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Determination of an Application for a PPC Permit under the Pollution Prevention and Control (England and Wales) Regulations 2000 (SI 2000 No.1973)

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 No.1973), as amended.

Administrative details

Application date and Agency reference ("the Permit Application") **29/08/03 - BU2357**

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

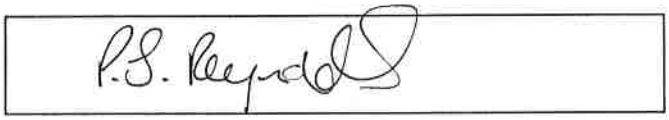
Applicant (the "Applicant") **Warwick International Limited**

Address/location of installation (the "Installation")]
Dock Road
Mostyn
Holywell
Flintshire
CH8 9HE

Name of Account Officer A W Leakey

Signature of Account Officer:

Signature of Authorising Officer:
(Paula Reynolds)



All relevant documents have been sent to the IPPC Public Registers

Purpose of this document

The Decision Document ("DD") explains how the Applicant's Permit Application has been determined and why the specific conditions in the Permit have been imposed. It is a record of the decision-making process to show how all relevant factors and legislative requirements have been taken into account.

It should be noted that the Permit contains many conditions taken from the Agency's standard PPC Permit template. These standard conditions were developed by the Agency having regard to the legal requirements of the PPC Regulations and other relevant legislation. This Decision Document does not include an explanation for these standard conditions, but does provide an explanation and justification for the emission limit values (ELVs), the choices made between optional standard conditions and for additional conditions which have been imposed in order to take installation-specific factors into account.

Summary of the decision

A Permit for the Applicant to operate the Installation has been granted by the Agency, subject to the conditions set out in the Permit. Where the Permit includes standard Agency Permit conditions (see above), these have been considered to be appropriate for the Installation, in particular in ensuring that all appropriate measures will be taken against pollution and that no significant pollution will be caused. The Agency considers that in its decision to issue the Permit and in the conditions included therein, it has taken into account all relevant considerations and legal requirements.

Description of the Permitted Installation

A non-technical summary of the activities covered by the Permit is contained within the Application. There is also a description of the Installation included in the Introductory Note to the Permit:

The Warwick International Mostyn installation produces up to 50,000 tonnes per year of tetra acetyl ethylene diamine (TAED), a bleaching activator used in the formulation of domestic washing powders. This scale of operation is in the medium range for bulk production of speciality organic chemicals. The installation consists of two continuous process plants that produce the intermediate diacetyl ethylene diamine (DAED) by reacting acetic acid with ethylene diamine. Further reaction of DAED with acetic anhydride completes conversion to TAED in three batch plants. Finished product formulations are made by granulation of TAED with binder additives such as surfactants and polymers.

Most of the processes employ modern technology, including computerised automation through a distributed control system. All plants have automatic safety shutdown and alarm functions.

Some site process water is abstracted from a local stream under licence from the Environment Agency.

Point source releases to air include oxides of carbon and nitrogen from combustion processes used to raise steam, provide process heat and incinerate process residues. Natural gas is used as the main fuel, with gas oil as standby. Liquid process residues containing Acetic Anhydride and Acetic Acid are burnt in an on-site incinerator to recover heat by raising steam. The process residues are considered to be hazardous due to their corrosive properties and the incinerator is regulated under the stringent requirements of the Hazardous Waste Incineration Directive. All releases are made via high level stacks.

Other process releases to air comprise predominantly Acetic Anhydride and Acetic Acid vapour that is passed through caustic soda scrubbing towers before release of residual vapours to air via stacks. Condensers are used to minimise releases from reaction and distillation processes into the vent streams.

Fugitive releases to air consist of Acetic Anhydride and Acetic Acid vapours from seals, safety valves, flanges, sample points and tanker loading displacement. Releases within process buildings are captured by local exhaust ventilation systems and passed through the caustic soda scrubbing towers.

Releases to controlled waters consist of process effluents from plant clean downs and vent scrubber draining and surface water run-off from production areas. The raw effluent contains Acetic Acid and traces of other raw materials and products. These streams are mixed and treated with Caustic Soda in order to control acidity prior to discharge into the Dee Estuary. Treated effluent is discharged into the main Dee channel via a submerged pipeline between 2 and 4 hours after high tide only.

The Dee Estuary is a conservation site of European importance and special consideration has been given to the potential for impact due to the relatively high Chemical Oxygen Demand (COD) and temperature of the effluent. The discharge COD concentration currently exceeds the guidance levels. However, the volume and mass of the release are subject to continuing reductions and the rapid dilution provided within the estuary combined with the ready degradability of the primary constituents renders significant effects unlikely.

Noise levels produced by the installation at local residential properties are predicted to be above guidance levels and further investigation of the potential for reducing noise levels is a requirement of this permit.

The installation environmental management system (EMS) operated by Warwick International Limited has been independently accredited to the international standard for EMS, ISO14001.

Glossary of terms used in this Decision Document

"*Application*" means the application for this Permit, together with any response to a Notice served under Schedule 4 to the PPC Regulations, and any other written information provided by the Operator for consideration in the determination of the Permit.

"*Applicant*" means Warwick International Limited

"*Operator*" means Warwick International Limited

"EP OPRA" means Environmental Protection Operator Performance and Risk Appraisal profile for the installation, submitted as part of the application fee determination.

"background concentration" means such concentration of that substance as is present in:

water supplied to the site; or

where more than 50% of the water used at the site is directly abstracted from ground or surface water on site, the abstracted water; or

where the Permitted Installation uses no significant amount of supplied or abstracted water, the precipitation on to the site.

"BAT" means best available techniques means the most effective and advanced stage of development of activities and their methods of operation which indicates the practical suitability of particular techniques to prevent and where that is not practicable to reduce emissions and the impact on the environment as a whole. For these purposes: "available techniques" means "those techniques which have been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the cost and advantages, whether or not the techniques are used or produced inside the United Kingdom, as long as they are reasonably accessible to the operator"; "best" means "in relation to techniques, the most effective in achieving a high general level of protection of the environment as a whole" and "techniques" "includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned." . In addition, Schedule 2 of the PPC Regulations has effect in relation to the determination of BAT.

"Fugitive emission" means an emission to air or water (including sewer) from the Permitted Installation which is not controlled by an emission or background concentration limit under conditions 2.2.1.3, 2.2.2.4, 2.2.2.5, 2.2.2.8 or 2.2.2.9 of this Permit.

"Groundwater" means all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

"HWID" means the Hazardous Waste Incineration Directive 94/67/EC.

"Land Protection Guidance" means the version of the Agency guidance note "H7 - *Guidance on the Protection of Land under the PPC Regime: Application Site Report and Site Protection and Monitoring Programme",* including its appended templates for data reporting, which is current at the time of issue of the Permit.

"$L_{Aeq,T}$" means the equivalent continuous A-weighted sound pressure level in dB determined over time period, T.

"$L_{A90,T}$" means the A-weighted sound pressure level in dB exceeded for 90% of the time period, T.

"L_{AFmax}" means the maximum A weighted sound level measurement in dB measured with a fast time weighting.

"MCERTS" means the Environment Agency's Monitoring Certification Scheme.
"Monitoring" includes the taking and analysis of samples, instrumental measurements (periodic and continual), calibrations, examinations, tests and surveys.

"Permitted Installation" means the activities and the limits to those activities described in Table 1.1.1 of this Permit.

"PPC Regulations" means the Pollution, Prevention and Control (England and Wales) Regulations SI 2000 No.1973 (as amended) and words and expressions defined in the PPC Regulations shall have the same meanings when used in this Permit save to the extent they are specifically defined in this Permit.

"Sewer" means sewer within the meaning of section 219(1) of the Water Industry Act 1991.

"Staff" includes employees, directors or other officers of the Operator, and any other person under the Operator's direct or indirect control, including contractors.

"WID" means the Waste Incineration Directive 2000/76/EC.

"Year" means calendar year ending 31 December.

PART A – ADMINISTRATIVE INFORMATION RELATING TO THE APPLICATION AND INFORMATION ABOUT THE APPLICANT

The Agency's determination procedure

A1 "Duly made" check on Application received

The Application was not duly made as submitted on 18/08/03 for the following reasons:
The submitted EP OPRA profile was not correct and the full application fee was not, therefore, paid with the application. Also, a Site Condition Report was not submitted with the application.

