considering the maximum flow rate and pollutant concentrations), operated within their design ranges, and maintained (through preventive, corrective, regular and unplanned maintenance) so as to ensure optimal availability, effectiveness and efficiency of the equipment. See section 5.2 of main document.	Yes
7	Monitoring of key process parameters.	BAT is to continuously monitor key process parameters (e.g. waste gas flow and temperature) of waste gas streams being sent to pretreatment and/or final treatment. See section 5.2 of main document.	Yes
8	Monitoring of emissions to air.	BAT is to monitor channelled emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. None of the substances listed in BAT 8 are emitted from the process and therefore no monitoring requirements are defined based on the BAT-Cs.	Yes
9		This BAT-C applies to organic compounds sent to the final waste gas treatment. As no organic compounds are emitted from the process, this BAT-C is not applicable.	N/A
10	Energy efficiency in relation to final waste gas treatment.	In order to increase energy efficiency and to reduce the mass flow of organic compounds sent to the final waste gas treatment, BAT is to send process off-gases with a sufficient calorific value to a combustion unit that is, if technically possible, combined with heat recovery. BAT 9 has priority over sending process off-gases to a combustion unit. Whilst gases with sufficient calorific content can be emitted from the process, this only occurs in the event of an emergency and prior to maintenance which will occur once annually. A combustion unit would not be suitable for very occasional and emergency use. For these purposes a safety vent has been specified and is regarded as BAT.	Yes
11		This BAT-C applies to channelled emissions to air of organic compounds, As there are no emissions of organic compounds to air from the facility, the BAT-C is not applicable.	N/A

BATC	Description	Summary of BATC and discussion	Complies with BATC?
12		This BAT-C applies to channelled emissions to air of PCDD/F from thermal treatment of waste gases containing chlorine and/or chlorinated compounds. As there is no thermal treatment at the facility, the BAT-C is not applicable.	N/A
13-14		These BAT-Cs apply to emissions of dust and particulate-bound metals. As there are no emissions of dust and particulate-bound metals to air from the facility, the BAT-C is not applicable.	N/A
15	Resource efficiency in relation to waste gas treatment.	In order to increase resource efficiency and to reduce the mass flow of inorganic compounds sent to the final waste gas treatment, BAT is to recover inorganic compounds from process off-gases by using absorption and to reuse them. Inorganic gases (hydrogen, oxygen, nitrogen) will be emitted from the process. Emission of hydrogen and nitrogen only occur in the event of an emergency and prior to maintenance which will occur once annually. Given the infrequent nature and emission profile recovery is impractical and release via a safety vent is regarded as BAT. Oxygen produced as a by-product from the process will be routinely vented to atmosphere, this is normal for hydrogen plants of this type unless a suitable user is sited locally and is therefore considered to be BAT. Through the resource efficiency review SEPA will expect the Operator to continue to look for possible uses for capture/re-use of this stream	Yes
16		This BAT-C applies to channelled emissions to air of CO, NOX and SOX from thermal treatment. As there is no thermal treatment at the facility, the BAT-C is not applicable.	N/A
17		This BAT-C applies to channelled emissions to air of ammonia from the use of selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) for the abatement of NOX emissions (ammonia slip). As neither SCR or SNCR are required to be used at the facility the BAT-C is not applicable.	N/A
18		This BAT-C applies to channelled emissions to air of inorganic compounds other than channelled emissions to air of ammonia from the use of selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) for the abatement of NOX emissions, channelled emissions to air of CO, NOX and SOX from the use of thermal treatment, and channelled emissions to air of NOX from process furnaces/heaters. As none of these techniques are required to be used at the facility the BAT-C is not applicable.	N/A
19-23		These BAT-Cs apply to emissions of Volatile organic compounds. The facility does emit volatile organic compounds and so the BAT-Cs are not applicable.	N/A
24-35		These BAT-Cs apply to the production of polymers and synthetic rubbers and so are not applicable to hydrogen production	N/A

BATC	Description	Summary of BATC and discussion	Complies with BATC?
36		This BAT-C applies to process furnaces and heaters, the facility does not have either a furnace or a heater and so the BAT-C is not applicable.	N/A

