Permitting decisions

Bespoke permit

We have decided to grant the permit for Runcorn Site operated by Inovyn Chlorvinyls Limited.

The permit number is EPR/UP3034JY.

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 provides a record of the decision making process. It summarises the decision making process in the decision checklist to show how all relevant factors have been taken in to account.

This decision document provides a record of the decision making process. It:

- highlights key issues in the determination
- summarises the decision making process in the decision checklist to show how all relevant factors have been taken into account
- shows how we have considered the consultation responses.

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

Read the permitting decisions in conjunction with the environmental permit. The introductory note summarises what the permit covers.

Description of the main features of the Installation

The operator has applied for a permit to store and treat wastes containing mercury and waste metallic mercury under Schedule 1 Sections 5.3 A(1)(a)(ii) and 5.6A(1)(a)(i) of the EP Regulations. The mercury is required to be disposed of due to the closure and decommissioning of the operator's chlor-alkali process, in accordance with the requirements of the Chlor-alkali Bref and Council Regulation (EU) 2017/852.

Waste mercury sludges will be processed on site by settlement and dewatering. Waste mercury sludges may also be exported off-site for dewatering and/or retorting prior to return to the site (as metallic mercury) for stabilisation. Metallic mercury will be stabilised by a reaction with sulphur to produce mercury sulphide (referred to as Cinnabar – a naturally occurring mineral form of mercury sulphide) in a purpose built unit (referred to as the ECON Unit). The facility may also receive metallic mercury for stabilisation from off-site sources.

The ECON Unit is capable of retorting mercury sludges followed by stabilisation of the resulting mercury, or of accepting metallic mercury directly for stabilisation without the retorting step. The operator is proposing to operate the ECON Unit on metallic mercury. The reaction of mercury and sulphur is exothermic. The process is undertaken in the exclusion of oxygen to prevent a spontaneous reaction of the sulphur. Once stabilised, the mercury sulphide waste is drummed and stored on site until an economic load is assembled. It is then disposed of off-site to a suitable long term storage repository, such as deep mine disposal.

The operator is also constructing a temporary storage facility for liquid metallic mercury. Temporary storage of metallic mercury waste is permitted under Council Regulation (EU) 2017/852 pending stabilisation of the metallic mercury. Such storage must be carried out in accordance with the requirements set out in Council Directive 1999/31/EC (as amended).

Emissions to air from the dewatering and stabilisation process are via a carbon filters to remove mercury vapour. There are no emissions to water from the process.

Key issues of the decision

Environmental Risk

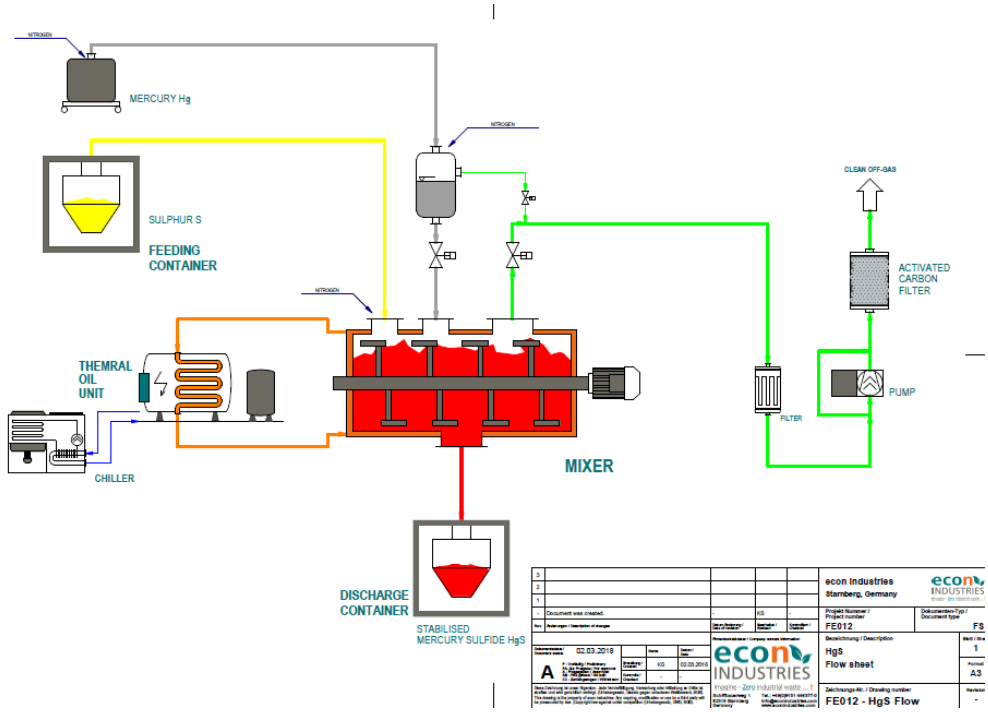
Waste Treatment

Mercury-sulphur treatment (ECON Unit)