Upon receipt of a revised EP OPRA profile, top up application fee and Site Condition Report the Application was determined to be duly made on 16/09/03. Note, however, that subsequent detailed scrutiny of the application has revealed that complexity scoring in respect of the on-site incinerator was not included within the EP OPRA profile and limited details of the incinerator are included in the application. The Operator has submitted a revised EP OPRA profile for subsistence charging purposes and will apply for a WID compliant variation of the permit under the transitional arrangements for implementation of WID. Existing IPC authorisation HWID conditions have been transferred into the permit, where possible.

A2 Consultation on the Application

The Application was advertised by the Applicant according to the requirements of Part 1 of Schedule 4 to the PPC Regulations on 10/10/03 in the Chester Chronicle and London Gazette.

The Agency sent copies of the Application to the following statutory consultees in accordance with Part 2 of Schedule 4 to the PPC Regulations:

- Flintshire Local Health Board;
- the Food Standards Agency;
- the Countryside Council for Wales;
- the Health and Safety Executive;
- Flintshire County Borough Council;
- Welsh Assembly Government.

The Agency also sent copies of the Application to the following non-statutory consultees:

- Welsh Water

A3 Consideration of consultation responses

Responses were received from the following statutory and non-statutory consultees:

Flintshire Local Health Board
Welsh Assembly Government
Countryside Council for Wales

No responses were received from members of the public during the determination period.

All responses have been considered by the Agency in determining the Application. The ways in which material responses have been taken into account are summarised in the appendix to this document.

A4 Matters of commercial confidentiality or national security

The Operator made a claim for commercial confidentiality. The nature of the claim is as follows: A site mass balance diagram contained within the bulk of the application document was included without mass flow information on the grounds that such details would be commercially sensitive. This was not identified during the duly made checks and the claim was upheld by default.

Upon subsequent consideration the Agency upheld the claim for commercial confidentiality, considering that the inclusion of the relevant information on the public register would prejudice the Applicant's commercial interests to an unreasonable degree because release of detailed mass balance flows may enable the Operator's cost position to be evaluated. In addition the information was not needed for determination purposes.

A5 Further information requirements

The Application was deemed duly made by the Agency, but further information was required in order for the Agency to be able to determine the Application. Further information was requested from the Applicant by letter as follows:

Clarification of multi-product protocol requirements, location and depth of discharge points to water, raw material pump details, raw materials composition, emissions to air and water, ambient pollutant concentrations, review of extent of installation and contact details of a neighbouring site, submission of a revised EP OPRA profile and details relating to site condition.

Responses were received from the Applicant on 19/04/04. These were placed on the public register and have been taken into consideration by the Agency in making its determination.

A6 The Applicant

The Agency is satisfied that the Applicant (now the Operator) is the person who will have control over the operation of the Installation after the grant of the Permit, and that the Operator will be able to operate the Installation so as to comply with the conditions that have been included in the Permit

Warwick International is the sole Operator at the installation and has been producing TAED and related products using similar chemistry and processes at the site since the 1970s. The installation and its environmental management system are now well established and the Agency considers these to be sufficient grounds to reach the above conclusions regarding permit compliance.

A6.1 OPRA profile

The Agency considers that the OPRA profile submitted with the Application should be amended as a result of its detailed consideration of the Application and in light of the conditions included in the Permit. Complexity scoring in respect of the on-site incinerator was not included within the original EP OPRA profile. The Operator has submitted a revised EP OPRA profile (version 2) for subsistence charging purposes and will apply for a WID compliant variation of the permit under the transitional arrangements for implementation of WID. Existing IPC authorisation HWID conditions have been transferred into the permit. The revised OPRA score of 273 will therefore be used as the basis for subsistence and other charging and for all other relevant purposes at the commencement of the Permit. In accordance with the Agency's OPRA Scheme, however, the Operator's OPRA profile for the installation may change over time.

PART B – THE INSTALLATION AND ITS MANAGEMENT

B1 Permit Section 1.1.1 - The permitted activities

The principal listed activity at the Installation falls within the activity description in Section 4.1 Part A(1)(a)(iv) of Part 1 of Schedule 1: Producing organic compounds containing Nitrogen, such as amines. The Agency considers that this constitutes the "stationary technical unit".

The Agency considers that the following activities are directly associated with the stationary technical unit and therefore form part of the Installation:

- Section 5.1 A(1)(a) : Incineration of hazardous waste. The incineration at the installation of distillation residues arising during the on-site production of TAED with the recovery of heat is considered to be an integral part of the installation primary activity.
- Section 5.3 A(1)(c)(ii) : Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by physico-chemical treatment, i.e. pH adjustment and storage of process effluent arising during the on-site production of TAED and discharge, along with installation surface water drainage, into the Dee Estuary.
- Combustion of natural gas to raise steam and for process heating is considered to be an integral part of the installation primary activity.

The stationary technical unit and its directly-associated activities described above, together constitute the Installation.

B2 Permit Condition 1.1.2 – Identification of exempt waste activities

This is a standard condition of all Permits but it is understood that it is not the Operator's intention to undertake any waste activities which are exempt from Waste Management Licensing (ie. activities listed in Schedule 3 of the Waste Management Licensing Regulations 1994) on the same site, which are not part of the Installation.

B3 Permit Section 1.2 - Site plan

The Applicant has provided a plan that the Agency considers is satisfactory for showing the site of the Installation and its extent. This plan is included in the Permit as Schedule 5, and the Operator is required to carry on the Permitted activities within the site boundary.

B4 Permit section 1.5 - Minor operational changes; (Changes allowed within the scope of this Permit)

The Permit constrains the Operator to operate the activities subject to the limits and conditions in the Permit. However the Operator may make minor changes as defined within the Application by notifying the Agency in writing under Conditions 1.5.1 -1.5.4.

The Application contains a "Procedure to Cover Changes to Multi-purpose Plants" detailed in Section 2.1.8 relating primarily to changes in granulation formulations and processing, rather than fundamental changes to process chemistry. It is not considered to constitute a true multi-product protocol. It is noted that the procedure contains the main elements required by a Multi-product Protocol, but detailed assessment has not been carried out on the basis that the standard permit conditions will provide protection against uncontrolled implementation of significant process changes.

B5 Permit section 2.11 - Closure and decommissioning; (Prevention of deterioration of the site)

The Applicant has provided a Site Report as required by paragraph 1 of Part 1 of Schedule 4 to the Regulations, the main elements of which are:

The site reconnaissance revealed various areas where the general quality of environmental protection measures is intermediate, i.e. permeable ground under overhead pipes or adjacent to the lorry park, etc. Records indicate that there have been several minor breaches in containment – but no information is provided on how these incidents were dealt with. The submitted site report does not meet the prime objectives of setting a comprehensive 'baseline of ground conditions' for the defined zone around the installation under the original site condition policy. The previous analytical suites do not include all the substances of concern.

The Agency considers that based upon the information provided, it would appear that there is reasonable possibility of pollution resulting from current on-site operations. Additional reference data will need to be collected as part of the post-permit Site Protection and Monitoring Programme (SPMP).

Further information, as described below, will be collected via the SPMP:

1. Thorough inspection and review of containment infrastructure surface water and foul water drainage systems be undertaken during implementation of SPMP. (i.e. within 6 months of permit issue) if these works haven't been undertaken already.
2. Submit proposals and implementation timetable for improvements to containment infrastructure and, surface water and foul water drainage systems be undertaken within 9 months of permit issue. Implement agreed improvement programme within 1 year of permit issue. (if remedial works haven't been undertaken already)
3. Maintenance & regular inspection programme to be included in SPMP.
4. Intrusive investigations are needed to establish "Reference data" under the SPMP.

B6 Permit Section 2.12 - Multiple Operator installations

This is not a multi-Operator installation.

Management

B7 Permit Section 1.3 - Overarching Management Condition

Condition 1.3.1 in the Permit is a standard condition but, based upon the information submitted in the Application the Agency is satisfied that appropriate management systems and management structures are in place for this Installation, and that sufficient financial, technical and manpower resource is available to the Operator to ensure compliance with all the Permit conditions.

The Operator's Environmental Management System, is externally accredited to ISO 14001. This is an internationally recognised standard of environmental management and is considered to represent BAT for management arrangements.

B8 Permit Section 2.3 - Management

B8.1 Staffing and Training

The information provided in response to Questions in Section 2.3 of the Application indicates that the installation is operated by an adequate number of staff, who are suitably trained and supervised. Appropriate written operating instructions are available, and a system is in place for the recording of staff training.

