Determination of an application for a variation to a Permit under regulation 17 of the Pollution Prevention and Control (England and Wales) Regulations 2000 (SI 2000 No1973).

Decision Document recording the decision-making process

Note: all references to the "PPC Regulations" are to the Pollution Prevention and Control (England and Wales) Regulations 2000 (SI 2000 No1973), as amended.

Administrative details

Application 'duly made' date and Agency reference ("the Application for Variation")

AP3338MA
3 November 2006

Permit number (the "Permit") **BU2357**

Operator (the "Operator")

Warwick International Ltd
Dock Road
Mostyn
Holywell
Flintshire
CH8 9HE

Address/location of installation (the "Installation")

Warwick International Ltd
Dock Road
Mostyn
Holywell
Flintshire
CH8 9HE

Purpose of this document

This decision document explains how the Application for Variation has been determined and provides summary details why specific conditions in the permit have been deleted, amended or added. It is a record of the decision-making process to show how all relevant factors have been taken into account.

Summary of the decision

The Agency has varied the Operator's Permit to operate the Installation. This variation is necessitated by proposed changes in operation applied for by the Operator. The Agency considers that in varying the Permit, it has taken into account all relevant considerations and legal requirements and that the permit as varied will ensure that all appropriate measures will be taken against pollution and that no significant pollution will be caused.

Background

The operator applied for a variation to permit production of up to 10,000 tonnes per year of sodium acetate trihydrate salt, a crystalline solid. The production process involves the re-use of acetic acid recovered from tetra acteylethylenediamine (TAED) manufacture on site.

Sodium acetate is formed from the neutralisation reaction of acetic acid with caustic soda solution. The quantity of water present is controlled, to give the desired degree of hydration during the crystallisation stage to produce the trihydrate salt.

The recovered acetic acid used in the process contains a small amount of acetic anhydride (<5%) and trace impurities (amine and acetyl derivatives) from the TAED process. The anhydride hydrolyses exothermically to acetic acid, which then reacts with caustic as above. Anhydride in the feed however affects the quantity of water to be removed by distillation to produce the trihydrate and therefore has to be monitored and pH and water composition adjustments made. Zeolite is added at the reaction stage to minimise colouration of the product due to the presence of the trace impurities.

The reaction is carried out batchwise in an existing glass-lined reactor in Plant 3, and then transferred to an adjacent reactor as a melt. The molten product is feed to a belt flaker in Plant 4, where it is crystallised and the heat of fusion removed. The flake is size reduced, classified, blended with zeolite and packaged in a continuous process.

Emissions to air of acetic acid from the reaction vessel, the melt tank vent and belt flaker are abated using a fan assisted venturi fume scrubber. In the solids handling part of the process, in Plant 4, the conveyors are enclosed and hoppers vent to reverse jet particulate filters (vent within the building). The dust collected is returned to the process.

The load on the wet scrubber is predicted to be very small and the selection of an existing venturi scrubber is considered suitable and sufficient. The operator has provided further justification regarding its selection as supporting information to the application.

The proposed change in operation to the permitted activities does not represent a substantial change by virtue of Regulation 2 (SI 2000 No.1973, as amended), and no additional consultation was considered necessary.

The Agency's determination procedure

"Duly made" check on Application for Variation received

The Application for Variation was determined to be duly made, as received on 3 November 2006.

Consultation on the Application for Variation

There was no consultation on the application.

Matters of commercial confidentiality or national security

The Operator made no claim for commercial confidentiality and the Agency has not received any information in relation to this Application for Variation, which appears to be confidential in relation to any party. There are no matters involving national security for which information shall be excluded from being placed on the public registers or consulted upon.

Further information requirements

The Application for Variation to permit sodium acetate production was deemed duly made by the Agency. Further information regarding proposals for the selection of a venturi scrubber and the measures to monitor its residual emissions were received on 5 February 2007.

All relevant documents have been provided to the IPPC Public Registers.

EPORA profile

A revised EPOPRA score will be used as the basis for subsistence and other charging. The listed activities and complexity attribute have been revised to reflect the addition of sodium acetate as '*producing inorganic chemicals such as...salts [SI 2000 No.1973, Schedule 1, section 4.2].* In accordance with the EPOPRA scheme, the operator's EPOPRA profile for the installation may change over time.

Assessment of Best Available Techniques (BAT)

1. General Management

Existing safety, environment and quality management standards and systems are proposed for operation and maintenance of the sodium acetate plant. Standard Operating Procedures, Work Instructions and Menu Cards are to be established before start up of the process. The management measures are considered satisfactory to ensure compliance with the permit conditions. The Operator's environmental management system is externally accredited to ISO 14001.

2 Raw Material Use

Acetic acid for the reaction process is sourced as a by-product from the TAED manufacturing process on site. Use of the by-product stream will result in a reduction of about 60% in acetic acid leaving site for conversion to anhydride.

Stoichiometric production without aqueous waste generation would require a 52% caustic solution. This is not commercially available. The operator will minimise the volume of reactor distillate waste by the use of 50% caustic solution.

Site annual average water consumption is estimated to increase by about 2%, without appreciable change in final effluent composition. It is considered that appropriate measures are in place to ensure the efficient use of raw materials and water.

