

## **Environment Agency Permitting decisions**

We have decided to vary (PAS Ref EP3039GC) the permit for Mold Chemicals (Alyn Works), Synthite Limited.

The operator has requested the introduction of a reactor/mixer – designated R6 – into the bunded Chemicals plant building to allow better management of product campaigns, and reduction of water use per batch of chemicals produced. This will allow a 15% increase in permitted output of the formaldehyde derivatives business.

The Variation number is EA/EPR/BU2349IL/V002

The operator is Synthite Limited

The facility is located at Denbigh Road, Mold, Flintshire, CH7 1BT

The decision was effective from 21 April 2009

### **Summary of the decision**

We have decided to grant a Variation for the operator, subject to the conditions in the Variation.

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 environment protection is provided.

The installation Mold Chemicals (Alyn Works) comprises Synthite Limited as the major component and original site operator since 1950, and making up the integrated stationary technical unit is Dynea (UK) Limited which has operated on the site since 1995. The site is located near Rhyd-y-goleu to the north west of Mold, Flintshire and has been industrial for over 200 years through cotton milling then tinplating prior to chemical manufacture. The site is roughly triangular in shape and bounded to the south and west by the A541 Denbigh Road; to the north by the River Alyn (which ultimately flows into the River Dee) and to the east a recreational area developed by Flintshire County Council. The site is approximately 4 hectares.

Synthite primarily manufactures formaldehyde from methanol via separate silver catalyst and mixed iron and molybdenum oxide (mixed oxide) processes. The silver catalyst process is one of oxidation/dehydrogenation of a rich methanol/air mixture to produce formaldehyde, hydrogen, carbon monoxide and water. The reaction products are quenched and exit gases scrubbed to leave hydrogen and carbon monoxide gas, which is burned in a gas boiler. The silver process is capable of producing a strong formaldehyde solution of up to 82% for paraformaldehyde powder/prill production in addition to the standard formalin product of 50-55%. The mixed oxide process oxidises a lean methanol/air mixture to produce a solution of up to 57% formaldehyde and water. Heat is recovered via a heat transfer fluid and condenser to generate steam

for on site use. The exit gas stream containing low levels of formaldehyde, methanol, dimethyl ether and carbon monoxide are oxidised in a Noble metal catalyst emission control system to carbon dioxide and water.

Synthite also produces formaldehyde derivatives such as triazines, hemiacetals, formals, resole acetate, chemical blends such as urea in water and paraformaldehyde in butanol and polymer emulsions as well as ammonium salts of organic acids. The most environmentally significant chemicals stored are formaldehyde, methanol, ammonia, acrylic acid and the mixed oxide process heat transfer fluid (70% biphenyl ether and 30% biphenyl).

There are 18 point source emission points of which 14 are abated. Those not abated are the exit gas boiler stack, the three gas fired boilers' stack and the methanol storage tanks (2). A combination of abatement technologies are being employed the selection of which is dependent on the chemical and physical nature of the emission and include catalytic oxidation, combustion, wet scrubbing, filtration and adsorption.

Synthite discharges trade effluent from a secondary effluent treatment plant to Welsh Water Mold Wastewater Treatment Works which discharges into a tributary of the River Alyn. Synthite abstracts water from two boreholes in order to provide site flood protection and cooling water. Used cooling water is sent for effluent treatment, the unused/untreated water is sent directly to the River Alyn (70000 tonnes per annum for each). In addition, surface water runoff from adjacent fields and Denbigh Road is collected in Parry's Ditch and pumped into the same River Alyn discharge line. Running approximately west to east at a depth of 4 – 5 metres (similar level to River Alyn) is an underground culvert, a relic of historical site activities. The culvert has been capped at both ends within the site and acts as a general site drain for surface water soakaway and may still receive old drains. Ingress by groundwater is reduced by the borehole regime. The culvert is stone lined except along its base and is pumped out via lagoons to the effluent treatment plant to prevent site flooding (35000 tonnes per annum). Groundwater sensitivity is assessed as moderate due to the presence of two minor aquifers beneath the site. There are no direct or indirect emissions from the installation to groundwater of List I or II substances either directly or indirectly, as set out in the Groundwater Regulations 1998. There are significant areas of unmade ground on the site particularly along the River Alyn boundary and the potential for soakaway contamination to groundwater/River Alyn exists. A concrete barrier wall 2 – 3 metre deep constructed in 1993/4, between the site and the River Alyn on the northern boundary is considered to offer improved protection as has been the improvements in bunding and increased hardstanding particularly in the Agricultural Products Yard.

