

Permitting decisions

Surrender

We have decided to accept the surrender of the permit for Seal Sands Chelates/Fine Chemicals operated by The Dow Chemical Company Limited.

The permit number is EPR/BV2719IH

We are satisfied that the necessary measures have been taken to avoid any pollution risk and to return the site to a satisfactory state. We consider in reaching that decision we have taken into account all relevant considerations and legal requirements.

Purpose of this document

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

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

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

Key issues of the decision

Description of the site

The site is located at the Seal Sands Oil Terminal complex at National Grid Reference 453100 524000 approximately eight kilometres northeast of Middlesbrough and 800m to the west of the River Tees estuary. It covers an area of approximately 3 hectares and was operated as a chemical manufacturing plant; comprised of a chelating agents plant, cyanide derivatives plant (a Multi-Product Plant described in the original permit as the Custom and Fine Chemicals Plant), control room, boiler house, drum storage area, offices, laboratory and car park.

A non-technical description of the permitted installation is included in the Introductory Note to the Permit, however key points considered relevant to the decision to accept the surrender of the permit are outlined below:

A permit was issued under the Pollution Prevention and Control (PPC) Regulations to *The Dow Chemical Company Ltd* on 21/04/04 to carry out the following activities, listed in Part 1 of Schedule 1 to the PPC Regulations (now Environmental Permitting Regulations (EPR)):

- Section 4.1 Part A (1) (a) (iv) – producing organic chemicals such as organic compounds containing nitrogen, such as amines, amides, nitrous-, nitro- or azo-compounds, nitrates, nitriles, nitrogen heterocyclics, cyanates, isocyanates, di-isocyanates and di-isocyanate prepolymers;
- Section 4.2 Part A (1) (a) (i) – producing inorganic chemicals such as gases, such as ammonia, hydrogen chloride, hydrogen fluoride, hydrogen cyanide, hydrogen sulphide, oxides of carbon, sulphur compounds, oxides of nitrogen, hydrogen, oxides of sulphur, phosgene;
- Section 4.2 Part A (1) (a) (iv) – producing inorganic chemicals such as salts, such as ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonium phosphomolybdate;

and the following directly associated activities:

- Storage and handling of raw materials
- Storage, handling and dispatch of intermediates, by-products, finished products, waste and other materials
- Control and abatement systems for emissions to air and releases to sewer
- Utilities and Services

The main features of the installation when operational were as follows:

The installation was permitted as a multi-purpose batch chemical plant manufacturing a wide range of organic and inorganic speciality chemicals, predominantly based on cyanide chemistry and utilising relatively simple process equipment. The two product groups comprise chelates (the major product) and fine chemicals manufactured on two separate production units, however, the main process chemistry on both plants fell within the Schedule description within Section 4.1 Part A (1)(a)(iv).

Chelates Plant: The key raw material in the manufacture of chelates is sodium cyanide. This was either bought in by bulk road tanker or manufactured on site, at 30% concentration, utilising

hydrogen cyanide supplied as a chilled liquid at 0°C by direct pipeline from the neighbouring plant. The Operator's responsibility for the hydrogen cyanide transfer line commenced at the installation boundary.

Chelates were manufactured by the reaction of an amine, sodium cyanide and formaldehyde in one of five Stirred Tank Reactors (STR's). The reaction produced ammonia as a by-product and this was continuously distilled from the batch and recovered using a packed column scrubbing system.

Custom and Fine Chemicals (C and FC) Plant: This was a multi-purpose batch production unit which manufactured a range of speciality chemicals, usually to specific customer order and often in limited quantities. Products manufactured in the C and FC Plant were subjected to a range of refining operations, such as solvent extraction, crystallisation, centrifugation, dilution (water or solvent), evaporation, pH adjustment, filtration and carbon treatment before despatch to the customer. The principle potential emissions to air from the C and FC Plant were hydrogen cyanide, Class A and Class B VOC's, ammonia and formaldehyde. Abatement techniques included water-cooled condensers, scrubbers and two thermal oxidisers.

The installation as a whole consisted of production areas, drumming operations (filling and emptying), a range of bulk storage tanks in bunded tank farms, warehousing for raw materials, intermediate and product storage, open storage areas for drums, steam boilers and cooling towers with storage ponds. There were also offices and a development/control laboratory.