**3. Common waste water and gas treatment/management systems in the chemical sector BAT-C compliance assessment:**

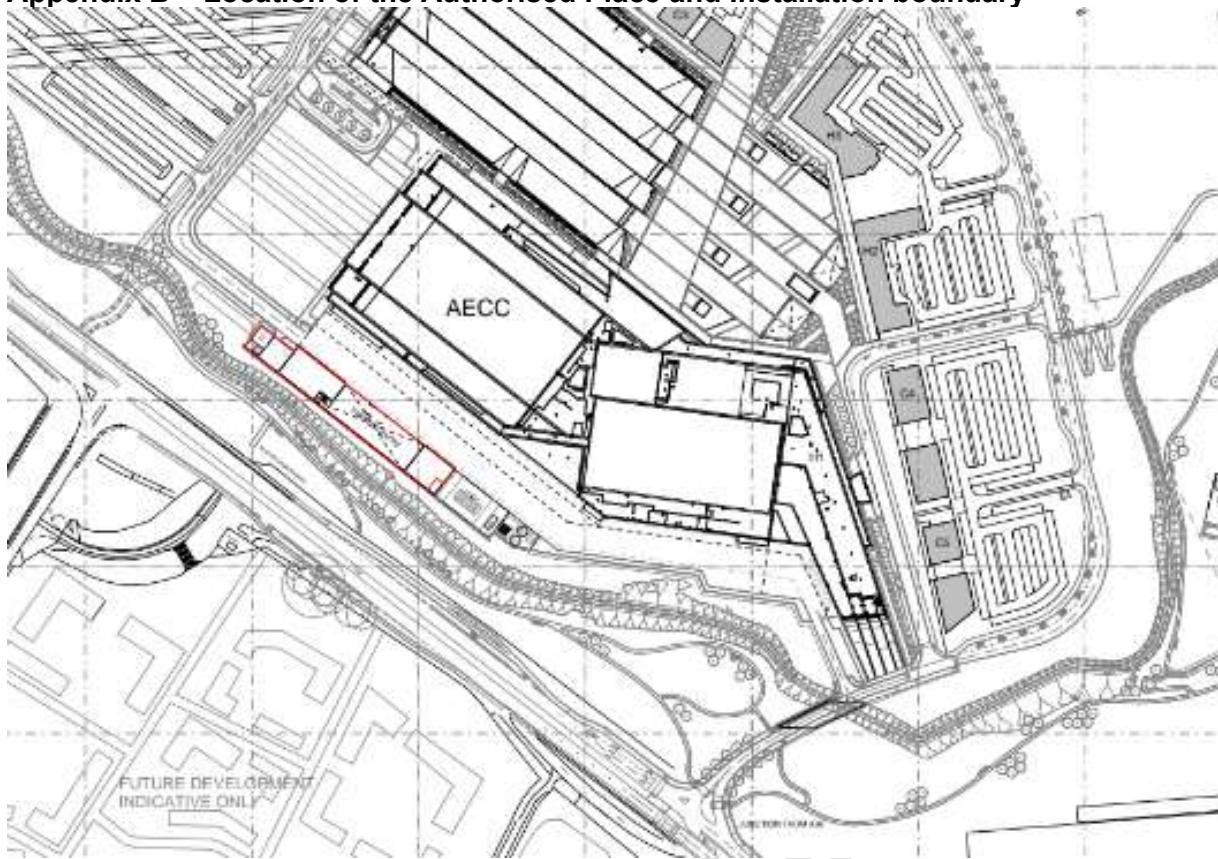
BATC	Description	Summary of BATC and discussion	Complies with BATC?
1	Environmental Management Systems (EMS)	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the listed features: See section 5.7 of main document.	Yes
2	Establish and to maintain an inventory of waste water and waste gas streams.	In order to facilitate the reduction of emissions to water and air and the reduction of water usage, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the listed features.	Yes
3	Monitoring key process parameters.	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). As no emission limit values have been set based on BAT-AELs and that the wastewater streams will be discharged into a trade effluent sewer regulated by Scottish Water, no monitoring requirements have been set in the permit. However, to ensure that emissions are minimised and remain below the BAT-AEL threshold levels annual reporting has been required.	Yes
4	Monitoring of emissions to water.	BAT is to monitor emissions to water in accordance with EN standards with at least the minimum frequency given below. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. As the emissions are at very low levels and well below that BAT-AEL application thresholds, no monitoring requirements have been set in the permit, but to ensure that emissions are minimised and remain below the BAT-AEL threshold levels annual reporting has been required.	Yes
5		This BAT-C applies to diffuse VOC emissions to air. As there are no VOC emissions from the facility the BAT-C is not applicable.	N/A
6	Monitoring of odour emissions.	BAT is to periodically monitor odour emissions from relevant sources in accordance with EN standards. The hydrogen production process will not result in the generation of odour as	Yes