Sections 2.3.1, 2.3.2 and 2.3.3 of the application describe the management structure and responsibilities and training arrangements in place. Environmental responsibility induction training and ongoing update training is provided to all operational staff. Training Manual PD01 is referenced.

B8.2 Operation and Maintenance

The information provided in response to Questions in Section 2.3 of the Application indicates that the installation is operated and maintained in compliance with the Conditions in the Permit.

The Operator has a formal computerised maintenance system ("Mainsaver"), which includes maintenance planning, programmed preventative maintenance, breakdown history and recording of all maintenance done.

Sections 2.1.7 and 2.3.3 of the application briefly describe the maintenance management arrangements in place. It is noted that some standby plant, e.g. raw material ring main pumps, is operated in equal rotation with duty plant, giving the potential for common failure of the standby plant soon after being brought into operation especially for environmentally critical plant such as scrubber re-circulation pumps. There is no indication of maintenance programmes associated with the effluent discharge line, including details of any cathodic protection, and frequency/findings of storage tank thickness checks. These issues have been included in the proposed hand over document for consideration/follow up.

B8.3 Incidents and Complaints

The information provided in response to Questions in Section 2.3 of the Application indicates that there is a suitable incident/complaint logging and response system in place. However, it is noted that the Operator does not regularly receive nuisance complaints.

PART C: DETERMINATION OF PERMIT CONDITIONS

C1. Operating conditions and BAT determination

C1.1 Permit Section 2.1 In-Process controls – the Applicant's proposed techniques

The following key in-process controls described in the application/further information have been incorporated into the Permit. Exclusions of sub-parts of the Application are also identified:

Description	Parts	Justification
Process chemistry and technology definition.	Section 2.1, p. 16-47	These are the key limitations and controls that fix the type of reactions and process equipment used at the installation.
Operation at stoichiometric excess Acetic Acid during DAED production.	Page 18 in section 2.1.3 of the application.	Excess Acetic Acid ensures complete conversion of EDA to DAED, preventing significant vent releases of EDA.
Emission controls and abatement	Section 2.2, p. 47-70	These are the key controls that limit the emissions from the installation.
TAED plant caustic scrubber vents are fitted with extraction fan failure alarm, liquor low-flow alarm and standby pump trip, packing differential pressure alarm. Caustic soda strength in the scrubber liquors is also checked twice per shift.	Page 55 in section 2.2.1 of the application.	All of these parameters, if not controlled adequately, could lead to an undetected significant release of unabated process vapours.
Waste water control system, including tidal monitoring and discharge arrangements, pH control.	Pages 59, 60 of section 2.2.2 and Appendix 9 of the application.	These controls ensure that key effluent discharge parameters are in compliance, in particular the timing of the discharge in relation to the local tidal state.
Continuous DAED plant bund inspection regime and instrumentation.	Pages 69, 70 in section 2.2.5 of the application.	A continuous flow of water is maintained through the bund via an overflow weir to ensure that process residues do not accumulate. Regular inspection and monitoring of associated instrumentation is necessary to ensure that significant releases of process materials do not occur.

C1.2 General summary of the aspects considered in determining BAT for the installation

The following considerations have been taken into account in determining BAT for the installation as a whole:

- Comparison of the installation specific BAT with indicative BAT requirements in the Sector guidance is summarised in the table below:

	Indicative BAT requirement	Installation	Comment
Optimisation of reaction stage			
	Use of 'low inventory – fast reactors'	Continuous DAED process	Existing multiple batch reactors are not due for upgrade in near future. However, the Operator has developed and installed continuous reaction technology for the production of intermediate DAED. This will result in the closure of the old batch Plant 4 upon completion of reliability runs over the next few months. The TAED reaction kinetics are not suitable for continuous operation. Overall reaction efficiencies appear to be high.
	Alarm/Operational control	DCS and hard-wired interlocking	A distributed control system is used for many reactor operations. Hardwired alarms and interlocks on other key parameters (e.g. agitator failure, reactor temperature, condenser flow, high level, etc.). Some manual operations take place, particularly on Plant 4, which is to close.
VOC Minimisation			
	Ventilation Systems should not be sent to abatement if compromising its efficiency	Scrubber systems are designed for LEV loading	Many production buildings are enclosed due to the odorous nature of the primary raw materials and intermediate streams. Main fugitive losses probably due to slurry blockage clearance. Line flushing with Acetic Anhydride/Acid is carried out to minimise blockages.
	Distillation/Filtration/Vac system protected with adequate condensing means	Water cooled condensers	Vent condensers fitted on all systems with significant VOC vapour pressure. Minimum cooling water temperature is limited due to Acetic Acid "icing". Some liquid ring pumps use Acetic Anhydride as seal fluid to allow recovery of vapours.
	Vapour loss from reactors / tanks/pumps	Water cooled condensers	Vent condensers fitted on all systems with significant VOC vapour pressure. Limited evidence of back-venting in use on low temperature tanks and vessels, most of which are connected to scrubbers. Bottom filling of recovered Acetic Acid tankers is used. No use of seal-less pumps for solids-free duties. Details of agitator seal arrangements are not provided.
Control of Emissions to air			
	VOC's	Caustic soda/water scrubbers	Alternative options are limited due to variability of vent streams. Use as combustion air for on-site incinerator or bio-filtration may merit more detailed consideration for abatement of continuous DAED process vents.
	Oxides of Nitrogen	Natural gas-fired, gas oil back-up	Installation of flue gas recirculation identified as BAT. Short-term incinerator NO_x releases will need further consideration when WID requirements are implemented.
	Particulate Matter	Filtration	Bag filters fitted on solids handling systems for raw materials and products. On-site incinerator has ceramic filtration.
	Odour	Plant enclosure/ extraction	Most potential fugitive sources are enclosed and/or extracted to scrubbers. There is no history of persistent off-site odour complaints.

Control of Emissions to water			
	Segregation of surface water run-off	Site drainage combined with effluent	Process area surface water is not separated due to accidental contamination risks. Surface water in areas remote from the process units is discharged directly.
	Effluent treatment	pH adjustment only	Biological treatment considered excessive cost and reduction of losses at source has been implemented with some success. COD loads have reduced from typically 40 to 4 te/day. High organic load residues are incinerated with heat recovery. COD comprises mainly dilute Sodium Acetate, but benchmark release levels are not achieved. Tidal restrictions on release to Dee Estuary provide optimum dilution and dispersion. Rigorous re-evaluation of COD reduction or treatment options required by permit improvement programme.
Raw materials			
	Selection /Audit	Limited scope for substitution	Acetic Anhydride/Acid acylation process route is optimum for minimisation of by-product Acetic Acid formation. Diaphragm-grade Caustic Soda is used. Elimination of neutralisation requirements may be possible if biological treatment becomes viable. Material database, purchasing specifications and quality control are used.
	Water use	Closed circuit cooling and condensate return	Manual control of cooling tower blow down based upon total dissolved solids. Automatic boiler blow down. Use of high efficiency scrubber packing minimises water use on once through duties. Limited recycling of wastewater is currently practised. Specific water consumption rates of around 16 m^3/te product is above typical benchmark ranges of 2-10 m^3/te. Permit condition requires submission of a water efficiency audit report. It is noted, however, that rigorous measurement and control of current water usage appears to take place.
Waste			
	Handling	Dedicated storage facilities	Waste disposal, recovery and record keeping are controlled by a dedicated procedure. Wastes containment measures described are appropriate.
	Recovery/Disposal	On-site recycle and recovery of waste streams	Mixed Acetic Anhydride/Acid streams are separated by distillation enabling reuse of Acetic Anhydride. Acetic Acid by-product is returned to supplier for recovery by conversion back to Acetic Anhydride. Landfill of high boiling distillation residues is minimised by on-site incineration with energy recovery.
Energy			
	Basic Energy (1)	CCL agreement in place	Detailed energy consumption data is provided in the application and includes specific energy consumption for individual process units. There is an ongoing energy use reduction programme.
	Basic Energy (2)	Energy mgt plan	Instrument air compressors are staged, large motors use variable speed control, 60% condensate return to boilers is achieved. Heat recovery from process residues by on-

			site incineration. Steam generation and distribution maintenance is scheduled. Thermodynamic pinch analysis carried out by consulant. PSA rather than cryogenic separation is used to produce site Nitrogen supply. CHP has been considered, but is not viable at current electricity/gas price differentials.

