Permit with introductory note

Pollution Prevention and Control Regulations 2000

Seal Sands Chelates/Fine Chemicals

The Dow Chemical Company Ltd.
Seal Sands
Middlesbrough
Cleveland TS2 1UD

Permit number

BV2719

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Introductory note

This introductory note does not form a part of the Permit

The following Permit is issued under Regulation 10 of the Pollution Prevention and Control (England and Wales) Regulations 2000 (S.I.2000 No.1973), as amended, ("the PPC Regulations") to operate an installation carrying out activities covered by the descriptions in Section 4.1 Part A (1) (a) (iv), Section 4.2 Part A (1) (a) (i) and Section 4.2 Part A (1) (a) (iv) in Part 1 to Schedule 1 of the PPC Regulations, to the extent authorised by the Permit:

Section 4.1 Part A (1) (a) (iv) – producing organic chemicals such as organic compounds containing nitrogen, such as amines, amides, nitrous-, nitro- or azo-compounds, nitrates, nitriles, nitrogen heterocyclics, cyanates, isocyanates, di-isocyanates and di-isocyanate prepolymers;

Section 4.2 Part A (1) (a) (i) – producing inorganic chemicals such as gases, such as ammonia, hydrogen chloride, hydrogen fluoride, hydrogen cyanide, hydrogen sulphide, oxides of carbon, sulphur compounds, oxides of nitrogen, hydrogen, oxides of sulphur, phosgene;

Section 4.2 Part A (1) (a) (iv) – producing inorganic chemicals such as salts, such as ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonium phosphomolybdate;

Aspects of the operation of the installation which are not regulated by conditions of the Permit are subject to the condition implied by Regulation 12(10) of the PPC Regulations, i.e. the Operator shall use the best available techniques for preventing or, where that is not practicable, reducing emissions from the installation.

Techniques include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

In some sections of the Permit conditions require the Operator to use Best Available Techniques (BAT), in each of the aspects of the management of the installation, to prevent and where that is not practicable to reduce emissions. The conditions do not explain what is BAT. In determining BAT, the Operator should pay particular attention to relevant sections of the IPPC Sector guidance, appropriate Horizontal guidance (H1 to H4) and other relevant guidance.

A non-technical description of the installation is given in the Application, but the main features of the installation are as follows.

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

Chelates Plant

The key raw material in the manufacture of chelates is sodium cyanide. This is either bought in by bulk road tanker at 30% concentration or manufactured on site, also at 30% concentration, utilising hydrogen cyanide supplied as a chilled liquid at $0^{o}C$ by direct, all-welded pipeline from the neighbouring BASF Plant. The Operator's responsibility for the hydrogen cyanide transfer line commences at the Installation boundary fence. The hydrogen cyanide is transferred to a small break tank en route to the reactor, allowing the Operator to hold only a working inventory of this material on site with no bulk storage facility. Sodium cyanide is produced by the neutralisation of sodium hydroxide (caustic) solution with liquid hydrogen cyanide in a dedicated reactor equipped with weigh cells and cooling coils supplied with water from a dedicated cooling tower. The reactor temperature is controlled at $50^{o}C$ and a slight excess of sodium hydroxide is maintained to limit the potential for hydrogen cyanide emissions. The reactor is continuously vented to a caustic scrubber which removes 100% of any hydrogen cyanide release. The scrubber exhaust is continuously monitored and an alarm is initiated if the exhaust cyanide concentration exceeds 1 ppm.

Chelates are manufactured by the reaction of an amine, sodium cyanide and formaldehyde in one of five Stirred Tank Reactors (STR's), according to the following general reaction, known as the Bersworth Process:

amine + sodium cyanide + formaldehyde = chelate + ammonia.

The specific chelant produced is determined by the starting amine. Typically, the amine and 50% sodium hydroxide are charged to the reactor; 30% sodium cyanide and 50% w/w formaldehyde are simultaneously fed over a reaction period generally lasting around 6 hours at a reflux temperature of $105^{o}C$ at atmospheric pressure. The reaction produces ammonia as a by-product and this is continuously distilled from the batch and recovered using a packed column scrubbing system. On completion, the batch is adjusted to specification, usually by the addition of water, cooled and bleached with hydrogen peroxide before filtration en route to storage. Recovered ammonia is either used as a reaction intermediate or sold in bulk to agricultural customers where it is used as a source of nitrogen.

Control of critical batch reaction parameters, principally sodium cyanide and formaldehyde mass flow rates, is fully automated with cascaded mass flow controllers. The lead parameter is sodium cyanide.

The ammonia scrubber recovers all reaction ammonia distilled from the reactor and consists of two parallel packed columns with final vent scrubber for maximum efficiency. Scrubber medium flows are alarmed and a specific gravity controller maintains a 15 – 25% w/w concentration in the product liquor. The vent gas stream is continuously monitored for ammonia concentration at a point immediately below the first water spray on the final vent scrubber. If the concentration at this point exceeds the Emission Limit Value (ELV) of 15 mg/m^3, which infers that the final vent to atmosphere could also be releasing ammonia, an alarm annunciates in the control room and the reaction steps which produce ammonia are shut down.

Custom & Fine Chemicals Plant

The Custom & Fine Chemicals Plant (C & FC) is a multi-purpose batch production unit which manufactures a range of speciality chemicals, usually to specific customer order and often in limited quantities. There is a wide range of reaction equipment, of glass-lined or stainless steel fabrication to provide adequate corrosion characteristics, but technology is generally similar to the Chelates Plant, i.e., STR's operating at modest process conditions. Some of the C & FC products are, in fact, manufactured on the Chelates Plant equipment.

Reaction chemistry employed on the C & FC Plant can be summarised as follows:-

- Production of nitriles, cyanohydrins and aminonitriles from the reaction of cyanides with ketones, aldehydes and halides:

A + B = C

Where A = hydrogen cyanide or alkali metal cyanide;

B = amine, ketone, aldehydes, myrcene, iosfreshy, aldol, alkyl halide;

C = nitrile, cyanohydrin, aminonitrile;

- Further reaction of compounds produced as above with inorganic acids, bases and alcohols to produce acid salts, esters, hydantoins and pyrethroids:

  C + D = E

  Where D = inorganic acid, alcohol, inorganic base, carbon dioxide, acid chloride;

  E = acid salts, esters, hydantoins, pyrethroids;

- Production of aldols from the reaction of two aldehydes:

  F + G = H

  Where F = aldehyde 1;

  G = aldehyde 2;

  H = aldol.

The hydantoin compounds produced above are also reacted with inorganic bases to produce aminoacid salts.

The life cycle of these products within the C & FC business can be relatively short, of the order of 2 – 3 years, after which production may cease owing to lack of demand. Typically, 2 – 3 new products will be introduced per year to replace end-of-life products, demanding a high level of flexibility and a frequent requirement to introduce new products and/or processes to the business portfolio. The introduction of these new products is controlled by a Multi Product Protocol.

Products manufactured utilising the above process chemistries may be subjected to a range of refining operations, such as solvent extraction, crystallisation, centrifugation, dilution (water or solvent), evaporation, pH adjustment, filtration and carbon treatment before despatch to the customer.

The principle potential emissions to air comprise hydrogen cyanide, Class A and Class B VOC's, ammonia and formaldehyde. Abatement techniques include water-cooled condensers (in some cases, with chilled water), scrubbers with media appropriate to the duty and two thermal oxidisers designed to destroy VOC's released from the process prior to venting to atmosphere. These are electrically heated, ceramic matrix units operating at approximately 850^{o}C, at which temperature organic material present in the gas stream is oxidised to carbon dioxide and water at high conversion efficiencies.

Infrastructure

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

Water and electricity are received "over the fence" and distribution systems supply these utilities to points of use around the site. The nitrogen distribution system is supplied from one of two bulk liquid nitrogen tanks which are owned by a third party. Compressed air is supplied to the plants from one of two compressors which are maintained by a specialist contractor for maximum efficiency.

The Installation has one central control room with a Distributed Control System (DCS) networked to all plant. Control systems are relatively sophisticated but retain considerable scope for manual intervention by the operating staff.

