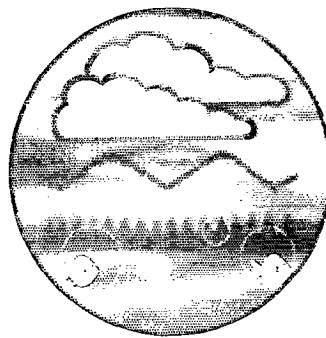
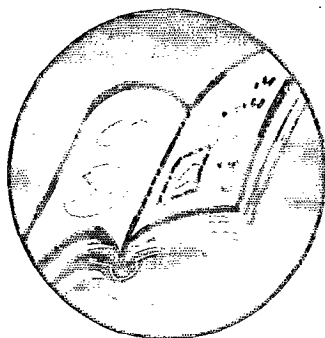
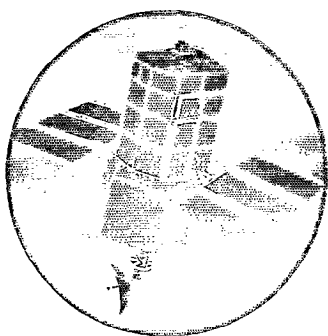


Best Available Techniques for the Control of Pollution in Inorganic Chemical Processes Appendix



Research and Development
Project Record
P4/056/1



ENVIRONMENT AGENCY



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Best Available Techniques for the Control of Pollution in Inorganic Chemical Processes Appendix

Project Record P4/056/1

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Statement of use

This report provides information on best available techniques for pollution control in inorganic chemical processes. It includes costs of the techniques and economic information on the industry sub-sectors. The report will be used in the revision of IPC process guidance on the relevant processes.

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SUMMARY

This document contains information on the companies authorised for Integrated Pollution Control under the inorganic chemicals and fertilizer sections of SI 472 which has been obtained from the public registers, the National Library of Authorisations, previous Research Contract reports, telephone conversations and other sources.

This document also contains quantitative information, for the chemicals under consideration in this review, of releases into the environment from all sectors. This information has been obtained from the Chemical Release Inventory (CRI database).

This information is not intended as a definitive listing of operations, process abatement techniques and releases to the environment from the inorganic chemicals industry but is to be used as a guide to highlight the diversification of operations, techniques and environmental releases which occur. This information has been used to assist in identifying the main industry groups (and individual companies) authorised under the inorganic chemical and fertilizer categories, the main release sources and species released, and the current environmental issues of concern to this sector.

In assembling the data contained in this document some difficulty has been experienced in collating the various sources of information relating to the individual authorisations and their categorisation and in reaching agreement between the various sources. In some cases the detail of the individual authorisations does not seem appropriate to the category concerned and in these situations it has been noted as such.

A. HYDROGEN CYANIDE / HYDROGEN SULPHIDE

A.1 Summary details of companies registered under 4.5 A (a/b/c)

A.1.1 Manufacture of hydrogen cyanide / hydrogen sulphide - 4.5 A (a)

AI0624 COOKSON MATTHEY CERAMICS AND MATERIALS LTD

Manufacture of ceramic products.

No hydrogen sulphide emissions listed.

Releases to air - fluorides, lead, manganese, nitrogen oxides (as NO₂), particulates, sulphur dioxide.

AN9379 JC SEED LTD

Manufacture of animal feedstuffs.

No hydrogen sulphide emissions listed.

Releases to air - particulates, selenium.

Releases to land - selenium.

AO0393 BRUNNER MOND (UK) LTD

Soda Ash manufacture. Integrated Ammonia-soda process. Reaction between limestone (Calcium carbonate) and brine to give sodium carbonate and calcium chloride solution. Ammonia is dissolved in the brine to aid the process. Large usage/release of ammonia to air and water. (*For further information see Chem Systems Ltd, 1994*).

Releases to air - ammonia, carbon monoxide, hydrogen sulphide, particulates.

Releases to water - ammonia, cresol, phenol, sodium chloride.

AQ6830 FIAMM UK LTD

Manufacture of lead acid batteries, lead alloy grids and processing and assembly of pasted plates.

No hydrogen sulphide emissions listed.

Abatement equipment - wet scrubber and DCE bag filters.

Releases to air - lead.

Releases to water - lead.

None of the above companies would appear to fit the category for which they appear to be authorised. Therefore there would appear to be no facilities in the UK which currently come under this category.

A.1.2 Use of hydrogen cyanide / hydrogen sulphide - 4.5 A (b)

AO2175 ICI CHEMICALS & POLYMERS PLC

Manufacture of sodium cyanide. This involves the production of hydrogen cyanide from methane, ammonia, and air, followed by reacting the hydrogen cyanide with sodium hydroxide to produce approximately 32% concentration sodium cyanide which is then concentrated to saturation in evaporators and then centrifuged to recover the solid product which is fed to presses for compaction into egg shaped cyanoids which are then packaged for sale.

Tail gas from the hydrogen cyanide production, contains ammonia, methane and trace hydrogen cyanide. This passed through a flare stack before release to air. The conveying gases, which may contain hydrogen cyanide dust and fume, leaving the driers are scrubbed with water before release to atmosphere. Cyanide dust is also formed during the compaction process. The dust is extracted and fed to a Rotoclone where the dust is removed from the air stream and washed to the effluent treatment plant. All aqueous effluent from this process is routed to the treatment plant where the cyanide is destroyed using sodium hypochlorite. The remaining solution is then released to Billingham Beck. (*For further information see WS Atkins Consultants Ltd, 1994*).

Releases to air - ammonia, chlorine, hydrogen cyanide, methane, nitrogen oxides, particulates.
Releases to water - chlorides, copper, cyanides, mercury, nitrogen compounds, NP-suspended solids, zinc.

AN9042 AC INFRARED LTD

Manufacture of zinc sulphide "window" by a chemical vapour deposition process.

Abatement equipment - CVD process vented through dust filters, followed by a caustic scrubber to remove unreacted hydrogen sulphide and then discharged through stack. The remainder of the plant is vented via a catalytic oxidation unit prior to the stack.

Releases to air - hydrogen sulphide, sulphur dioxide.

AN9000 FLEXSYS RUBBER CHEMICALS LTD (MONSANTO)

Manufacture of Diphenylguanidine (DPG). (*WS Atkins Consultants Ltd, 1994*)

Releases to air - aniline, cyanides, particulates, trichloroethylene.

Releases to land - NP-solids.

A.1.3 Release of hydrogen cyanide / hydrogen sulphide - 4.5 A (c)

AN7970 COURTAULDS FIBRES LIMITED

Manufacture of viscose fibre from refined wood pulp.

(*For further information see WS Atkins Consultants Ltd, 1994*)

Abatement equipment - two, parallel, horizontal scrubbing chambers in which the air is contacted with Ferrox solution, which absorbs most of the hydrogen sulphide, which is oxidised to elemental sulphur. A purge of solution to the liquid effluent stream then removes the sulphur. A pilot plant has been installed on a side stream of the exhaust from scrubbing chambers to investigate recovery of carbon disulphide by adsorption onto activated charcoal from hydrogen sulphide free air.

Releases to air - carbon disulphide, hydrogen sulphide, nitrogen oxides, sulphur oxides

Releases to water - cadmium, mercury, sulphuric acid, zinc, COD, suspended solids, copper, lead, chromium, nickel, amine oxides.

AN8984 ROBINSON BROTHERS LIMITED

Envelope application for processes producing organic chemicals, that use and release of hydrogen sulphide.

Abatement equipment - caustic soda scrubber, bag filters and an incinerator. The incinerator is designed to destroy gaseous emissions, mainly hydrogen sulphide, from many of the processes. The incinerator operates continuously and is used to generate steam for the site via a waste heat boiler. Emissions are continuously monitored for temperature and sulphur dioxide content before discharge via one flue of a multi-flue stack. The gaseous collection system for the incinerator has

two parts, the lean stream and the rich stream. Either of the streams can be fed directly to the incinerator and in an emergency the rich stream can be fed to a separate incinerator with a continuous pilot flame which discharges via the stack. If the incinerator fails the lean stream is discharged via a caustic soda scrubber and the stack. A liquid effluent treatment plant is also in operation, but is covered under authorisation AK6438.

Releases to air - isobutyl alcohol, amines, butanone, carbon dioxide, carbon disulphide, carbon monoxide, free halogens, hydrogen chloride, hydrogen sulphide, nitrogen oxides, particulates, sulphur oxides, VOCs class A/B

AQ3385 TRENT VALLEY WATER SYSTEMS LTD

Batch manufacture of 13% ferrous chloride solution used in mainline sewage systems to reduce septicity.

Releases to air - hydrogen, hydrogen chloride, hydrogen sulphide.

Abatement equipment - natural draught chimney with in built pressurised cold water spray tower scrubber.

AW6669 SURCOTECH INTERNATIONAL LTD

Manufacture of precious metal based specialist paints known as Liquid Gold, which is used in the glass and ceramics industry. The process involves reacting unsaturated organic compounds with sulphur at temperatures of up to 250°C, producing a highly viscous organo-sulphur compound. The reaction vessel is vented via a condenser and collecting vessel to two sodium hydroxide scrubbers. Exhaust gases from the scrubbers are collected in a fume cupboard from where they are extracted to atmosphere via activated carbon adsorption units. Low molecular weight organo-sulphur compound is present in the vent stream from the reaction vessel. This is collected after being condensed, in the collecting vessel, leaving a gaseous stream of hydrogen sulphide which is removed in the scrubbers. The resultant product from the reaction vessel is then heated with Aqueous Gold solution to produce an organic compound of gold, which is washed and treated with solvents to form an organic gold compound. Gases and vapours produced from this stage are collected by the condenser system with the scrubber acting as a back-up for any acidic vapour not captured in the condenser. The organic gold compound may be mixed with solvents and other organic compounds to produce materials of the required viscosity.

Releases to air - hydrogen sulphide, organic sulphides and mercaptans, VOCs.

AL5623 LAMBSON FINE CHEMICALS LTD

Manufacture of up to 20,000tpa patented lubricating oil additive which is used principally in marine diesel engine oil formulations to extend lubricant life. Hydrogen sulphide and mercaptans are evolved from this process and are abated primarily using an incinerator. The incinerator is a recent addition and prior to this two scrubbers were used to abate the emissions, one irrigated with sodium hydroxide and the second with sodium hydroxide/sodium hypochlorite. The scrubbers are now only used when the incinerator is off-line.

Releases to air - ethyl mercaptan, hydrogen sulphide, nitrogen oxides, particulates, sulphur dioxide, VOCs.

AN3575 MITCHELL COTTS CHEMICALS LTD

Manufacture of cyano-substituted organic compounds, including pesticides, and thio-substituted organic fine chemicals. Use of caustic in packed tower scrubbing systems.

Releases to air - hydrogen cyanide, hydrogen sulphide.

AN9204 ANGUS FIRE ARMOUR LTD

Manufacture of a range of fire-fighting foams based on aqueous solutions of hydrolysed proteins extracted from animal by-products. Use two incinerators to thermally decompose ammonia and hydrogen sulphide emissions. Other emissions are treated by bag filters and scrubbers.

Releases to air - ammonia, hydrogen sulphide, sulphur dioxide.

AN9212 JAMES ROBINSON LTD

Multi-product batch processing. Reaction of organic intermediates with sulphur or polysulphides to produce sulphur dyes. Fume scrubbing systems include back-up scrubbers. Caustic followed by potassium permanganate. Use lime for pH adjustment and neutralisation at effluent plant.

Releases to air - ammonia, hydrogen chloride, hydrogen sulphide, nitrobenzene, particulates.

AN9239 ROBINSON BROTHERS LTD

Manufacture of specialised organic chemicals in multi-purpose plant - for example 2-mercapto 1,3,4 thiadiazole uses ammonium thiocyanate and releases hydrogen sulphide. Use circulating water and/or sodium hydroxide systems. Dust filtration and incineration.

Releases to air - carbon disulphide, carbon monoxide, free halogens, hydrogen sulphide, nitrogen oxides, particulates, sulphur dioxides, VOCs class A & B.

AN9921 BP CHEMICALS (ADDITIVES) LTD

Manufacture of zinc dithiophosphates by a batch process where a range of alcohols is reacted with phosphorus pentasulphide, forming a thiol acid which is then neutralised using zinc oxide to form crude product which is then filtered before bulk storage. The range of zinc phosphates is used in the manufacture of lubricating oil additives. Significant amounts of hydrogen sulphide is produced as a by-product of the thiol acid stage and some remains dissolved in the final product. Two incineration systems for abating the hydrogen sulphide evolved are employed; one for the hydrogen sulphide released during the process and one for the hydrogen sulphide released from the product storage tanks. Process gaseous effluent is burnt on site in the TGCU (Tail Gas Combustion Unit). Vents from tanks/vessels are routed to the boiler house to be destroyed by combustion in specially adapted boiler. TGCU has advantages over caustic scrubber since no aqueous effluent produced. No emissions of hydrogen sulphide listed. All liquid effluent passes to one of the two interceptor pits before entering the main site effluent pit. Oil is skimmed off the surface of the effluent and any sludge accumulated on the bottom of the interceptor pits is removed periodically and sent to landfill. Filter cake from the process filter operation is also sent for landfill.

Releases to air - VOCs.

Releases to water - cadmium.

AN9956 BP CHEMICALS (ADDITIVES) LTD

Calcium phenate production. Hydrogen sulphide is produced as a by-product of this process and also exist dissolved in the product. The process off gases are abated using the same techniques as described in authorisation AN9921.

Releases to air - hydrogen sulphide, sulphur dioxide.

AO0776 CRODA INTERNATIONAL PLC

Copper ferrocyanide pigment process. Basic dye-metal complex pigments produced. Use hydrated lime for pH adjustment. Ferric chloride used to assist flocculation. Lime dosing precipitates out copper and heavy metals which are then isolated in two settling tanks.

Releases to air - hydrogen chloride, particulates, sulphur oxides.

Releases to water - mercury.

AO1357 CHIREX LTD

Paracetamol production.

Releases to air - chlorine dioxide, hydrogen chloride, hydrogen sulphide, nitrogen oxides, particulates, sulphur oxides, VOCs Class A&B.

Releases to water - ethylene dichloride, mercury, NP-COD, NP-suspended solids, phenol.

Releases to land - NP-solids.

AU040 WHYTE CHEMICALS LTD

Cyanation processes - reaction of ethyl chloroacetate with solid sodium cyanide in the presence of a catalyst. Use overhead condensers and scrubber to abate emissions.

Releases to air - Hydrogen cyanide, VOCs.

AO1292 DEGUSSA LTD

Manufacture of iron blue pigments (sodium ferrocyanide $\text{Na}_4[\text{Fe}(\text{CN})_6]$). Use of sodium cyanide solution plus iron chloride. CIMAH site for sodium cyanide storage. Water scrubbers for ammonia.

Releases to air - ammonia, hydrogen cyanide, nitrogen oxides.

Releases to water - ammonia, cyanides.

Releases to land - NP-solids.

AO2345 UCB FILMS (UCB SIDAC LTD)

Manufacture of regenerated cellulose film by the Viscose process.

No emissions data from CRI after 1996.

Releases to air - hydrogen sulphide, carbon disulphide.

AN9123 ALBRIGHT & WILSON

No emissions data of hydrogen sulphide.

Releases to air - amines, hydrogen chloride, VOCs Class A&B.

Releases to water - mercury.

AO2353 UCB CELLOPHANE LTD

Viscose and film coating process. The viscose is made from the cellulose of trees, the bark and lignin are removed in pulp mills and the extracted cellulose is pressed and cut into sheets. These cellulose sheets are the starting materials for the film coating process. The sheets are steeped in caustic soda solution at elevated temperature, forming alkali cellulose. The excess caustic is removed and recycled to the process by a pressing operation. The alkali cellulose is then shredded before xanthanation, where carbon disulphide is mixed with the alkali cellulose to form sodium-cellulose xanthate. Sodium hydroxide is then added to give a syrup like extrusion solution of sodium-cellulose xanthate in caustic soda, this is known as viscose. It is then continually recirculated through attritors to render it more homogeneous. It is then stored in agitated vessels and allowed to "age" before it is filtered to remove any undissolved particles and gels and passed

through continuous vacuum deaerators to remove entrained air. It is then converted into regenerated cellulose film on a series of continuous casting/extrusion machines. The viscose film is then passed to a series of dilute sulphuric acid baths where coagulation and regeneration begins. At this stage in the process carbon disulphide and hydrogen sulphide gases are evolved which are collected by the ventilation hoods and conveyed by fan through a foul air ducting system to the site boiler for destruction by incineration. The film is then contacted with hot, softened water where further carbon disulphide is evolved which is extracted to the carbon disulphide condensation recovery plant. The films then are passed through baths of hot sodium sulphide and hot water. Some carbon disulphide and hydrogen sulphide gases are evolved at this stage which are extracted through LEV's and are discharged directly to atmosphere. The film is then passed through a dilute sodium hypochlorite bath and another hot water bath before final processing such as softening, dying, drying, and coating.

Releases to air - carbon disulphide, hydrogen sulphide, sulphur oxides.

Releases to water - sulphides, sulphuric acid.

AO1730 CYANAMID AGRICULTURE LTD

Manufacture of synthetic drugs. The process includes the preparation of crude compounds, purification, drying and blending and the recovery of solvents used in the process.

Abatement equipment - filters dryers and caustic liquor scrubbers. Liquid effluent is pH adjusted if necessary and checked for solvent contamination before discharge to the site effluent treatment plant. If the level of solvent is unacceptable then the waste is distilled to remove the solvent.

Releases to air - 1,2 dichlorobenzene, acetone, ammonia, chlorobenzene, ethyl acetate, hydrocarbons, hydrogen chloride, hydrogen sulphide, particulates.

Releases to water - acetone, ethyl acetate, toluene, ethylene glycol, monochlorobenzene, ortho-dichlorobenzene.