- An environmental impact assessment of the installation is provided in the application based upon the H1 methodology. Some air and water dispersion modelling has been carried out in the past and is summarised, but detailed reports are not provided in support of the application. The H1 results are representative of likely worst case impacts.
- None of the typical releases are expected to result in significant pollution being caused, although there may be some scope for further emission reductions.
- There are no highly toxic, persistent or bio-accumulative substances likely to be emitted in significant quantities
- The widespread use of wet scrubbers at the installation in order to minimise releases to air results in transfer of VOC loads to COD discharge into the Dee Estuary. However, it is considered that the use of scrubbers enables fugitive and potentially odorous Acetic Acid releases to be captured more readily than if other techniques were employed. The availability of large dilution in the Dee Estuary enables high COD discharge concentrations to be tolerated, although mass releases are relatively small. Incoming abstracted water supplies have high suspended solids loading due to fungal activity. This impacts upon the installation discharge of suspended solids.
- The following aspects of the Application have significant relevance to the list of topics to be borne in mind when determining BAT (ie. Schedule 2 to the PPC Regulations):

  i) The TAED process route used at the installation enables high primary conversion of raw materials to finished product. The production of direct process wastes (~180 te/year) appears to be less than 0.5% of raw material inputs. However, it should be noted that this excludes discharges to the estuary of 2000 te/year of 25% Caustic Soda (~750 te/year Acetic Acid equivalent) and associated raw material, intermediate or product losses as COD. A detailed mass balance was not provided with the application, but typical COD discharges of 4 te/day is indicative of the overall process efficiency (~95%). An improvement condition is included in the permit requiring future review of BAT for releases of COD into the Dee Estuary to ensure that further process efficiency measures are evaluated. Use of the continuous intermediate DAED process will inevitably improve production efficiency and this development is considered to represent BAT for this installation.

  ii) There is limited scope for substitution of process raw materials for significantly less hazardous substances. The use of Acetic Acid in addition to Acetic Anhydride for acylation will reduce inventory of the more hazardous Acetic Anhydride.

  iii) Significant process by-product streams are recycled, in particular Acetic Acid/Acetic Anhydride mixtures are separated by distillation and by-product Acetic Acid is returned to the Acetic Anhydride supplier for recovery. Distillation residues are incinerated and combustion heat is recovered. Fines recycling during the granulation process are also significant.

  iv) Alternative BAT process routes considered in the Application is the sole use of Acetic Anhydride for acylation and the use of Ketene for acylation. The former process develops large volumes of by-product Acetic Acid which must be converted back into Acetic Anhydride and is not considered to be economic at this scale, while the later is considered to be energy intensive and uses a non-regenerable Phosphorus catalyst.

  v) Prominent emissions from the installation include Acetic Acid (~10 te/year), Oxides of Nitrogen (33 te/year) and Particulate Matter (~2 te/year) to air and COD (~4 te/day) to water. None of these releases are considered to be at a scale sufficient to cause significant effects in the environment. However, consideration of the potential for further reductions is required.

  vi) Energy, water and raw material consumption may not be optimised. Use of low energy technology (e.g. membrane techniques for separation of Acetic Acid/Acetic Anhydride mixtures) has been reviewed, re-use of process effluent should be considered and losses into the site drainage system may require further minimisation. However, it is noted that introduction of the continuous intermediate DAED process has potential for significant improvements in overall efficiency for all of these aspects.

vii) The installation is also a Top Tier establishment under the COMAH Regulations and consideration of environmental accident risks under this regime is considered to be valid for minimisation of lesser accidental risks at the installation. Some potential improvements to secondary containment standards (wastewater tank bunding) have been identified and these should be reviewed through the Site Protection and Monitoring Programme (SPMP).

- BAT options considered by the Applicant are detailed above. These are considered to be the only viable alternative process routes available.
- There is no significant disagreement with the Applicant's BAT proposals. However, there are clearly areas for potential improvements at the installation. These improvements and time-scales for implementation, where appropriate, are detailed under Section C5.1 of this document.

C2. Justification for ELVs or equivalent technical parameters set for specific emissions

The following emission limit values (or "equivalent measures" or "technical parameters") have been included in the Permit for the reasons described:

C2.1 Permit section 2.2.1 - Emissions to air

The primary potential releases from the installation into air are Acetic Acid/Anhydride, Ethylene Diamine and particulate matter from DAED/TAED production activities and combustion emissions from the on-site boilers/process heaters and incinerator.

VOLATILE ORGANIC COMPOUNDS (VOC)

Acetic Acid, Acetic Anhydride and Ethylene Diamine (EDA) are classified as low hazard (Class B) VOCs and the relevant benchmark release for such substances where released at levels greater than 5 te/year (Acetic Acid only) is 75 mg/m^3. Ethylene Diamine is rapidly consumed in the reaction with excess Acetic Acid/Anhydride and so vent releases to the process scrubbers are normally negligible. Reliance is placed upon in-process controls, rather than emission limit values (ELVs) to prevent significant releases of EDA. Where EDA is handled alone, i.e. pumping into storage and head tanks the low temperature vapour releases *before abatement* are estimated to be 600-2400 kg/year. Total releases after abatement are 17 kg/year and can be considered to be negligible. EDA environmental assessment levels (EAL), including odour threshold value, are the same or greater than those for Acetic Acid. No ELVs have been set for EDA on this basis.

All point source releases associated with Acetic Acid/Anhydride handling are via wet scrubbing systems and, therefore Acetic Anhydride releases are likely to be substantially hydrolysed to the acid. ELVs are, therefore, based upon Acetic Acid, although the impact assessment for short-term releases pessimistically considers Acetic Anhydride EAL and odour thresholds because these are lower than those for the acid. Existing authorised release limits for Acetic Acid are 50 mg/m^3. These have been retained on the basis that they are considered to provide adequate short-term protection against acute effects, although off-site odour potential is discussed in detail below. However, it is expected that long-term releases will be well below these levels and historic emissions data confirm this. In order to ensure that long-term releases are acceptable overall, an annual Acetic Acid mass release limit of 15 tonnes has also been imposed.

The expected process contributions for Acetic Acid/Anhydride releases are summarised in the table below. Long-term impacts are pessimistic and do not warrant further consideration. However, the short-term estimates may reflect reality, if several release points are operating close to the ELV simultaneously for a period of time, although this is considered to be unlikely. The primary concern is the potential for nuisance odour incidence. Although there is no history of complaint, worst-case odour estimates are close to the indicative level for annoyance. This is based upon a screening assessment using the H1 guidance methodology to estimate short-term

maximum ground level concentration for a representative worst case short-term release scenario (main scrubbers operating at 50 mg/m^3), modifying the short-term maximum ground level concentration using an empirical factor to give a 98%ile hourly average and then converting to odour units using the H4 guidance methodology.

The indicative level for annoyance is derived from the H4 guidance note, assuming that Acetic Acid/Anhydride odour has high "offensiveness". Actual routine releases are significantly lower than those assessed and the realistic potential for regular off-site nuisance odour is considered to be minimal.

Monitoring of Acetic Acid/Anhydride releases has been required on a quarterly basis for all of the main release points, with the exception of releases associated with the storage areas where vapour pressures of process liquids are expected to be low. The frequency of monitoring is justified on the basis of the in-process controls available (flow, liquor composition).

COMBUSTION RELEASES AND PARTICULATE MATTER

Annual Nitrogen oxides emissions are typically 30-40 tonnes and long-term impacts are not considered being of concern based upon a pessimistic release of 50 tonnes/year. An annual mass release limit of 40 tonnes has been proposed. Short-term impacts have been assessed assuming releases at the ELVs, in particular the incinerator, which is known to suffer from start up and shut down difficulties resulting in high NOx emissions. Short-term impact is potentially significant, although the Applicant refers to air dispersion modelling for all the boilers operating (but not including the incinerator) suggests that impacts are much lower (7 µg/m^3 hourly average) than those indicated in the summary table below. It is expected that actual impact is somewhere between the two estimates. Boundary monitoring data provided by the Applicant suggests that long-term averages are in the range 15-30 mg/m^3 (38-75% AQS). The ELVs proposed (170 mg/m^3) are within the benchmark range of 50-200 mg/m^3 for small boiler plant. Consideration was given to use of a 350 mg/m^3 (95% of hourly averages in any 24 hours) limit based upon the existing IPC limit, modified to allow for start-up peaks and the WID guidance limit. The latter was considered to be most appropriate at this time. Further assessment of incinerator releases and monitoring has not been carried out because the application contains limited information and the application fee did not reflect the complexity profile associated with an incinerator. Existing HWID ELVs are to be applied and further assessment will take place within 12 months when an application for variation to comply with WID requirements will be necessary.