The site operates a steam boiler firing on medium fuel oil with a thermal capacity of 6 MWTh input, venting through a 43 metre stack, with a maximum steaming rate of 10 tonnes per hour at 250 psig. Owing to the small scale of the unit, emissions of combustion gases are relatively low. Bulk fuel oil storage is bunded, with this bund being isolated from the main effluent sump. Accumulated material from this bund is first analysed for contamination to determine suitability for release to the effluent sump, which is then done under close control. Delivery of fuel oil by bulk road tanker is well managed with a proven off-loading procedure which minimises any spillages, which would, in any case, be contained within the bunded area. Boiler feed water is prepared from the towns water supply to the site utilising proprietary feed water treatment chemical systems and management of this activity is contracted out to a third party. Similar arrangements are in place for the management of the site's three cooling towers.

There are no discharges to groundwater. The site has concrete hard standing with controlled drainage to the site effluent system in all process areas. A "dry slab" philosophy is in place, with significant emphasis placed on detection and remediation of leaks and fugitive releases.

Effluent generated by the site's operations is treated in two ways. Any cyanide-contaminated effluent from the Chelates Plant is first sent to the cyanide destruction unit where cyanide content in excess of the consent level of 1 ppm is oxidised by the addition of sodium hypochlorite liquor. When cyanide concentration is compliant, the treated effluent is discharged by gravity to the main effluent sump. Waste water from all other plant areas, including surface water drains, either flows by gravity or is pumped to the main effluent sump. The sump is maintained on permanent circulation to ensure homogenous mixing of the effluent. Continuous pH monitoring displays locally and in the Chelate Plant Control Room and the final outlet control valve is inhibited from opening if this continuously-monitored pH is outside consented levels. Laboratory analysis supports the continuous monitor and adjustment instructions are issued for any effluent which does not meet the defined specification; discharge to the Tees Estuary is only allowed once consent compliance has been achieved. This effluent discharge to controlled waters has been subjected to Direct Toxicity Assessment as part of the Tees Estuary Direct Toxicity Assessment Demonstration Programme and was categorised as not significantly toxic. The discharge line itself crosses BASF land en route to the Tees and is included within the boundary of this Installation.

The site is accredited to ISO9002. Consolidation of the parent company's Operating Discipline Management System (ODMS), an integrated management system, is in hand. The ODMS has been assessed against ISO14001 for Environmental Management Systems and has been shown to be comparable, although not formally certified.

The Installation is a Top Tier site under the Control of Major Accident Hazards Regulations 1999 (COMAH) and has prepared and submitted a COMAH Safety Report to the Competent Authority (a joint function of the HSE and the Environment Agency). The Report contains an Accident Management Plan for the facility.

Energy efficiency measures are in place and the Operator holds a Climate Change Levy Agreement.

Note that the Permit requires the submission of certain information to the Agency (see Sections 4 and 5). In addition, the Agency has the power to seek further information at any time under regulation 28 to the PPC Regulations provided that it acts reasonably.

Other PPC Permits relating to this installation		
Permit holder	**Permit Number**	**Date of Issue**
Not applicable	Not applicable	Not applicable

Superseded Licences/Authorisations/Consents relating to this installation		
Holder	**Reference Number**	**Date of Issue**
The Dow Chemical Company Ltd	AD8911	22/07/92
The Dow Chemical Company Ltd	AK5644	30/03/94
The Dow Chemical Company Ltd	AO0237	23/12/94

There are no other activities that take place on the site of this installation which are not regulated under this Permit or any other PPC Permit referred to in the Table above.

Public Registers

Considerable information relating to Permits including the Application is available on public registers in accordance with the requirements of the PPC Regulations. Certain information may be withheld from public registers where it is commercially confidential or contrary to national security.

Variations to the Permit

This Permit may be varied in the future (by the Agency serving a Variation Notice on the Operator). If the Operator itself wants any of the Conditions of the Permit to be changed, it must submit a formal Application. The Status Log within the Introductory Note to any such Variation Notice will include summary details of this Permit, variations issued up to that point in time and state whether a consolidated version of the Permit has been issued.

Surrender of the Permit

Before this Permit can be wholly or partially surrendered, an Application to surrender the Permit has to be made by the Operator. For the application to be successful, the Operator must be able to demonstrate to the Agency that there is no pollution risk and that no further steps are required to return the site to a satisfactory state.

Transfer of the Permit or part of the Permit

Before the Permit can be wholly or partially transferred to another person, an Application to transfer the Permit has to be made jointly by the existing and proposed holders. A transfer will be allowed unless the Agency considers that the proposed holder will not be the person who will have control over the operation of the installation or will not comply with the conditions of the transferred Permit. If, however, the Permit authorises the carrying out of a specified waste management activity, the transfer will only be allowed if the proposed holder is also considered to be "a fit and proper person" as required by the PPC Regulations.

Talking to us

Please quote the Permit Number if you contact the Agency about this Permit.
To give a Notification under Condition 5.1.1, the Operator should use the Incident Hotline telephone number (0800 80 70 60) or any other number notified in writing to the Operator by the Agency for that purpose.

Status Log

Detail	Date	Comment
Application BV2719	21 August 2003	Duly Made 15/09/03
Additional information (unsolicited)	18 September 2003	Additional site boundary drawing showing effluent line route through BASF land
Request for additional information	Request dated 08 January 2004	
Request to extend determination to 21 April 2004	Request dated 09 January 2004	Request accepted 13 January 2004
Response to request for information	By letter dated 24 January 2004	Copy of the Climate Change Levy Agreement Certificate; confirmation of site boundary noise survey.
Request for additional information	Request dated 23 March 2004	
Response to request for information	By letter dated 08 April 2004	Revised Installation Table, Form IPPC 1 Part B Section B1.1; Revised EP OPRA profile
Request for additional information	Request dated 01 April 2004	
Response to request for information	By e-mail dated 12 April 2004	Clarification of battery limit for hydrogen cyanide delivery line from BASF
Request for additional information	Request dated 08 April 2004	
Response to request for information	By e-mail dated 14 April 2004	Identification of method and procedure references for monitoring techniques
Permit determined	21/04/2004	

End of Introductory Note.

ENVIRONMENT AGENCY

Permit

Permit number
BV2719

The Environment Agency (the Agency) in exercise of its powers under Regulation 10 of the Pollution Prevention and Control (England and Wales) Regulations (SI 2000 No 1973), hereby authorises

The Dow Chemical Company Ltd. ("the Operator"),

Of/ whose Registered Office (or principal place of business) is

2 Heathrow Boulevard
284 Bath Road
West Drayton
Middlesex UB7 0DQ

Company registration number 537161

to operate an Installation*(s)* at

Seal Sands Chelates/Fine Chemicals
Seal Sands
Middlesbrough
Cleveland
TS2 1UD

to the extent authorised by and subject to the conditions of this Permit.

Signed	Date

Graeme Hull

Authorised to sign on behalf of the Agency

Conditions

1 General

1.1 Permitted Activities

1.1.1 The Operator is authorised to carry out the activities and the associated activities specified in Table 1.1.1.

Table 1.1.1

Activity listed in Schedule 1 of the PPC Regulations / Associated Activity	Description of specified activity	Limits of specified activity
Section 4.1 Part A (1) (a) (iv) – producing organic chemicals such as organic compounds containing nitrogen, such as amines, amides, nitro us-, nitro- or azo-compounds, nitrates, nitriles, nitrogen heterocyclics, cyanates, isocyanates, di-isocyanates and di-isocyanate prepolymers	Producing organic chemicals such as chelates, nitriles, cyanohydrins, aminonitriles, quaternary amines, acid salts, esters, hydantoins, pyrethroids and aldols as described in the Application, subject to the requirements of the Multi Product Protocol	Receipt of raw materials to storage of finished product incorporating the activities below
Section 4.2 Part A (1) (a) (i) – producing inorganic chemicals such as gases, such as ammonia, hydrogen chloride, hydrogen fluoride, hydrogen cyanide, hydrogen sulphide, oxides of carbon, sulphur compounds, oxides of nitrogen, hydrogen, oxides of sulphur, phosgene;	Producing inorganic chemicals such as ammonia	Receipt of raw materials to storage of finished product incorporating the activities below
Section 4.2 Part A (1) (a) (iv) – producing inorganic chemicals such as salts, such as ammonium chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonium phosphomolybdate;	Producing inorganic chemicals such as sodium cyanide	Receipt of raw materials to storage of finished product incorporating the activities below
Storage and handling of raw materials	Storage of solid and liquid materials in bulk storage tanks, drums, IBC's, bags and other containers	Receipt and storage of raw materials to transfer to batch preparation or other process areas
Storage, handling and dispatch of intermediates, by-products, finished products, waste & other materials	Storage of solid and liquid materials in bulk storage tanks, drums, IBC's, bags or other containers. Process waste segregation and storage	Internal & external storage of intermediates, by-products and finished products; storage of waste in designated areas and loading for transit off site
Control & abatement systems for emissions to air and releases to sewer	Operation of site abatement systems for the control of releases to air and controlled waters	Extraction and collection of waste gases and treatment in condensers, scrubbers and thermal oxidisers and collection and treatment of process effluent and site surface water
Utilities and Services	Operation of site systems for the supply of utilities and services such as process heating (steam), cooling water, nitrogen, compressed air, electricity and effluent treatment	Site utility and services systems as far as the Installation boundary; site combustion unit < 20 MWTh input

1.1.2 Where waste on site is subjected to activities that are exempt from control under the Waste Management Licensing Regulations 1994 then the wastes controlled under condition 1.1.1, above, shall be clearly identified and kept separate from such exempt waste activities and a record shall be kept of where such exempt activities are conducted.