<b>BATC</b>	<b>Description</b>	<b>Summary of BATC and discussion</b>	<b>Complies with BATC?</b>
		hydrogen is odourless. Given the enclosed nature of the process and the maintenance systems described in the application, this is regarded as BAT for the installation and monitoring to EN standards is not required.	
7	Reduction in the usage of water and the generation of waste water.	In order to reduce the usage of water and the generation of waste water, 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. Given that water is the main raw material feed for the process, the amount of wastewater is directly related to the amount of hydrogen produced. Efficient operation of the water preparation process should ensure that water is not unnecessarily sent to sewer	Yes
8	Segregation of uncontaminated waste water streams from waste water streams that require treatment.	In order to prevent the contamination of uncontaminated water and to reduce emissions to water, BAT is to segregate uncontaminated waste water streams from waste water streams that require treatment. Wastewater is segregated from surface water and they are disposed of independently so that resources are not wasted treating uncontaminated surface water run-off.	Yes
9	Prevention of uncontrolled emissions to water.	In order to prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for waste water incurred during other than normal operating conditions based on a risk assessment (taking into account e.g. the nature of the pollutant, the effects on further treatment, and the receiving environment), and to take appropriate further measures (e.g. control, treat, reuse). As the wastewater streams will be discharged into a trade effluent sewer regulated by Scottish Water, and the fact that if the process stops the production of wastewater stops, no additional buffer storage is considered necessary.	Yes
10	Integrated waste water management and treatment strategy.	In order to reduce emissions to water, BAT is to use an integrated waste water management and treatment strategy that includes an appropriate combination of the listed techniques. See section 5.3 of main document.	Yes
11	Pretreatment of waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment.	In order to reduce emissions to water, BAT is to pretreat waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment by using appropriate techniques. See section 5.3 of main document.	Yes
12	Final waste water treatment.	In order to reduce emissions to water, BAT is to use an appropriate combination of final waste water treatment techniques. See section 5.3 of main document.	Yes
13	Waste management plan.	In order to prevent or, where this is not practicable, to reduce the quantity of waste being sent for disposal, BAT is to set up and implement a waste management plan as part of the environmental management system (see BAT 1) that, in order of priority, ensures that waste	Yes

<b>BATC</b>	<b>Description</b>	<b>Summary of BATC and discussion</b>	<b>Complies with BATC?</b>
		is prevented, prepared for reuse, recycled or otherwise recovered. The presence of a suitable waste management plan will be confirmed by inspection once the facility is operating.	
14	Reduction in the volume of waste water sludge requiring further treatment or disposal.	In order to reduce the volume of waste water sludge requiring further treatment or disposal, and to reduce its potential environmental impact, BAT is to use one or a combination of the listed techniques. As the wastewater streams will be discharged into a trade effluent sewer regulated by Scottish Water, no additional techniques are required on site.	Yes
15	Enclosure of emission sources and treatment of emissions.	In order to facilitate the recovery of compounds and the reduction of emissions to air, BAT is to enclose the emission sources and to treat the emissions, where possible. Due to the nature of the process, the bulk of the wastewater consists of concentrated constituents of the water supply itself and there are no emissions to air from the waste water. On this basis emissions sources do not require enclosure or treatment.	Yes
16		This BAT-C applies to the use of an integrated waste gas management and treatment strategy that includes process-integrated and waste gas treatment techniques. Emissions to air are limited and do not require treatment before release, therefore the BAT-C is considered to not be applicable.	N/A
17	Flaring.	In order to prevent emissions to air from flares, BAT is to use flaring only for safety reasons or non-routine operational conditions (e.g. start-ups, shutdowns) by using one or both of the listed techniques. Releases of hydrogen during emergencies and prior to maintenance, will be vented rather than flared. This stream could be flared but given the location this introduces potential visual and noise issues which can be safely avoided using a vent. For these purposes a safety vent has been specified and is regarded as BAT.	
18		This BAT-C applies to emissions to air from flares. As there is no flare at the facility the BAT-C is not applicable.	N/A
19		This BAT-C applies to diffuse VOC emissions to air. As there are no VOC emissions from the facility the BAT-C is not applicable.	N/A
20	Odour management plan.	In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the listed elements. See section 5.2 of main document.	Yes
21	Reduction in odour emissions from waste water collection and treatment and from sludge treatment.	In order to prevent or, where that is not practicable, to reduce odour emissions from waste water collection and treatment and from sludge treatment, BAT is to use one or a combination of the listed techniques. Due to the nature of the process, the bulk of the wastewater consists of concentrated constituents of the water supply itself and therefore not odorous.	Yes