Waste metallic mercury will be stabilised in an enclosed mercury treatment plant (the ECON Unit). The ECON Unit uses a reaction with sulphur to produce mercury sulphide. The ECON Unit is a purpose built mobile unit and it is intended that the plant will primarily be on-site to treat Inovyn's inventory of mercury from decommissioning of their Chlor-alkali Plant, but it can also treat metallic mercury from other off-site sources. The plant will be operated until the current metallic mercury inventory is treated and is then intended to be removed from the site. The length of deployment may be subject to change depending on mercury generation rates from decommissioning activities, but is anticipated to be on site for around 6 months to deal with the current inventory.

A process diagram and summary is provided below. A detailed description of the process is provided in the Schedule 5 response dated 13/4/2018. Plan ref 607945 of the application shows the plant layout. This is a batch operation with a duration of 8-10 hours, and is proposed to operate 2-3 shifts/day.

Econ Unit process diagram



NB. The above schematic shows nitrogen as the pressurisation source to transfer the mercury from the storage containers to the plant weigh vessel – in this application, the use of nitrogen will be replaced by the use of an air-driven pump.

Metallic mercury will be brought to the ECON Unit in specially designed 2 tonne storage vessels (sealed 'pots' described in more detail below) using a fork lift truck (FLT).

Sulphur will be pre-charged into the reactor. Granulated sulphur is used in the process to reduce the potential for dust formation. Sulphur will be transferred into a hopper, the weight being accurately measured via a weigh scale. The hopper is then lifted by FLT into position above the mercury/sulphur reactor and manually connected.

Sulphur, in the presence of oxygen, and an ignition source, can cause a deflagration. To reduce the possibility of this occurring, the reactor will be purged with nitrogen to remove oxygen prior to the addition of sulphur. After the addition of the pre-set weight of sulphur the reactor will be purged again to remove oxygen. The reactor has also been designed to 10 barg, which is higher than the potential deflagration pressure that could be generated from sulphur dust.

The quantity of mercury added to the reactor will be controlled using the load cells on the mercury feed vessel. Once the reaction temperature (>120°C) has been reached the thermal oil will be cooled using a chiller unit and the temperature maintained using the reaction exotherm. When all the mercury has been added, and there is no longer a reaction exotherm, hot oil will circulate around the jacket to allow a final period of mixing to “grind” the mixture to ensure that there are no mercury inclusions within the solid cinnabar product. The reaction process will be controlled to ensure that there is a small sulphur excess with respect to mercury.

Before discharge of the treated mercury sulphide it is cooled to approximately 60°C. The powder will be “extruded” from the reactor using the mixer paddle into a hopper via a sealed connection. The hopper, will then be connected, using a FLT, to a drum filling station that will include a weigh scale and filling valve. Plastic lined steel drums are to be used to hold the treated waste, which will be transferred by FLT to a dedicated storage area until an economic load is assembled for transport off-site.

The area of the ECON Unit is undercover in a temporary building, and is designed to be fully contained, with an impermeable resin coated concrete surface and kerbing (hatched areas shown on the above referenced plan) to prevent fugitive emissions.

The ECON unit itself has a bespoke containment tray below the mercury containing vessels and feed system. The design also includes a containment tray below the main hot oil heating system that can be drained.

Spill kits have been positioned in designated locations to be readily accessible in the event of any loss of containment during material storage, transfer and handling.

ECON Unit - air emission

During operation the reactor will be maintained at a small positive pressure (mbar) by a small pressure control valve. Excess pressure will be vented to atmosphere after first passing through an activated carbon bed to air via emission point (A1). During the reaction process the vent flow will be low. The reactor is not continuously purged. The majority of the vent flow is therefore associated with the expansion of the gas/vapour volume in the reactor from ambient to about a maximum of approx. 220°C.