Total annual particulate matter releases are typically less than 2 tonnes/year although release limits are not at benchmark levels, except for the incinerator. However, typical releases are less than 5 mg/m^3. It is anticipated that the majority of particulate matter releases will be due to product granulation, handling and packing operations and this forms the basis of the assessment summarised below. Impact of incinerator particulate matter releases will be negligible at the HWID release levels. It is proposed to rely upon the use of good maintenance practice for the bag filter abatement to prevent excessive releases and apply a "no visible release" condition for all particulate matter release points with the exception of the incinerator.

Total annual Carbon monoxide releases are typically less than 2 tonnes/year and release levels are well below the benchmarks. Existing limits around benchmark levels are proposed. The impact will be negligible and is not considered further.

Releases of metals, TOC and Dioxins from the incinerator have not been assessed and reliance is made upon the recent HWID IPC variation application determination, discussion of recent developments with the Site Inspector and the future WID PPC variation application determination to address these issues. It is expected however, that due to the single source nature of the waste streams incinerated, impact of these pollutants will be negligible. The application confirms that releases are below the reporting threshold of the pollution inventory.

The following table summarises the proposed ELVs to be used to control the key pollutants from the installation:

Pollutant	Source	Benchmark	ELV	Comments
Acetic Acid/ Acetic Anhydride	Process scrubbers	75 mg/m³	50 mg/m³	Existing IPC limits plus annual mass limit (15 te)
Ethylene Diamine	Process scrubbers	75 mg/m³	None	Rely upon in-process controls
Nitrogen Dioxide	Boilers/process heaters	50-200 mg/m³	170 mg/m³	Total annual mass limit (40 te) also
Carbon Monoxide	Boilers/process heaters	100 mg/m³	70 mg/m³	
Nitrogen Dioxide	Incinerator	400 mg/m³ (daily average)	400 mg/m³ (daily average)	Total annual mass limit (40 te) also
total particulate matter	Incinerator	As HWID	As HWID	
TOC/CO/metals/ Dioxins	Incinerator	As HWID	As HWID	
Total particulate matter	Granulation, product handling	5 mg/m³	"No visible release"	Typical releases below benchmark

The following table summarises the estimated impact of the key pollutants from the installation:

Pollutant	Objective/EAL	PC	PC/EAL	PEC/EAL*
Acetic Acid	250 µg/m³ (long-term)	15 µg/m³ (annual average)	6%	6%
Acetic Acid	3700 µg/m³ (short-term)	890 µg/m³ (hourly average)	24%	24%
Acetic Anhydride (assuming <3% present in total releases)	40 µg/m³ (short-term)	22 µg/m³ (hourly average)	55%	55%
Odour (based upon Acetic Anhydride)	1.5 ou_E/m^3 (98%ile hourly average)	~1.3 ou_E/m^3 (98%ile hourly average)	87%	-
Odour (based upon Acetic Acid)	1.5 ou_E/m^3 (98%ile hourly average)	~1.1 ou_E/m^3 (hourly average)	73%	-
Nitrogen Dioxide	40 µg/m³ (annual average)	3.4 µg/m³ (annual average)	8.5%	66%
Nitrogen Dioxide	200 µg/m³ (99.8%ile hourly average)	77 µg/m³ (hourly average)	38.5%	61.5%
PM_{10} (assuming total particulate matter released as PM_{10})	40 µg/m³ (annual average)	2.4 µg/m³ (annual average)	6%	44%
PM_{10} (assuming total particulate matter released as PM_{10})	50 µg/m³ (90.4%ile daily average)	25 µg/m³ (maximum daily average)	50% (based upon maximum daily average)	63% (based upon 90.4%ile daily average)

*Predicted background concentrations in the 1km grid square containing the nearest sensitive receptor (Mostyn residential area) for 2005 were used from the NETCEN website.

C2.2 Permit Conditions 2.2.2.3 - 2.2.2.6 - Emissions to water (other than sewer)

The installation process effluent consists primarily of dilute aqueous Sodium Acetate solution discharged between 2 and 4 hours after high tide in order to maximise dilution. Release is via a submerged out fall pipe fitted with diffusers to aid dispersion. The discharge is limited to 6000 mg/l COD and 2250 cubic metres per tidal period, with the bulk of the discharge occurring during the first hour. Sodium Acetate is readily degraded and is not expected to persist in well-oxygenated waters such as the ebb tide on the Dee Estuary. Initial dilutions in the discharge plume are estimated (using WRc outfall design guide 1990) to be in the range 24-43 times, dependent upon tidal current and water depth. Initial estuary COD concentrations might be expected in the range 140-250 mg/l, with the main discharge period being at the low end of this scale. These levels are comparable with estuary background levels (e.g. 280-440 mg/l upper Severn Estuary, 25-320 mg/l River Dee at Queensferry) and only occur for a maximum of two hours each tidal cycle. Wider scale dilution of 500:1 is estimated in the Dee Estuary by a Welsh Water study carried out in 2002 investigating the impact of sewage treatment works discharges close to Mostyn.

Maximum COD releases are typically less than 4000 mg/l and average 2300 mg/l. It is proposed that the COD release concentration of 6000 mg/l is retained to allow for reductions in water usage which might increase concentrations, but reduce load. In order to prevent excessive COD load a daily mass limit of 10 tonnes and an annual mass limit of 1200 tonnes is proposed. However, the release concentration is well above benchmark levels and it is proposed that an improvement condition is included requiring future review of BAT for further reducing the COD discharge.

BOD is typically half of the chemical oxygen demand and the existing concentration limit has been retained.

Suspended solids releases are typically around 50 mg/l, just above the 20-30 mg/l benchmark. However, high levels of suspended solids in the incoming abstracted water ("Mostyn water") due to fungal activity has resulted in levels of up to the current limit of 200 mg/l. It was originally proposed that a differential suspended solids limit of 50 mg/l above incoming Mostyn water supplies suspended solids concentration was set. This would allow for fluctuations in the suspended solids load in the incoming raw water and allow for reductions in water usage, which might increase released concentrations. Subsequent discussion with the Site Inspector raised concerns that it may be difficult to demonstrate compliance with such a limit. The existing limit of 200 mg/l has been increased to 250 mg/l to allow for the excess loads in the abstracted water. The impact of suspended solids load on the Dee Estuary is expected to be minimal due to the dynamic nature of the tidal flow, which is likely to result in naturally high solids loads. None of the solids present in the discharge are expected to have significant levels of associated metals or persistent organic compounds.

The existing daily, tidal and flow volume limits have been retained to allow for storm conditions.

The existing discharge pH limits are considered to be adequate and have been retained.

The temperature of the discharge is currently limited to 25°C, but excursions up to 30°C have occurred during warm weather. The applicant has requested consideration of allowing discharge to occur at up to 35°C during warm weather.

At the wider scale dilution (500 times) available, a discharge temperature of 35°C into a typical low estuary temperature of 10°C would result in an estimated rise in ambient estuary temperature of 0.05°C. This is well below the 0.2°C maximum temperature rise suggested in the guidance for no likely significant effect on thermal regime.

However, consideration of the temperature gradient in the discharge plume suggests a temperature rise of between 0.5 and 4°C might be experienced local to the outfall. This agrees with modelling carried out for the Applicant in the 1990s, which suggested a differential of 1.5°C in the near field. Subsequent field measurements found that temperature differential between the plume and ambient water extends less than 20 metres from the outfall. This plume scale is considered to be minimal in comparison with the local estuary channel width of hundreds of meters. On this basis it is concluded that no significant effect will occur as a result of changes in the thermal regime of the estuary due to the installation discharge. In order to allow flexibility for high ambient temperatures, while maintaining the existing thermal load differential, it was originally proposed to allow a maximum discharge temperature differential of 15°C above ambient estuary temperature up to a maximum of 35°C. However, follow discussion a seasonally split temperature limit of 35°C from 1st May-31st October and 25°C from 1st November-30th April was considered to be more appropriate until temperature differential data are available over a full year.

No information regarding releases of total hydrocarbon oils was provided with the application. A limit has not, therefore, been set, but monitoring is required by inclusion of this parameter in Table 2.2.5. This will enable assessment of the need for a limit to be made in future and prevents releases greater than background.