1.2 Site

1.2.1 The activities authorised under condition 1.1.1 shall not extend beyond the Site, being the land shown edged in green on the Site Plan at Schedule 5 to this Permit.

1.3 Overarching Management Condition

1.3.1 Without prejudice to the other conditions of this Permit, the Operator shall implement and maintain a management system, organisational structure and allocate resources that are sufficient to achieve compliance with the limits and conditions of this Permit.

1.4 Improvement Programme

1.4.1 The Operator shall complete the improvements specified in Table 1.4.1 by the date specified in that table, and shall send written notification of the date of completion of each requirement to the Agency within 14 days of the completion of each such requirement.

Table 1.4.1: Improvement programme

Reference	Requirement	Date
IP1	The operator shall develop a written procedure to regularly review fugitive releases from the installation, demonstrating the application of an appropriate, effective and structured LDAR (leak detection and repair) system and the development of an action plan to implement any improvements identified, as described in the Sector Guidance Note IPPC S4.02 for Speciality Organic Chemicals (section 2.2.4). The operator shall periodically update this review and action plan in accordance with Condition 4.1.4 of this Permit with the purpose of minimising fugitive releases. A copy of the written procedure and a written report describing the outcome of the first review, including details of any proposed improvements and the timetable for their implementation, shall be submitted to the Agency.	31/12/2004
IP2	The Operator shall implement a formal procedure for the inspection and subsequent maintenance of underground tanks, drains and collection sumps with the purpose of preventing fugitive releases to ground. A copy of the procedure shall be submitted to the Agency.	31/12/2004
IP3	The Operator shall implement a formal procedure for the inspection and subsequent maintenance of impervious surfaces and containment kerbs with the purpose of preventing fugitive releases to ground. A copy of the procedure shall be submitted the Agency.	31/12/2004

Table 1.4.1: Improvement programme (continued)		
Reference	**Requirement**	**Date**
IP4	The Operator shall conduct an assessment of environmental risk associated with the use of iso-tanks on plant areas for the storage of raw materials and products with the purpose of preventing fugitive releases to ground, having regard for the Agency Sector Guidance Note for Speciality Organic Chemicals IPPC S4.02. A written report shall be submitted to the Agency which shall include details of any proposed improvements and the timetable for their implementation.	30/06/2004
IP5	The Operator shall implement revised procedures for the storage of materials which shall include the maximum duration for which materials may be stored in specified areas and the requirement for storage areas to be clearly labelled with the purpose of preventing or minimising releases to the environment, having regard for the Agency Sector Guidance Note for Speciality Organic Chemicals IPPC S4.02. A copy of the procedure shall be submitted the Agency.	31/12/2004
IP6	The Operator shall conduct a review of storage and handling arrangements for drums and IBC's containing raw materials, products and wastes with the purpose of preventing or minimising releases to the environment and achieving proper segregation of incompatible materials, having regard for the Agency Sector Guidance Note for Speciality Organic Chemicals IPPC S4.02. A written report shall be submitted to the Agency which shall include details of any proposed improvements and the timetable for their implementation.	31/08/2004
IP7	The Operator shall establish a Site Closure Plan having regard for the Agency Sector Guidance Note IPPC S4.02 and submit a copy to the Agency for approval.	31/08/2005
IP8	The Operator shall conduct a review of V105 Scrubber operation with the objective of establishing whether the current operational mode constitutes BAT for the chelate and C&FC processes, having regard for techniques described in the Agency Sector Guidance for Speciality Organic Chemicals IPPC S4.02. A report on the findings and proposed actions, with timescales for implementation, shall be supplied to the Agency.	31/12/2005
IP9	The Operator shall introduce an energy balance component into the Reactive Chemical Review process which is undertaken under the Multi Product Protocol with the purpose of evaluating and, by design, minimising energy requirements for all new products, having regard for the Agency Sector Guidance Note IPPC S4.02. A copy of the procedure shall be submitted to the Agency.	31/08/2004
IP10	The Operator shall conduct a review of the operation and performance of the thermal oxidisers in order to establish the optimum method of controlling inlet vapour loadings and combustion chamber parameters with the purpose of ensuring compliance with Emission Limit Values, having regard for the Agency Sector Guidance Note IPPC S4.02. A report on the findings and proposed actions, with timescales for implementation, shall be supplied to the Agency.	31/10/2004

Table 1.4.1: Improvement programme (continued)		
Reference	**Requirement**	**Date**
IP11	The Operator shall conduct an investigation to identify the optimum disposal route for spent carbon adsorption drums, with the purpose of preventing or minimising the impact on the environment, having regard for the Best Practicable Environmental Option (BPEO) and the Agency Sector Guidance Note IPPC S4.02. A report on the findings and proposed actions, with timescales for implementation, shall be supplied to the Agency.	31/08/2004
IP12	The Operator shall conduct an investigation to identify alternative means of detecting the phase interface on liquid-liquid separation equipment, with the purpose of preventing or minimising releases to the environment and achieving optimum raw material utilisation, having regard for the Agency Sector Guidance Note IPPC S4.02. A report on the findings and proposed actions, with timescales for implementation, shall be supplied to the Agency.	31/08/2004
IP13	The Operator shall carry out modelling of the release of ammonia from Release Point W1 to the Tees Estuary with the purpose of further assessing the potential for environmental impact of this release and ultimately securing reductions in quantities released, having regard for Environment Agency Tees Estuary Improvement Plans, the relevant EQS/EAL for estuarine waters and the Agency Sector Guidance Note IPPC S4.02. The specific model to be employed, modelling parameters, relevant background concentrations including EQS, scope and objectives of the modelling, shall be agreed in writing with the Environment Agency prior to commencement of the modelling. A report on the results, with interpretation, conclusions and proposed actions, with timescales for implementation, shall be supplied to the Agency.	31/10/2004
IP14	The Operator shall conduct an assessment of all monitoring methods and procedures for conformance with appropriate monitoring Standards such as CEN, BSI, ISO, etc., having regard for the Agency Sector Guidance for Speciality Organic Chemicals IPPC S4.02 and the hierarchy of Sampling and Analysis Standards presented. A report on the findings and proposed actions will be submitted to the Agency.	31/10/2004
IP15	The Operator shall investigate the sourcing and usage within the Installation of mercury-free sodium hydroxide. A report setting out conclusions and proposed actions, with timescales for implementation, will be supplied to the Agency.	31/08/2004
IP16	The operator shall provide a written report to the Environment Agency on releases of mercury from release point W1. The report shall identify concentration data, mass release and operational data, sufficient to identify operational criteria which will further control and reduce overall releases, as appropriate, by the application of techniques such as those specified in the Guidance for Speciality Organic Chemicals IPPC S4.02.	31/10/2004

Table 1.4.1: Improvement programme (continued)		
Reference	**Requirement**	**Date**
IP17	The operator shall provide a written report to the Environment Agency on releases of Total Chelate species (expressed as Ethylenediamine Tetraacetic Acid [EDTA]) from release point W1. The report shall identify concentration data, mass release and operational data, sufficient to identify operational criteria which will further control and reduce overall releases, as appropriate, by the application of techniques such as those specified in the Guidance for Speciality Organic Chemicals IPPC S4.02.	31/10/2004
IP18	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.	31/12/2004
IP19	The operator shall undertake a Direct Toxicity Assessment of releases to controlled waters from release point W1 with the purpose of evaluating the potential for impact and/or harm to the aquatic environment, having regard for Environment Agency Tees Estuary Improvement Plans and the Agency Sector Guidance Note IPPC S4.02. A report on the results, with interpretation, conclusions and proposed actions to prevent any acute toxic effects in the receiving waters, with timescales for implementation, shall be supplied to the Agency.	30/04/2005

1.4.2 Where the Operator fails to comply with any requirement by the date specified in Table 1.4.1 the Operator shall send written notification of such failure to the Agency within 14 days of such date.