3. Energy Efficiency

The existing site boilers provide heat input in the form of steam to the sodium acetate plant. The reaction is exothermic and the heat of reaction is normally sufficient to remove the excess water. The amount of steam required is minimised by the selection of the highest strength of caustic commercially available, minimising excess water for removal. The expected increase in gas consumption by the boilers is estimated to be small at about 1.5%.

All heated systems are fully insulated. Electrical trace-heated piped transfer lines eg. acetic acid and caustic are fitted with thermostatic controllers to minimise energy use. Variable speed drives are fitted to key plant items, which also serve to minimise energy use.

No process heating is required for solids handling in Plant 4. It is considered that appropriate measures are in place to ensure the efficient use of energy.

4. Avoidance, Recovery and Disposal of Wastes

It is considered that appropriate measures are in place such that waste production will be avoided as far as possible, and where waste is produced it will be recovered unless technically and economically impracticable.

Fines and oversized product material are recycled back into the process. Nominally empty sacks containing zeolite will be disposed to landfill classed as non-hazardous waste. Recovery of acetic acid from wastewater generated from the reaction stage is not considered to be economically viable (see emissions to water).

5. Emissions to Air

The primary emission from the sodium acetate process is during reactor filling. Acetic acid and water vapour in air or nitrogen pass to the venturi scrubber where the acetic acid is absorbed into water. A limit of 50mg/m^3 has been set as the emission limit value. This is considered achievable based on trial studies and is lower than the indicative BAT benchmark value for the industry sector.

The recovered acetic acid used for TAED and now sodium acetate production is held in a storage tank in Tank Farm 1. This tank has its own existing scrubber (emission point A1) for displaced vapour from Distillation Unit 4. Other more minor emissions may arise from the vents serving the melt tank and belt flaker hood; all of which vent to the venturi scrubber.

6. Emissions to Water

Emissions to water are primarily reactor distillates, spent scrubber liquor and washdown/decontamination water. These dilute slightly acidic streams are not considered viable for reuse or recovery and are sent to the effluent treatment plant for neutralisation. There is no change to the permitted emission limit values to controlled waters. There is no change to the biocide (trace level) as used elsewhere on site for cooling water duty.

7. Noise and Vibration

Most plant items are housed within plant buildings (Plants 3 & 4). Background noise levels at the site boundary are not predicted to be impacted. Pilot scale trials using similar equipment have indicated little likelihood for vibrational problems.

8. Closure/Decommissioning & Site Protection and Monitoring Programme

The process will be carried on in existing production plant buildings with similar chemistry and raw material usage. It is considered that appropriate measures are in place for the closure and decommissioning of this part of the installation.

The SPMP will require revision in due course but no fundamental changes to the protection and monitoring schemes are likely to be necessary.

9. Prevention of Accidents and Limiting their Consequences

The chemical reaction hazards and the corresponding process safety measures are sufficiently described in the application. It is considered that suitable arrangements for emergency planning and response are already established. The site is a top-tier establishment under the Control of Major Accident Hazard Regulations (SI 743 1999) (COMAH).

10. Emissions Monitoring

Proposals for monitoring the emission from the venturi scrubber (A24) were provided as additional information in the letter dated 1/2/07. Representative periodic monitoring using portable GC-FID equipment, as used on the continuous DAED process, is accepted. The operator is pursuing a MCERTs limited technical endorsement for in-house emissions monitoring of acetic acid across the installation.

Environmental Impact Assessment

1 Impacts to Air

The operator has used the 'H1' impact assessment tool to assess the impacts of the emissions of acetic acid from the venturi scrubber using conservative source term criteria. The impacts have been screened out as insignificant using this methodology.

2 Impacts to Water

There is no appreciable change predicted to the composition of the final treated effluent from the site. No changes in the permitted emission limit values are proposed.

3 Impacts to Land

Nominally empty sacks containing zeolite will be disposed to landfill classed as non-hazardous waste.

4. Improvement Programme

No additional improvement requirements are considered necessary at this time.

Changes to the Permit

A summary of the changes made through this variation notice are highlighted below:

Conditions to be deleted

- Redundant conditions relating to land quality/SPMP requirements have been deleted.
- Some conditions relating to the Hazardous Waste Incineration Directive in the original permit have been deleted, superseded by conditions giving effect to the Waste Incineration Directive (WID) {Variation AP3436SJ}.

Conditions to be amended

- The amended conditions primarily reflect incorporation of sodium acetate into the permitted activities of the PPC installation, the addition of the scrubber emission point and its emission limit value.
- The condition incorporating emission limits to air has been amended to give appropriate effect to the WID requirements regarding the operation of the incinerator plant, particularly application of emission limit values during periods of abnormal operation.
- Conditions relating to the SPMP have been revised for the purpose of clarity in line with wording in the latest permit template.
- The condition relating to the interpretation of expressions has been amended to include new or revised interpretations for '*Application*', '*Land Protection Guidance*' and '*Site Protection and Monitoring Programme*'.

Conditions to be added

- No new conditions are added.

CONCLUSION

The variation notice should be issued to permit the production of up to 10,000 tonnes per year of sodium acetate trihydrate.

Permitting Officer	J C Jones	Date: 28-2-07
Authorising Officer	J I Morris	Date: 28-2-07