The remaining releases are trace organic compounds arising from raw material and product losses into the effluent system and metals arising as impurities in raw materials (e.g. Mercury in Caustic Soda). Releases and their expected impacts are summarised in the table below:

Component	Annual mass to Dee Estuary kg	Concentration released to estuary µg/l	Concentration after initial dilution in estuary (30 times) µg/l	EQS of species µg/l	% of EQS after initial dilution
Total COD	456 te (2002)	6000 mg/l	200 mg/l	-	-
Ammoniacal Nitrogen	16	<10	<0.3	21 (Ammonia)	<1.4%
Nickel	<26	0.12*	0.004	30	0.01%
Iron	-	0.7*	0.03	1000	0.003%
Chromium	<26	1.8*	0.06	15	0.4%
Copper	<26	0.4*	0.01	5	0.3%
Lead	<26	<19	<0.6	25	<2.6%
Zinc	535	4.1*	0.14	40	0.3%
Arsenic	5	3.7*	0.12	25	0.5%
Cadmium	5	0.15*	0.005	5	0.1%
Mercury	0.3	0.22	0.007	0.5	1.5%

* actual release concentrations, rather than estimates based upon limit of detection.

Releases of Ammoniacal Nitrogen and Zinc at levels of 2 and 1 mg/l respectively have been recorded. A Nitrogen limit of 5 mg/l is proposed to ensure that significant impacts do not occur after wider dilution in the estuary. This limit is at the benchmark level. Zinc releases are due to high incoming abstracted water background levels and therefore no limit is set other than the implied background limit through condition 2.2.2.5.

Releases of halogenated organic compounds due to the presence of halogens in water treatment chemicals, Cyanides and Copper due to potential losses of pigments used at the installation are not quantified, but likely to be minimal. Limits have not, therefore, been set, but

monitoring is required by inclusion of these parameters in Table 2.2.5. This will enable assessment of the need for a limit to be made in future and prevents releases greater than background.

Releases of the remaining metals identified as liable to be present in the discharge are not significant in terms of contribution to background levels compared to the EQS or load and specific conditions in respect of these Dangerous Substances are not considered to be necessary, with the exception of Mercury. Due to the large volumes (2000 te/year) of Caustic Soda discharged a Mercury composition limit is imposed on the raw material under section 2.2.8.

Direct Toxicity Assessment (DTA) of the effluent is not considered to be appropriate given the readily degraded nature of the bulk effluent constituents and low levels of persistent and eco-toxic substances likely to be present.

C2.3 Permit section 2.2.2.7 - 2.2.2.10 - Emissions to sewer

There are no emissions to sewer.

C2.4 Permit section 2.2.3 - Emissions to groundwater

There are no emissions to groundwater from the installation.

C2.5 Permit section 2.2.6 - Odour

On consideration of the Application and further information provided by the Applicant and from its previous knowledge of the operation of the installation, the Agency considers that the activities carried out at the installation have the potential to cause odour, but that such odour is not likely to cause annoyance and that the Applicant's proposals in respect of odour control represent BAT. Agency therefore considers that the standard Condition 2.2.6.1 is appropriate and sufficient.

Pessimistic assessment suggests that nuisance may be caused, but there is no recent history of complaint (see section 2.2.1 – emissions to air).

C2.6 Permit section 2.2.7 - Emissions to land

The permit does not allow emissions to land from the installation.

C2.7 Permit section 2.9 - Noise (and vibration)

On consideration of the Application the Agency considers that the activities carried out at the installation have the potential to cause noise that might cause annoyance. Noise levels at the nearest sensitive receptor, a residential area overlooking the installation to the South West, have been measured and modelled and assessed according to BS4142 against substitute background levels measured at a surrogate location. The modelled and measured levels are reasonably consistent and also comparable with historic noise surveys (most recently 1999), although the scale of error introduced by use of the substitute background level is not considered. However, the Applicant accepts that, on the basis of the BS4142 assessment, further noise reduction measures are required. Noise level at the sensitive receptor is likely to be in the range 53-55 $L_{Aeq,T}$ dB(A), the surrogate Daytime background is around 48 $L_{A90,T}$ dB(A) and night time is around 35 $L_{A90,T}$ dB(A). The background levels may be lower at the actual sensitive receptor location due to differences in elevation reducing traffic noise from the adjacent main road and railway. It is therefore clear that the 10 dB differential likely to result in complaints may be approached by day and exceeded at night.

It is noted that there is no history of regular noise complaint from the sensitive receptor location and that mitigation measures are already in place at the installation to eliminate significant tonal noise components. The Applicant has identified the three dominant noise sources that would give the greatest noise level reduction (est. 5 dB(A)) at the sensitive receptor when further attenuated. Further evaluation is considered to be appropriate (See detailed comments in hand over document).

Whilst the Agency considers that the Applicant's proposals represent BAT to prevent/minimise such noise, the Agency considers that it is appropriate to impose a further condition in the Improvement Programme in respect of noise from the installation in addition to Condition 2.9.1.

C2.8 Permit section 2.13 - Transfer to effluent treatment plant

No transfers to effluent treatment plant are controlled under this part of this Permit.

C3. Other BAT considerations – (where not covered in general section above)

C3.1 Permit section 2.4 - Efficient use of raw materials

The Agency has assessed the proposals set out in the Application in sections 2.1.3, 2.1.4 (detailed process descriptions) and 2.4 (Materials Inputs) and that they are consistent with the use of BAT and the standard Conditions 2.4.1.1-3 are sufficient and appropriate regard having been given to minimising their use and to ensuring that materials with the lowest practicable environmental impact are used

C3.2 Permit section 2.5 - Waste storage and handling

The Agency considers that the Applicant has appropriate measures in place for the storage and handling of waste to prevent releases during normal operations and to minimise the potential for accidental releases. The standard Permit Condition 2.5.1 is considered to be appropriate and sufficient for the Permit to be issued. However further requirements in respect of waste storage and handling have been included in the Improvement Programme (see section C5.1).

C3.3 Permit section 2.6 - Waste recovery or disposal

The Agency has considered the proposals in the Application for the avoidance of waste production and in respect of such waste as is produced, its potential recovery. [See sections 2.1.3, 2.1.4 (detailed process descriptions), 2.4 (Materials Inputs), 2.6 (Waste Handling) and 2.6 (Waste Recovery and Disposal)]. The Agency is satisfied that the proposals show that waste production will be avoided as far as possible, and where produced will be recovered insofar as that is technically and economically possible. The Agency is further satisfied that the proposals show that the installation will be operated in such a way that waste which is unable to be recovered can be disposed of so as to avoid or reduce impact on the environment. Standard Conditions 2.6.1 – 2.6.4 are considered to be appropriate and sufficient for the Permit to be issued.

The TAED process route used at the installation enables high primary conversion of raw materials to finished product. The production of direct process wastes (~180 te/year) appears to be less than 0.5% of raw material inputs. However, it should be noted that this excludes discharges to the estuary of up to 2000 te/year of 25% Caustic Soda (~750 te/year Acetic Acid equivalent) and associated raw material, intermediate or product losses as COD. A detailed mass balance was not provided with the application, but typical COD discharges of 4 te/day is

indicative of the overall process efficiency (~95%). An improvement condition is included in the permit requiring future review of BAT for releases of COD into the Dee Estuary to ensure that further process efficiency measures are evaluated. Use of the continuous intermediate DAED process will inevitably improve production efficiency and this development is considered to represent BAT for this installation.

C3.4 Permit section 2.7 - Energy efficiency

The Agency has considered the information in the Application in respect of energy efficiency, including that for the Applicant's energy management system (See section 2.7). The Agency is satisfied that at the commencement of the Permit, the installation should be operated in an energy efficient manner, and that Standard Conditions 2.7.1 – 2.7.3 are appropriate and sufficient.

The Agency has noted that this installation is subject to a Climate Change Agreement.

In respect of Condition 2.7.1, the Operator is required to report the standard energy consumption data for the organic chemicals sector.

C3.5 Permit section 2.8 - Accident prevention and control

The Agency has considered the accident management plan submitted under Section 2.8 of the Application and considers that the Applicant has a suitable system in place to identify, assess and minimise the environmental risks and hazards of accidents and their consequences. Standard Condition 2.8.1 in the Permit is appropriate and sufficient to ensure that the necessary measures will be taken to prevent accidents and to limit their consequences.

The Agency has taken into account that the site is subject to COMAH and considers that Standard Condition 2.8.1 is consistent with, and does not conflict with, any obligations on the Operator under those Regulations.

C4. Other legal requirements relevant to the determination of the Application and to the setting of ELVs and other conditions of the Permit

C4.1 Waste Management Licensing Regulations 1994

There are no Waste Management Licensing regulatory considerations relevant to this installation.