AO0113 CHUBB FIRE LTD

Production of fire fighting chemicals.

Abatement system to treat "fume" i.e. mixture of hydrogen sulphide, ammonia/amines, carbon disulphide, organic sulphides and mercaptans. The system employs a series of five scrubbers using water, iron oxide/peat, hydrogen chloride, sodium hypochlorite/sodium hydroxide and activated carbon impregnated with sodium hydroxide, respectively.

Releases to air - potential to release hydrogen sulphide.

AR9290 ASTOR STAG LTD

Chemical synthesis processes involving chemical modification of bitumen to form a complex product for use in road surface dressings (SURMAC process) and bituminous paints (FEATLEY process). The SURMAC process batch plant consists of stirred reactors into which 25 tonnes of bitumen is fed. The reactors operate at 150°C and additives are added, depending on the current recipe. The reactor vents pass through water cooled condensers prior to dilution and dispersal from a chimney. Local extraction vents from the product tanker filling station are passed through a potassium permanganate filter prior to stack discharge. The FEATLEY process is a smaller scale batch process where bitumen, kerosene, and additives are mixed/reacted. The process is vented via condensers.

Releases to air - hydrogen sulphide, organic particulates, VOCs.

Releases to water - NP-oil & oil/solid mixtures.

AO0547 HORNETT BROS AND CO LTD

Manufacture of sulphurised oil additives.

Abatement equipment - series of water and caustic scrubbers to arrest hydrogen sulphide emissions.

Releases to air - hydrogen sulphide.

AO0911 VISCOSE CLOSURES LTD

Manufacture of viscose closures.

Abatement equipment - caustic scrubbing units.

Releases to air - ammonia, carbon disulphide, hydrogen sulphide.

Releases to water - ammonia, NP-oil & oil/solid mixtures, NP- suspended solids, sulphates, sulphides.

A.2 Summary

The companies authorised under this category fall into several categories and include many organic chemical and multi-batch operations for which a common theme is the release of the cyanide or sulphide. Other categories include viscose/film manufacturers releasing hydrogen sulphide. Many of the standard abatement techniques for the removal of hydrogen cyanide and hydrogen sulphide are to be found in this sector but often additional modified systems are required to suit process specific requirements. For example the removal of associated organics or particulates in addition to the hydrogen cyanide or hydrogen sulphide.

A.2.1 Emissions to air

From the emissions data provided by the CRI the most commonly authorised emissions to air from the companies under this section are - hydrogen sulphide, sulphur dioxide, particulates, NO_x, hydrogen chloride, ammonia, carbon disulphide and VOCs.

There is a miscellaneous collection of specifically named organic species relevant only to individual applications covering the following - ethylene dichloride, butanone, amines, isobutyl alcohol, xylene, trichloroethylene, aniline, ethyl mercaptan, nitrobenzene, acetone, chlorobenzene, ethyl acetate etc.

Several metals are also listed - lead, manganese and selenium.

In terms of discharges >1000 kg per annum the following have been reported:

| | |
|-------------------|---|
| Albright & Wilson | hydrogen chloride, VOCs; |
| Angus Fire | ammonia, sulphur dioxide; |
| BP Chemicals | sulphur dioxide; |
| Brunner Mond | ammonia, carbon monoxide, particulates; |
| Cookson-Matthey | ammonia, NO _x , particulates, sulphur dioxide; |
| Courtaulds | carbon disulphide, hydrogen sulphide, sulphur dioxide; |
| Cyanamid | acetone; |
| Degussa | ammonia, NO _x ; |
| ICI | ammonia, hydrogen cyanide, methane, NO _x , particulates; |
| Monsanto | aniline, trichloroethylene; |
| Robinson | sulphur dioxide; |
| Sterling | hydrogen chloride, NO _x , sulphur dioxide, VOCs; |
| Trent | hydrogen chloride; |
| UCB Films | carbon disulphide, hydrogen sulphide; and |
| Viscose Closures | ammonia, carbon disulphide. |

A.2.2 Discharges to water

From the emissions data provided by the CRI the most commonly authorised emissions to water from the companies under this section are - mercury, cadmium, cyanides, suspended solids and ammonia. Other metals authorised include lead, copper and zinc.

In terms of discharges >1000 kg per annum the following have been reported:

| | |
|------------------|--|
| Brunner Mond | ammonia, phenol, sodium chloride; |
| Courtaulds | sulphuric acid, zinc; |
| Degussa | ammonia; |
| ICI | chlorides, cyanides, sodium carbonate, suspended solids; |
| Sterling | COD, suspended solids; and |
| Viscose Closures | ammonia, suspended solids, sulphates. |

A.2.3 Discharges to land

From the emissions data provided by the CRI only solids and organic residues are listed.

In terms of discharges > 1000 kg per annum the following have been reported:

| | |
|---------------|------------------|
| Degussa | solids |
| Sterling | solids |
| Rhone-Poulenc | organic residues |

A.3 Details of reported emissions of hydrogen cyanide and hydrogen sulphide

Table A.1 Emissions data for hydrogen cyanide to the environment

Table A.2 Emissions data for cyanides to the environment

Table A.3 Emissions data for hydrogen sulphide to the environment

Table A.1 Emissions data for hydrogen cyanide to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Authorisation No. | Emissions 1993 (kg) | Emissions 1994 (kg) | Emissions 1995 (kg) | Emissions 1996 (kg) |
|---|---------|-------------------|---------------------|---------------------|---------------------|---------------------|
| | | | Air | Air | Air | Air |
| British Steel PLC | 1.2A(a) | AF7193 | - | - | - | - |
| Dunlop Ltd. | 1.2A(a) | AG8624 | - | - | 9.44E+02 | 1.33E+02 |
| Regency Doors PLC | 1.3A(c) | AG0534 | 4.88E+01 | 0.00E+00 | 0.00E+00 | - |
| Total emissions from sector 1 | | | 4.88E+01 | 0.00E+00 | 9.44E+02 | 1.33E+02 |
| Wyeth Research (UK) Ltd. | 4.2A(a) | AK5571 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Albright and Wilson UK Ltd. | 4.2A(c) | AJ4669 | 0.00E+00 | 7.10E+01 | 1.11E+02 | 1.50E+02 |
| Rhone-Poulenc Chemicals Ltd. | 4.2A(c) | AK7329 | - | - | - | 0.00E+00 |
| BASF PLC | 4.2A(c) | AJ6505 | - | 2.77E+04 | 3.95E+04 | 2.54E+04 |
| Abbott Laboratories Ltd. | 4.2A(c) | AK8031 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zeneca Ltd. | 4.2A(d) | AM3014 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Agrevo UK Ltd. | 4.2A(d) | AK4982 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Hampshire Chemicals Ltd. | 4.2A(d) | AK5644 | - | 4.80E-01 | 5.00E-01 | 5.00E-01 |
| Seal Sands Chemicals Ltd. | 4.2A(d) | AL1202 | - | - | 0.00E+00 | 0.00E+00 |
| Glaxo Research and Development Ltd. | 4.2A(d) | AK4524 | - | - | 0.00E+00 | - |
| International Speciality Chemicals Ltd. | 4.2A(d) | AK6861 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Glaxo Research and Development Ltd. | 4.2A(d) | AK4516 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Glaxo Research and Development Ltd. | 4.2A(d) | AJ2500 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Merck Sharp and Dohme Ltd. | 4.2A(d) | AK6942 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Abbott Laboratories Ltd. | 4.2A(d) | AK8082 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Astra Charnwood | 4.2A(d) | AK6870 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rhone-Poulenc Agriculture Ltd. | 4.2A(d) | AK7230 | - | - | 2.40E+01 | 2.10E+01 |
| Genzyme Ltd. | 4.2A(d) | AK6730 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mitchell Cotts Chemicals Ltd. | 4.2A(d) | AK8015 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zeneca Ltd. | 4.2A(d) | AK7515 | - | 3.50E+00 | 0.00E+00 | 0.00E+00 |
| Zeneca Ltd. | 4.2A(d) | AK7604 | - | 2.00E-01 | 3.00E-01 | 4.00E-01 |
| Zeneca Ltd. | 4.2A(d) | AK7507 | - | 5.80E+00 | 0.00E+00 | 0.00E+00 |
| Zeneca Ltd. | 4.2A(d) | AX7776 | - | - | - | - |
| Seal Sands Chemicals Ltd. | 4.2A(g) | AH6465 | 3.98E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

| | | | | | | |
|--|---------|--------|---|-----------------|-----------------|-----------------|
| Seal Sands Chemicals Ltd. | 4.2A(g) | AP6290 | - | - | 0.00E+00 | 1.00E-12 |
| Zeneca Ltd. | 4.2A(g) | AM9870 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| ICI PLC | 4.2A(i) | AM7265 | - | 2.52E+04 | 6.09E+04 | 5.29E+04 |
| Total emissions from sector 4.2 | | | | 3.98E-01 | 1.01E+05 | 7.85E+04 |

| Company | Sector | Authorisation No. | Emissions 1993 (kg) Air | Emissions 1994 (kg) Air | Emissions 1995 (kg) Air | Emissions 1996 (kg) Air |
|--|---------|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| ICI PLC | 4.5A(b) | AO2175 | - | 3.00E+03 | 5.87E+04 | 4.50E+04 |
| Degussa Ltd. | 4.5A(c) | AO1292 | - | - | 7.80E+01 | 4.70E+01 |
| Rhone-Poulenc Agriculture Ltd. | 4.5A(c) | AK7108 | - | 1.40E+01 | - | - |
| Mitchell Cotts Chemicals Ltd. | 4.5A(c) | AN3575 | - | 2.87E+01 | 0.00E+00 | 0.00E+00 |
| Whyte Chemicals Ltd. | 4.5A(c) | AU0040 | - | - | - | 0.00E+00 |
| Cyanamid of Great Britain Ltd. | 4.5A(d) | AK9992 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| William Blythe Ltd. | 4.5A(i) | AO1233 | - | - | 4.93E+02 | 6.33E+01 |
| Total emissions from sector 4.5 | | | | 3.04E+03 | 5.92E+04 | 4.51E+04 |

| | | | | | | |
|---|---------|--------|---|----------|-----------------|-----------------|
| Courtaulds Textiles Automotive Products | 6.2A(d) | AU8156 | - | - | - | 2.70E+00 |
| Rosendale Combining Co. Ltd. | 6.2A(d) | AU6846 | - | - | - | 2.11E+02 |
| Vita Achier | 6.2A(d) | AN7210 | - | - | 0.00E+00 | 8.28E+01 |
| Daphfield Ltd. (Greenfield Laminates) | 6.2A(d) | AU8172 | - | - | - | 0.00E+00 |
| Bail & Young Ltd. | 6.2A(d) | AT4015 | - | - | 4.40E-01 | 2.50E+01 |
| Textile Bonding Ltd. | 6.2A(d) | AU5424 | - | - | - | - |
| Jordan Laminates Ltd. | 6.2A(d) | AU8202 | - | - | - | 7.60E+01 |
| Bitmac Ltd. | 6.3A(a) | AU8296 | - | - | - | - |
| Total emissions from sector 6 | | | | - | 4.40E-01 | 3.98E+02 |

Table A.2 Emissions data for cyanides to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Authorisation No. | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Sevalco Ltd | 1.2A(a) | AF7916 | - | - | - | 2.75E+01 | - | 1.96E+01 | - | 2.13E+01 |
| British Steel PLC | 1.2A(a) | AF8530 | - | - | - | - | - | - | - | 1.10E+05 |
| British Steel PLC | 1.2A(a) | AF8548 | - | 4.00E-01 | - | 4.00E+01 | - | 3.00E+01 | - | - |
| British Steel PLC | 1.2A(a) | AF7193 | - | - | - | - | - | - | - | - |
| British Steel PLC | 1.2A(a) | AF8645 | - | 3.20E+00 | - | 1.95E+03 | - | 7.70E+02 | - | 8.30E+01 |
| Gulf Oil Refining Ltd | 1.4A(a) | AF7860 | - | - | - | 3.50E+01 | - | 2.72E+01 | - | 7.85E+00 |
| Texaco Ltd | 1.4A(a) | AF7894 | - | - | - | - | - | 2.00E+02 | - | - |
| Total emissions from sector 1 | | | - | 3.60E+00 | - | 2.05E+03 | - | 1.05E+03 | - | 1.10E+05 |
| British Steel PLC | 2.1A(a) | AR0349 | - | - | - | - | - | 1.60E+03 | - | 1.60E+03 |
| British Steel PLC | 2.1A(a) | AR0080 | - | - | - | - | - | 1.20E+01 | - | 8.20E+01 |
| Total emissions from sector 2 | | | - | - | - | - | - | 1.61E+03 | - | 1.68E+03 |
| BASF PLC | 4.2A(c) | AJ6505 | - | - | - | - | - | - | - | - |
| Zeneca Ltd | 4.2A(d) | AM3014 | - | - | - | 2.08E+02 | - | 0.00E+00 | - | 0.00E+00 |
| ICI PLC | 4.2A(f) | AM7265 | - | - | - | 9.60E+02 | - | 1.59E+03 | - | 3.50E+03 |
| Total emissions from sector 4 (excl. 4.5) | | | - | - | - | 1.17E+03 | - | 1.59E+03 | - | 3.50E+03 |

| Company | Sector | Authorisation No | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Monsanto PLC | 4.5A(a) | AN9000 | - | - | 1.08E+01 | - | 1.01E+01 | - | 1.60E+01 | - |
| ICI PLC | 4.5A(b) | AO2175 | - | - | - | 5.92E+02 | - | 4.04E+03 | - | 1.80E+03 |
| Degussa Ltd | 4.5A(c) | AO1292 | - | - | - | - | - | 4.00E+02 | - | 3.27E+02 |
| Johnson Matthey PLC | 4.5A(e) | AN8712 | - | - | - | - | - | 1.50E+00 | - | 0.00E+00 |
| Gulson Plating Ltd | 4.5A(f) | AO0865 | - | - | - | - | 0.00E+00 | - | 1.26E-01 | - |
| Hunting Aviation A.E.D. | 4.5A(h) | AO5336 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Trinity Aerospace Ltd (Note 1) | 4.5A(h) | AN9492 | - | - | - | - | - | - | - | - |
| ITT Cannon PLC (Note 2) | 4.5A(h) | AO0563 | - | - | - | - | - | 5.58E+01 | - | - |
| Coltax Aerospace Ltd | 4.5A(h) | AO1691 | - | - | - | - | - | - | - | - |
| Portsmouth Aviation Ltd | 4.5A(h) | AO1748 | - | - | - | - | - | - | - | 3.60E-01 |
| B. F. Goodrich Component Services Ltd | 4.5A(h) | AO5085 | - | - | - | - | - | - | - | - |
| RNAY Fleetlands | 4.5A(h) | AV3150 | - | - | - | - | - | - | - | - |
| Walker AEC Ltd | 4.5A(h) | AO7452 | - | - | - | - | - | 5.40E-01 | - | 5.40E-01 |
| Walton Plating Ltd | 4.5A(h) | AO7720 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Ingram Glass Ltd | 4.5A(h) | AO8017 | - | - | - | - | - | 1.60E+00 | - | 1.62E+00 |
| British Aerospace Defence Ltd | 4.5A(l) | AH9561 | - | 0.00E+00 | - | 0.00E+00 | - | 1.02E-03 | - | 2.00E-02 |
| Hampshire Chemicals Ltd | 4.5A(m) | AO0237 | - | - | - | 0.00E+00 | - | 6.70E+00 | - | 5.50E+00 |
| Total emissions from sector 4.5 | | | - | 0.00E+00 | 1.08E+01 | 5.92E+02 | 1.01E+01 | 4.51E+03 | 1.61E+01 | 2.14E+03 |
| Fine Organics Ltd | 5.1A(a) | AG8578 | - | 2.11E+00 | - | 9.12E-01 | - | 2.71E+00 | - | 5.40E+00 |
| Rechem International Ltd | 5.1A(a) | AG8047 | - | 1.00E-01 | - | 1.00E+00 | - | 1.00E+00 | - | 1.00E+00 |
| National Standard Co. Ltd | 5.1A(b) | AH4705 | 5.64E-02 | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Chemviron Carbon Ltd | 5.2A(a) | AG8403 | - | 0.00E+00 | - | 1.83E+00 | - | 1.57E+00 | - | - |
| Total emissions from sector 5 | | | 5.64E-02 | 2.21E+00 | - | 3.74E+00 | 0.00E+00 | 5.28E+00 | 0.00E+00 | 6.40E+00 |