1.5 Minor Operational Changes

1.5.1 The Operator shall seek the Agency's written agreement to any minor operational changes under condition 2.1.1 of this Permit by sending to the Agency: written notice of the details of the proposed change including an assessment of its possible effects (including waste production) on risks to the environment from the Permitted Installation; any relevant supporting assessments and drawings; and the proposed implementation date.

1.5.2 Any such change shall not be implemented until agreed in writing by the Agency. As from the agreed implementation date, the Operator shall operate the Permitted Installation in accordance with that change, and relevant provisions in the Application shall be deemed to be amended.

1.5.3 When the qualification "unless otherwise agreed in writing" is used elsewhere in this Permit, the Operator shall seek such agreement by sending to the Agency written notice of the details of the proposed method(s) or techniques.

1.5.4 Any such method(s) or techniques shall not be implemented until agreed in writing by the Agency. As from the agreed implementation date, the Operator shall operate the Permitted Installation using that method or technique, and relevant provisions in the Application (and the Site Protection and Monitoring Programme, as the case may be) shall be deemed to be amended.

1.6 Pre-Operational Conditions

1.6.1 There are no pre-operational conditions

1.7 Off-site Conditions

1.7.1 There are no off-site conditions

2 Operating conditions

2.1 In-Process Controls

2.1.1 The Permitted Installation shall, subject to the conditions of this Permit, be operated using the techniques and in the manner described in the documentation specified in Table 2.1.1, or as otherwise agreed in writing by the Agency in accordance with conditions 1.5.1 and 1.5.2 of this Permit.

Table 2.1.1: Operating techniques

Description	Parts	Date Received
Application	The response to questions 2.1 and 2.2 given in the Application documents as follows: Sections 2.1 and 2.2 of Part 2 on pages 13 – 47; Sections 2.1 and 2.2 of Part 3 Chapter 1 on pages 13 – 76; Sections 2.1 and 2.2 of Part 3 Chapter 2 on pages 13 – 74; the Multi Product Protocol in Appendix 10 of Part 2 beginning on page 108; Principle Reactions and Detailed Chemistry given in Section 2.1.1.3 of Part 3 Chapter 1 on pages 21 – 23 and Section 2.1.1.3 of Part 3 Chapter 2 on pages 25 – 29.	21 August 2003

2.1.2 The Permitted Installation shall, subject to the other conditions of this Permit, be operated using the techniques and in the manner described in the Site Protection and Monitoring Programme submitted under condition 4.1.7 of this Permit (as amended from time to time under condition 4.1.8), or as otherwise agreed in writing by the Agency.

2.2 Emissions

2.2.1 Emissions to Air, (including heat, but excluding Odour, Noise or Vibration) from Specified Points

2.2.1.1 This Part 2.2.1 of this Permit shall not apply to releases of odour, noise or vibration.

2.2.1.2 Emissions to air from the emission points in Table 2.2.1 shall only arise from the source(s) specified in that Table.

Table 2.2.1 : Emission points to air		
Emission point reference or description	**Source**	**Location of emission point**
A1	Scrubbing Column Exhaust on V105	Point A1 on Schedule 5 or Appendix 3 of the Application Part 2 (page 101)
A2	Scrubbing Column on V208	Point A2 on Schedule 5 or Appendix 3 of the Application Part 2 (page 101)
A3	Scrubbing Column Exhaust on V230	Point A3 on Schedule 5 or Appendix 3 of the Application Part 2 (page 101)
A4	Thermal Oxidiser on V560	Point A4 on Schedule 5 or Appendix 3 of the Application Part 2 (page 101)
A5	Thermal Oxidiser on V501	Point A5 on Schedule 5 or Appendix 3 of the Application Part 2 (page 101)

2.2.1.3 The limits for emissions to air for the parameter(s) and emission point(s) set out in Table 2.2.2 shall not be exceeded.

Table 2.2.2 : Emission limits to air and monitoring				
Emission point reference	**Parameter**	**Limit (including Reference Period)[1]**	**Monitoring frequency**	**Monitoring method**
A1, A4, A5	Hydrogen Cyanide	2.0 mg/m^3 Note 2	Continuous	EIT in-line gas analyser
A1, A4, A5	Hydrogen Cyanide	2.0 mg/m^3	Quarterly	Draeger Tubes [Method EM-3]
A2	Ammonia	15.0 mg/m^3 Note 2	Continuous	Contronic ion selective electrode ammonia analyser
A1, A2, A3, A4, A5	Ammonia	15.0 mg/m^3	Quarterly	Draeger Tubes [Method EM-1]
A1, A4, A5	Formaldehyde	2.0 mg/m^3	Quarterly	Draeger Tubes [Method EM-2]
A1, A4, A5	Class A Volatile Organic Compounds (expressed as species)	100 g/hr	Quarterly	Crowcon VOC Analyser Autofilm II (annual calibration by Crowcon) [Method EM-4]
A1, A4, A5	Class B Volatile Organic Compounds (expressed as carbon)	500 g/hr	Quarterly	Crowcon VOC Analyser Autofilm II (annual calibration by Crowcon) [Method EM-4]
A2, A3	Total Class A and B Volatile Organic Compounds (expressed as carbon)	25 g/hr	Quarterly	Crowcon VOC Analyser Autofilm II (annual calibration by Crowcon) [Method EM-4]

Note 1: See Section 6 for reference conditions

Note 2: Compliance criterion 95th percentile of half hourly averages for plant operational hours; no single half hourly average shall exceed 1.5 times the ELV

2.2.1.4 No condition applies.

2.2.2 Emissions to water (other than groundwater), including heat, from specified points

2.2.2.1 This Part 2.2.2 of this Permit shall not apply to releases of odour, noise or vibration or to releases to groundwater.

Emissions to Water (other than to Sewer)

2.2.2.2 Conditions 2.2.2.3 - 2.2.2.6 shall not apply to emissions to sewer.

2.2.2.3 No emission from the Permitted Installation shall be made to water except via the Operator's on-site effluent treatment plant as specified in this Permit

Table 2.2.4: Emission point to water

Emission Point Reference or description	Source	Receiving Water
W1 [Point W1 on Schedule 5 or Appendix 3 of the Application Part 2 (page 101)]	Effluent Plant Discharge	Tees Estuary at Grid Reference NZ 5390 2370

2.2.2.4 The limits for the emissions to water for the parameter(s) and emission point(s) set out in Table 2.2.5 shall not be exceeded.

2.2.2.5 Where a substance is specified in Table 2.2.5 but no limit is set for it, the concentration of such substance in emissions to water from the relevant emission point shall be no greater than the background concentration

Table 2.2.5 : Emission limits to water and monitoring				
Emission point reference	**Parameter**	**Limit (including Reference Period)**	**Monitoring frequency**	**Monitoring method**
W1	Mercury	0.01 mg/l	Daily flow proportional composite	Note 1
W1	Chemical Oxygen Demand	20,000 mg/l	Daily flow proportional composite	HACH DR2000 Spectrophotometer [ETM 9]
W1	Chemical Oxygen Demand	1 tonne/day	Daily flow proportional composite	HACH DR2000 Spectrophotometer [ETM 9]
W1	Cyanide	1.0 mg/l	Daily flow proportional composite	Metrohm 691 Ion-selective electrode [TM 61 & ETM 7]
W1	Ammoniacal Nitrogen (as nitrogen)	300 mg/l	Daily flow proportional composite	Merckoquant 10024 test kit [TM 01 06]
W1	Total Chelates (as Ethylenediamine Tetraacetic Acid [EDTA])	Note 2	Daily flow proportional composite	Note 2
W1	pH (max/min)	5 – 9	Daily flow proportional composite	Metrohm 713 pH meter with pH electrode [TM 01 07]

Note 1: Monitoring methods and schedules to be agreed in writing by the Environment Agency on completion of Improvement Programme item IP16. The reference measurements used shall be agreed in writing by the Agency.

Note 2: Monitoring methods and schedules to be agreed in writing by the Environment Agency on completion of Improvement Programme item IP17 when the Environment Agency will also set an Emission Limit Value for this parameter by varying the Conditions of this Permit. The reference measurements used shall be agreed in writing by the Agency.