C4.2 The Conservation (Natural Habitats etc) Regulations 1994

The continued use of BAT by the Applicant in operating the installation will meet the requirements of these Regulations. An assessment summary form HR01 concluding no likely significant effect upon the interest features of the Dee Estuary pSAC, SPA and RAMSAR site was sent to CCW for comments on 9/03/04. Comments were received on 22/04/04.

It is noted that no releases to air and water, with the exception of Beryllium to air, was identified as relevant for assessment under the Habitats Regulations in the AQTAG 03 Guidance for PPC chemicals tranche applications (Version 3, dated 20/1/03). However, consideration was given in the assessment to the main pollutants, including COD and temperature releases for completeness. Releases of Beryllium to air are considered to be negligible.

C4.3 CROW Act

The continued use of BAT by the Applicant in operating the installation will meet the requirements of this Act. The Dee Estuary is the only SSSI within 2 km of the installation. The assessment detailed under section C4.2 considers the Dee Estuary.

C4.4 Dangerous Substances Directive

The following provisions have been included in the Permit to take account of requirements of this Directive:

Permit conditions 2.2.2.4, 2.2.2.5, 2.2.5.2 and 2.2.8.1 have been included in the Permit to take account of requirements of this Directive under Consenting Regimes A, B and C.

C4.5 Solvent Emissions Directive

There are no SED regulatory considerations relevant to this installation.

C4.6 Groundwater Regulations 1998

The continued use of BAT by the applicant in operating the installation will meet the requirements of these Regulations. There are no permitted or expected emissions to land or groundwater of relevant substances.

C4.7 Environment Act 1995 – Section 4 (Pursuit of Sustainable Development)

The continued use of BAT by the Applicant in operating the installation will meet the requirements of this Act.

C4.8 Environment Act 1995 – Section 7 (Pursuit of Conservation Objectives)

The continued use of BAT by the Applicant in operating the installation will meet the requirements of this Act.

C4.9 Human Rights Act 1998

In discharging its duties, the Agency takes into account the implications of the Human Rights Act 1998, which implements certain parts of the European Convention on Human Rights into law in England and Wales. The Act seeks to protect individuals and companies from unjustified interference from public bodies with certain protected rights. There are a number of provisions of the Convention which have been considered in relation to this application.

Article 2 – "the right to life"

The Agency has carefully considered all the relevant data and consulted with Flintshire Local Health Board and the Food Standards Agency and has concluded that the emissions from the installation do not pose a significant risk to public health.

Article 6 – "the right to a fair trial"

The Agency considers that no third party's civil rights or obligations are determined by its decision to grant the applicant a PPC permit. However, without prejudice to this view, the Agency is in any case satisfied that affected groups and individuals have had a sufficient opportunity to have their representations considered during the determination process. The Agency has considered all responses up to the date of its decision.

Article 8 – "the right to respect for private and family life and First Protocol – Article 1 – "peaceful enjoyment of possessions and right not to be deprived of them except in the public interest and in accordance with the law"

The Agency considers that the operation of the installation in accordance with the conditions in the permit will not engage these Convention rights so far as the public is concerned. Without prejudice to this view, the Agency is satisfied that in issuing this PPC permit it has complied with the legal framework established in the Pollution Prevention and Control (England and Wales) Regulations 2000, which were made under the Pollution Prevention and Control Act 1999. This legislation balances the rights of an Operator to carry on their business against the public interest that this proposal is properly regulated and does not cause significant environmental harm. The Agency has carried out its statutory duty under the above Regulations in the determination of this application.

Summary

The Agency considers that there is unlikely to be any identifiable interference with Article 2, 6, 8 or First Protocol Article 1 rights as a result of this permit being granted. No other rights protected by the Human Rights Act 1998 are considered likely to be infringed by the permit, or the Agency's decision making process.

C4.10 Relevant Secretary of State Directions

The following Directions apply:

Pollution Prevention and Control (Waste Incineration Directive) (England and Wales) Direction 2002. The application does not contain sufficient detail to enable a determination of WID conditions for the on-site incinerator. Also, the application fee did not include consideration of the complexity associated with the on-site incinerator. Due to determination time constraints (3 months available) it is proposed that existing HWID conditions imposed under the existing IPC Authorisation are retained and that the Operator is advised to submit a transitional application for variation to comply with WID by the end of the appropriate window (31/03/05).

C4.11 The Sulphur Content of Liquid Fuels (England and Wales) Regulations 2000

These regulations have been considered and condition 2.2.8.1 is used to control the sulphur content of fuels used in the installation boilers.

C5 Other conditions included in the Permit

C5.1 Permit section 1.4 - The Improvement Programme

The Improvement Conditions described below have been imposed on the Operator for the reasons given in the table below.

Ref	Requirement	Due date	Justification
1.4.1.1	The Operator shall submit a report to the Environment Agency reviewing the options for reducing the emissions of the pollutants listed below so they shall not exceed the concentrations indicated at standard conditions for emission point W1: i. BOD: 20-30 mg l^{-1}; ii. COD: 30-125 mg l^{-1}; iii. Suspended solids: 20-30 mg l^{-1}; iv. Total hydrocarbon oil: 1-3 mg l^{-1} If one of the options represents BAT the report shall contain a timetable for implementation of that option by **1 June 2007**.	6 months from the date of issue of the Permit	Benchmark release levels are not/may not be achieved and effluent treatment is currently limited to pH adjustment. A recent rigorous options appraisal for effluent treatment has not been carried out.
1.4.1.2	The Operator shall submit a report proposing a methodology for determination of the temperature differential between the Dee Estuary and the effluent discharged from the installation.	6 months from the date of issue of the Permit	Temperature differential limitation is proposed to control thermal impact of effluent upon the estuary
1.4.1.3	The operator shall submit a report to the Environment Agency reassessing BAT for noise with regard to the findings of the assessment contained within the Application and recommending further attenuation measures. If the report identifies improvements that represent BAT, the report shall contain a timetable for implementing by **31 December 2005** the improvements and submission of a revised noise monitoring survey and assessment report following implementation.	6 months from the date of issue of the Permit	Noise levels at sensitive receptors due to the installation may be above background levels and further attenuation of significant sources should be evaluated.
1.4.1.4	The Operator shall provide to the Environment Agency, in writing, a protocol used by the Operator to determine 'uncertainty' values associated with each parameter to be reported for each emission point together with an indication of the likely uncertainty values associated with the test methods to be used.	6 months from the date of issue of the Permit	Standard sector improvement condition where issues are not addressed by the application.
1.4.1.5	The operator shall review the provision of MCERTS accreditation for the monitoring equipment, personnel and organisations employed for the emissions monitoring programme in condition 2.10.1 and propose a timetable for achieving this standard for any elements that are not MCERTS certified.	9 months from the date of issue of the Permit	Not all monitoring effort at the installation is currently certified to MCERTS.
1.4.1.6	The Operator shall submit to the Environment Agency in writing, a report confirming that all monitoring required for all parameters listed in Table 2.2.2 are representative. Specific derogation from requirements of BS EN 13284-1:2002 and ISO 10396:1993, as appropriate for particulate and gaseous emissions respectively, are to be indicated. The report shall include the feasibility, cost and time required to implement changes to meet the standard requirements.	1 year from the date of issue of the Permit	Standard sector improvement condition where issues are not addressed by the application.

C5.2 Permit section 1.6 - Pre-operational conditions

The Agency considers that the circumstances do not require the imposition of any pre-operational Conditions.

C5.3 Permit section 1.7 - Off-site Conditions (including Off-site monitoring)

The Agency considers that it is not necessary to impose any off-site Conditions.

Releases to air are not considered to be of sufficient significance in terms of quantity or hazard to warrant routine ambient air or soil quality monitoring.

Estimated dilution of effluent discharges into the Dee Estuary suggests that there will be no likely significant effect upon the interest features of the area. Also, the absence of significant eco-toxic, persistent or bio-accumulative substances in the discharge suggests that local environmental monitoring of the estuary is not necessary.

Noise levels at the nearest sensitive receptors have potential to cause nuisance. The re-evaluation of noise impacts is proposed through the improvement programme as a one-off exercise following implementation of further attenuation measures.

Determination of estuary temperature is required in order for the differential temperature between the receiving water and the installation effluent to be reported. This may constitute an off-site condition, but the actual means of determination of estuary temperature is to be proposed by the Operator in response to an improvement condition. Any off-site issues will need to be addressed at the time of agreement to the proposals, although it is anticipated that a reference temperature obtained from a reliable source (e.g. Met. Office/Maritime and Coast Guard Agency) will be acceptable.