Note 1: 1.80E -02 reported to land in 1995

Note 2: 2.46E +02 reported to land in 1995

Table A.3 Emissions data for hydrogen sulphide to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Authorisation No. | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-------------------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | Air | Water | Air | Water | Air | Water |
| Kelt UK Ltd | 1.1A(a) | AK2793 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Air Products | 1.1A(a) | AW4194 | - | - | - | - | 0.00E+00 | - |
| British Steel | 1.2A(a) | AF7193 | - | - | - | - | - | - |
| Sevalco Ltd | 1.2A(a) | AF7916 | - | - | - | - | 3.00E+03 | - |
| Dunlop Ltd | 1.2A(a) | AG8624 | - | - | 0.00E+00 | - | 0.00E+00 | - |
| CRE Group Ltd | 1.2A(a) | AL4457 | 1.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| UCB Cellophane Ltd | 1.3A(a) | AA2879 | 5.79E+02 | - | - | - | - | - |
| Cairn Energy | 1.4A(a) | AF5344 | 3.93E-01 | - | 3.92E-01 | - | 5.20E-01 | - |
| Cairn Energy | 1.4A(a) | AF6464 | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Candecca Resources | 1.4A(a) | AF8149 | - | - | - | - | - | - |
| Shell UK Ltd | 1.4A(a) | AF8246 | - | - | - | - | - | - |
| South Western Tar Distilleries Ltd | 1.4A(a) | AK1215 | 1.00E+00 | - | 1.00E+00 | - | 1.00E+00 | - |
| Candecca Resources | 1.4A(a) | AV2242 | - | - | - | - | 1.00E-15 | - |
| Carless Refining | 1.4A(c) | AB2963 | 4.80E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Croda Application Chemicals Ltd | 1.4A(c) | AF7673 | 0.00E+00 | - | - | - | - | - |
| Total emissions from sector 1 | | | 5.86E+02 | - | 1.39E+00 | - | 3.00E+03 | - |
| British Steel | 2.1A(a) | AR0080 | - | - | 2.21E+05 | - | 3.07E+04 | - |
| British Steel | 2.1A(a) | AR0241 | - | - | 0.00E+00 | - | 1.00E-15 | - |
| British Steel | 2.1A(a) | AR0349 | - | - | - | - | 9.28E+02 | - |
| British Steel | 2.1A(l) | AO4684 | - | - | - | - | 2.27E+03 | - |
| British Steel | 2.1A(l) | AO9684 | - | - | - | - | 2.27E+03 | - |
| Cambrian Stone | 2.1A(l) | AD1925 | 1.17E+04 | - | 1.06E+04 | - | - | - |
| Silver Lining Industries Ltd | 2.2A(c) | AS7833 | - | - | - | - | - | - |
| Mercury Recovery Services | 2.2A(f) | AV6027 | - | - | - | - | 1.00E+00 | - |
| Total emissions from sector 2 | | | 1.17E+04 | - | 2.32E+05 | - | 3.62E+04 | - |
| Owens Corning Building Products UK Ltd | 3.3A(a) | AI0756 | 1.50E+01 | - | 7.00E-03 | - | 7.30E+01 | - |
| Total emissions from sector 3 | | | 1.50E+01 | - | 7.00E-03 | - | 7.30E+01 | - |

| Company | Sector | Authorisation No. | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|------------------------------------|---------|-------------------|---------------------|-------|---------------------|-------|---------------------|-------|
| | | | Air | Water | Air | Water | Air | Water |
| Chemoxy | 4.1A(c) | AK8201 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Enichem Elastomers Ltd | 4.2A(a) | AK5547 | 1.40E+01 | - | 4.25E+00 | - | 1.10E+00 | - |
| Wyeth Research (UK) Ltd | 4.2A(a) | AK5571 | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Castrol | 4.2A(c) | AI7220 | 2.10E-02 | - | 2.50E-03 | - | 1.70E-03 | - |
| Revertex Chemicals Ltd | 4.2A(c) | AI9508 | 1.00E-14 | - | 0.00E+00 | - | 0.00E+00 | - |
| Holland Dyes and Chemicals Ltd | 4.2A(c) | AJ5193 | 5.68E+02 | - | 2.68E+02 | - | 7.80E+01 | - |
| BASF | 4.2A(c) | AJ6505 | 1.90E+02 | - | 6.14E+02 | - | 3.07E+02 | - |
| BOC | 4.2A(c) | AK3501 | 1.00E+00 | - | 1.00E+00 | - | 1.00E+00 | - |
| James Robinson Ltd | 4.2A(c) | AK6233 | 0.00E+00 | - | - | - | - | - |
| James Robinson Ltd | 4.2A(c) | AK6341 | 1.00E-01 | - | - | - | - | - |
| Rhone-Poulenc Chemicals Ltd | 4.2A(c) | AK7329 | - | - | - | - | - | - |
| Abbot | 4.2A(c) | AK8031 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Croda Chemicals Ltd | 4.2A(c) | AK9194 | 5.00E+02 | - | 5.79E+02 | - | 1.50E+00 | - |
| DTBA Ltd | 4.2A(c) | AL1482 | 1.00E+00 | - | 1.07E+00 | - | 1.92E+00 | - |
| AGA gas | 4.2A(c) | AM6862 | - | - | 2.46E-02 | - | 0.00E+00 | - |
| Zeneca Ltd | 4.2A(d) | AJ4158 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Glaxo Research and Development Ltd | 4.2A(d) | AJ2500 | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Smithkline Beecham PLC | 4.2A(d) | AJ3131 | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Dista Products Ltd | 4.2A(d) | AJ5754 | 1.62E-01 | - | 0.00E+00 | - | 1.14E-01 | - |
| Hays Chemical Distribution Ltd | 4.2A(d) | AK0235 | 5.20E-02 | - | 1.68E-03 | - | 0.00E+00 | - |
| Grace Dearborn Ltd | 4.2A(d) | AK3986 | 0.00E+00 | - | 7.10E+00 | - | 5.59E+00 | - |
| AH Marks | 4.2A(d) | AK4320 | - | - | 2.27E+01 | - | 1.90E+01 | - |
| Glaxo Research and Development Ltd | 4.2A(d) | AK4516 | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Agrevo | 4.2A(d) | AK4982 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Dista Products Ltd | 4.2A(d) | AK5156 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Union Camp Chemicals Ltd | 4.2A(d) | AK5202 | 2.20E+03 | - | 2.10E+04 | - | 7.81E+03 | - |
| Quest International UK Ltd | 4.2A(d) | AK5440 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Glaxochem Ltd | 4.2A(d) | AK5954 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |

| | | | | | | | | |
|---|---------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Genzyme Ltd | 4.2A(d) | AK6730 | - | - | 0.00E+00 | - | 0.00E+00 | - |
| International Speciality Chemicals Ltd | 4.2A(d) | AK6861 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Astra charnwood | 4.2A(d) | AK6870 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Merck Sharp and Dohme Ltd | 4.2A(d) | AK6942 | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Zeneca Ltd | 4.2A(d) | AK7566 | 1.20E+01 | - | 2.50E+01 | - | 6.00E+00 | - |
| Zeneca Ltd | 4.2A(d) | AK7604 | 6.10E+00 | - | 1.00E-01 | - | 1.00E-01 | - |
| Chemoxy | 4.2A(d) | AK7892 | 0.00E+00 | - | 1.00E-02 | - | 1.00E+02 | - |
| Morton International Ltd | 4.2A(d) | AK7949 | 1.00E+01 | - | - | - | - | - |
| Mitchell Cotts Chemicals Ltd | 4.2A(d) | AK8015 | 0.00E+00 | - | - | - | - | - |
| Abbot | 4.2A(d) | AK8082 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Chemoxy | 4.2A(d) | AK8228 | 9.00E-01 | - | 8.00E-02 | - | 8.00E-02 | - |
| Albright & Wilson | 4.2A(d) | AK8694 | - | - | - | - | - | - |
| Pfizer Ltd | 4.2A(d) | AL0427 | - | - | 0.00E+00 | - | - | - |
| Sterling Organics Ltd | 4.2A(d) | AL0982 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Chyrek Ltd | 4.2A(d) | AL2586 | 0.00E+00 | - | - | - | 1.30E+01 | - |
| Chyrek Ltd | 4.2A(d) | AL2934 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Sterling Organics Ltd | 4.2A(d) | AL2969 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Chirex Ltd | 4.2A(d) | AL2977 | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Oxford Asymmetry Ltd | 4.2A(d) | AQ8450 | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Cleveland Chemicals Ltd | 4.2A(d) | AR7335 | - | - | - | - | 0.00E+00 | - |
| Cleveland Chemicals Ltd | 4.2A(d) | AR7351 | - | - | - | - | - | - |
| Courtaulds Chemicals (Holdings) Ltd | 4.2A(e) | AK0715 | 0.00E+00 | - | 3.20E-02 | - | 1.00E-01 | - |
| Sterling Organics Ltd | 4.2A(e) | AL8878 | 6.00E+00 | - | 0.00E+00 | - | - | - |
| Seal Sands Chemicals Ltd | 4.2A(g) | AP6290 | - | - | - | - | 1.00E-12 | - |
| Albright & Wilson | 4.3A(a) | AL9009 | 9.26E+00 | - | 9.25E+00 | - | - | - |
| Hays Chemical Distribution Ltd | 4.3A(a) | AL9297 | 1.59E+02 | - | 6.29E+01 | - | 1.88E+02 | - |
| William Blythe Ltd | 4.3A(c) | AL8185 | 9.20E+00 | - | 3.30E+01 | - | 1.41E+02 | - |
| A&W | 4.3A(f) | AM0040 | 1.90E+01 | 1.00E-14 | 1.00E-02 | 0.00E+00 | 3.00E-03 | 0.00E+00 |
| ICI Chemicals and Polymers Ltd | 4.4A(a) | AL7294 | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Tioxide Europe Ltd | 4.4A(b) | AL8363 | - | - | 7.42E+02 | - | 5.25E+02 | - |
| SCM Chemicals Ltd | 4.4A(b) | AM0147 | 5.27E+02 | - | 2.70E+02 | - | 2.17E+02 | - |
| Monsanto PLC | 4.4A(c) | AL7618 | 4.70E+02 | - | 2.10E+02 | - | 3.00E+01 | - |
| Total release for sector 4 (excl. 4.5) | | | 4.70E+03 | 1.00E-14 | 2.38E+04 | 0.00E+00 | 9.45E+03 | 0.00E+00 |

| Company | Sector | Authorisation No. | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-------------------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | Air | Water | Air | Water | Air | Water |
| Brunner Mond and Co. Ltd. | 4.5A(a) | AO0393 | - | - | 0.00E+00 | - | 3.10E+02 | - |
| Fine Organics Ltd. | 4.5A(b) | AA5533 | 0.00E+00 | - | 0.00E+00 | - | - | - |
| AC Infra Red | 4.5A(b) | AN9042 | - | - | 2.46E-02 | - | 0.00E+00 | - |
| UCB Cellophane Ltd. | 4.5A(c) | AO2345 | - | - | 6.38E+05 | - | 6.34E+05 | - |
| Astor Stag Ltd. | 4.5A(c) | AR9290 | - | - | - | - | 0.00E+00 | - |
| Hornett Bros. and Co. Ltd. | 4.5A(c) | AO0547 | 6.00E+00 | - | 7.00E+00 | - | 8.00E+00 | - |
| Cyanamid of Great Britain Ltd. | 4.5A(c) | AO1730 | 0.00E+00 | - | 1.51E+00 | - | 1.28E+00 | - |
| BP Chemicals (additives) Ltd. | 4.5A(c) | AN9956 | - | - | 1.60E+02 | - | 6.50E+01 | - |
| Courtaulds Fibres Ltd. | 4.5A(c) | AN7970 | - | - | 8.51E+04 | - | 3.87E+04 | - |
| Trent Valley Water Systems | 4.5A(c) | AQ3385 | - | - | 9.54E+02 | - | 4.79E+02 | - |
| Angus Fire Armour Ltd. | 4.5A(c) | AN9204 | - | - | 4.06E+00 | - | 5.62E+00 | - |
| Robinson Brothers Ltd. | 4.5A(c) | AN9239 | - | - | 0.00E+00 | - | 1.26E+02 | - |
| UCB Cellophane Ltd. | 4.5A(c) | AO2353 | - | - | - | - | 0.00E+00 | - |
| Sterling Organics Ltd. | 4.5A(c) | AO1357 | 1.30E+01 | - | 0.00E+00 | - | 3.22E+03 | - |
| Viscose Closures Ltd. | 4.5A(c) | AO0911 | - | - | 6.80E+01 | - | 6.80E+01 | - |
| Robinson Brothers Ltd. | 4.5A(c) | AN8984 | - | - | 0.00E+00 | - | 0.00E+00 | - |
| James Robinson Ltd. | 4.5A(c) | AN9212 | 1.70E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Lambson Fine Chemicals Ltd. | 4.5A(c) | AL5623 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Mitchell Cotts Chemicals Ltd. | 4.5A(c) | AN3575 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Cyanamid of Great Britain Ltd. | 4.5A(d) | AK9992 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Johnson Matthey PLC. | 4.5A(d) | AN7040 | - | - | 2.00E-01 | - | 5.00E-01 | - |
| Johnson Matthey PLC. | 4.5A(d) | AN8364 | - | - | 4.00E-02 | - | 2.30E-01 | - |
| Anzon Ltd. | 4.5A(d) | AO0962 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Cookson Matthey Ceramics and Materials | 4.5A(g) | AO0032 | - | - | 1.03E+00 | - | 0.00E+00 | - |
| William Blythe Ltd. | 4.5A(i) | AO1233 | - | - | 6.36E+02 | - | 9.10E+01 | - |
| Brunner Mond and Co. Ltd. | 4.5A(m) | AO0385 | - | - | 1.10E+03 | - | 7.20E+02 | - |
| Croda Kerr Ltd. | 4.5A(m) | AO0229 | 1.00E+00 | - | 1.00E+00 | - | 1.50E+00 | - |
| Chirex Ltd. | 4.5A(m) | AO1365 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Albright & Wilson UK Ltd. | 4.5A(o) | AO0628 | - | - | 8.80E+01 | - | 0.00E+00 | - |
| Total release for sector 4.5 | | | 2.17E+01 | - | 7.26E+05 | - | 6.78E+05 | - |

| Company | Sector | Authorisation. No. | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|-----------------------------------|-----------|-----------------------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | Air | Water | Air | Water | Air | Water |
| Rechem International Ltd | 5.1A (a) | AG8047 | 1.00E+02 | - | 1.70E+01 | - | 5.00E+00 | - |
| Leigh Environmental Ltd | 5.2A (a) | AG8080 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Orcol Fuels Ltd | 5.2A (a) | AI0039 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Cleveland Chemicals Ltd | 5.2 A (a) | AR7343 | | - | | - | 0.00E+00 | - |
| Total release for sector 5 | | | 1.00E+02 | - | 1.70E+01 | - | 5.00E+00 | - |
| Coalite Products Ltd | 6.3A (a) | AU7613 | - | - | - | - | 1.00E-02 | - |
| Total release for sector 6 | | | - | - | - | - | 1.00E-02 | - |

B. ANTIMONY / ARSENIC / BERYLLIUM / GALLIUM / INDIUM / LEAD / PALLADIUM / PLATINUM / SELENIUM / TELLURIUM / THALLIUM

B.1 Summary details of companies registered under 4.5 A (d/e/f)

B.1.1 Production of antimony compounds etc. - 4.5 A (d)

AN8682 GEC MARCONI MATERIALS TECHNOLOGY LTD

Manufacture of range of electronic materials including compound semiconductor and sensor devices.

Gallium arsenide production. Metal-Organic Chemical Vapour Deposition or Molecular Beam Epitaxy semiconductor manufacture.

Releases to air - arsenic, phosphorus, trichloroethylene; VOCs class B.

Releases to water - cadmium, mercury.

Abatement equipment - guardian system on arsenic/phosphorus.

AO0121 WAFER TECHNOLOGY LTD

Manufacture of semi-conductor materials

Releases to air - antimony, arsenic, gallium; hydrogen chloride, indium, nitrogen oxides, phosphorus.

AN1432 JAMES KENT (CERAMIC MATERIALS) LTD

Manufacture of colours for the pottery industry (up to 150 tonnes/year). The process uses compounds of lead, chromium, nickel and manganese. The process involves a number of stages such as weighing, mixing, wet milling, sieving, drying, calcining and triple mill rolling. Local exhaust ventilation is discharged to atmosphere via filters and any spillages are either swept up or washed to the plant drainage system which discharges via a settlement pit to public sewer. Sludge from the settlement tank is periodically removed for specialist waste disposal.

Releases to air - chromium, cobalt, copper, fluorides, lead; manganese, nickel, nitrogen oxides, particulates.

Releases to water - lead, NP-suspended solids, zinc.

AO0474 LUCAS YUASA BATTERIES LTD

Production of lead acid accumulator type batteries for the automotive and other markets.

Releases to air - lead and antimony.

Releases to water - liquid effluent is treated on-site and then discharged to public sewer. This discharge may contain lead.

AO0857 GE LIGHTING LTD

Manufacture of a range of lamps including the production of tungstone filaments and low pressure sodium lamps. These operations involve iron mandrel dissolving, molybdenum mandrel dissolving and indium coating.

The two mandrel dissolving processes are carried out in dedicated fume cupboards. Fume from the iron mandrel dissolving process is extracted through a packed column scrubber containing

a recirculating caustic soda solution. Fume evolved in the molybdenum mandrel dissolving process is extracted through a caustic soda scrubber designed for longer than normal residence times to achieve greater NO_x removal. Scrubbed gases from both of these processes are discharged to atmosphere via a stack. Liquid effluent from these processes is sent to the effluent treatment plant which consists of a neutralisation pit where caustic soda is dosed at pH 8-9 to precipitate iron hydroxide and a settlement pit for separation of the solids and liquid. Molybdenum remains in solution in the alkaline conditions and so in order to precipitate it out of solution a metered dose of calcium chloride is added to the settlement pit. The liquid is discharged to sewer leaving the solids in the settlement pit which are regularly pumped out for disposal off-site.

The indium coating process produces a gaseous effluent, containing indium trichloride, which is discharged via a twin venturi scrubber recirculating caustic soda solution. The scrubber discharges to an enclosed holding tank where indium oxide precipitates out in the scrubber liquor. Gases pass through the holding tank to a high energy venturi scrubber before emission to atmosphere via a stack. The slurry in the holding tank is centrifuged and the solid cake is sent off-site for indium recovery and the liquor is sent to the effluent treatment plant.

Releases to air - hydrogen chloride, indium, nitrogen oxides.

Releases to water - indium, mercury, molybdenum.

AO0920

COOKSON MATTHEY CERAMICS AND MATERIALS LTD

Production of base colour and surface decoration, cadmium being one of the ingredients. Base colour products are used in the ceramics industry, and the surface decoration products (enamels) are used in the printing industry.

Base colours are produced batchwise by blending, dispersing, or dry or wet milling the raw materials, followed by drying, where necessary, and calcining.

Enamels are produced batchwise. The raw materials are wet milled, dried and then either roasted and then crushed or sieved in a flat bed or rotary sieve. Some enamels are mixed with water to produce an aqueous dispersion. Some are mixed with mineral oil for use in lithographic transfer production.