2.2.2.6 No condition applies

Emissions to sewer

2.2.2.7 No emission from the permitted Installation shall be made to sewer

2.2.2.8 No condition applies.

2.2.2.9 No condition applies.

2.2.2.10 No condition applies.

2.2.3 Emissions to groundwater

2.2.3.1 No emission from the Permitted Installation shall give rise to the introduction into groundwater of any substance in List I (as defined in the Groundwater Regulations 1998 (S.I. 1998 No. 2746)).

2.2.3.2 No emission from within the Permitted Installation shall give rise to the introduction into groundwater of any substance in List II (as defined in the Groundwater Regulations 1998 (S.I. 1998 No. 2746)) so as to cause pollution (as defined in the Groundwater Regulations 1998 (S.I. 1998 No. 2746)).

2.2.3.3 For substances other than those in List I or II (as defined in the Groundwater Regulations 1998 (SI 1998 No.2746)), the Operator shall use BAT to prevent or where that is not practicable to reduce emissions to groundwater from the Permitted Installation provided always that the techniques used by the Operator shall be no less effective than those described in the Application, where relevant.

2.2.4 Fugitive emissions of substances to air

2.2.4.1 The Operator shall use BAT so as to prevent or where that is not practicable to reduce fugitive emissions of substances to air from the Permitted Installation in particular from:

- storage areas
- buildings
- pipes, valves and other transfer systems
- open surfaces

provided always that the techniques used by the Operator shall be no less effective than those described in the Application, where relevant.

2.2.4.2 The Operator shall use BAT so as to prevent or where that is not practicable to reduce emissions of litter from the Permitted Installation provided always that the techniques used by the Operator shall be no less effective than those described in the Application, where relevant.

2.2.5 Fugitive emissions of substances to water and sewer

2.2.5.1 Subject to condition 2.2.5.2 below, the Operator shall use BAT so as to prevent or where that is not practicable to reduce fugitive emissions of substances to water (other than Groundwater) and sewer from the Permitted Installation in particular from:

- all structures under or over ground
- surfacing
- bunding
- storage areas

provided always that the techniques used by the Operator shall be no less effective than those described in the Application, where relevant.

2.2.5.2 There shall be no release to water that would cause a breach of an EQS established by the UK Government to implement the Dangerous Substances Directive 76/464/EEC.

2.2.6 Odour

2.2.6.1 Subject to Condition 2.2.6.2 of this Permit, the Operator shall use BAT so as to prevent or where that is not practicable to reduce odorous emissions from the Permitted Installation, in particular by:

- limiting the use of odorous materials
- restricting odorous activities
- controlling the storage conditions of odorous materials
- controlling processing parameters to minimise the generation of odour
- optimising the performance of abatement systems
- timely monitoring, inspection and maintenance
- employing, where appropriate, an approved odour management plan

provided always that the techniques used by the Operator shall be no less effective than those described in the Application, where relevant.

2.2.6.2 No condition applies.

2.2.6.3 No condition applies.

2.2.7 Emissions to Land

2.2.7.1 This Part 2.2.7 of this Permit shall not apply to emissions to groundwater.

2.2.7.2 No emission from the Permitted installation shall be made to land.

2.2.7.3 No condition applies.

2.2.8 Equivalent Parameters or Technical Measures

2.2.8.1 The Operator shall comply with the requirements specified in Table 2.2.11, which supplement or replace emission limit values in accordance with Regulation 12(8) of the PPC Regulations.

Table 2.2.11 Equivalent parameters and technical measures	
Parameter or measure	**Requirement or description of measure, and frequency if relevant**
V560 and V501 Thermal Oxidiser trips for the units described on pages 49– 51 of Part 3, Chapter 2 of the Application	Annual report of frequency and duration of occurrence (as a percentage of processing time)
Combustion chamber temperature for V560 and V501 Thermal Oxidiser units described on pages 49– 51 of Part 3, Chapter 2 of the Application: temperature to be > 850^{0}C during VOC abatement	Maintain a continuous log of operating parameters for VOC abatement duty
Scrubber medium recirculation low flow alarms for scrubbers V105, V208 and V230, as described on pages 17, 38 and 42 – 43 of Part 3, Chapter 1 and pages 47 – 48 of Part 3, Chapter 2 of the Application	Annual report of frequency and duration of occurrence (as a percentage of processing time)
Scrubber medium composition and strength for scrubbers V105, V208 and V230, as described on pages 17, 38 and 42 – 43 of Part 3, Chapter 1 and pages 47 – 48 of Part 3, Chapter 2 of the Application	Maintain a log of specific scrubber medium concentration/strength and frequency of scrubber medium change-out or make-up
Mercury throughput based on purchased sodium hydroxide usage	Annual report of calculated mercury throughput/release based on usage of purchased sodium hydroxide at specified mercury content
Emissions from Release Point A6, V550 Dump Tank Vent [Point A6 on Schedule 5 or Appendix 3 of the Application Part 2 (page 101)]	Release only occurs if relief devices on reactors have operated – report as Schedule 1, Notification of abnormal emissions and as Annual Mass Release

2.3 Management

2.3.1 A copy of this Permit and those parts of the application referred to in this Permit shall be available, at all times, for reference by all staff carrying out work subject to the requirements of the Permit.

Training

2.3.2 The Permitted Installation shall be supervised by staff who are suitably trained and fully conversant with the requirements of this Permit.

2.3.3 All staff shall be fully conversant with those aspects of the Permit conditions which are relevant to their duties and shall be provided with adequate professional technical development and training and written operating instructions to enable them to carry out their duties.

2.3.4 The Operator shall maintain a record of the skills and training requirements for all staff whose tasks in relation to the Permitted Installation may have an impact on the environment and shall keep records of all relevant training.

Maintenance

2.3.5 All plant and equipment used in operating the Permitted Installation, the failure of which could lead to an adverse impact on the environment, shall be maintained in good operating condition.

2.3.6 The Operator shall maintain a record of relevant plant and equipment covered by condition 2.3.5 and for such plant and equipment:

2.3.6.1 a written or electronic maintenance programme; and

2.3.6.2 records of its maintenance.

Incidents and Complaints

2.3.7 The Operator shall maintain and implement written procedures for:

2.3.7.1 taking prompt remedial action, investigating and reporting actual or potential non-compliance with operating procedures or emission limits and if such event occur;

2.3.7.2 investigating incidents, (including any malfunction, breakdown or failure of plant, equipment or techniques, down time, any short term and long term remedial measures and near misses) and prompt implementation of appropriate actions; and

2.3.7.3 ensuring that detailed records are made of all such actions and investigations.

2.3.8 The Operator shall record and investigate complaints concerning the Permitted Installation's effects or alleged effects on the environment. The record shall give the date and nature of complaint, time of complaint, name of complainant (if given), a summary of any investigation and the results of such investigation and any actions taken.

2.4 Efficient use of raw materials

2.4.1 The Operator shall -

2.4.1.1 maintain the raw materials table or description submitted in response to Section 2.4 of the Application and in particular consider on a periodic basis whether there are suitable alternative materials to reduce environmental impact;

2.4.1.2 carry out periodic waste minimisation audits and water use efficiency audits. If such an audit has not been carried out in the 2 years prior to the issue of this Permit, then the first such audit shall take place within 2 years of its issue. The methodology used and an action plan for increasing the efficiency of the use of raw materials or water shall be submitted to the Agency within 2 months of completion of each such audit and a review of the audit and a description of progress made against the action plan shall be submitted to the Agency at least every 4 years thereafter; and

2.4.1.3 ensure that incoming water use is directly measured and recorded.

2.5 Waste Storage and Handling

2.5.1 The Operator shall design, maintain and operate all facilities for the storage and handling of waste on site such that there are no releases to water or land during normal operation and that emissions to air and the risk of accidental release to water or land are minimised.

2.6 Waste recovery or disposal

2.6.1 Waste produced at the Permitted Installation shall be recycled or recovered unless technically and/or economically impossible.

2.6.2 The Operator shall maintain the waste recovery or disposal table or description submitted in response to Section 2.6 of the Application and in particular identify the best practicable environmental options for waste disposal.

2.6.3 The Operator shall maintain and implement a system which ensures that a record is made of the quantity, composition, origin, destination (including whether this is a recovery or disposal operation) and where relevant removal date of any waste that is produced at the Permitted Installation.