The site operated a steam boiler firing on medium fuel oil with a thermal input capacity of 6MWth. Bulk fuel oil storage was bunded and isolated from the main effluent sump.

There were no discharges to groundwater. The site had concrete hard standing with controlled drainage to the site effluent system in all process areas.

Any cyanide-contaminated effluent from the Chelates Plant was first sent to the cyanide destruction unit where cyanide content was oxidised by the addition of sodium hypochlorite liquor. The treated effluent was then directed to the main effluent sump, together with waste water from all other plant areas. Subject to monitoring results, the effluent sump was discharged to the Tees Estuary.

The Installation as a whole was a Top Tier site under the Control of Major Accident Hazards Regulations 1999 (the COMAH Regulations).

The Site ceased production in June 2014 and following closure, the site was decommissioned and demolished during 2016-17. Currently the site is reduced to ground level (hard core fill) with no facilities or services. The Operator has applied to surrender the Permit.

We are satisfied that the necessary measures have been taken to avoid any pollution risk and to return the site to a satisfactory state. We consider in reaching that decision we have taken into account all relevant considerations and legal requirements.

Site Condition Report

As part of their surrender application, the Operator submitted a Site Condition Report (SCR) and supporting documents, the main elements of which are summarised below:

Condition of the land at permit issue, including Environmental Setting

The site was reclaimed from salt marsh in the late 1960's using dredged alluvial deposits from the River Tees. A large volume of furnace slag was used to contain the dredged material on site until it stabilised. A slag wall is known to be present along the River Tees frontage.

A chemicals site was developed on the land in the late 1970's. The Chelate Plant was built and commenced operations in 1979 and Multi-Product Plant No.1 was constructed in 1988. The Dow Chemical Company Ltd took over the site in 1989. A second Multi-Purpose plant was developed in 1998.

The site is underlain by Made Ground (ash, clinker, brick); superficial Tidal Flat deposits (lenticular sequence of sands, silts and clays); overlying low permeability Triassic age Mercia Mudstone Group bedrock. Groundwater is encountered at a depth between 1 and 1.5 meters. Superficial deposits are classified as an undifferentiated Secondary Aquifer. Despite being a low permeability formation, the Mercia Mudstone bedrock is classified as a Secondary B Aquifer. The site is not located within a designated Groundwater Source Protection Zone.

Closest surface water feature is the River Tees Estuary approx. 800m to the south/southeast.

Changes to Activities

There have been no significant changes to the installation boundary or activities since permit issue, other than the shutdown of the activities for site closure. No additional dangerous or potentially polluting substances were introduced to the site during the life of the permit.

Measures taken to protect the land

The site was a Top Tier COMAH site, this required the site to adopt detailed systems for identifying and assessing potential accidents.

Throughout the life of the operational plant under the Environmental Permit, the Operator continually reviewed and improved operating procedures and pollution prevention measures.

The areas of the site where permitted activities were undertaken were either bunded or covered by concrete hardstanding and activities were undertaken in accordance with safe working procedures.

All storage tanks were bunded, and all manufacturing operations on the site were conducted in contained areas. The site roadways and drum parks were constructed on hardstanding and were connected by surface water drains to the effluent sump. The effluent sump was the only underground storage on site and was covered by the site's inspection programme.

Soil and groundwater monitoring data collected between 2005 and 2018 indicates that there has been no deterioration of land during the permitted operations at the site. See Reference Data section below for further information.

The Environment Agency considers that the preventative measures implemented during the lifetime of the permit were satisfactory and demonstrate that significant pollution of the land at the installation has been prevented.

Pollution Incidents

No significant pollution incidents are known to have occurred at the site during permitted operations (2005-2014).

Isolated small-scale spills have been recorded at the site. The largest occurring in 2007 when approximately 8,600 kg of Versene 100E (a commercial Ethylenediaminetetraacetic acid (EDTA) product) was released due to a flexi hose failing during transfer to a tank. The product was contained within a bund before entering site drains. Groundwater monitoring data does not indicate a subsequent rise in concentrations between 2008 and 2011, suggesting limited impact from this 2007 event.

All other incidents involving chelating agents were minor. Any small spills were contained within barrels, banded areas or onto concrete hardstanding before being directed to the site drainage system.