Three types of media are produced, oil based, wax based and water based. Oil based media are produced by combining solvents and resins and mixing them in churn type mixers. Wax based media are manufactured by heating wax compounds, solid resins and small amounts of chemicals in kettles to make a thermoplastic medium. Water based media are produced by high speed mixing of water based components.

Ceramic ink is manufactured by blending of raw materials and adding them to media followed by triple roll milling or another suitable dispersion technique.

Various types of abatement equipment are used including wet collectors bag filters and carbon filters. Processes creating liquid effluent containing cadmium will have their own individual treatment equipment.

Variation AW1756 - Places a limit on cadmium discharges to sewer

Releases to air - antimony, cadmium, chromium, hydrogen chloride, hydrogen fluoride, lead, nitrogen oxides, particulates, sulphur dioxide, VOC's.

Releases to water - cadmium, suspended solids, fluoride, COD, sulphates, oil, chromium, lead, zinc.

AO1454

LEAD CHROME COLOURS LTD

Batch production of inorganic chrome pigments. (*For further information see Cremer & Warner, 1993*).

Abatement equipment - Nitrogen oxides are arrested by scrubbing with sodium hydroxide solution with added ammonium sulphate. Particulate matter is abated with bag filters. Liquid effluent is treated to precipitate dissolved materials. It is then filter pressed before final treatment at Courtaulds dirty drainage system, from where it is discharged to sewer.

Releases to air - chromium and lead particulates, nitrogen oxides.

Releases to water - antimony, cadmium, chromium, lead.

AO4011

PB BATTERIES

Manufacture of batteries (Oxide mill, plate fabrication, assembly and charging).

Use of lead oxide, lead alloys.

Releases to air - lead.

Releases to water - lead.

Abatement equipment - Air conveying systems fitted with bag filter and absolute filter.

Aqueous wastes to settling tanks, pH correction using caustic.

AP1263

RICOH (UK) PRODUCTS LTD

Manufacture of photosensitive drums by vacuum coating ultra pure selenium/tellurium or selenium/arsenic alloys onto the polished, outer surface of aluminium mandrels.

Releases to air - particulates, VOC's, selenium, tellurium, arsenic.

Releases to land - solid waste sludges.

Abatement equipment - DC bag filtration units.

AN8461

TUNGSTONE BATTERIES LTD

Production of lead-acid accumulator type batteries for automotive and other markets.

Releases to air - antimony, lead.

Releases to water - lead.

Abatement equipment - the process produces various dust releases which are arrested using a combination of cyclones, bag filters, and secondary high efficiency filters in series. Additionally, the works air is extracted through wet collectors where the air is contacted with water sprays.

AN9336

CHEMSON LTD

Manufacture of lead oxide - Barton process. Water treatment / lead recovery system uses sodium carbonate to precipitate out lead carbonate. The remaining suspended lead is treated with ferric sulphate solution and polymer to quickly flocculate the suspended solids. The water is routed via a DAF unit and sand filter prior to discharge. Settled solids are dosed with acetic acid to produce lead acetate solution which is then filtered and used as catalyst for stabiliser slurry production. Over 90 % of lead is recovered by this method. Use reverse jet high temperature filter bags to remove particulates. Also use settling chambers, mechanical shaker type bag filters and absolute filters.

Releases to air - lead, particulates, VOCs class B.

Releases to land - NP-solids.

AN9344 CHEMSON LTD

Manufacture of lead stabilisers by the reaction of lead oxide with various acids in the presence of a catalyst.

Releases to air - ammonia, lead, particulates, VOCs class B.

Releases to water - lead, nitrogen compounds, NP-suspended solids.

Releases to land - NP-solids.

AO0962 ANZON LTD

Production of antimony sulphide. Aqueous solutions of antimony and sulphide salts are prepared by dissolving the antimony bearing raw materials at pre-determined pH and temperature prior to the precipitation of the desired variety of antimony sulphide. Releases to air are treated in caustic scrubbers. Site effluent treatment plant neutralises aqueous effluents with lime or hydrochloric acid. From the settling tank the sludge is dewatered prior to release of effluent to river.

Releases to air - antimony, hydrogen sulphide, particulates.

Releases to water - antimony, arsenic, cadmium, lead, mercury, NP-solids, zinc.

Releases to land - NP-solids.

AO0997 ANZON LTD

Antimony works. Antimony oxide produced from metal (previously used antimony sulphide concentrates). Filter units on antimony oxide fume.

Releases to air - antimony, nitrogen oxides, particulates, sulphur dioxide.

AO1047 ANZON LTD

Manufacture of a wide range of antimony based chemicals used as flame retardants, catalysts, lubricants and in friction linings. Authorisation covers production of antimony oxides (trioxide and pentoxide) by wet chemical methods. All process liquors treated with lime and ferrous sulphate to precipitate out any soluble salts.

Releases to air - antimony, hydrogen chloride, particulates.

AE7490 JOHNSON MATTHEY RARE EARTH PRODUCTS

Small scale batch production of specialist alloys containing tellurium, selenium or antimony (less than 10kg of alloy is produced by each batch). Tellurium, antimony, sulphur and selenium are heated, at reduced pressure in a sealed crucible to form the alloy. The alloy is then cooled and poured into moulds. Some machining and sizing of the finished product may be required. The whole process is performed in an enclosed unit (Tellurium Glove Box).

Air is extracted from the process, and passed through an ultrafilter before discharge to the atmosphere. Solid waste is sealed in metal containers and stored awaiting collection by a contractor. It is then sent for encapsulated disposal.

Variation AZ6118 - this variation introduces an increased capacity, use of a wider range of raw materials and alloying in an induction furnace and machining outside of the glove box.

Releases to air - selenium compounds, sulphur dioxide, tellurium compounds.

AO1209 WILLIAM BLYTHE LTD

Pilot plant to allow various processes to be tested/developed. Typical processes include redox reactions, acid/base double decomposition, metal dissolution and electrochemical reactions.

Releases to air - ammonia, particulates, carbon dioxide, hydrogen chloride, sulphur dioxide, chlorine, iodine, nitrous oxides, zinc compounds, nitric acid and VOC's.

Releases to water - cadmium, zinc, arsenic, copper, chromium and tin.

Releases to land - salts of zinc, arsenic, lead, iron, copper, chromium and tin.

Abatement equipment - liquid effluent is pH adjusted to precipitate out the heavy metals.

A01225 WILLIAM BLYTHE LTD

Manufacture of arsenical compounds (arsenic acid, sodium arsenite, sodium arsenate, arsenic trioxide, ammonium arsenate). Arsenic trioxide is the raw material used for arsenic acid production. Hot nitric acid is fed to a still at a constant rate in parallel with the introduction of arsenic trioxide and a catalyst solution. The arsenic trioxide is oxidised by the nitric acid solution and the resulting arsenic pentoxide immediately dissolves in water to produce arsenic acid. The contents of the still is then transferred to holding tanks, from where it is filtered and then concentrated, in evaporators to produce 80% strength arsenic acid.

Releases to air - arsenic compounds, chromium compounds, copper compounds, nitrogen oxides.

Releases to land - NP-solids.

AO1241 RENTOKIL LTD

Manufacture of copper, chrome and arsenic (CCA) based wood preservatives from ore containing arsenic. Arsenic acid is produced as a precursor of the CCA products, by reacting a strong mineral acid with ore containing arsenic. Either arsenic trioxide ore and nitric acid or copper arsenical ore and sulphuric acid are used. Arsenic acid produced by the arsenic trioxide route is manufactured on the arsenic acid plant. Gaseous oxides of nitrogen are evolved in this process and are vented to a gas scrubbing system consisting of a venturi scrubber circulating water, followed by packed tower through which caustic soda is circulated. As the circulating water becomes more concentrated as nitric acid, it is recycled back to the process, whereas the spent caustic soda is removed from site by tanker. Insoluble impurities from the ore are filtered out of the acid and are then sent to landfill, off-site.

The copper arsenical ore route is carried out on the copper sulphate plant where the arsenic acid is a by-product of the reaction to produce copper sulphate. No gaseous emissions are evolved from this reaction process. The final operation in the process is the blending of various materials in the CCA plant. This does not involve any chemical reactions and any wastewater arising from this stage is collected and either sold as dilute wood treatment or recycled within the plant.

Variation AZ4433 - This variation introduces the manufacture, as opposed to the purchasing of sodium arsenite. This is achieved by mixing arsenic trioxide, sodium hydroxide and water. There are no releases to air involved with this process, and all vessels are located within bunds.

Variation BA1567 - addition of a second stage scrubber and installation of continuous NO_x monitors in the scrubber stack.

Releases to air - arsenic compounds, nitrogen oxides.

Releases to water - arsenic compounds, chromium compounds, copper compounds.

Releases to land - NP-solids.

AP8268 JOSEPH STOREY AND CO LTD

Manufacture of non toxic fire retardant inorganic powders (800 tpa), the main product being zinc borate which is prepared in batches from boric acid and zinc oxide. The zinc borate is passed as a wet solid to an attritor continuous pneumatic drier. From here the product and gases pass through a cyclone followed by a reverse jet filter. The collected dry borate powder is conveyed to a bag filling station, whilst the moist drying gases are drawn out of the filter unit and released to atmosphere at roof level.

Calcium borate, barium metaborate and melamine borate are made in a similar way to zinc borate. Other fire retardant powders manufactured include manganese borate, magnesium borate,

potassium metaborate and zinc borophosphate. Also produced is a smaller quantity of lead acetate solution for the textile industry.

Releases to air - boric acid.

AO1624 NORTEL PLC

Manufacture of group III - V semiconductor chips for use in the telecommunications industry, involving deposition of epitaxial growth on purchased semiconductor wafers by a Metal-Organic Vapour Deposition (MOCVD) process followed by chemical and physical processing of the wafers to produce discrete semiconductor chips.

Releases to air - arsenic, chlorine, phosphine.

AK9992 CYANAMID OF GREAT BRITAIN LTD

Releases to air - amines, ammonia, bromine, chlorine, hydrogen bromide, hydrogen chloride, hydrogen cyanide, hydrogen sulphide, nitrogen oxides, particulates, sulphur dioxide, VOCs.

AO0512 HILGER ANALYTICAL LTD

Production of crystals containing thallium iodide for use in the manufacture of precision optical and spectroscopic instruments.

Releases to air - thallium iodide.

Abatement equipment - Extract vent from crystal growing furnaces is routed to atmosphere via a filter and stack. Liquid/solid wastes recycled/or sent for thallium recovery.

AO1187 ABBOTT LABORATORIES LTD

Manufacture of the active ingredient of a therapeutic shampoo used for controlling dandruff. Selenium is an ingredient.

Releases to air - sulphur, oxides of sulphur, selenium and selenium disulphide dust.

Releases to land - packaging materials and general waste which are passed to a licensed waste contractor.

Abatement equipment - filtration systems, cyclones, JETLINE filters.

AO2205 MORGAN MATROC LTD

Manufacture of fired ceramic components by processing lead oxide, zirconium oxide and titanium oxide in gas fired oven.

Releases to air - lead, particulates, VOCs.

Releases to water - lead.

Abatement - wet de-duster system and gas scrubbing system.

AN6248 JOHNSON MATTHEY PLC

Production of selenium salts for use in glass production, pharmaceuticals, and as additives to animal feeds. Releases to air occur through the dissolution of selenium powder in nitric acid, which results in the production of NO_x in the working environment. The area is vented through local exhaust vents and a series of gas scrubbers using water/dilute nitric acid, before discharge to atmosphere via a stack. Crystallisation, drying, weighing and packaging operations have the potential to release selenium compound particulates to air. This potential is reduced using cyclones, venturi scrubbers, and bag filters.

Releases to air - nitrogen oxides, selenium, zinc.

Releases to land - NP-solids, selenium.

AN6477

JOHNSON MATTHEY PLC

Effluent treatment plant for many processes using platinum, palladium, gallium, lead, indium, selenium, tellurium and thallium. Treatment includes lime addition to increase pH, flocculant addition, followed by settling and clarifying.

Releases to air - ammonia, ammonium chloride, chlorine, hydrogen chloride, mercury, nitrogen oxides, sulphur dioxide.

Releases to water - cadmium, mercury.

AN7040

JOHNSON MATTHEY PLC

Envelope authorisation to cover the small scale batch production (50 g to 150 g) of a range of high purity chemicals including compounds of gallium, indium, lead, selenium, tellurium and thallium. Typically the processes reactions are;

Acid treatment of the metal/metal oxide/metal carbonate followed by crystallisation of product;

Dissolution of metals salt in water, reaction with liquid reagent and precipitation of product;

heating of metal salt to form the metal oxide, further heating of the oxide under hydrogen to give a pure metal product;

Heating of a mixture of metal oxides and carbonates to give a product;

Reacting halides with a metal or metal salt to give a metal halide, which can be followed by further heating to give the pure product;

Reacting ammonia with a metal salt or oxide to give a metal hydroxide followed by crystallisation of product.

Operations that release prescribed gaseous substances as by-products are carried out in vessels or areas that are vented through a scrubbing tower irrigated with sodium hydroxide solution and a stack. All aqueous effluent is treated in the site effluent treatment plant (covered by AN6477) and any solid waste is sent to landfill via an approved contractor.

Releases to air - ammonia, chlorine, hydrogen chloride, hydrogen fluoride, hydrogen sulphide, iodine, nitrogen oxides, sulphur dioxide.

AN8364

JOHNSON MATTHEY PLC

Envelope process for the manufacture of inorganic chemical compounds, particularly compounds of platinum and palladium. Production is by batch processes, with batch sizes typically in the range of up to 800 litres of solution and from 1 to 200 kg. Typical processes involve dissolution, the preparation of reagent solutions, heat treatment, precipitation of solids, purification by water washing, filtration, drying, sieving and packaging. Process vessels have LEVs which vent to atmosphere through scrubbing systems. All aqueous effluent is treated in the site effluent treatment plant (covered by AN6477). Any solid waste that may contain precious metals is sent off-site for recovery and other solid wastes are sent to landfill by an approved contractor.

Releases to air - acetic acid, acetone, ammonia, bromine, chlorine, formaldehyde, hydrogen bromide, hydrogen sulphide, hydrogen chloride, nitrogen oxides, sulphur dioxide.

AG9493

YUASA BATTERY (UK) LTD

Manufacture of lead oxide which is then used in the production of lead acid batteries.

Releases to air - lead particulate (+compounds).

Releases to water - chromium, copper, lead, nickel, zinc.

Abatement equipment - Use of fabric sock filters, bag filters and HEPA.

Aqueous wastes to settling tanks, pH correction using lime slurry, neutralisation using caustic, flocculation stage, lamella settler, sand filter.

Solid waste to 3rd party lead smelter for recovery.

AO0342

HAWKER ENERGY PRODUCTS LTD

Manufacture of lead acid batteries - lead alloy grades, oxides, plates and assembly. Bag filters used in lead alloy production. Cyclone filter used in oxide production to remove lead oxide. Air released via absolute filter. Also use wet/dry filter systems and reverse jet bag filters. Releases to air - lead particulate.

AO1004

BIG BATTERIES LTD

Manufacture of lead acid batteries.

Releases to air - lead particulate (+compounds).

Abatement equipment - Use of bag filters, absolute filter in oxide production.

Aqueous wastes to dewatering/filtering plant. Water recycled for washing.

Solid wastes to lead reclamation company.

B.1.2 Recovery of antimony compounds etc. - 4.5 A (e)

AN9816

BP CHEMICALS LTD

Manufacture of ammonia from hydrogen, supplied by pipeline from other plants on the Saltend site, and nitrogen, supplied by pipeline from the neighbouring Air Products site. The hydrogen feed stream is compressed and cooled and mixed with nitrogen in hydrogen to nitrogen mole ratio of 3 to 1 to form synthesis make up gas. This is then compressed and preheated with recycle gas from the synthesis loop, before being passed into the converter. The converter contains an iron-based catalyst which aids the conversion of nitrogen and hydrogen into ammonia in the synthesis loop. The ammonia is collected by refrigeration techniques and transferred to product storage. Gaseous effluent streams are scrubbed to remove ammonia before being used as fuel for the steam superheater. All liquid effluent is directed to the site effluent treatment plant and all solid waste is disposed of to licensed landfill.

Releases to air - ammonia, carbon monoxide, nitrogen oxides.

This authorisation appears to be miscategorised under this section.

AN8712

JOHNSON MATTHEY PLC

Chloroplatinic acid production, approximately 300 tonnes p.a. The process involves a number of stages in series and many precious metals enter the process at different stages. Abatement equipment includes afterburners on the incinerators as well as sodium carbonate scrubbers, bag filters on the furnaces, sodium hydroxide scrubbers on the iron bullion leach plant and water and sodium hydroxide scrubbers on the chlorination plant. All process aqueous effluent is routed through the site effluent treatment plant (AN6477).

Releases to air - arsenic, cadmium, carbon monoxide, chlorine, copper, hydrogen chloride, iodine, lead, mercury, nitrogen oxides, particulates, platinum, polychlorinated dibenzo-p-dioxin, selenium, silver, sulphur oxides, VOCs Classes A&B.

Releases to water - cadmium, chlorine, chromium, copper, cyanides, lead, nickel, selenium, silver, tellurium, zinc.

Releases to land - aluminium, arsenic, boron, cadmium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, NP-solids, tin, titanium, zinc.

Abatement equipment - Tilghman bag plant to remove particulates. Sodium carbonate scrubber on incinerators. Sodium hydroxide scrubbers on iron bullion leach plant. Water and sodium hydroxide scrubbers on chlorination plant. Process effluent is treated with lime, flocculated, settled and clarified before release to sewer.

B.1.3 Use of antimony compounds etc. - 4.5 A (f)

AN85001 EEV PLC

Manufacture of electronic components- manufacture of gallium-arsenide solar cells and solar panels. MOCVD and IMPL processes for wafer production.

Releases to air - arsenic, beryllium, indium, selenium, VOCs Classes A&B.