2.6.4 No condition applies.

2.7 Energy Efficiency

2.7.1 The Operator shall produce a report on the energy consumed at the Permitted Installation over the previous calendar year, by 31 January each year, providing the information required by condition 4.1.2.

2.7.2 The Operator shall maintain and update annually an energy management system which shall include, in particular, the monitoring of energy flows and targeting of areas for improving energy efficiency.

2.7.3 The Operator shall design, maintain and operate the Permitted Installation so as to secure energy efficiency, taking into account relevant guidance including the Agency's Energy Efficiency Horizontal Guidance Note H2 as from time to time amended. Energy efficiency shall be secured in particular by:

- ensuring that the appropriate operating and maintenance systems are in place;
- ensuring that all plant is adequately insulated to minimise energy loss or gain;
- ensuring that all appropriate containment methods, (e.g. seals and self-closing doors) are employed and maintained to minimise energy loss;
- employing appropriate basic controls, such as simple sensors and timers, to avoid unnecessary discharge of heated water or air;
- where building services constitute more than 5% of the total energy consumption of the installation, identifying and employing the appropriate energy efficiency techniques for building services, having regard in particular to the Building services part of the Agency's Energy Efficiency Horizontal Guidance Note H2; and
- maintaining and implementing an energy efficiency plan which identifies energy saving techniques that are applicable to the activities and their associated environmental benefit and prioritises them, having regard to the appraisal method in the Agency's Energy Efficiency Horizontal Guidance Note H2.

2.8 Accident prevention and control

2.8.1 The Operator shall maintain and implement when necessary the accident management plan submitted or described in response to Section 2.8 of the Application. The plan shall be reviewed at least every 2 years or as soon as practicable after an accident, whichever is the earlier, and the Agency notified of the results of the review within 2 months of its completion.

2.9 Noise and Vibration

2.9.1 The Operator shall use BAT so as to prevent or where that is not practicable to reduce emissions of noise and vibration from the Permitted Installation, in particular by:

- equipment maintenance, eg. of fans, pumps, motors, conveyors and mobile plant;
- use and maintenance of appropriate attenuation, eg. silencers, barriers, enclosures;
- timing and location of noisy activities and vehicle movements;
- periodic checking of noise emissions, either qualitatively or quantitatively; and
- maintenance of building fabric,

provided always that the techniques used by the Operator shall be no less effective than those described in the Application, where relevant.

2.10 On-site Monitoring

2.10.1 The Operator shall maintain and implement an emissions monitoring programme which ensures that emissions are monitored from the specified points, for the parameters listed in and to the frequencies and methods described in Tables 2.2.2 and 2.2.5, unless otherwise agreed in writing, and that the results of such monitoring are assessed. The programme shall ensure that monitoring is carried out under an appropriate range of operating conditions.

2.10.2 No condition applies.

2.10.3 No condition applies.

2.10.4 No condition applies.

2.10.5 The Operator shall notify the Agency at least 14 days in advance of undertaking monitoring and/ or spot sampling, where such notification has been requested in writing by the Agency.

2.10.6 The Operator shall maintain records of all monitoring taken or carried out (this includes records of the taking and analysis of samples instrument measurements (periodic and continual), calibrations, examinations, tests and surveys) and any assessment or evaluation made on the basis of such data.

2.10.7 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme in condition 2.10.1 of this Permit shall have either MCERTS certification or MCERTS accreditation (as appropriate) unless otherwise agreed in writing.

2.10.8 There shall be provided:

2.10.8.1 safe and permanent means of access to enable sampling/monitoring to be carried out in relation to the emission points specified in Schedule 2 to this Permit, unless otherwise specified in that Schedule; and

2.10.8.2 safe means of access to other sampling/monitoring points when required by the Agency.

2.10.9 The Operator shall carry out the on-going monitoring identified in the Site Protection and Monitoring Programme submitted under condition 4.1.7, unless otherwise agreed in writing by the Agency.

2.10.10 The Operator shall, within 6 months of the issue of this Permit, in accordance with and using the format given in the Land Protection Guidance:

2.10.10.1 collect the site reference data identified in the Site Protection and Monitoring Programme submitted under condition 4.1.7, and

2.10.10.2 report that site reference data to the Agency,

- unless otherwise agreed in writing by the Agency.

2.11 Closure and Decommissioning

2.11.1 The Operator shall maintain and operate the Permitted Installation so as to prevent or minimise any pollution risk, including the generation of waste, on closure and decommissioning in particular by:-

2.11.1.1 attention to the design of new plant or equipment;

2.11.1.2 the maintenance of a record of any events which have, or might have, impacted on the condition of the site along with any further investigation or remediation work carried out; and

2.11.1.3 the maintenance of a site closure plan to demonstrate that the installation can be decommissioned avoiding any pollution risk and returning the site of operation to a satisfactory state.

2.11.2 Notwithstanding condition 2.11.1 of this Permit, the Operator shall carry out a full review of the Site Closure Plan at least every 4 years.

2.11.3 The site closure plan shall be implemented on final cessation or decommissioning of the Permitted activities or part thereof.

2.11.4 The Operator shall give at least 30 days written notice to the Agency before implementing the site closure plan.

2.12 Multiple Operator installations

2.12.1 This is not a multi-Operator installation.

2.13 Transfer to effluent treatment plant

2.13.1 No transfer from the Permitted Installation shall be made to effluent treatment plant.

2.13.2 No condition applies.

3 Records

3.1 The Operator shall ensure that all records required to be made by this Permit and any other records made by it in relation to the operation of the Permitted Installation shall:-

3.1.1 be made available for inspection by the Agency at any reasonable time;

3.1.2 be supplied to the Agency on demand and without charge;

3.1.3 be legible;

3.1.4 be made as soon as reasonably practicable;

3.1.5 indicate any amendments which have been made and shall include the original record wherever possible;

3.1.6 be retained at the Permitted Installation, or other location agreed by the Agency in writing, for a minimum period of 4 years from the date when the records were made, unless otherwise agreed in writing; and

3.1.7 where they concern the condition of the site of the Installation, or are related to the implementation of the Site Protection and Monitoring Programme, be kept at the Permitted Installation, or other location agreed by the Agency in writing, until all parts of the Permit have been surrendered.

4 Reporting

4.1.1 All reports and written and or oral notifications required by this Permit and notifications required by Regulation 16 of the PPC Regulations shall be made or sent to the Agency using the contact details notified in writing to the Operator by the Agency.

4.1.2 The Operator shall, unless otherwise agreed in writing, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:-

4.1.2.1 in respect of the parameters and emission points specified in Table S2 to Schedule 2;

4.1.2.2 for the reporting periods specified in Table S2 to Schedule 2 and using the forms specified in Table S3 to Schedule 3;

4.1.2.3 giving the information from such results and assessments as may be required by the forms specified in those Tables; and

4.1.2.4 to the Agency within 28 days of the end of the reporting period.

4.1.3 The Operator shall submit to the Agency a report on the performance of the Permitted Installation over the previous year, by 31 January each year, providing the information listed in Tables S4.1 and S4.2 of Schedule 4, assessed at any frequency specified therein, and using the form specified in Table S3 to Schedule 3.

4.1.4 The Operator shall review fugitive emissions, having regard to the application of Best Available Techniques, on an annual basis, or such other period as shall be agreed in writing by the Agency, and a summary report on this review shall be sent to the Agency detailing such releases and the measures taken to reduce them within 3 months of the end of such period.

4.1.5 Where the Operator has a formal environmental management system applying to the Permitted Installation which encompasses annual improvement targets the Operator shall, not later than 31 January in each year, provide a summary report of the previous year's progress against such targets.

4.1.6 The Operator shall, within 6 months of receipt of written notice from the Agency, submit to the Agency a report assessing whether all appropriate preventive measures continue to be taken against pollution, in particular through the application of the best available techniques, at the installation. The report shall consider any relevant published technical guidance current at the time of the notice which is either supplied with or referred to in the notice, and shall assess the costs and benefits of applying techniques described in that guidance, or otherwise identified by the Operator, that may provide environmental improvement.

4.1.7 The Operator shall, within two months of the date of this permit, submit a detailed Site Protection and Monitoring Programme, in accordance with and using the appropriate template format given in the Land Protection Guidance.

4.1.8 The Operator shall maintain the Site Protection and Monitoring Programme (SPMP) submitted under condition 4.1.7, and shall carry out regular reviews of it. The results of such reviews and any changes made to the SPMP shall be reported to the Agency within 1 month of the review or change.