Soil gas and water quality monitoring

Soil and groundwater quality data has been collected since 2005 (original baseline for sites environmental permit), as follows:

- 2005: soil and groundwater data
- 2007: routine groundwater
- 2011: routine groundwater
- 2014: routine groundwater
- 2015: soil and groundwater data
- 2018: soil and groundwater data

The 2015 and 2018 soil and groundwater investigations were undertaken prior to and after demolition. Results from these investigations indicated declining concentrations for many parameters in both soils and groundwater when compared to monitoring data collected in 2005 (original baseline assessment) and during period of active production of chemicals at the site up to mid-2014.

Decommissioning and Removal of Pollution Risk

The Site ceased production in June 2014. Decommissioning works were undertaken during 2016 and 2017, and involved:

- Emptying of tanks and pipelines
- Dismantling and removal of Tank V568, which contained residual hazardous material
- Demolition of above ground structures (including all plant and equipment, raised plinths and bunds)
- Excavation and removal of below ground services (including pipes, effluent drainage network and electrics)
- Re-grading of the surface level using crushed, clean demolition materials to ensure the site is level and hazard free
- The processing and removal of all contaminated tarmac and concrete
- Removal of site asphalt roads and concrete slabs

- As part of the decommissioning works, historically contaminated waste was also removed from the adjacent field (outside of the permit boundary).

The site has been reduced to ground level (hard core fill) with no facilities or services remaining. All processing equipment has been fully decommissioned and demolished. Raw materials and finished products have been removed from the site.

A demolition excavator was used to cut and remove pipework, plant and equipment surrounding Tank V568. This allowed for the crane to safely access the tank and lift it out for transport. The tank was then cut open, the chemicals removed and transferred to 50 gallon drums ready for offsite removal. The empty tank was then removed for further processing offsite.

Much of the work undertaken at the site was done mechanically, with manual handling kept to a minimum.

Once all plant and equipment had been removed from the site, the decision was made to lift, process and crush all the concrete slabs. Due to the risk of contamination, the slabs were removed in a controlled manner. As the concrete was crushed, samples were sent for analysis to ensure the concrete was clean and not contaminated. Once certified, the crushed concrete was spread to ensure the site was level. This has also been rolled to provide a suitable surface for walking on.

During the demolition work and subsequent slab removal, boreholes were protected and where damaged they were repaired and made good. Plastic piping has been left at the site to protect the boreholes and mark their location.

Waste material was segregated into three separate waste streams: contaminated asphalt, contaminated stone and inert soils. These were stockpiled and then removed from site to licenced waste facilities.

Soil and groundwater investigations were undertaken prior to and after demolition (in 2015 and 2018). Results from these investigations indicated declining concentrations in both soils and groundwater when compared to monitoring data collected in 2005 (original baseline assessment) and during the period of active production of chemicals at the site up to mid-2014. The available data does not suggest the presence of significant soil or groundwater contamination.

Reference Data

We are satisfied that soil and groundwater conditions at the site have not deteriorated during the lifetime of the permit. When compared to the 2005 baseline and interim sampling data, the surrender reference data shows there has been a general reduction for many parameters. The results from the 2018 soil and groundwater study are summarised below.

Soil:

In general, low concentrations were measured for the majority of determinands. These were similar in order of magnitude to previous soil sampling events and the 2005 baseline.

However, for some parameters detections were at or above the 2005 baseline. For example, higher concentrations were recorded for several metals, ammonia and cyanide, although often results were only marginally higher than 2005 data. Where an increase in concentrations were measured, these tended to be where 2005 data was at or near detection limits. Made ground used to reclaim the original Seal Sands Wetlands before site development includes ash and clinker materials, which may be associated with high levels of metals, polycyclic aromatic hydrocarbons (PAH) compounds, ammonia and cyanides.

PAH compounds were more frequently detected in 2018, although they were at similar concentrations to the 2005 data set. The PAH compounds are not known to have been used in the production activities at the site and are considered to originate from the ash and clinker materials

within made ground. The higher frequency of detections is likely due to the laboratory reporting limits which were an order of magnitude lower in 2018 (0.1mg/kg) compared to 2005 (1mg/kg).