Releases to water - arsenic, beryllium.

Releases to land - arsenic, beryllium, gallium, indium, NP-solids, selenium.

Abatement equipment - HEPA filter.

AO0091 HEWLETT PACKARD LTD

Manufacture of opto-electronic semiconductor devices, used for example in communication systems or semiconductor lasers. Manufacture involves a number of processes, detailed below.

MOVPE (Metal Organic Vapour Phase Epitaxial Growth) process; raw materials include arsine, phosphine, organo-metallics of indium, gallium, phosphorus and zinc and hydrogen sulphide.

Dielectric deposition process; for which the main raw material is silane.

Wafer fabrication process; this involves the etching, separating, polishing and lapping of the wafers. Etchants used include hydrochloric, hydrofluoric and sulphuric acid.

Assembly operations; thinning, washing, rinsing and soldering of the wafers. Rinsing chemicals include hydrochloric and nitric acid and a range of organic solvents.

Releases to air - arsenic, phosphine, silane, VOCs Classes A&B.

Releases to water - arsenic, copper, gallium, indium, lead, nickel, zinc, VOCs Classes A&B.

Abatement equipment - MOVPE reactors are fitted with a multi-stage gas scrubbing system, consisting of an alkyl cracker, paper filter and an activated carbon absorber. Should any breakthrough of contaminants be detected after the carbon absorber then the gaseous waste is diverted through a separate "Emcell filter" which uses activated carbon to absorb arsine and phosphine. Discharges from these systems, as well as gaseous waste from the dielectric deposition and the wafer fabrication processes are directed to the "Clean Room Extraction System" for release via a 18.5m stack. Gaseous releases from the assembly process are discharged via the "Laboratory Ventilation System" stack at 18.5m. Waste solvents are sent for off-site incineration.

AO0865 GULSON PLATING LTD

Process involves the plating of steel with various metals including cadmium, nickel, zinc, copper, tin and silver. Effluent treatment plant consists of an initial vessel where cyanide treatment is carried out using sodium hypochlorite and sodium hydroxide to precipitate metallic hydroxides. This discharges to another vessel where the effluent from the electroless nickel plating process is added and the pH adjusted using sodium hydroxide. Settling and filtration occurs before discharge to sewer of the effluent.

Releases to air - acetic acid, ammonia, cadmium, chromium, cyanides, hydrogen chloride, nickel, nitrogen oxides, sulphur oxides.

Releases to water - cadmium, copper, lead, chromium, nickel, tin, zinc, suspended solids, COD, cyanides.

Abatement equipment - cadmium recovery unit which uses an electrolytic cell process. The recovered cadmium is returned to the plating process. Effluent treatment plant consists of an initial vessel where cyanide compounds are treated with sodium hypochlorite and sodium hydroxide, to precipitate metallic hydroxides. This discharges into another vessel where the effluent from the electroless nickel plating process is added and the pH is adjusted using sodium

hydroxide. Following settling and filtration the liquors are discharged to sewer and the sludge is removed by contractors for further, off-site, processing.

AO4178 TELFORD EXTRUSIONS LTD

Process by which PVC-U is extruded into window profiles. Polymer and impact modifier are delivered to site and stored in silos. The polymer and impact modifier are weighed and mixed. Filler, stabiliser, process aid and titanium dioxide pigment are added at various stages of the mixing/heating/cooling. The mixture is then discharged to silos from where it is extruded.

Discharges to air are possible from a number of process equipment, however the operations are housed in a single storey building, from which all release routes have filters.

Releases to air - particulates

Releases to water - chromium, suspended solids, copper, lead, nickel, zinc, cadmium.

AN9425 HI-VOLT BATTERY CO LTD

Manufacture of lead acid batteries from lead alloy and battery grade lead monoxide. LEV extraction on air emissions.

Releases to air - lead particulate (+compounds).

AN9433 STALLITE BATTERY CO. LTD

Manufacture of lead acid batteries. Particulate lead removed by fabric filters and HEPA filters.

Moist air emissions treated in wet scrubbers. Water recycled wherever possible.

Releases to air - lead sulphate and lead oxide particulates.

AO0725 HYDRO POLYMERS LTD

Subsidiary of Norsk Hydro.

Use of heavy metal compounds (stabilisers) in PVC compound manufacture. Antimony/lead/cadmium release to air. Essentially physical process of mixing and blending. Use solid (lead chromates) and liquid stabilisers (barium/zinc and cadmium/zinc complexes).

Releases to air - antimony trioxide, PVC, cadmium salts, and lead salts, lead chromates particulates, chloroethylene, particulates, hydrogen chloride and VOCs.

Releases to land - waste PVC compounds to landfill.

Abatement equipment - Reverse jet fabric filtration on air exhausts.

AO0741 BRITMAG LTD

Magnesia by extraction from seawater.

(For further information see Cremer & Warner, 1993).

Releases to air - carbon monoxide, nitrogen oxides, particulates, sulphur dioxide.

Releases to water - NP-suspended solids.

AO0750 EARNSHAW LTD

Manufacture of Inorganic pigments. Dispersion of inorganic pigments composed of compounds of lead, cadmium and selenium. No chemical reactions only physical mixing. Pigments are stable, insoluble and unreactive. Dust extraction system for pigment charging.

Releases to air - lead, selenium.

Releases to water - cadmium.

Releases to land - cadmium and lead in effluent treatment plant sludge - sent to landfill.

AO1306 GALLOWS GREEN SERVICES LTD

Manufacture of sodium selenite premixes for use in animal feeds. Batch operations. Sodium selenite is pre-weighed and charged - dust extraction DCE unit with shake down facility.

Releases to air - particulates, selenium.

Releases to water - selenium.

Releases to land - selenium.

AO8122 PREMIER PROFILES

Convert PVCU powder compounds to window profiles or ancillary trims. Batch process involving no chemical reaction. DCE dust extractor systems - cartridge filters.

Releases to air - lead compounds (particulate).

AP0771 HEPWORTH BUILDING PRODUCTS

Use of lead stabilised PVC in the manufacture of extruded plastic pipes. Use of lead salts - lead sulphate, lead stearate, lead phosphite.

Releases to air - lead.

AP1271 POLYPIPE PLC

Addition of stabilisers and other additives to poly vinyl chloride, which is then moulded or extruded into product. A proportion of these additives contain lead compounds. Filter system on water to remove solids. Reverse jet filter units on displaced air when filling silos.

Releases to air - lead.

AU5238 S DUGDALE SON & CO LTD

Manufacture of lead stabilisers. PVC chips from PVC, plasticizer and additives (pigments). Stabilisers include lead compounds. Filter to remove PVC dust.

Releases to air - zinc dummy IPC substance.

AN7554 ICI CHEMICALS & POLYMERS LTD

Electrode coating plant which coats electrodes from worldwide chlorine producing plants, including mercury anodes, diaphragm and membrane cells and cathodes from membrane cells. Titanium anodes from all three types of cell are electrostatically sprayed with paints containing precious metal compounds (most commonly ruthenium) dissolved in pentanol. Membrane cell cathodes are spray coated with acetic acid based paints containing platinum salts.

The coating processes may be repeated to obtain the desired thickness and composition. The spraying processes, which follow preparative operations of desoldering terminals from the anodes, oxalic acid etching of anodes and gritblasting of cathodes, are carried out on conveying lines inside forced extraction enclosures. The air from these spraying operations is passed through glass fibre mat filters before discharge, to remove paint particulates. Air extracted from gritblasting operations passes through bag filters, and air extracted from platinum and acetic acid spraying is routed through a water scrubber to remove hydrochloric acid and acetic acid solvent. Spent scrubber liquors and grit blasting water is routed to the effluent treatment plant along with any oxalate and etched titanium, where calcium is added and the pH is adjusted, causing the oxalate and titanium to precipitate.

Releases to air - acetic acid, hydrogen chloride, soluble iridium compounds, pentan-1-ol, soluble platinum compounds, ruthenium compounds and particulates.

AN9395 BLUE STAR BATTERIES LTD

Manufacture of lead acid batteries. Considered to be a medium sized operation, relative to UK competitors.

Releases to air - lead.

Releases to water - lead.

Releases to land - lead oxide to landfill.

AN9719 EVC COMPOUNDS LTD

Manufacture of PVC compounds, principally using lead compounds.

Releases to air - lead, particulates.

Abatement equipment - particulate emissions minimised by a series of dust control units.

AO0709 OLDHAM CROMPTON BATTERIES LTD

Manufacture of lead acid cells and batteries.

Releases to air - lead and its compounds (particulate), sulphur oxides and VOCs.

Abatement equipment - bag filters.

AO0717 CHLORIDE INDUSTRIAL BATTERIES LTD

Production of lead acid batteries. General particulates abatement is in the form of bag filters and HEPA filters and the pasting process is fitted with wet scrubbers (rotoclones). The aqueous effluent is screen filtered, dosed with polyelectrolyte and left to settle. The pH is then adjusted to pH 5-7 with lime, and again dosed with polyelectrolyte and left to settle. The clear liquor is then directed to the storm water overflow.

Releases to air - lead and lead oxide particulates.

Releases to water - small quantities of cadmium from impurities in raw materials, lead in solution or suspension, suspended solids and BOD from miscellaneous sources.

Releases to land - lead sludges to landfill.

AO0733 EVC COMPOUNDS LTD

PVC compounding process, which involves the incorporation of plasticisers, flame retardants and other additives to PVC. Lead and antimony compounds are used in this process.

Releases to air - particulates

Abatement equipment - dust control units and electrostatic precipitators.

AO1837 CMP BATTERIES LTD

Use of lead and lead oxide in the manufacture of lead acid batteries.

Releases to air - lead compounds.

Releases to water - lead compounds.

Releases to land - lead compounds.

Abatement equipment - Rotoclone - wets particulates to form a slurry.

A08505 OSRAM LTD

Use and recovery of indium associated with the production of low pressure sodium lamps.

Releases to air - hydrogen chloride, indium, VOCs.

Releases to water - indium.

Releases to land - NP-solids

AP5323 HEPWORTH BUILDING PRODUCTS

Use lead stabilised PVC in the manufacture of extruded plastic pipes. Use of lead salts such as lead sulphate, lead stearate and lead phosphite.

Releases to air - lead compounds (particulate).

Releases to water - lead compounds (particulate).

Releases to land - NP-solids.

AV1939 BARLOCHER UK LTD

Blending process of various dry powdered chemicals, principally tribasic lead sulphate, lead stearate and cadmium stearate. The resultant blends are used, by the customer, as a "one product" additive, either in the plastics, pharmaceutical or cosmetics industries.

Releases to air - lead compounds, lead particulate + compounds.

Abatement equipment - dust filters on air extraction units. The collected dust is either recycled or sent to landfill.

AO0598 THERMOFILL POLYMERS

Compounding of engineering plastics for subsequent moulding and forming into components for use in automotive, household appliance and electrical equipment industries. Use antimony compounds and lead chrome pigments. Use of fabric filters.

Releases to air - antimony, cadmium, chromium, lead, selenium, VOCs class B.

Releases to water - cadmium.

AN8356 JOHNSON MATTHEY PLC

Envelope authorisation for processes to manufacture a range of supported metal catalysts which involve the use of palladium and platinum compounds. Production is by batch processes, batch sizes typically in the range of 1 to 200 kg. The processes can involve; dissolution and slurring in water; mixing of reagents, washing and filtration; drying of materials in ovens; firing in an electric furnace; reduction using hydrogen gas in a furnace and sieving and packing.

Solids can be released to air during handling operations and so such operations are carried out under ventilated systems fitted with bag filters and most processing is undertaken in slurries or solution. Hydrogen reduction of chloride salts, produces hydrogen chloride which is directed to a wet scrubbing system. Reactors are fitted with condensers and demisters to avoid any vapour releases. All aqueous effluent is directed to the site effluent treatment plant which is covered by AN6477. Any solid waste which may contain precious metals is sent off-site for recovery and organic waste liquors are disposed of by an approved contractor.

Variation AZ1078 - introduces new drying equipment for the particulate catalyst produced in the process.

Releases to air - hydrogen chloride, particulates.

AN8488 UOP LIMITED

Manufacture of a range of precious metal based catalysts for use in petroleum refining and petroleum industries. Use of metal salts.

Releases to air - ammonia, chlorine, hydrogen chloride, nitrogen oxides, particulates.

Releases to water - mercury.

Abatement equipment - wet scrubber, selective catalytic reduction unit, bag filters.

AO1977 EXIDE BATTERIES (GEMALA BATTERY COMPANY)

Manufacture of lead acid batteries.

Releases to air - lead compounds (particulate).

Releases to water - cadmium compounds, chromium compounds, copper compounds, lead compounds, manganese compounds, nickel compounds, zinc compounds.

AO2469 GBL LTD

Production of coated drums for major manufacturers of photocopiers. Use of arsenic triselenide and selenium tellurium as coatings. All water used in the processes is de-ionised water, which is produced on-site and can be regenerated using sodium hydroxide and hydrochloric acid. Liquid effluent from the de-ionising plant, degrease, etch and desmutting tanks are pumped to a buffer tank for neutralisation before discharge to sewer.

Releases to air - arsenic, particulates, selenium, tellurium compounds, trichloroethylene.

Releases to water - aluminium, arsenic, copper compounds, mercury compounds, selenium, tellurium compounds.

Releases to land - NP-solids.

AO0610 EPITAXIAL PRODUCTS INTERNATIONAL LTD

Compound semiconductor manufacture based on gallium arsenide substrates. Use of arsine, phosphine etc. Abatement technology - use of water/hypochlorite scrubbing systems for process off gases. Releases to air - arsenic compounds, phosphorus.

Releases to water - arsenic compounds.

AO0954 CBL CERAMICS LTD

Manufacture of precision ceramics containing beryllium for the electronics industry. Use of beryllium oxide. Absolute HEPA filters are used to abate dust emissions and a reed bed system is incorporated for aqueous effluent.

Releases to air - beryllium compounds.

Releases to water - copper compounds, nickel compounds, NP-COD, NP- oil & oil/solid mixtures, NP-suspended solids, sulphates, zinc compounds.

Releases to land - beryllium compounds, nickel compounds, NP-solids, VOCs class B.

B.2 Summary

The companies authorised under this category fall into several categories and include many metal processing operations for which a common theme is the release of metal vapours, particulates and liberated gaseous products due to the reaction of acids on metals. Many of the standard abatement techniques for the removal of particulate matter and off-gas scrubbing are to be found in this sector but often additional modified systems are required to suit process specific requirements.

B.2.1 Emissions to air

From the emissions data provided by the CRI the most commonly authorised emissions to air from the companies under this section are - lead, particulates, NO_x, hydrogen chloride, arsenic, VOC's, sulphur dioxide and antimony.

There are a few specifically named organic species - chloroethylene, formaldehyde, trichloroethylene, pentanol.

Several other metals are also listed - copper, gallium, indium, mercury, beryllium, cadmium, chromium, selenium, cobalt, tellurium, nickel, platinum, zinc, ruthenium, silver, manganese, vanadium.

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|-----------------|---|
| Anzon Ltd | particulates, sulphur dioxide |
| BP Chemicals | ammonia, carbon monoxide, NO _x |
| Chemson Ltd | lead, particulates |
| Cookson Matthey | hydrogen fluoride, NO _x |
| GBL Ltd | trichloroethylene |
| Gemala Battery | lead |
| Hewlett Packard | VOCs |
| Johnson Matthey | carbon monoxide, chlorine, copper, iodine, NO _x , particulates, sulphur dioxide, VOCs, hydrogen chloride |
| Joseph Storey | boric acid |
| Osram | VOCs |
| Britmag | carbon monoxide, NO _x , particulates, sulphur dioxide |
| Wm Blythe | NO _x |

B.2.2 Discharges to water

From the emissions data provided by the CRI the most commonly authorised emissions to water from the companies under this section are - lead, cadmium, arsenic, mercury, suspended solids and zinc.

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|-------------|------------------|
| Anzon Ltd | suspended solids |
| GEC Marconi | mercury |
| Britmag | suspended solids |

B.2.3 Discharges to land

From the emissions data provided by the CRI the most commonly authorised emissions to land from the companies under this section is solids. Other compounds include beryllium, nickel, lead, cadmium, arsenic, gallium, indium, selenium, aluminium, boron, chromium, cobalt, copper, manganese, mercury, molybdenum, tin, titanium and zinc.