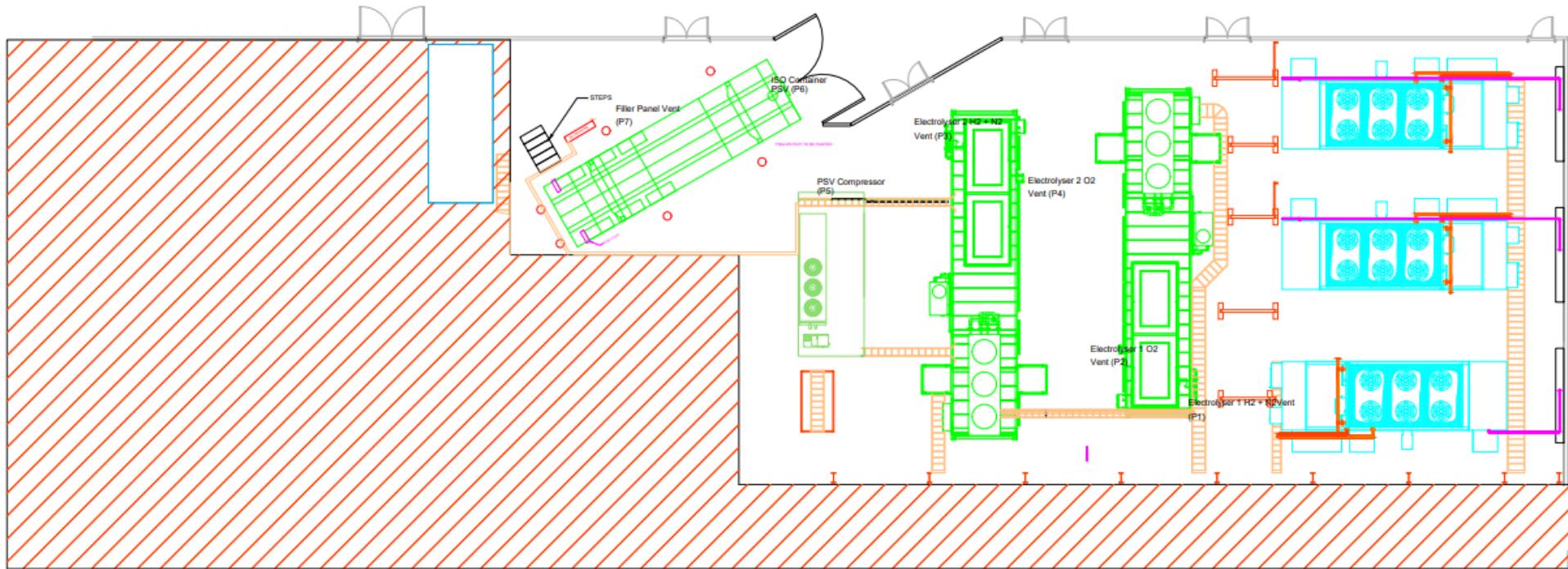
<b>BATC</b>	<b>Description</b>	<b>Summary of BATC and discussion</b>	<b>Complies with BATC?</b>
22	Noise management plan.	In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to set up and implement a noise management plan, as part of the environmental management system (see BAT 1), that includes all of the listed elements: See section 5.4 of main document.	Yes
23	Reduction in noise emissions.	In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the listed techniques. See section 5.4 of the main document.	Yes

**Appendix B – Location of the Authorised Place and Installation boundary**



Appendix C – Emissions point location plan

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