Expected performance of the carbon bed is detailed as 99.5% removal of mercury vapour. Emissions from the Econ unit vent have been provided by the operator with a maximum calculated mercury concentration in the filtered exhaust of 35 µg/m^3 and a maximum flow rate of 59 m^3/hour. Using our H1 methodology, this screens out as an insignificant release.

We have not required the operator to monitor the emission to air from the vent in accordance with our usual MCERTS methodology, which is more appropriate for releases with a significant flow rate (such as a combustion plant). Instead we have applied a process monitoring requirement for the operator to monitor the carbon filter for mercury vapour breakthrough each shift to ensure the carbon beds are replaced at suitable intervals to ensure the continued effective abatement of the vent.

We consider that the measures proposed for the ECON Unit represent BAT. A pre-operational condition (table S1.4, PO2) has been set for the operator to provide full details any amendments to the proposals outlined, ensure that the containment systems are in place and show that full procedures are in place for managing the processes prior to commencement of the operation.

Retorting

The ECON Unit also has the capability to retort sludges to capture the metallic mercury for stabilisation. However this entails the addition of further equipment, which has not currently

been proposed by the operator. The on-site retorting process has therefore not been considered as part of this permit application.

The Recovery Activities and Storage Area

As described in the description of the main features of the installation, sludges containing mercury generated from the decontamination processes will also be decanted into UN drums or IBCs from a vacuum tanker and dewatered, prior to removal off site for treatment. This will take place in the Recovery Activities and Storage Area (as shown on drawing 607945 of the application). Sludge treatment will involve settlement followed by phase separation of the aqueous phase using syphoning, pumping or vacuum removal of the liquid portion. Mercury sludges generated by this process are to be treated (off-site) by retorting, with the metallic mercury portion returned to Inovyn for stabilisation through the ECON Unit. The aqueous fraction will be returned to the mercury effluent treatment plant (METP) at Inovyn for treatment.

An additional proposal is to utilise an enclosed and abated filter press to prepare the sludge for retorting. This will involve sludge mobilisation via the addition of water followed by the use of a sealed filter press. The filtrate is discharged to tanker and the solid material captured on the filter cloths and drummed for onward transport to treatment. Air exhausting via the tanker will be exhausted by carbon abatement.

Fugitive emissions of mercury are not anticipated to be significant by the operator. Mobile extraction hoods fitted with carbon abatement units are proposed and will be in place for each activity. The operator has stated that the carbon abatement equipment will consist of a combination of single and double (in-series) carbon bed absorption units dependant on the scale of the activity - simple decanting may only require a single carbon bed whereas use of the filter press is likely to require two carbon beds configured in series. Monitoring as described in the Schedule 5 Notice response will be undertaken to check for breakthrough of mercury vapour. Monitoring via handheld mercury vapour analysers of each configuration would be undertaken to check for breakthrough, at which the carbon beds would be replaced. Spent carbon beds will be removed from site for treatment or disposal.

The Recovery Activities and Storage Area is intended to be fully contained, with an impermeable resin coated concrete surface and kerbing (hatched areas on the above referenced plan). Up to 300 tonnes of wastes will be stored in this area. All surface water will drain via a local sump from where it will be pumped to the sump in L Unit awaiting processing through the METP which serves the wider Inovyn site.

Suitable spillage clean-up equipment is provided (this includes use of vacuum equipment with carbon abatement for metallic mercury and absorbents such as sand). In the event of material spillage water washing may be deployed, this transferring contaminants to the drainage system, from which the water is pumped forward for treatment through the METP.

We consider that the measures proposed represent BAT. A pre-operational condition (table S1.4, PO3) has been set for the operator to provide full details any amendments to the proposals outlined, ensure that the containment systems are in place and show that full procedures are in place for managing the processes in the Recovery Activities and Storage Area prior to commencement of the operation.

Temporary storage of metallic mercury - storage requirements

The operator is also constructing a temporary storage facility for liquid metallic mercury. Temporary storage of metallic mercury waste is permitted under Council Regulation (EU) 2017/852 pending stabilisation of the metallic mercury. Such storage must be carried out in accordance with the requirements set out in Council Directive 1999/31/EC (as amended).