A Climate Change Agreement has been held with the Chemical Industry Association since August 2001. Under normal operating conditions three of the four boilers on site are on hot standby (natural gas fuelled), with the fourth burning the silver catalyst process exit gas containing hydrogen. The mixed oxide process is also a net exporter of steam. The total annual water usage is approximately 210000 tonnes. Process wastes are segregated into liquid and solid waste streams and stored in two bunded waste compounds.

Dynea primarily manufactures urea, melamine and phenol formaldehyde resins and operates separately under PPC permit BU2322. Dynea is however, supplied with raw material formaldehyde, steam and provision for surface water management and weak effluent treatment by Synthite.

Under the Control of Major Accident Hazards Regulations 1999 (COMAH) Synthite is classified as a Higher Tier and Dynea a Lower Tier site and collectively as a Domino site.

## **Purpose of this document**

This decision document:

- explains how the applicant's application has been determined;
- provides a record of the decision-making process;
- shows how all relevant factors have been taken into account; and
- justifies the specific conditions in the permit.

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

## **Structure of this document**

- Key Issues of the decision;
- Annex 1 the decision check list;

## **Key Issues of the decision**

### **Environmental risk**

The key environmental risks from the change to the facility is a slight rise in emissions from point sources to air. For further detail see Annex 1. There is no additional risk to fugitive emissions and accidents.

### **Conservation**

There are no particular issues with conservation sites in relation to the proposed change, and there was no consultation as the Variation requested is a simple standard Variation, i.e. consultation is not required due to the small scale of the change.

### **Groundwater**

There are no direct emissions to groundwater from the Installation and none is proposed in relation to this change in operation.

### **Air quality**

There are no particular issues with air quality such as air quality management areas. Formaldehyde and nitrogen dioxide releases were examined during the original PPC Permit determination due to the potential for environmental impacts that were not insignificant as detailed below for formaldehyde. Nitrogen dioxide releases are not discussed further as there will be no change in releases as a result of the proposed change in operation. The original H1 assessment for the PPC permit showed that for formaldehyde process contributions were at 13% of the long term environmental assessment levels (LT EAL) and 15% of the short term environmental assessment levels (ST EAL). Modelling was required by the Permit Improvement Programme and this showed that the predicted environmental concentration was 0.18% of the LT EAL and 0.4% of the ST EAL at the receptor.

The Variation H1 shows that the new activities comprise only 5% of the sites overall process contribution to levels of formaldehyde. Dimethylamine and methanol releases are shown to be insignificant with process contributions of <1% in both the short and long term.

Taking the previous modelling into account, it is considered that the additional environmental impacts from this Variation can be considered to be insignificant.

### **Operational techniques**

The Operator is installing an additional reactor of similar design to those already in place. Safeguards such as pressure relief valves are in place and

the gases from the reactor will be vented to atmosphere via a scrubber and polishing carbon filter. This is the same arrangement as is in place for the current reactors and is considered BAT for abatement of emissions from these reactors at this facility.

The Variation will allow a 15% rise in production from this aspect of the operation of the sites. This will lead to a minor increase in emissions to air, and an ~1% reduction in water use due to a reduction in the number of vessel boil outs required between batches of different product...

There are no other changes to operation required.

The operator shall monitor the emissions from the new reactor, which will be vented via an existing scrubber and carbon filter, and shall send in a commissioning report including details of the monitoring to confirm that the new plant is operating as expected and that emissions from the scrubber following installation of the new reactor are as expected. This has been formalised in Improvement Condition 22.

### **Monitoring and compliance**

A limit has been put into the Permit for formaldehyde from scrubber vent A7. Discussion of this in Annex 1. It is expected that due to the additional polishing provided by the carbon filter, the actual emissions will be lower than those currently emitted from A8 which is otherwise an identical process. The limits can be reduced in a future Variation if it is demonstrated during the lifetime of the permit that the emissions are lower than anticipated.