In terms of discharges > 1000 kg per annum the following have been reported:-

| | |
|-------------------|---|
| Anzon Ltd | solids |
| Chemson Ltd | solids |
| GBL Ltd | solids |
| Hepworth Building | solids |
| Johnson Matthey | aluminium, chromium, copper, nickel, solids, titanium |
| Rentokil | solids |
| Wm Blythe | solids |

B.3 Details of reported emissions of antimony, arsenic, beryllium, gallium, indium, lead, palladium, platinum, selenium, tellurium and thallium.

| | |
|------------|--|
| Table B.1 | Emissions data for antimony and its compounds |
| Table B.2 | Emissions data for arsenic and its compounds |
| Table B.3 | Emissions data for beryllium and its compounds |
| Table B.4 | Emissions data for gallium and its compounds |
| Table B.5 | Emissions data for indium and its compounds |
| Table B.6 | Emissions data for lead and its compounds |
| Table B.7 | Emissions data for palladium and its compounds |
| Table B.8 | Emissions data for platinum and its compounds |
| Table B.9 | Emissions data for selenium and its compounds |
| Table B.10 | Emissions data for tellurium and its compounds |
| Table B.11 | Emissions data for thallium and its compounds |

Table B.1 Emissions data for antimony and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Authn. Number | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|---------------|-------------------|---------------------|-------|---------------------|-------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| National Power PLC | 1.3A(a) | AA3204 | Antimony | - | - | - | - | - | - | - | - |
| Powergen PLC. | 1.3A(a) | AA2267 | Antimony | - | - | 7.00E-01 | - | 2.80E-01 | - | - | 3.10E-01 |
| Total emissions from sector 1 | | | | - | - | 7.00E-01 | - | 2.80E-01 | - | - | 3.10E-01 |
| Allied Steel and Wire Ltd | 2.1A(a) | AR0322 | Antimony cpds | - | - | - | - | 5.000E-01 | - | - | 3.00E-03 |
| Alphasteel Ltd. | 2.1A(f) | AQ944 | Antimony cpds | - | - | - | - | 3.348E-01 | - | - | 4.00E-01 |
| Midlands Lead Manufacturing Company Ltd. | 2.2A(a) | AS7027 | Antimony | - | - | - | - | - | - | 1.80E+00 | - |
| Britannia Refined Metals Ltd | 2.2A(a) | AS7850 | Antimony cpds | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| HJ Enthoven & Sons | 2.2A(e) | AS7205 | Antimony | - | - | - | - | - | - | 4.70E+00 | 4.81E+01 |
| Billbrime Ltd. | 2.2A(e) | AH4853 | Antimony | 0.00E+00 | - | - | - | - | - | - | - |
| Mining and Chemical Products Ltd. | 2.2A(c) | AS7272 | Antimony | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Mining and Chemical Products Ltd. | 2.2A(g) | AS2530 | Antimony | - | - | - | - | 4.10E-02 | - | 5.70E-01 | - |
| Total emissions from sector 2 | | | | 0.00E+00 | - | - | - | 4.10E-02 | 8.35E-01 | 7.07E+00 | 4.85E+01 |
| Roulds (UK) Ltd. | 3.2A(b) | AI0551 | Antimony | - | - | - | - | - | - | 8.03E+00 | - |
| BBA Friction Mintex Don Ltd. | 3.2A(b) | AI0152 | Antimony | 5.00E+00 | - | 6.10E+00 | - | 1.90E+01 | - | 2.40E+01 | - |
| Pilkington's Tiles Ltd. | 3.5A(a) | AI5154 | Antimony | 0.00E+00 | - | - | - | - | - | - | - |
| Total emissions from sector 3 | | | | 5.00E+00 | - | 6.10E+00 | - | 1.90E+01 | - | 3.20E+01 | - |
| Jotun Polymer (UK) Ltd. | 4.2A(d) | AK8171 | Antimony | - | - | - | - | - | - | - | - |
| Abbott Laboratories | 4.4A(d) | AM0945 | Antimony cpds | - | - | 8.00E+01 | - | 9.200E+01 | - | - | 0.00E+00 |
| Total emissions from sector 4 (excluding 4.5) | | | | - | - | 8.00E+01 | - | 9.200E+01 | - | - | 0.00E+00 |

| Company | Sector | Auth no. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|----------|-------------------|---------------------|----------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Wafer Technology Ltd. | 4.5A(d) | AO0121 | Antimony | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Vitreous Enamels Ltd. | 4.5A(d) | AI1256 | Antimony | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Lead Chrome Colours Ltd. | 4.5A(d) | AO1454 | Antimony | - | - | - | - | - | 1.88E+01 | - | 3.30E+01 |
| Tungstone Batteries Ltd. | 4.5A(d) | AV3796 | Antimony | - | - | - | - | - | - | 1.30E-01 | - |
| Cookson Matthey Ceramics and Materials | 4.5A(d) | AO0920 | Antimony | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Anzon Ltd. | 4.5A(d) | AO0997 | Antimony | - | - | 1.75E+02 | - | 3.36E+02 | - | 8.44E+02 | - |
| Anzon Ltd. | 4.5A(d) | AO0962 | Antimony | - | - | 7.20E+00 | - | 7.10E+00 | - | 2.60E+01 | - |
| Anzon Ltd. | 4.5A(d) | AO1047 | Antimony | - | - | 0.00E+00 | - | 6.52E+01 | - | 5.92E+01 | - |
| Anzon Ltd. | 4.5A(d) | AO0962 | Antimony | - | - | - | 2.98E+01 | - | 3.87E+02 | - | 4.11E+02 |
| Hydro Polymers Ltd. | 4.5A(f) | AO0725 | Antimony | - | - | - | - | 8.30E-01 | - | 1.50E+00 | - |
| Jotun Polymer (UK) Ltd. | 4.5A(f) | AG3401 | Antimony | 0.00E+00 | - | 2.00E-01 | - | 3.40E-02 | - | - | - |
| Thermofoil Polymers (UK) Ltd. | 4.5A(f) | AO0598 | Antimony | - | - | 6.00E+00 | - | 3.00E-02 | - | 7.45E-01 | - |
| Aquapersions Ltd. | 4.5A(i) | AO0245 | Antimony | - | - | 0.00E+00 | 1.15E+03 | 8.40E-06 | 1.78E+03 | 5.50E-05 | 0.00E+00 |
| Geo Neale Ltd | 4.5A(m) | AS7248 | Antimony cpds | - | - | - | - | - | - | 3.79E-01 | - |
| Ferro (Great Britain) Ltd. | 4.5A(m) | AN5349 | Antimony | - | - | 4.00E+01 | - | 8.35E+00 | - | 1.95E+00 | - |
| Total emissions from sector 4.5 | | | | 0.00E+00 | - | 2.28E+02 | 1.18E+03 | 4.18E+02 | 2.19E+03 | 9.34E+02 | 4.44E+02 |
| Leigh Environmental Ltd. | 5.1A(c) | AK2688 | Antimony | 0.00E+00 | - | 4.80E+00 | - | 4.10E+00 | - | 0.00E+00 | - |
| Total emissions from sector 5 | | | | 0.00E+00 | - | 4.80E+00 | - | 4.10E+00 | - | 0.00E+00 | - |

Table B.2 Emissions data for arsenic and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---------------------------------------|---------|-----------|-------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Conoco Ltd. | 1.1A(a) | AF6863 | Arsenic | - | 1.40E+00 | - | 2.53E+00 | - | 4.00E+00 | - | 5.00E+00 |
| Coal Products Ltd. | 1.2A(a) | AF6227 | Arsenic | - | 8.00E-01 | - | 1.60E+00 | - | 1.40E+00 | - | 0.00E+00 |
| National Power plc | 1.3A(a) | AA3204 | Arsenic | - | - | - | - | - | - | - | - |
| Powergen Plc | 1.3A(a) | AA3000 | Arsenic | - | 2.20E+02 | - | 1.87E+02 | - | 1.53E+02 | - | 0.00E+00 |
| Powergen Plc | 1.3A(a) | AA2267 | Arsenic | - | 0.00E+00 | - | 6.20E-01 | - | 2.80E-01 | - | 3.20E-01 |
| National Power plc | 1.3A(a) | AA3107 | As cpds | - | - | - | - | - | - | - | - |
| Conoco Ltd. | 1.4A(a) | AF8173 | Arsenic | - | 1.16E+00 | - | 1.07E+01 | - | 1.35E+01 | - | 9.28E+00 |
| Lindsey Oil Refinery Ltd. | 1.4A(a) | AF68928 | Arsenic | - | 9.90E+00 | - | 4.81E+01 | - | 2.70E+01 | - | 2.20E+01 |
| Total emissions from sector 1 | | | | - | 2.33E+02 | - | 2.51E+02 | - | 1.99E+02 | - | 3.66E+01 |
| Co-Steel Sheerness | 2.1A(a) | AP5986 | Arsenic | - | - | - | - | - | 2.00E+02 | - | 0.00E+00 |
| Allied Steel and Wire Ltd. | 2.1A(a) | AR0322 | As cpds | - | - | - | - | - | 4.00E-01 | - | 3.30E+00 |
| Alphasteel Ltd. | 2.1A(f) | AQ9944 | As cpds | - | - | - | - | - | 1.507E+00 | - | 7.60E-01 |
| British Steel Engineering Steels Ltd. | 2.1A(f) | AQ9855 | Arsenic | - | - | - | - | - | 4.00E-02 | - | 1.00E-15 |
| Midlands Lead Manufacturing | 2.2A(a) | AS7027 | Arsenic | - | - | - | - | - | - | 1.80E+00 | - |
| Inco Europe Ltd. (Note 1) | 2.2A(a) | AS6888 | As cpds | - | - | - | - | - | - | - | - |
| Britannia Refined Metals Ltd. | 2.2A(a) | AS7850 | As cpds | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| Brookside Metal Company Ltd. | 2.2A(a) | AS6829 | Arsenic | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| IMI Refineries Ltd. | 2.2A(a) | AS6632 | Arsenic | - | - | - | - | 2.36E+01 | - | 2.79E+02 | - |
| Delta Enfield Metals Ltd. | 2.2A(d) | AS5059 | Arsenic | - | - | - | - | - | - | - | 0.00E+00 |
| HJ Enthoven and Sons | 2.2A(e) | AS7205 | Arsenic | - | - | - | - | - | - | 4.30E+00 | 9.40E+00 |
| Geo Neale Ltd. | 2.2A(e) | AS7248 | As cpds | - | - | - | - | - | - | - | - |
| Billbrime Ltd. | 2.2A(e) | AH4853 | Arsenic | 0.00E+00 | - | - | - | - | - | - | - |
| Mining and Chemical Products Ltd. | 2.2A(g) | AS2530 | Arsenic | - | - | - | - | 0.00E+00 | - | 5.30E-01 | - |
| Ricoh (UK) Products Ltd. | 2.2A(g) | AP1263 | Arsenic | - | - | - | - | 4.70E-03 | - | 1.99E-02 | - |
| Total emissions from sector 2 | | | | 0.00E+00 | - | - | - | 2.36E+01 | 2.02E+02 | 2.86E+02 | 1.35E+01 |

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|-------------------|---------------------|----------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Rugby Group Plc. | 3.1A(a) | AH8743 | Arsenic | - | - | - | - | - | 1.20E+00 | - | 7.20E-02 |
| Vitrous Enamels Ltd. | 3.5A(a) | AI1256 | Arsenic | 0.00E+00 | - | 1.65E+01 | - | 2.50E-01 | - | 1.80E-01 | - |
| Pilkington's Tiles Ltd. | 3.5A(a) | AI5154 | Arsenic | 0.00E+00 | - | - | - | - | - | - | - |
| Total emissions from sector 3 | | | | 0.00E+00 | - | 1.65E+01 | - | 2.50E-01 | 1.20E+00 | 1.80E-01 | 7.20E-02 |
| Ciba-Geigy Plc. | 4.2A(c) | AK8511 | Arsenic | - | - | - | 8.00E-01 | - | 1.60E+00 | - | 0.00E+00 |
| Tioxide (europe) Ltd. | 4.3A(c) | AL8282 | Arsenic | - | - | - | 3.20E+02 | - | 2.00E+02 | - | 1.00E+02 |
| Total emissions from sector 4 (excl. 4.5) | | | | - | - | - | 3.21E+02 | - | 2.02E+02 | - | 1.00E+02 |
| Wafer technology Ltd. | 4.5A(d) | AO0121 | Arsenic | - | - | - | - | 0.00E+00 | - | 5.80E-04 | - |
| Nortel Ltd. | 4.5A(d) | AO1625 | Arsenic | - | - | 0.00E+00 | - | 8.80E-04 | - | 0.00E+00 | - |
| William Blythe Ltd. | 4.5A(d) | AO1225 | Arsenic cpds | - | - | - | - | 1.40E+01 | - | 1.73E+01 | - |
| Rentokil Ltd | 4.5A(d) | AO1241 | Arsenic cpds | - | - | 0.00E+00 | 0.00E+00 | 3.19E-01 | 2.75E-02 | 1.69E-02 | 1.40E-02 |
| GEC-Marconi Materials Technology Ltd. | 4.5A(d) | AN8682 | Arsenic | - | - | - | - | 0.00E+00 | - | 9.00E-03 | - |
| Anzon Ltd. | 4.5A(d) | AO0962 | Arsenic | - | - | - | - | - | 1.220E+00 | - | 1.97E+01 |
| Johnson Matthey plc.(Note 2) | 4.5A(e) | AN8712 | Arsenic | - | - | - | - | - | 5.60E+00 | 2.50E+00 | 5.74E+00 |
| BNR Europe Ltd. | 4.5A(f) | AN9506 | Arsenic | - | - | - | - | 5.00E-03 | - | - | - |
| EEV Ltd. (Note 3) | 4.5A(f) | AN8500 | Arsenic | - | - | - | - | 7.00E-03 | 5.00E-02 | 0.00E+00 | 0.00E+00 |
| Epitaxial products International Ltd. | 4.5A(f) | AO0610 | Arsenic cpds | - | - | - | - | 1.06E-01 | 7.40E-01 | 2.38E-01 | 1.10E+01 |
| Hewlett Packard Ltd. | 4.5A(f) | AO0091 | Arsenic | - | - | - | - | 4.00E-02 | 3.90E+00 | 0.00E+00 | 0.00E+00 |
| GBL Ltd. | 4.5A(f) | AO2469 | Arsenic | - | - | 1.00E-04 | 0.00E+00 | - | - | 0.00E+00 | 1.00E-06 |
| William Blythe Ltd. | 4.5A(i) | AO1233 | Arsenic | - | - | - | - | - | 7.66E+01 | - | 7.94E+01 |
| William Blythe Ltd. | 4.5A(i) | AO1234 | Arsenic cpds | - | - | - | - | 1.03E+02 | - | 2.83E+01 | - |
| ICI Chemicals and Polymers Ltd. | 4.6A(b) | AL8614 | Arsenic | - | - | - | - | - | - | - | 0.00E+00 |
| Rentokil Ltd | 4.5A(m) | AO1241 | Arsenic | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Total emissions from sector 4.5 | | | | - | - | 1.00E-04 | 0.00E+00 | 1.17E+02 | 8.81E+01 | 4.84E+01 | 1.16E+02 |

| | | | | | | | | | | | |
|-----------------------------------|---------|--------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Rechem International Ltd. | 5.1A(a) | AG7946 | Arsenic | - | 2.20E+00 | - | 2.76E+01 | - | 1.63E+01 | - | 1.56E+01 |
| Rechem International Ltd. | 5.1A(a) | AG8047 | Arsenic | - | 4.00E+00 | - | 2.50E+00 | - | 2.70E+00 | - | 5.10E+00 |
| BOC Ltd. | 5.1A(b) | AG7873 | Arsenic | 0.00E+00 | - | 1.25E-02 | - | 1.24E-01 | - | 1.15E-01 | - |
| S Grundon (Waste) Ltd. | 5.1A(c) | AG8390 | Arsenic cpds | 2.12E+01 | - | 1.61E-01 | - | 1.88E-01 | - | 4.23E-01 | - |
| Huntingdon Research Centre Ltd. | 5.1A(c) | AG8667 | Arsenic | 2.83E+00 | - | 5.99E-02 | - | 1.05E-01 | - | 5.94E-02 | - |
| Cleveland County Council | 5.1A(c) | AG8322 | Arsenic cpds | 1.77E+02 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Leigh Environmental Ltd. | 5.1A(c) | AK2688 | Arsenic | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Northwick Park Hospital NHS Trust | 5.1A(c) | AG8012 | Arsenic cpds | 4.00E-01 | - | 6.00E-02 | - | 1.80E-01 | - | 0.00E+00 | - |
| Rnoh Incinerator Services Ltd. | 5.1A(c) | AM2034 | Arsenic cpds | - | - | 4.00E-01 | - | 4.00E-01 | - | 0.00E+00 | - |
| Total emissions from 5 | | | | 2.01E+02 | 6.20E+00 | 6.93E-01 | 3.01E+01 | 9.97E-01 | 1.90E+01 | 5.97E-01 | 2.07E+01 |
| Pfizer Ltd. | 6.9A(a) | AU8083 | Arsenic | - | - | - | - | - | - | 0.00E+00 | - |
| Total emissions from 6 | | | | | | | | | | 0.00E+00 | |

Note 1:- 2.50E+01 reported to land in 1996

Note 2:- 1.2E +00 reported to land in 1995, 6.00E +00 reported to land in 1996

Note 3:- 2.6E +01 reported to land in 1995

Table B.3 Emissions data for beryllium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|---------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water |
| Allied Steel and Wire Ltd. | 2.1A(a) | AR0322 | Beryllium compounds | - | - | - | 2.000E+00 | - | 3.00E-01 |
| Alphasteel Ltd. | 2.1A(f) | AQ9944 | Beryllium compounds | - | - | - | 8.370E-01 | - | 8.90E-01 |
| Avimo | 2.2A(g) | AT5534 | Beryllium | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Total emissions from sector 2 | | | | - | - | 0.00E+00 | 2.84E+00 | 0.00E+00 | 1.19E+00 |
| CBL Ceramics Ltd. (Note 1) | 4.5A(f) | AO0954 | Beryllium compounds | 2.40E+00 | 1.14E+02 | 1.57E+00 | 1.87E+01 | 1.18E+00 | 3.22E+00 |
| EEV Ltd. | 4.5A(i) | AN8500 | Beryllium | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Total emissions from sector 4.5 | | | | 2.40E+00 | 1.14E+02 | 1.57E+00 | 1.87E+01 | 1.18E+00 | 3.22E+00 |

Note 1:- 6.00E+02 reported to land in 1995
4.26E+02 reported to land in 1996

Table B.4 Emissions data for gallium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1995 (kg) | | | Emissions 1996 (kg) | | |
|---------------------------------------|---------|-----------|-------------------|---------------------|----------|-----------------|---------------------|----------|-----------------|
| | | | | Air | Water | Land | Air | Water | Land |
| Billbrime Ltd. | 2.2A(e) | AH4853 | Gallium | - | - | - | - | - | - |
| BNR Europe Ltd. | 4.5A(f) | AN9506 | Gallium | 5.00E-03 | - | - | - | - | - |
| EEV Ltd. | 4.5A(f) | AN8500 | Gallium | - | - | 1.50E+00 | - | - | 0.00E+00 |
| Phosphor Technology Ltd. | 4.5A(d) | AO1993 | Gallium | 0.00E+00 | - | - | 0.00E+00 | - | - |
| Wafer Technology Ltd. | 4.5A(d) | AO0121 | Gallium | 0.00E+00 | - | - | 0.00E+00 | - | - |
| Total emissions for sector 4.5 | | | | 5.00E-03 | - | 1.50E+00 | 0.00E+00 | - | 0.00E+00 |