C5.4 Permit section 2.10 - On-site monitoring

The Agency has decided that emissions monitoring should be carried out for the parameters listed in Tables 2.2.2 and 2.2.5, using the methods and to the frequencies it has specified in those Tables. (See Condition 2.10.1.) These monitoring requirements have been imposed in order to provide evidence that BAT continues to be employed in the operation of the installation; in particular to ensure that Acetic Acid releases (quarterly) do not result in significant off-site odour impacts, Nitrogen oxide releases (annually) do not threaten air quality standards locally and that COD, temperature, pH (each tidal period) and dangerous substances (monthly) do not cause deterioration of the Dee Estuary water quality.

The proposed monitoring technique for extractive sampling and analysis of Acetic Acid is considered to be appropriate and is based upon the OSHA method S169, although it is noted that this method has been updated by NIOSH method 1603. Any Acetic Anhydride present will be detected, although levels are expected to be very low. The applicability of alternative methods should be explored during the next Operator Monitoring Assessment (OMA) and has been included in the proposed permit hand over document.

The following table summarises the preferred monitoring techniques and those proposed by the applicant:

Test species	Relevant standards	Proposed in application
Total particulate matter	BS EN 13284-1:2002 BS ISO 12141:2002 BS ISO 9096:2003 BS ISO 10155:1995 (until CEN method EN 13284-2 available)	MDHS 14, gravimetric
Oxides of nitrogen	CEN method when available; EPA Method 7E until then. Instruments must comply with performance specification in ISO 10849. Either chemiluminescence/IR with a NOx converter. BS ISO 11564	ISO 10849
Carbon monoxide	EPA Method 10, with instruments meeting performance specifications in BS ISO 12039.	ISO 12039
Trace metals	EPA Method 29 until CEN standard available	US EPA 29
Mercury	BS EN 13211:2001	US EPA 29
Dioxins and furans	BS EN 1948:1996	BS EN1948
Total VOCs, low levels	BS EN 12619:1999	BS EN 12619
Speciated VOCs	BS EN 13469:2002	OSHA S169
Oxygen	EPA Method 3a until CEN standard available. Use a paramagnetic or Zirconia sensor which shall conform to BS ISO 12039.	Not specified
Moisture	EPA Method 4 until CEN standard available (based on EPA method 4)	Not specified (not required if gases dried before analysis)
Flow	ISO 10780 BS ISO 14164: 1999	BS EN13284

There is some divergence from the preferred standards and the latest OMA assessment records deviations with respect to HWID monitoring requirements. Standard improvement conditions are proposed to address most of these issues, but the next OMA should be used to persue further alignment with preferred monitoring methods.

Full details of aqueous effluent monitoring methods were not included in the application, although it is noted that in-house standard methods are used and the COD method is likely to reflect the requirements of ISO6060, which is equivalent to BS 6068-2.34:1988, a recognised method. The review of the validity of the in-house methods is proposed in the hand over document.

In addition, other monitoring requirements have been set by the Agency in Condition 2.10.2. These relate to continuous incinerator combustion and exhaust gas parameter measurements (temperatures, pressure, Oxygen and moisture) required by HWID in addition to the substance specific monitoring.

Conditions 2.10.3 and 2.10.4 have not been applied to this installation.

MCERTS certification/accreditation is not currently held in-house or by the contract monitoring organisation employed by the Operator. The sector standard improvement condition is proposed to address this issue.

C5.5 Permit section 3. - Records

The Agency considers that the standard condition requirements are appropriate and sufficient for the Permit.

C5.6 Permit section 4. - Reporting

The Agency considers that the standard condition requirements are appropriate and sufficient for the Permit. The standard form templates have been used.

Acetic acid emission concentrations are required to be reported for all release points from sources serving processes operating at elevated temperatures or pressures where potential exists for significant releases in the event of poor control. Monitoring and reporting of release points associated with cold ambient storage of volatile materials is not required because in-process controls such as scrubber low flow alarms are considered to be sufficient. Annual reporting of the quarterly monitoring, plus annual mass release is considered appropriate due to the low variability expected from the processes operated.

Annual monitoring and reporting of combustion plant releases is considered to be appropriate given the scale of operation. Quarterly reporting of incinerator continuous monitoring and annual reporting of incinerator extractive monitoring is required due to expected low variability as a result of single stream waste being incinerated.

Quarterly reporting of summarised tidal effluent discharge statistics plus annual mass release will allow trends in effluent quality to be tracked without compromising long-term water quality considerations.

Performance benchmarks for COD discharged, energy use, water use, solid waste production and VOC releases based upon total actual annual production of TAED are considered appropriate to enable tracking of trends in overall environmental performance at the installation. These are the production dependant parameters that reflect the key impacts of the installation and its operating efficiency.

C5.7 Permit section 5. - Notifications

The Agency considers that the standard condition requirements are appropriate and sufficient for the Permit.

C6. Other principal considerations taken into account in the determination process

C6.1 Substances of potential environmental significance

The list of substances of environmental concern was considered as part of the determination process. None of the substances are used at the Installation. In addition, Cadmium and nickel were the only materials on the list that may be liable to be emitted from this Installation. However, these materials, if present, are only there as a minor contaminant in the abstracted water supply or caustic soda used at the installation and therefore are not considered to be of environmental significance and were recorded as a "No" on the relevant form. The completed form is included in the determination file.

C6.2 Significance of emissions to air

The installation was not subject to a Section 28 Notice requiring the reporting of significant emissions to air.

C6.3 Chemical sector plan

The objectives of the Agency's Chemical Sector Plan were considered during the determination of the permit and appropriate performance indicators have been set.

C6.4 Pollution inventory

A Regulation 28(2) notice requiring reporting of annual emissions to air, controlled waters, sewer and off-site waste transfers will be sent to the Operator by the local Area team shortly after the permit is issued.

C6.5 Direct toxicity assessment

The use of Direct Toxicity Assessment is considered under section C2.2 and is not seen as being appropriate.

C6.6 Other standards and obligations

In addition to meeting the requirements of BAT, other national and international standards and obligation as summarised in the sector guidance S4.02 section 3.2.3 "Standards and obligations" have been taken into account during the determination of this permit.

C6.7 Other considerations

It should be noted that the determination was carried out without the benefit of a visit to the installation due to time constraints. Reliance has been made upon the provision of local knowledge by Area staff during the internal consultation on the draft permit.

Detailed study of local maps and aerial photography has also been employed to gain an understanding of the environmental context of the installation.

APPENDIX – Consultee responses

Summary of consultation responses received and the way in which they have been taken in to account in the determination process:

Response received from	Brief summary of issues raised	Summary of actions taken or show how this has been covered
Flintshire Local Health Board	Requested that noise emissions be confirmed to be at BAT levels and that point source and fugitive releases to air represent the use of BAT. Suggested that modelling should be undertaken for significant releases to air and PECs reassessed utilising revised background concentrations. Also, that ethylene diamine release monitoring and environmental monitoring be carried out.	1. Improvement conditions imposed for further evaluation of BAT for noise and Acetic acid releases. 2. Improvement condition imposed requiring rigorous air dispersion modelling of Acetic acid releases. Representative background NO_2 and PM_{10} levels from NETCEN used to check impact assessment during determination. 3. Vapour pressure-based calculations used to check EDA impact assessment during determination suggest that releases are insignificant. In-process controls are considered to be appropriate. 4. No releases are considered to be of sufficient concern at this stage to warrant off-site environmental monitoring.
Welsh Assembly Government	Requested that site condition report recommendations be implemented.	These will be taken forward through the Site Protection and Monitoring Programme (SPMP) requirements of the permit.
Countryside Council for Wales	Accepted conclusions of Appendix 11 assessment. Clarification requested regarding biocide discharges, limitation of Sulphur Dioxide releases during oil combustion, use of seasonal temperature discharge limits, volume limitations and estuary temperature monitoring, salmonid movements in the Dee Estuary, site condition survey requirements and drainage system repair.	1. Monitoring requirements included for Halogenated organics in order to verify that brominated biocide use is effectively controlled. 2. Gas oil Sulphur content limited by permit. 3. Temperature limitation and monitoring requirements imposed through permit 4. Temperature dependent effluent volume limitations are not necessary due to discharge time restrictions included in permit. 5. Absence of salmonids not relied upon in impact assessment. 6. Site condition survey will be taken forward through the Site Protection and Monitoring Programme (SPMP) requirements of the permit. 7. Drainage maintenance is ongoing and will be controlled through SPMP.