5 Notifications

5.1.1 The Operator shall notify the Agency **without delay** of:-

5.1.1.1 the detection of an emission of any substance which exceeds any limit or criterion in this Permit specified in relation to the substance;

5.1.1.2 the detection of any fugitive emission which has caused, is causing or may cause significant pollution unless the quantity emitted is so trivial that it would be incapable of causing significant pollution;

5.1.1.3 the detection of any malfunction, breakdown or failure of plant or techniques which has caused, is causing or has the potential to cause significant pollution; and

5.1.1.4 any accident which has caused, is causing or has the potential to cause significant pollution.

5.1.2 The Operator shall submit written confirmation to the Agency of any notification under condition 5.1.1, by sending:-

5.1.2.1 the information listed in Part A of Schedule 1 to this Permit within 24 hours of such notification; and

5.1.2.2 the more detailed information listed in Part B of that Schedule as soon as practicable thereafter;

and such information shall be in accordance with that Schedule.

5.1.3 The Operator shall give written notification as soon as practicable prior to any of the following:-

5.1.3.1 permanent cessation of the operation of part or all of the Permitted Installation;

5.1.3.2 cessation of operation of part or all of the Permitted Installation for a period likely to exceed 1 year; and

5.1.3.3 resumption of the operation of part or all of the Permitted Installation after a cessation notified under condition 5.1.3.2.

5.1.4 The Operator shall notify the Agency, as soon as reasonably practicable, of any information concerning the state of the Site which adds to that provided to the Agency as part of the Application or to that in the Site Protection and Monitoring Programme submitted under condition 4.1.7 of this Permit.

5.1.5 The Operator shall notify the following matters to the Agency in writing within 14 days of their occurrence:-

5.1.5.1 where the Operator is a registered company:-

- any change in the Operator's trading name, registered name or registered office address;
- any change to particulars of the Operator's ultimate holding company (including details of an ultimate holding company where an Operator has become a subsidiary)
- any steps taken with a view to the Operator going into administration, entering into a company voluntary arrangement or being wound up;

5.1.5.2 where the Operator is a corporate body other than a registered company:

- any change in the Operator's name or address;
- any steps taken with a view to the dissolution of the Operator.

5.1.5.3 In any other case: -

- the death of any of the named Operators (where the Operator consists of more than

one named individual);

- any change in the Operator's name(s) or address(es);
- any steps taken with a view to the Operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case them being in a partnership, dissolving the partnership;

5.1.6 Where the Operator has entered into a Climate Change Agreement with the Government, the Operator shall notify the Agency within one month of:-

5.1.6.1 a decision by the Secretary of State not to re-certify that Agreement.

5.1.6.2 a decision by either the Operator or the Secretary of State to terminate that agreement.

5.1.6.3 any subsequent decision by the Secretary of State to re-certify such an Agreement.

5.1.7 Where the Operator has entered into a Direct Participant Agreement in the Emissions Trading Scheme which covers emissions relating to the energy consumption of the activities, the Operator shall notify the Agency within one month of:-

5.1.7.1 a decision by the Operator to withdraw from or the Secretary of State to terminate that agreement.

5.1.7.2 a failure to comply with an annual target under that Agreement at the end of the trading compliance period.

5.1.8 The Operator shall notify the Agency in writing of, any known or planned introduction or material change in respect to emissions from the permitted installation to controlled waters, that may increase or introduce into the effluent any "dangerous substance" as defined in List I and List II of the Dangerous Substances Directive 76/464/EEC and its daughter directives.

6 Interpretation

6.1.1 In this Permit, the following expressions shall have the following meanings:-

"Application" means the application for this Permit, together with any response to a notice served under Schedule 4 to the PPC Regulations and responses to written requests for further information received on 24/01/2004, 08/04/2004, 12/04/2004 and 14/04/2004 and any operational change agreed under the conditions of this Permit.

"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.

"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.

"Year" means calendar year ending 31 December.

6.1.2 Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

6.1.3 Unless otherwise stated, any references in this Permit to concentrations of substances in emissions into air means:-

6.1.3.1 in relation to gases from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid and gaseous fuels, 6% dry for solid fuels; and/or

6.1.3.2 in relation to gases from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content.

6.1.4 Where any condition of this Permit refers to the whole or parts of different documents, in the event of any conflict between the wording of such documents, the wording of the document(s) with the most recent date shall prevail to the extent of such conflict.

Schedule 1 - Notification of abnormal emissions

This page outlines the information that the Operator must provide to satisfy conditions 5.1.1 and 5.1.2 of this Permit.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the PPC Regulations.

Part A

Permit Number	
Name of Operator	
Location of Installation	
Location of the emission	
Time and date of the emission	

Substance(s) emitted	Media	Best estimate of the quantity or the rate of emission	Time during which the emission took place

Measures taken, or intended to be taken, to stop the emission	

Part B

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment or harm which has been or may be caused by the emission	
The dates of any unauthorised emissions from the installation in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of The Dow Chemical Company Ltd., Seal Sands [BV2719]

Schedule 2 - Reporting of monitoring data

Parameters, for which reports shall be made, in accordance with conditions 4.1.2 and 4.1.3 of this Permit, are listed below.

Table S2: Reporting of monitoring data

Parameter	Emission point	Reporting period	Period begins	
Hydrogen Cyanide (mg/m^3)	A1, A4, A5	Quarterly	01/05/2004	
Ammonia (mg/m^3)	A1, A2, A3, A4, A5	Quarterly	01/05/2004	
Formaldehyde (mg/m^3)	A1, A4, A5	Quarterly	01/05/2004	
Class A Volatile Organic Compounds (expressed as species) (g/hr)	A1, A4, A5	Quarterly	01/05/2004	
Class B Volatile Organic Compounds (expressed as carbon) (g/hr)	A1, A4, A5	Quarterly	01/05/2004	
Total Class A and B Volatile Organic Compounds (expressed as carbon) (g/hr)	A2, A3	Quarterly	01/05/2004	
Unknown process chemicals from site inventory (kg)	A6	Annual	01/05/2004	Also to be reported as Schedule 1 Notification of Abnormal Emission
Mercury (mg/l)	W1	Quarterly	01/05/2004	
Chemical Oxygen Demand (mg/l & tonnes/day)	W1	Quarterly	01/05/2004	
Cyanide (mg/l)	W1	Quarterly	01/05/2004	
Ammoniacal Nitrogen (as nitrogen) (mg/l)	W1	Quarterly	01/05/2004	
Total Chelates (as Ethylenediamine Tetraacetic Acid [EDTA]) (mg/l)	W1	Quarterly	01/05/2004	
pH	W1	Quarterly	01/05/2004	
Water usage	n/a	Quarterly	01/05/2004	
Energy usage	n/a	Quarterly	01/05/2004	
Waste disposal and/or recovery.	n/a	Quarterly	01/05/2004	
V560 and V501 Thermal Oxidiser trips	n/a	Annual	01/05/2004	Report of frequency and duration of occurrence (as a percentage of processing time)
Scrubber medium recirculation low flow alarms for scrubbers V105, V208 and V230	n/a	Annual	01/05/2004	Report of frequency and duration of occurrence (as a percentage of processing time)
Mercury throughput based on purchased sodium hydroxide usage	n/a	Annual	01/05/2004	Report of calculated mercury throughput/release based on usage of purchased sodium hydroxide at specified mercury content

Schedule 3 - Forms to be used

Table S3: Reporting Forms		
Media / parameter	**Form Number**	**Date of Form**
Air	A1	21/04/2004
Water (excluding sewer)	W1	21/04/2004
Energy	E1	21/04/2004
Waste Return	R1	21/04/2004
Water usage	WU1	21/04/2004
Performance indicators	PI1	21/04/2004

Schedule 4 - Reporting of performance data

Data required to be recorded and reported by Condition 4.1.3. The data should be assessed at the frequency given and reported annually to the Agency.