The Metallic Mercury Storage Facility will be housed within the old KOH Plant building and is marked on the plan showing the permitted area in Schedule 7 of the permit. The layout of the Metallic Mercury Storage Facility is provided in the application (drawing 607057: Mercury Storage Area). There will be no other mercury handling or processing activities undertaken in the store.

It is the operator’s intention that the Metallic Mercury Storage Facility will be used for the storage in containers of mercury once the ECON Unit has left site (after the bulk elemental

mercury has been transferred from the cellroom to the ECON Unit and treated to form mercuric sulphide). The mercury requiring storage will be that returning to site from the retorting of mercury wastes generated during future decontamination of plant and equipment from the Chlor-alkali process.

The mercury will be stored in hermetically sealed and drop-tested pots within this store building. The specification of the pots is provided (Attachment V of the Schedule 5 response dated 13/4/2018). These are purpose built to the requirements set out in Council Directive 1999/31/EC. The store will have the capacity to hold up to 300 tonnes of elemental mercury in pots (approximately 23 m^3).

The Metallic Mercury Storage Facility will be suitably surfaced and contained by kerbing and falls to provide containment for the complete inventory of mercury.

We consider the operator's proposals for storage are BAT and in accordance with Council Directive 1999/31/EC, in all respects, except for the following.

One requirement set out in Council Directive 1999/31/EC is for installation of a fixed mercury vapour monitoring system in the storage area. The operator has stated that such a requirement is excessively costly, given the level of containment provided by the hermetically sealed pots. Instead the operator has proposed to monitor the storage area for mercury vapour in the atmosphere each shift using a portable mercury vapour analyser. The store area will also be periodically monitored and inspected for potential problems such as container corrosion, container movement or mercury leakage.

We have set conditions 2.3.8 – 2.3.15 to ensure the requirements of Council Regulation (EU) 2017/852 and in Council Directive 1999/31/EC (as amended) relating to storage of elemental mercury are complied with.

We have also set a pre-operational condition (Table S1.4, PO1) to ensure that the facility is in accordance with the necessary requirements of conditions 2.3.8 – 2.3.15 prior to receiving any waste for storage. This can include the lesser requirement for periodically monitoring for mercury vapour in the atmosphere using portable mercury vapour analyser if the operator can demonstrate that they can manage the stock such that the installation of a fixed mercury vapour monitoring system is unnecessary and the alternate proposals are adequate. Details of the proposed system to be used must be provided as part of the condition response. Condition 2.3.13 has been worded to allow equivalent technical measures agreed in writing with the Environment Agency, so as to allow an alternative to the installation of a fixed mercury vapour monitoring system to be agreed.

Decision checklist

This document should be read in conjunction with the application, supporting information and permit.

Aspect considered	Decision
Receipt of application	
Confidential information	A claim for commercial or industrial confidentiality has not been made.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential.
Consultation/Engagement	
Consultation	The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement. The application was publicised on the GOV.UK website. We consulted the following organisations: For this application we consulted the following bodies: • Food Standards Agency • Halton Borough Council • Cheshire Fire Service • Health & Safety Executive • Public Health England The comments and our responses are summarised in the consultation section.
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 facility after the grant of the permit. The decision was taken in accordance with our guidance on legal operator for environmental permits.
The facility	
The regulated facility	We considered the extent and nature of the facilities at the site in accordance with RGN2 'Understanding the meaning of regulated facility', Appendix 2 of RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1', guidance on waste recovery plans and permits. The extent of the facilities are defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit. The regulated facility is an installation which comprises the following activities listed in Part 2 of Schedule 1 to the