Table B.5 Emissions data for indium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|-------------------|---------------------|-------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Billbrime Ltd. | 2.2A(e) | AH4853 | Indium | 0.00E+00 | - | - | - | - | - | - | - |
| Mining and Chemical Products Ltd. | 2.2A(e) | AS7272 | Indium | - | - | - | - | 3.50E-02 | - | 6.00E-02 | - |
| Total emissions from sector 2 | | | | - | - | - | - | 3.50E-02 | - | 6.00E-02 | - |
| Wafer Technology Ltd. | 4.5A(d) | AO0121 | Indium | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Phosphor Technology Ltd. | 4.5A(d) | AO1993 | Indium | - | - | - | - | - | - | 0.00E+00 | - |
| GE Lighting Ltd. | 4.5A(d) | AO0857 | Indium | - | - | 0.00E+00 | 0.00E+00 | 8.30E+00 | 2.00E-01 | 1.39E+01 | 0.00E+00 |
| BNR Europe Ltd. | 4.5A(f) | AN9506 | Indium | - | - | - | - | 5.00E-03 | - | - | - |
| EEV Ltd. (Note 1) | 4.5A(f) | AN8500 | Indium | - | - | - | - | - | - | - | - |
| Osram Ltd. | 4.5A(f) | AO8505 | Indium | - | - | - | - | 7.95E+01 | 2.54E+01 | 1.02E+02 | 4.00E-02 |
| Total emissions from sector 4.5 | | | | - | - | 0.00E+00 | 0.00E+00 | 8.78E+01 | 2.56E+01 | 1.15E+02 | 4.00E-02 |

Note 1 - 5.00E -03 reported to land in 1995

Table B.6 Emissions data for lead and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|-------------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Conoco Ltd | 1.1A(a) | AF6863 | Lead | - | 8.45E+01 | - | 2.05E+02 | - | 9.09E+02 | - | 3.19E+02 |
| British Gas Plc | 1.1A(a) | AF7517 | Lead | - | 0.18 | - | 2.58E-01 | - | 3.60E+00 | - | - |
| British Gas Plc | 1.1A(b) | AF7533 | Lead | - | 0.01 | - | 1.00E-02 | - | - | - | - |
| Coal Products Ltd | 1.2A(a) | AF6227 | Lead | - | - | - | 4.50E+00 | - | 1.70E+00 | - | 3.00E+00 |
| Sevalco Ltd | 1.2A(a) | AF7916 | Lead | - | 4.15E+01 | - | 5.71E+01 | - | 9.39E+01 | - | 1.23E+02 |
| BP Chemical Ltd | 1.3A(a) | AA1996 | Lead | - | - | - | - | - | - | - | 235 |
| Powergen Plc | 1.3A(a) | AA2267 | Lead | - | 0.00E+00 | - | 4.68E+00 | - | 5.95E+00 | - | 7.06E+00 |
| National power Plc | 1.3A(a) | AA3107 | Lead cpds | - | - | - | - | - | - | - | - |
| National Power Plc | 1.3A(a) | AA3204 | Lead | - | - | - | - | - | - | - | - |
| HM Naval Base | 1.3A(a) | AJ3077 | Lead | - | - | - | 3.75E-01 | - | 3.54E-01 | - | 1.00E-02 |
| Horton Kirby Ltd | 1.3A(c) | AF6839 | Lead | 3.02E+02 | - | 2.13E+02 | - | 2.80E+02 | - | 0.00E+00 | - |
| P Garnett & Son Ltd | 1.3A(c) | AF8416 | Lead&lead cpds | - | - | - | - | 1.37E+02 | - | 3.39E+01 | - |
| Castrol (UK) Ltd | 1.3A(c) | AG0097 | Lead cpds | - | - | 0.00E+00 | - | 0.00E+00 | - | 1.00E-01 | - |
| Avon Tyres Ltd | 1.3A(c) | AG8101 | Lead | - | - | - | 5.00E-01 | - | 0.00E+00 | - | 0.00E+00 |
| International Flavours and Fragrances (GB) Ltd | 1.3A(c) | AN7031 | Lead | - | - | 1.00E-02 | - | 6.10E-01 | - | 1.00E+00 | - |
| Lindsey Oil Refinery Ltd | 1.4A(a) | AF6928 | Lead | - | 1.40E+01 | - | 5.38E+00 | - | 1.08E+02 | - | 8.11E+01 |
| Esso Petroleum Co Ltd | 1.4A(a) | AF8009 | Lead | - | 201 | - | 290 | - | 360 | - | 554 |
| Conoco Ltd | 1.4A(a) | AF8173 | Lead | - | - | - | 7.71E+00 | - | 1.07E+01 | - | 9.21E+00 |
| Carlisle Refining & Marketing Ltd | 1.4A(c) | AB2963 | Lead & lead cpds | - | - | 0.00E+00 | 6.10E+00 | 0.00E+00 | 1.01E+01 | - | - |
| Total emissions from sector 1 | | | | 3.02E+02 | 3.41E+02 | 2.13E+02 | 5.82E+02 | 4.18E+02 | 1.50E+03 | 3.50E+01 | 1.33E+03 |

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|-----------|------------------------------|---------------------|-------|---------------------|-------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Co-Steel Sheerness | 2.1A(a) | AP5986 | Lead | - | - | - | - | 1.10E+04 | 3.20E-01 | - | - |
| British Steel Plc | 2.1A(a) | AR0063 | Lead | - | - | - | - | - | 5.00E-02 | - | 4.20E-01 |
| British Steel Plc | 2.1A(a) | AR0080 | Lead | - | - | - | - | 3.60E+01 | 3.80E+01 | 6.43E-01 | 1.25E+02 |
| Allied Steel and Wire Ltd | 2.1A(a) | AR0322 | Lead&Lead cpds | - | - | - | - | 5.20E+01 | 8.00E+00 | 5.28E+01 | 5.25E-01 |
| British Steel Plc | 2.1A(a) | AR0349 | Lead | - | - | - | - | - | 1.10E+04 | - | 1.80E+03 |
| Forgemasters Steel and Engineering Ltd | 2.1A(f) | AQ5159 | Lead | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Avesta Sheffield Ltd | 2.1A(f) | AQ9596 | Lead | - | - | - | - | 1.13E+01 | - | 1.99E+01 | - |
| British Steel Engineering Steels Ltd | 2.1A(f) | AQ9855 | Lead&lead cpds (particulate) | - | - | - | - | 4.00E+02 | 1.02E+01 | 2.30E+02 | 2.00E-01 |
| Alphasteel Ltd | 2.1A(f) | AQ9944 | Lead | - | - | - | - | 8.00E-02 | 4.19E+00 | 1.95E+02 | 4.45E+00 |
| Abram Alloys Ltd | 2.2A(a) | AS5067 | Lead cpds | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Abram Alloys Ltd | 2.2A(a) | AS5075 | Lead cpds | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| British Nuclear Fuels Ltd | 2.2A(a) | AS5601 | Lead | - | - | - | - | - | - | - | 9.00E+00 |
| Park P Paterson | 2.2A(a) | AS6624 | Lead | - | - | - | - | - | - | - | 1.10E-01 |
| IMI Refiners Ltd | 2.2A(a) | AS6632 | Lead | - | - | - | - | 2.67E+02 | 1.17E+01 | 4.60E+03 | 6.50E+01 |
| Brookside Metal Company Ltd | 2.2A(a) | AS6829 | Lead | - | - | - | - | 8.00E+01 | 3.20E-01 | 6.16E+02 | 3.20E+00 |
| Inco Europe Ltd (Note 1) | 2.2A(a) | AS6888 | Lead cpds (particulate) | - | - | - | - | - | - | 9.00E+00 | 9.00E+00 |
| Midlands Lead Manufacturing Company Ltd | 2.2A(a) | AS7027 | Lead | - | - | - | - | - | - | 1.80E+00 | - |
| Thomas Bolton Ltd | 2.2A(a) | AS7213 | Lead | - | - | - | - | - | - | - | - |
| Englehard-clal UK Ltd | 2.2A(n) | AS7299 | Lead cpds | - | - | - | - | - | - | - | - |
| Warton Metals Ltd | 2.2A(a) | AS7566 | Lead cpds | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Britannia Refined Metals Ltd | 2.2A(a) | AS7850 | Lead cpds (particulate) | - | - | - | - | - | - | - | - |
| Inco Alloys Ltd | 2.2A(c) | AS7035 | Lead | - | - | - | - | - | - | - | 6.00E+00 |
| Delta Extruded Metals Company Ltd | 2.2A(d) | AR0187 | Lead | - | - | - | - | 2.00E+01 | - | 1.00E+00 | - |
| Delta Enfield Metals Ltd | 2.2A(d) | AS5059 | Lead | - | - | - | - | - | - | - | - |
| Wednesbury Tube Company Ltd | 2.2A(d) | AS5423 | Lead | - | - | - | - | - | - | - | - |
| Delta Extruded Metals Company Ltd | 2.2A(d) | AS5741 | Lead | - | - | - | - | - | - | - | - |
| Ever Ready Ltd | 2.2A(d) | AS6101 | Lead | - | - | - | - | - | - | - | - |
| British Steel Plc | 2.2A(d) | AS6977 | Lead | - | - | - | - | - | - | 6.00E-01 | 1.16E+01 |
| Kaye Aluminium Ltd | 2.2A(d) | AS7230 | Lead | - | - | - | - | - | - | - | - |

| Company | Sector | Auth. No. | Chemical | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|------------------------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Rugby Group Plc | 3.1A(a) | AH8727 | Lead | - | 1.90E+00 | - | 6.56E+00 | - | 3.00E+00 | - | - |
| Rugby Group Plc | 3.1A(a) | AH8743 | Lead | - | - | - | - | - | 8.60E+01 | - | 3.71E+01 |
| Railko Ltd | 3.2A(b) | AH6686 | Lead cpds | 0.00E+00 | - | 4.00E-03 | - | 0.00E+00 | - | 0.00E+00 | - |
| Roulands UK Ltd | 3.2A(b) | AI0551 | Lead | - | - | - | - | 3.59E+00 | - | - | - |
| Pirelli General Plc | 3.3A(a) | AI4212 | Lead | - | 0.00E+00 | - | 4.00E-02 | - | 3.10E-02 | - | 3.93E-01 |
| Ferro (GB) Ltd | 3.5A(a) | AI4174 | Lead | 1.47E+01 | - | 0.00E+00 | - | - | - | - | - |
| Pilkington's Tiles Ltd | 3.5A(a) | AI5154 | Lead | 0.00E+00 | - | - | - | - | - | - | - |
| Total emissions from sector 3 | | | | 1.47E+01 | 1.90E+00 | 4.00E-03 | 6.60E+00 | 3.59E+00 | 8.90E+01 | 0.00E+00 | 3.75E+01 |
| BP Chemicals Ltd | 4.1A(b) | AL3185 | Lead | - | - | - | 0.00E+00 | - | - | - | - |
| Morgan Matroc Ltd | 4.2A(a) | AO0164 | Lead | - | - | - | - | 2.70E+00 | 2.30E+00 | 2.70E+00 | 1.96E+01 |
| European Vinyls Corp. UK Ltd | 4.2A(a) | AP8730 | Lead | - | - | - | - | - | - | - | 2.74E+01 |
| European Vinyls Corp. UK Ltd | 4.2A(a) | AT6298 | Lead | - | - | - | - | - | - | - | 2.74E+01 |
| ICI Chemicals & Polymers Ltd | 4.2A(b) | AK6039 | Lead | - | - | - | - | - | 8.00E+00 | - | - |
| BASF Plc | 4.2A(c) | AJ6505 | Lead | - | - | - | - | - | 2.16E+02 | - | 6.35E+02 |
| Rhone-Poulenc Chemicals Ltd | 4.2A(c) | AK7337 | Lead | - | - | - | - | - | 3.60E+01 | - | 9.30E+01 |
| Ciba-Geigy Plc | 4.2A(c) | AK8511 | Lead | - | - | - | 1.30E+00 | - | 1.16E+02 | - | - |
| Exchem Plc | 4.2A(d) | AH7194 | Lead | - | 2.50E-02 | - | 2.28E-01 | - | 0.00E+00 | - | - |
| Borden Chemicals UK Ltd | 4.2A(d) | AJ1252 | Lead | - | 6.00E-02 | - | 5.00E-02 | - | 4.60E-02 | - | 6.00E-06 |
| Glaxo Research & Development Ltd | 4.2A(d) | AJ2500 | Lead | - | - | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Glaxo Research & Development Ltd | 4.2A(d) | AK4516 | Lead | - | - | 0.00E+00 | - | 0.00E+00 | - | - | - |
| Glaxo Research & Development Ltd | 4.2A(d) | AK4524 | Lead | - | - | 0.00E+00 | - | 0.00E+00 | - | - | - |
| International Speciality Chemicals Ltd | 4.2A(d) | AK6861 | Lead cpds | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Astra Charnwood | 4.2A(d) | AK6870 | Lead&lead cpds (particulate) | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Jotun Polymer (UK) Ltd | 4.2A(d) | AK8171 | Lead | - | - | - | 5.00E-04 | - | 7.00E-03 | - | 0.00E+00 |
| Merck Sharp and Dohme Ltd | 4.2A(d) | AK8244 | Lead | - | - | - | 0.00E+00 | - | 2.84E+00 | - | 1.79E+00 |
| Associated Octel Co Ltd | 4.2A(h) | AK3919 | Lead cpds | - | - | 9.10E+04 | - | 7.77E+04 | - | 6.61E+04 | - |
| Du Vergier Ltd | 4.2A(i) | AK2351 | Lead | - | - | 4.60E+01 | - | 3.40E+01 | - | 2.80E+01 | - |
| Albright & Wilson UK Ltd | 4.3A(a) | AL9009 | Lead | - | - | - | - | - | 5.00E+01 | - | 7.00E+01 |
| Tioxide (Europe) Ltd | 4.3A(c) | AL8282 | Lead | - | - | - | 5.00E+02 | - | 5.00E+02 | - | 5.00E+02 |

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|-----------|------------------------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| IMI Titanium Ltd | 4.3A(f) | AL8355 | Lead | - | - | - | 1.00E+00 | - | - | - | - |
| Exchem Plc | 4.3A(f) | AM0201 | Lead | - | - | - | - | - | - | - | - |
| ICI Chemicals & Polymers Ltd | 4.4A(a) | AL7294 | Lead | - | - | - | - | - | 1.22E+02 | - | 6.33E+01 |
| Associated Octel Co Ltd | 4.4A(a) | AL7529 | Lead | - | - | - | - | - | 2.26E+04 | - | 2.89E+04 |
| ICI Chemicals & Polymers Ltd | 4.4A(b) | AL7456 | Lead | - | - | - | - | - | 2.30E+01 | - | 7.27E+01 |
| ICI Chemicals & Polymers Ltd | 4.4A(d) | AL7243 | Lead | - | - | - | - | - | 2.33E+01 | - | 3.20E+00 |
| TKR Chemical Machining Co Ltd | 4.4A(e) | AL8576 | Lead | - | - | - | 5.30E-01 | - | 3.20E-01 | - | 0.00E+00 |
| Total emissions from sector 4 (excl 4.5) | | | | - | 8.50E-02 | 9.10E+04 | 5.03E+02 | 7.77E+04 | 2.37E+04 | 6.61E+04 | 3.04E+04 |
| | | | | | | | | | | | |
| Fiamm (UK) Ltd | 4.5A(a) | AQ6830 | Lead | - | - | - | - | 1.22E+00 | 6.90E-01 | 4.95E-01 | 4.49E-01 |
| Cookson Matthey Ceramics and Materials Ltd | 4.5A(a) | AO624 | Lead | 0.00E+00 | - | 2.20E+01 | - | 2.20E+01 | - | 5.00E+01 | - |
| Lead Chrome Colours Ltd | 4.5A(d) | AO1454 | Lead | - | - | - | - | 7.14E+01 | 5.00E+00 | 6.00E+01 | 3.90E+00 |
| P B Batteries | 4.5A(d) | AO4011 | Lead | - | - | - | - | 7.51E+00 | 8.28E+00 | 2.62E+00 | 1.08E+01 |
| Phosphor Technology Ltd | 4.5A(d) | AO1993 | Lead | - | - | - | - | - | - | - | - |
| CMP Batteries Ltd | 4.5A(d) | AO1837 | Lead cpds | - | - | - | - | 4.09E+01 | 3.18E+02 | 3.83E+01 | 6.23E+02 |
| Big Batteries Ltd | 4.5A(d) | AO1004 | Lead&lead cpds (particulate) | - | - | 2.70E-01 | - | 6.30E+01 | - | 1.99E+02 | - |
| Hawker Energy Products Ltd | 4.5A(d) | AO0342 | Lead&lead cpds (particulate) | - | - | 1.00E+00 | - | 8.90E+00 | - | 3.90E+02 | - |
| Yuasa Battery UK Ltd | 4.5A(d) | AG9493 | Lead | 2.28E+00 | 1.87E+01 | 2.69E+02 | 1.29E+02 | 1.48E+02 | 8.06E+01 | 4.43E+02 | 1.25E+02 |
| Morgan Matroc Ltd | 4.5A(d) | AO2205 | Lead | - | - | 2.90E+01 | 2.30E+00 | 1.20E+00 | 1.00E+00 | 4.40E+00 | 1.00E+00 |
| Tungstone Batteries Ltd | 4.5A(d) | AV3796 | Lead | - | - | - | - | - | - | 1.88E+02 | 6.50E-01 |
| Cookson Matthey Ceramics and Materials Ltd | 4.5A(d) | AO0920 | Lead | - | - | - | - | 0.00E+00 | - | - | - |
| James Kent (Ceramic Materials) Ltd | 4.5A(d) | AN1432 | Lead | - | - | - | - | 1.00E-05 | 2.00E-05 | 1.00E-05 | - |
| Anzon Ltd | 4.5A(d) | AO0962 | Lead | - | - | - | 3.24E-01 | - | 2.40E+00 | - | 3.40E+00 |
| Chemson Ltd | 4.5A(d) | AN9344 | Lead | - | - | 1.21E+03 | 8.24E+01 | 5.35E+02 | 4.85E+01 | 1.89E+02 | 3.57E+01 |
| Chemson Ltd | 4.5A(d) | AN9336 | Lead | - | - | 1.88E+03 | - | 1.34E+03 | - | 1.29E+02 | - |