These limits, in conjunction with formalisation of the maximum 15% rise in production via conditions in operating techniques, will ensure that additional impacts to the environment are not significant.

The Operator has stipulated in their Application that for the first month, during commissioning, the emissions from the scrubber vent A7 shall be monitored for formaldehyde (DNPH/HPLC), dimethylamine (Gastec Tube) and methanol (VOC Meter). This has been formalised in Improvement Condition 22 and will demonstrate that the levels of emissions of these substances are as stated in the Application for Variation.

Future monitoring will be for formaldehyde only due to the low environmental risk for dimethylamine and methanol– see Annex 1.

### **Improvement Programme Item 23.**

This improvement item has been put into the Variation in recognition that the operator is making changes to bring monitoring of flow from release point W1 to the River Alyn up to the MCERTs standard. This condition formalises an agreement made in letter from Agency dated 02 February 2009.

### **Operator**

The Operator is one of two Operators in a multi-operator facility. The changes requested do not required any change in the Permit for the other Operator of the facility, Dynea Limited.

**The facility**

There are no changes to the composition or the geographical extent of the facility.

**Commercial and industrial confidentiality**

There are no issues with respect to commercial and industrial confidentiality.

## Annex 1: decision checklist

### Bespoke permit and variation checklist

Activity	Justification / Detail	Determination criteria met	
		No	Yes
<b>Receipt of submission</b>			
Application fee	The application fee is correct and is for a simple standard Variation. Charge table reference N/A not in table. Environmental Permitting Charging Scheme April 2008, page reference for minor change C7 14 (1)		✓
Commercial confidentiality	The operator has not made a claim for commercial confidentiality. We have not received any information in relation to this application that appears to be confidential in relation to any party.		
<b>Consultation</b>			
Scope of consultation	The consultation requirements were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, RGN 9 Changes in operation and our Public Participation Statement.  No consultation took place as this was not required for the minor change in operation requested.		✓
Consultation responses	N/A		✓
<b>Operator</b>			
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of part of the facility after the grant of the permit. The decision was taken in accordance with EPR RGN 1 Understanding the meaning of operator		✓
<b>The facility</b>			
The regulated facility	The decision on the facility was taken in accordance with Regulatory Guidance Notes when the PPC permit was issued. There is no change in listed activities (types of chemical reaction) for the site, only a change in charging due to the additional reactor and increased production/flexibility.  This permit applies to only one part of the installation. The name and permit number of the operator of the other part of the installation is detailed in the permit's introductory note.		✓
<b>European Directives</b>			
Applicable Directives	The European Directives that apply to each regulated facility are as follows: IPPC Directive Habitats Directive		
<b>The site</b>			
Extent of the site of the facility	N/A no change		✓
Site condition report	N/A no change		✓
<b>Environmental Risk Assessment and operating techniques</b>			
EIA	The planning permission was not subject to EIA.		✓
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. The assessment was carried out using the H1 software tool and is considered to be satisfactory.  The assessment shows that, applying the conservative criteria in our guidance on Environmental Risk Assessment, the rise in emissions from this change may be categorised as environmentally insignificant.		✓
Operating techniques	The change requested is for an additional reactor of similar design to those already in use at the Installation, with emissions undergoing similar abatement. This reactor will be controlled using procedures and instrumentation already in place for		✓