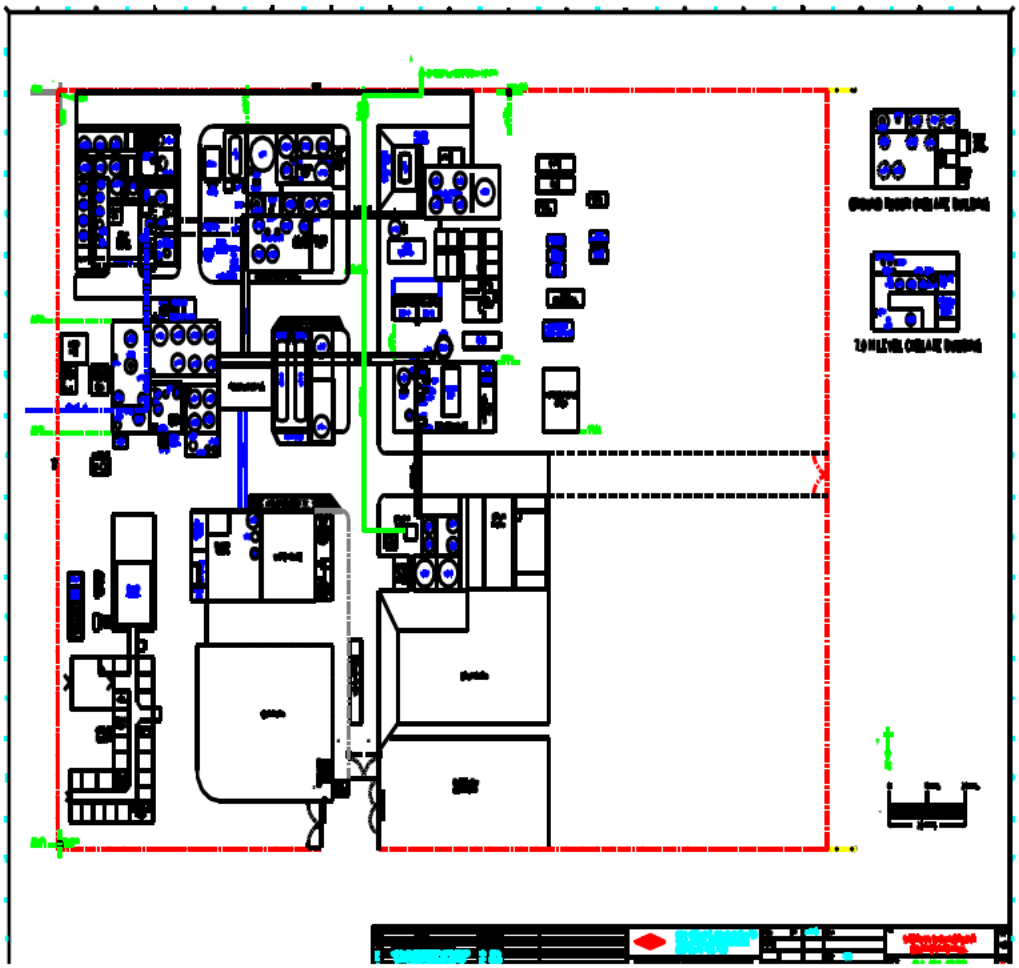
Table S4.1: Annual Production/Treatment	
Production of chelates	tonnes
Production of custom & fine chemicals	tonnes

Table S4.2: Performance parameters			
Parameter		**Frequency of assessment**	**Performance indicator**
Air quality impact			
• Hydrogen cyanide release per tonne product		Annual	Tonnes/tonne
• Ammonia release to air per tonne product		Annual	Tonnes/tonne
• VOC release per tonne product		Annual	Tonnes/tonne
Aquatic impact			
• Chemical Oxygen Demand release per tonne product		Annual	Tonnes/tonne
		Annual	Tonnes/tonne
• cyanide per tonne product		Annual	Tonnes/tonne
• mercury per tonne product		Annual	Tonnes/tonne
• ammoniacal nitrogen per tonne product		Annual	Tonnes/tonne
• total chelates (as EDTA) per tonne product		Annual	Tonnes/tonne
• NTA per tonne product		Annual	Tonnes/tonne
Potable water use		Annual	m^3/tonne
Non potable water use		Annual	m^3/tonne
Waste Hazard Score		Annual	(no units)
Waste Disposal Score		Annual	(no units)
Energy use:			
• per tonne product		Annual	MWh/tonne
• delivered electricity		Annual	MWh
• primary electricity (delivered x 2.6)		Annual	MWh
• primary carbon dioxide (primary electricity x 0/166)		Annual	Tonnes
• primary carbon dioxide per tonne product		Annual	Tonnes/tonne
• delivered fuel oil		Annual	MWh
Specific global warming impact, excluding net imported electricity use (H1 Methodology) per tonne product		Annual	Tonnes CO_2/tonne
Waste disposals:			
• Inert		Annual	Tonnes
• Hazardous		Annual	Tonnes
• Non hazardous		Annual	Tonnes

Schedule 5 - Site Plans

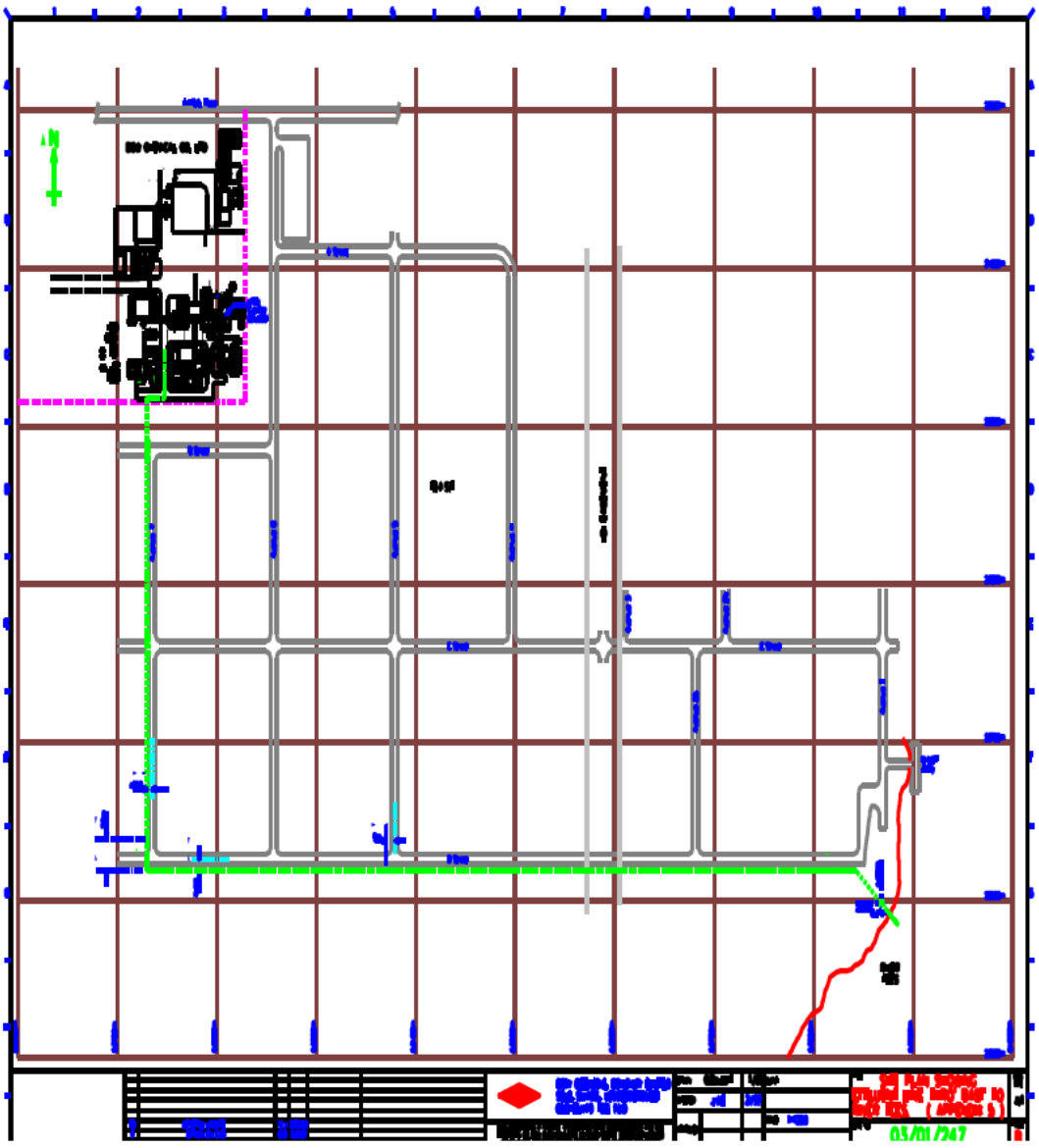
General Site Plan

(Installation boundary shown in red)



Plan showing route of effluent discharge line across BASF land en route to the Tees Estuary

(Effluent line route shown in green - defined as within the Installation boundary)



END OF PERMIT