Aspect considered	Decision
	Environmental Permitting Regulations: • Section 5.3 Part A(1)(a)(ii) Disposal or recovery of hazardous waste with capacity exceeding 10 tonnes per day involving physico-chemical treatment (D9 reaction of metallic mercury with sulphur. • Section 5.3 Part A(1)(a)(ii) Disposal or recovery of hazardous waste with capacity exceeding 10 tonnes per day involving physico-chemical treatment (D9 settlement and phase separation prior to treatment on-site or off site.) • Section 5.6 Part A(1)(a) Temporary storage of hazardous waste with a total capacity exceeding 50 tonnes. (D15 storage pending treatment on site or transfer off site).
The site	
Extent of the site of the facility	The operator has provided plans which we consider are satisfactory, showing the extent of the site of the facility. The plan is included in the permit.
Site condition report	The operator has provided a description of the condition of the site, which we consider is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under the Industrial Emissions Directive.
Biodiversity, heritage, landscape and nature conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. The following sites are within the relevant screening distances: Mersey Estuary Special Protection Area (SPA), Ramsar Site and Site of Special Scientific Interest (SSSI) Runcorn Hill Local Nature Reserve (LNR) and Local Wildlife Site (LWS) Clifton Cloughs Local Wildlife Site LWS Frodsham and Helsby and Ince Marshes LWS Weston Marsh Lagoon LWS Frodsham Field Studies Centre LWS Upper Mersey Estuary LWS We have assessed the application and its potential to affect all known sites of nature conservation, landscape and heritage and/or protected species or habitats identified in the nature conservation screening report as part of the permitting process. We consider that the application will not affect any sites of nature conservation, landscape and heritage, and/or protected species or habitats identified.

Aspect considered	Decision
	We have not consulted Natural England on the application. The decision was taken in accordance with our guidance.
Environmental risk assessment	
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. See Key Issues Section. 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.
Operating techniques	
General operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility. The relevant guidance is Sector Guidance Note S5.06. We have also considered the techniques set out in the Chlor-Alkali BAT reference (BREF) BAT conclusion 2, which concerns decommissioning of mercury cell plants, which applies standards for the handling of mercury that are relevant. The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.
Operating techniques for emissions that screen out as insignificant	Emissions of mercury have been screened out as insignificant, and so we agree that the applicant's proposed techniques are BAT for the installation. We consider that the emission limits included in the installation permit reflect the BAT for the sector.
Permit conditions	
Use of conditions other than those from the template	Based on the information in the application, we consider that we do need to impose conditions other than those in our permit template, which was developed in consultation with industry having regard to the relevant legislation. We have set conditions 2.3.8 to 2.3.15 to ensure the requirements of Council Directive 2011/97/EU for the long-term storage of metallic mercury are met. See Key Issues Section.
Waste types	We have specified the permitted waste types, descriptions and quantities, which can be accepted at the regulated facility. We are satisfied that the operator can accept these wastes for the following reasons: • they are suitable for the proposed activities; • the proposed infrastructure is appropriate; and

Aspect considered	Decision
	• the environmental risk assessment is acceptable. We made these decisions with respect to waste types in accordance with sector guidance note SGN S5.06.
Pre-operational conditions.	Based on the information in the application, we consider that we need to impose pre-operational conditions. See Key Issues section.
Emission limits	We have decided that emission limits should be not set in the permit.
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. See Key Issues Section.
Reporting	We have specified reporting in the permit. Standard performance parameters for water, energy and raw material usage are applied. Process monitoring requirements for the treatment processes to ensure the carbon abatement equipment is operating as required. We made these decisions in accordance with sector guidance note S5.06.
Operator competence	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.
Technical competence	Technical competence is required for activities permitted. The operator is a member of an agreed scheme. We are satisfied that the operator is technically competent.
Relevant convictions	The Case Management System has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence.
Financial competence	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.
Growth Duty	
Section 108 Deregulation Act 2015 – Growth duty	We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit.

Aspect considered	Decision
	Paragraph 1.3 of the guidance says: “The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.” We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections. We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards. Any unique condition, that is a condition distinct from a site specific condition needed to deliver the legislative standards need to be justified Provide additional text if needed, for example where specific comment on the growth duty is made by the applicant in their application.

Consultation

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public, and the way in which we have considered these in the determination process.

Responses from organisations listed in the consultation section

Response received from
Public Health England (PHE)
Brief summary of issues raised
We recommend that any Environmental Permit issued for this site should contain conditions to ensure that any fugitive emissions to the atmosphere are controlled and managed adequately. Other than the above recommendations, and based solely on the information contained in the application provided, PHE has no significant concerns regarding risk to health of the local population from this proposed activity, providing that the operator takes all appropriate measures to prevent or control pollution, in accordance with the relevant sector technical guidance or industry best practice.
Summary of actions taken or show how this has been covered
The permit requires that the operator controls fugitive emissions to the atmosphere. This will be managed by appropriate storage techniques and use of carbon abatement equipment during waste treatment as described in the decision document above. The proposals presented by the operator in the application are considered BAT.