Activity	Justification / Detail	Determination criteria met	
		No	Yes
	the management of the other similar reactors in the building. This is considered to be BAT for this facility.		
<b>The permit conditions</b>			
Use of conditions other than those from the template	<p>The permit contains many conditions taken from our permit template. We developed these conditions in consultation with industry having regard to the relevant legislation. This decision document does not include an explanation for these usual conditions.</p> <p>Where such conditions are imposed we have considered the application and accepted the details are sufficient and satisfactory to control that aspect of the operation.</p>		✓
Incorporating the application	We have specified that the applicant must operate his installation in accordance with the following descriptions in his Application for Variation – the response to question 2, given in BU2349_VAR_SECC2, and the statement provided in letter received 02 December 2008 regarding the maximum expected rise in production.		✓
Emission limits	<p>As abatement is being used to minimise releases, ELVs have been set for the following substances:</p> <p>Formaldehyde – 2 mg/m<sup>3</sup>. This is 50% more than the expected level of emission in the Application and is the benchmark for releases from point sources in the Speciality Organic Chemicals Sector Guidance. This is to ensure that the environmental impacts from formaldehyde emissions from the site as a whole are at levels which remain not significant.</p> <p>Given the low levels of methanol (Facility PC &lt;0.5% of the ST and LT EAL, 10% point source BAT benchmark emission for amines) and dimethylamine (Facility PC ~0.1% of the ST and LT EAL, 7% BAT benchmark emission for class B VOCs) expected to be present, it is not considered necessary to impose limits for these substances.</p> <p>Emission monitoring during the commissioning process will be used to demonstrate that the emissions are at the levels stated in the Application. It is considered that the ELVs/ equivalent parameters or technical measures described above will ensure that significant pollution of the environment is prevented and a high level of protection for the environment secured.</p>		✓
Monitoring	<p>We have decided that monitoring should be carried out for the parameters listed in table 2.2.2 of condition 2.2.1.3 using the methods and to the frequencies specified in those tables. These monitoring requirements have been imposed in order to demonstrate that the levels of releases are within the levels required in the Permit, and stated to be the case in the Application. Periodic monitoring rather than continuous monitoring is accepted as a valid method where small scale or batch processes are employed as is the case for this change. This is in accordance with the guidelines in the Speciality Organic Chemicals Sector Guidance.</p> <p>The monitoring techniques specified in the Permit are the same as those already in place for monitoring from point A8, a similar process in the formaldehyde derivatives plant. Based on the information in the application we are not fully satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate. However, monitoring techniques across the site have not been reviewed as this is a simple standard Variation. Instead this will be left to regulation via the Operator Monitoring Assessment process which will address this issue.</p>		✓
Reporting	We have specified reporting as specified in table S2 of Schedule 2 of the Permit in order that the Operator can demonstrate compliance with the Permit limits. Quarterly reporting of each set of monitoring is required, as per the reporting requirements already in place for the facility. Reporting frequency in itself is not covered in sector guidance notes.		✓
<b>Operator Competence</b>			

Activity	Justification / Detail	Determination criteria met	
		No	Yes
Technical competence	There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions.  The decision was taken in accordance with RGN 5 on Operator Competence		✓
Relevant Convictions	N/A No change.		✓
<b>OPRA</b>			
Opra Score	<p>The Opra score is 467.</p> <p>The Opra score has changed from that set out in the application, and has increased by ~22% from an Opra score of 383. This is due to the additional reactor and increasing production in some of the other reactors over the 2000tpa production charging threshold.</p> <p>Detail as follows:</p> <ul style="list-style-type: none"> <li>i) add reactor R6 to carry out 2 listed activities (4.1(a) ii &lt;2k TPA and 4.1(a) iv &gt;2k TPA)</li> <li>ii) increasing production/flexibility in reactor R4: 4.1 (a) ii from &lt;2k TPA to &gt; 2k TPA</li> <li>iii) increasing production/flexibility in reactor R5: 4.1 (a) ii from &lt;2k TPA to &gt; 2kTPA, additional activities 4.1 (a) iv &gt;2k TPA and 4.2 (a) iv &lt;2k TPA</li> <li>iv) increasing production/flexibility in reactor RV10: 4.1 (a) ii from &lt;2k TPA to &gt; 2kTPA, additional activities 4.1 (a) iv &gt;2k TPA</li> </ul> <p>This is considered to be a large increase in charges considering the scale of the change in process and the minor additional risk to the environment, but is in line with the process used to determine the EPOPRA score when the PPC Permit was being issued, i.e. each reactor is considered to be a stationary technical unit in its own right, with up to 3 listed activities in each reactor.</p> <p>It is considered that the Opra score should be revisited with Agency technical advisors to ensure that the method used to determine the EPOPRA score is still considered appropriate. This process will commence following issue of the Variation, rather than as part of this simple standard Variation rather than hold up issue of this Variation, as this may take some time.</p>		