Chelating compounds (Ethylenediaminetetraacetic acid (EDTA), Nitrilotriacetic acid (NTA) and diethylenetriaminepentaacetic acid (DTPA)) were typically either detected at similar concentrations to the baseline or were not detected at all in 2018. No 2005 baseline was available for NTA and DTPA in soils. However, a comparison of available soils data indicates that all but one of twelve samples showed a decline in concentrations, with 2018 results lower than 2015. The highest 2018 concentration of EDTA was measured in BH301 (0.6m depth) at 211mg/kg. In 2005 EDTA in this location was measured at 275mg/kg. For the remaining soil samples maximum 2018 detections are less than 3mg/kg, this is lower than the 2005 baseline, where soil concentrations for EDTA varied between 17 and 360mg/kg.

Groundwater:

The 2018 groundwater results indicate a general reduction in concentrations for the majority of parameters, particularly metals.

Measured EDTA concentrations in 2018 were typically detected at lower concentrations when compared to both the 2005 baseline and 2015 sampling rounds. Analysis of the EDTA groundwater data, undertaken by the Operator, indicated statistically significant declining trends in four out of the six monitoring wells.

Only limited groundwater data is available for NTA and DTPA prior to 2014, therefore no baseline could be quantified in 2005. Both NTA and DTPA were produced along with EDTA and it is considered that both these compounds would have been present in groundwater with EDTA prior to 2014. The 2014-2018 data set has been quantified using lower method detection limits and indicates declining trends that mirror the pattern exhibited by EDTA. Additionally, NTA is readily biodegradable and would be expected to decline rapidly following the end of production in 2014. For all three compounds inferred groundwater plumes extend to the southwest from the former production plant area and follow the inferred groundwater flow direction. For EDTA and DTPA, a comparison with 2015 data indicates plume concentrations in 2018 are lower than those measured in 2015.

For other determinands, low concentrations were measured in line with previous sampling events and the 2005 baseline.

Condition of the site at surrender

A final round of soil and groundwater monitoring was undertaken in 2018, following the decommissioning process. The sampling was carried out to assess the status of the land against the baseline reference data collected in 2005. The surrender reference data generally shows an improvement in soil and groundwater condition during the lifetime of the permit. See above for further details.

The Operator has confirmed in the surrender application and supporting documents that:

- All permitted activities have ceased;
- Decommissioning is complete;
- The land is in a satisfactory condition;
- Soil and groundwater chemical quality is not indicative of significant contamination levels and that a significant pollution risk is not present; and
- The condition of the land has not deteriorated during the lifetime of the permit.

The Site ceased production in June 2014 and following closure the site was decommissioned and demolished during 2016-17. Currently the site is reduced to ground level (hard core fill) with no facilities or services.

The site was inspected by an Environment Agency Area officer on 02/07/19, confirming that the site was fully decommissioned and demolished.

We are satisfied that the decommissioning activities were conducted in such a way that the risk of pollution was minimised and that no impact on the underlying land occurred as a consequence of these activities. We therefore agree that the pollution risk has been removed.

Conclusion

The test for the surrender of the permit is given in paragraph 14 of Schedule 5 of the Environmental Permitting Regulations 2016, where it states that:

The Regulator must accept an application to surrender an environmental permit in whole or in part under regulation 25(2) if it is satisfied that the necessary measures have been taken -

- a) To avoid pollution risk resulting from the operation of the regulated facility...; and*
- b) To return the site of the regulated facility to a satisfactory state, having regard to the state of the site before the facility was put into operation.*

Based on our analysis and consideration of the application to surrender the permit, the Environment Agency is satisfied that the necessary measures to avoid a pollution risk during the operation of the regulated facility were undertaken. We are also satisfied that all potential polluting activities and equipment associated with the chemical works have been removed and that the site has been returned to a satisfactory state.

We have decided to accept the surrender of the permit. We consider in reaching that decision we have taken into account all relevant considerations and legal requirements.

Decision checklist

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.
The site	
Pollution risk	We are satisfied that the necessary measures have been taken to avoid a pollution risk resulting from the operation of the regulated facility.
Satisfactory state	<p>We are satisfied that the necessary measures have been taken to return the site of the regulated facility to a satisfactory state.</p> <p>In coming to this decision we have had regard to the state of the site before the facility was put into operation.</p>
Growth Duty	
Section 108 Deregulation Act 2015 – Growth duty	<p>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 surrender.</p> <p>Paragraph 1.3 of the guidance says:</p> <p>“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.”</p> <p>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.</p>