| | | | | | | | | | | | |
|--|---------|--------|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Johnson Matthey Plc (Note 2) | 4.5A(e) | AN8712 | Lead | - | - | - | - | 1.23E+02 | 5.50E+00 | 2.50E+00 | 2.52E+00 |
| Hydro Polymers Ltd | 4.5A(f) | AO0725 | Lead | - | - | - | - | 1.11E+01 | - | 3.40E+00 | - |
| Gemala Battery Company Ltd | 4.5A(f) | AO1977 | Lead cpds (particulate) | - | - | - | 1.00E+01 | 7.03E+02 | 1.88E+01 | 5.94E-01 | 3.41E-01 |
| Barlocher UK Ltd | 4.5A(f) | AV1939 | Lead cpds | - | - | - | - | - | - | - | - |
| Chloride Industrial Batteries Ltd | 4.5A(f) | AO0717 | Lead cpds (particulate) | - | - | - | - | 3.32E+02 | - | 9.80E+01 | - |
| Oldham Crompton Batteries Ltd | 4.5A(f) | AO0709 | Lead cpds (particulate) | - | - | - | - | 1.41E+01 | - | 4.15E+01 | - |
| Thermofoil Polymers UK Ltd | 4.5A(f) | AO0598 | Lead | - | - | 2.20E+00 | - | 4.90E-01 | - | 7.57E+00 | - |
| Blue Star Batteries Ltd | 4.5A(f) | AN9395 | Lead | - | - | - | 0.00E+00 | 2.00E-01 | 6.00E+00 | 2.00E-01 | 6.00E+00 |
| Hepworth Building Products | 4.5A(f) | AP5323 | Lead cpds (particulate) | - | - | - | - | - | - | 2.06E+01 | 0.00E+00 |
| GE Lighting Ltd | 4.5A(f) | AK1550 | Lead | - | - | 1.84E+01 | - | - | - | - | - |
| Earnshaw Ltd | 4.5A(f) | AO0750 | Lead | - | - | 4.00E+00 | - | 7.80E-03 | - | 5.00E-03 | - |
| Hepworth Building Products | 4.5A(f) | AP0771 | Lead | - | - | - | - | - | - | - | - |
| Hi-Volt Battery Co. Ltd | 4.5A(f) | AN9425 | Lead cpds (particulate) | - | - | 0.00E+00 | - | 2.80E+01 | - | - | - |
| Polypipe PLC | 4.5A(f) | AP1271 | Lead | - | - | - | - | - | - | - | - |
| Premier Profiles Ltd | 4.5A(f) | AO8122 | Lead cpds (particulate) | - | - | - | - | - | - | - | - |
| Stallite Battery Co. Ltd | 4.5A(f) | AN9433 | Lead cpds (particulate) | - | - | - | - | - | - | - | - |
| RNAY Fleetlands | 4.5A(h) | AV3150 | Lead | - | - | - | - | - | - | - | 7.50E+02 |
| Cookson Matthey Ceramics and Materials Ltd | 4.5A(h) | AO1608 | Lead | - | - | - | - | 0.00E+00 | 0.000E+00 | - | - |
| Keiner and Co. Ltd | 4.5A(i) | AO0415 | Lead | - | - | 0.00E+00 | 0.00E+00 | 2.25E+00 | 3.40E-01 | 5.72E+00 | 2.13E+01 |
| Fisher Scientific | 4.5A(i) | AO2639 | Lead | - | - | - | - | - | 1.28E+01 | - | 1.12E+01 |
| Cookson Matthey Ceramics and Materials Ltd | 4.5A(i) | AN9018 | Lead | - | - | - | - | 0.00E+00 | - | 1.96E-01 | - |
| Harcros Chemicals UK Ltd | 4.5A(i) | AO2671 | Lead | - | - | - | 8.80E+00 | - | 9.40E+01 | - | 5.00E+00 |
| Britannia Alloys and Chemicals Ltd | 4.5A(i) | AO1594 | Lead | - | - | - | - | - | 6.50E+00 | - | 6.30E-01 |
| Ferro (Great Britain) Ltd | 4.5A(m) | AN5349 | Lead | - | - | 0.00E+00 | - | 3.67E+00 | - | 3.22E+00 | - |
| Total emissions from sector 4.5 | | | | 2.28E+00 | 1.87E+01 | 3.43E+03 | 2.33E+02 | 3.46E+03 | 6.08E+02 | 1.88E+03 | 1.60E+03 |

Note 2 2.70E +02 reported to land in 1995, 3.04E +02 to land in 1996

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|-----------|-------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Rechem International | 5.1A(a) | AG7946 | Lead | 2.95E+01 | 2.44E+01 | 9.87E+01 | 9.10E+01 | 3.95E+01 | 7.52E+01 | 1.60E+01 | - |
| Rechem International | 5.1A(a) | AG8047 | Lead | - | 3.00E+00 | - | 5.40E+00 | - | 7.60E+00 | - | 5.80E+00 |
| National Standard Co Ltd | 5.1A(b) | AH4705 | Lead | 2.15E+00 | - | - | - | 4.30E+00 | - | 3.08E+00 | - |
| Defence Test and Evaluation Organisation (Note 3) | 5.1A(b) | AL9530 | Lead | - | - | - | - | 6.50E-01 | - | - | - |
| Northwick Park Hospital NHS Trust | 5.1A(c) | AG8012 | Lead cpds | 4.57E+01 | - | 1.40E+02 | - | 1.08E+02 | - | - | - |
| S Grundon (Waste) Ltd | 5.1A(c) | AG8390 | Lead cpds | 3.40E+02 | - | 3.77E+02 | - | 4.40E+02 | - | 5.84E+02 | - |
| Huntingdon Research Centre Ltd | 5.1A(c) | AG8667 | Lead | 7.61E+00 | - | 7.73E+00 | - | 2.56E+01 | - | 4.73E+00 | - |
| Leigh Environmental Ltd | 5.1A(c) | AK2688 | Lead | 4.76E+01 | - | 1.78E+02 | - | 1.50E+02 | - | - | - |
| RNOH Incinerator Services Ltd | 5.1A(c) | AM2034 | Lead cpds | - | - | - | - | 2.89E+02 | - | - | - |
| Chemviron Carbon Ltd | 5.2A(a) | AG8403 | Lead | - | 0.00E+00 | - | 8.50E-01 | - | 5.58E-01 | - | - |
| Solrec Ltd | 5.2A(a) | AG9248 | Lead | - | - | - | 3.72E+00 | - | 3.27E+00 | - | 1.23E+00 |
| Isle of Wigh County Council | 5.3A(a) | AG9124 | Lead | - | 4.37E-01 | - | 4.85E-01 | - | 2.74E-03 | - | 5.80E-01 |
| Total emissions from sector 5 | | | | 4.73E+02 | 2.78E+01 | 8.01E+02 | 1.01E+02 | 1.06E+03 | 8.66E+01 | 6.08E+02 | 7.61E+00 |
| HM Naval Base | 6.5A(a) | AU8059 | Lead | - | - | - | - | - | - | - | - |
| Pfizer Ltd | 6.9A(a) | AU8083 | Lead | - | - | - | - | - | - | - | - |
| Total emissions from sector 6 | | | | - | - | - | - | - | - | - | - |

Note 3:- 1.00 E+02 reported to land in 1996

Table B.7 Emissions data for palladium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--------------------------------------|---------|-----------|-------------------|---------------------|-------|---------------------|-------|
| | | | | Air | Water | Air | Water |
| Englehard-clal UK Ltd | 2.2A(a) | AS7299 | Palladium | - | - | 8.63E-02 | - |
| Total emissions from sector 2 | | | | - | - | 8.63E-02 | - |
| ICI Chemicals & Polymers Ltd | 4.4A(d) | AP5536 | Palladium | - | - | 7.00E-05 | - |
| ICI Chemicals & Polymers Ltd | 4.4A(d) | AJ9164 | Palladium | 1.00E-05 | - | - | - |
| Total emissions from sector 4 | | | | 1.00E-05 | - | 7.00E-05 | - |

Table B.8 Emissions data for platinum and its compounds to the environment

Information extracted from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth No. | Chemical Released | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|----------|-------------------|---------------------|-------|---------------------|-------|
| | | | | Air | Water | Air | Water |
| Englehard-clal UK Ltd | 2.2A(a) | AS7299 | Platinum | - | - | 4.31E+00 | - |
| Total emissions from sector 2 | | | | - | - | 4.31E+00 | - |
| Johnson Matthey Plc | 4.3A(d) | AL4775 | Platinum | 1.40E+01 | - | 5.50E+00 | - |
| Total emissions from sector 4 (excl 4.5) | | | | 1.40E+01 | - | 5.50E+00 | - |
| ICI Chemicals & Polymers Ltd | 4.5A(f) | AN7554 | Platinum Cpds | 0.00E+00 | - | 0.00E+00 | - |
| Johnson Matthey Plc | 4.5A(e) | AN8712 | Platinum | 1.00E+01 | - | 2.50E+00 | - |
| Total emissions from sector 4.5 | | | | 1.00E+01 | - | 2.50E+00 | - |

Table B.9 Emissions data for selenium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|-----------|-------------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| National Power Plc | 1.3A(a) | AA3204 | Selenium | - | - | - | - | - | - | - | - |
| Powergen Plc | 1.3A(a) | AA2267 | Selenium | - | 0.00E+00 | - | 1.60E+00 | - | 2.80E+00 | - | 1.80E+00 |
| National Power Plc | 1.3A(a) | AA3107 | Selenium Cpds | - | - | - | - | - | - | - | - |
| Total emissions from sector 1 | | | | - | 0.00E+00 | - | 1.60E+00 | - | 2.80E+00 | - | 1.80E+00 |
| Co-Steel Sheerness | 2.1A(a) | AP5986 | Selenium | - | - | - | - | - | 8.00E-03 | - | - |
| Allied Steel and Wire Ltd | 2.1A(a) | AR0322 | Selenium Cpds | - | - | - | - | - | 9.00E-02 | - | 1.00E-03 |
| Alphasteel Ltd | 2.1A(f) | AQ9944 | Selenium Cpds | - | - | - | - | - | 1.67E-01 | - | 2.40E-01 |
| Sanderson Keyser Ltd | 2.1A(f) | AQ9154 | Selenium | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Midlands Lead Manufacturing Company Ltd | 2.2A(a) | AS7027 | Selenium | - | - | - | - | - | - | 1.80E+00 | - |
| Englehard-clal UK Ltd | 2.2A(a) | AS7299 | Selenium | - | - | - | - | - | - | 4.31E-02 | - |
| Britannia Refined Metals Ltd | 2.2A(a) | AS7850 | Selenium Cpds | - | - | - | - | - | - | 0.00E+00 | - |
| HJ Enthoven and Sons | 2.2A(e) | AS7205 | Selenium | - | - | - | - | - | - | 1.50E+00 | - |
| GEO Neale Ltd | 2.2A(e) | AS7248 | Selenium | - | - | - | - | - | - | 3.79E-01 | - |
| Billbrime Ltd | 2.2A(e) | AH4853 | Selenium | 0.00E+00 | - | - | - | - | - | - | - |
| Mining and Chemical Products Ltd | 2.2A(g) | AS2530 | Selenium | - | - | - | - | 2.70E-01 | - | 1.54E+00 | - |
| Ricoh (UK) Products Ltd | 2.2A(g) | AP1263 | Selenium | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| WJ Simpson and Son (Metals) Ltd | 2.2A(i) | AS7698 | Selenium | - | - | - | - | - | - | 1.18E-02 | - |
| Total emissions from sector 2 | | | | 0.00E+00 | - | - | - | 2.70E-01 | 2.65E-01 | 5.27E+00 | 2.41E-01 |
| Vitreous Enamels Ltd | 3.5A(a) | AI1256 | Selenium | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Pilkingtons Tiles Ltd | 3.5A(a) | AI5154 | Selenium | 0.00E+00 | - | - | - | - | - | - | - |
| Total emissions from sector 3 | | | | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |

| | | | | | | | | | | | |
|---|---------|--------|------------------|-----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Abbott Laboratories Ltd | 4.4A(d) | AM0945 | Selenium Cpds | - | - | - | 0.00E+00 | - | 8.00E-01 | - | - |
| Total emissions from sector 4 (excl 4.5) | | | | - | - | - | 0.00E+00 | - | 8.00E-01 | - | - |
| JC Seed Ltd | 4.5A(a) | AN9379 | Selenium | - | - | 6.50E-04 | - | 5.90E-04 | - | 5.69E-04 | - |
| Rare Earth Products | 4.5A(d) | AE7490 | Selenium Cpds | 2.02E-06 | - | 1.90E-05 | - | 0.00E+00 | - | 5.70E-07 | - |
| Johnson Matthey Plc | 4.5A(d) | AN6248 | Selenium | - | - | - | - | 6.27E+01 | 5.23E+02 | 4.10E+00 | 0.00E+00 |
| Johnson Matthey Plc | 4.5A(e) | AN8712 | Selenium | - | - | - | - | 1.00E+02 | 3.19E+02 | 4.10E+00 | 2.50E+02 |
| EEV Ltd (Note 1) | 4.5A(f) | AN8500 | Selenium | - | - | - | - | - | - | - | - |
| Thermofoil Polymers (UK) Ltd | 4.5A(f) | AO0598 | Selenium | - | - | 3.50E-01 | - | 3.00E-02 | - | 7.45E-01 | - |
| Earnshaw Ltd | 4.5A(f) | AO0750 | Selenium | - | - | 2.00E-01 | - | 4.00E-04 | - | 2.00E-04 | - |
| Gallows Green Services Ltd (Note 2) | 4.5A(f) | AO1306 | Selenium | - | - | 0.00E+00 | 0.00E+00 | 1.79E-04 | 3.20E-04 | 2.25E-04 | 2.60E-04 |
| GBL Ltd | 4.5A(f) | AO2469 | Selenium | - | - | 1.76E-02 | 0.00E+00 | 1.76E-02 | 1.11E-05 | 0.00E+00 | 7.00E-06 |
| Cookson Matthey Ceramics and Materials Ltd | 4.5A(g) | AO0032 | Selenium | - | - | - | - | 0.00E+00 | - | - | - |
| Cookson Matthey Ceramics and Materials Ltd | 4.5A(h) | AO1608 | Selenium | - | - | - | - | - | 0.00E+00 | - | - |
| Total emissions from sector 4.5 | | | | 2.02E-06 | - | 5.68E-01 | 0.00E+00 | 1.63E+02 | 8.42E+02 | 8.95E+00 | 2.50E+02 |

Note 1 :- 1.00E -03 reported to land in 1995

Note2 :- 9.00E -01 reported to land in 1994, 9.63E -01 in 1995, 8.00E-01 in 1996

Table B.10 Emissions data for tellurium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|-----------|-------------------|---------------------|----------|---------------------|----------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Midlands Lead Manufacturing Company Ltd | 2.2A(a) | AS7027 | Tellurium | - | - | - | - | - | - | 1.80E+00 | - |
| Britannia Refined Metals Ltd | 2.2A(a) | AS7850 | Tellurium cpds | - | - | - | - | - | - | - | - |
| HJ Enthoven and Sons | 2.2A(e) | AS7205 | Tellurium | - | - | - | - | - | - | 1.10E+00 | - |
| GEO Neale Ltd | 2.2A(e) | AS7248 | Tellurium cpds | - | - | - | - | - | - | 3.56E-02 | - |
| Billbrime Ltd. | 2.2A(e) | AH4853 | Tellurium cpds | 0.00E+00 | - | - | - | - | - | - | - |
| Mining and Chemical Products | 2.2A(g) | AS2530 | Tellurium | - | - | - | - | 1.37E-01 | - | 9.40E-01 | - |
| Ricoh (UK) Products Ltd | 2.2A(g) | AP1263 | Tellurium | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Total emissions from sector 2 | | | | 0.00E+00 | - | - | - | 1.37E-01 | - | 3.88E+00 | - |
| Rare Earth Products | 4.5A(d) | AE7490 | Tellurium cpds | 6.60E-07 | - | 1.90E-06 | - | 0.00E+00 | - | 5.70E-08 | - |
| Johnson Matthey Plc | 4.5A(e) | AN8712 | Tellurium | - | - | - | - | - | 2.90E+00 | - | 5.84E+00 |
| GBL Ltd | 4.5A(f) | AO2469 | Tellurium cpds | - | - | 8.70E-04 | - | 8.70E-03 | - | 0.00E+00 | - |
| GEC Marconi Infra-Red Ltd | 4.5A(h) | AN9093 | Tellurium | - | - | 1.00E-03 | - | 1.00E-03 | - | 1.00E-03 | - |
| BP Solar Ltd | 4.5A(h) | AN8178 | Tellurium | - | - | - | - | - | 1.45E-05 | - | 3.20E-05 |
| Total emissions from sector 4.5 | | | | 6.60E-07 | - | 1.87E-03 | - | 9.70E-03 | 2.90E+00 | 1.00E-03 | 5.84E+00 |

Table B.11 Emissions data for thallium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|------------------------------------|---------|-----------|-------------------|---------------------|----------|---------------------|-------|
| | | | | Air | Water | Air | Water |
| Midlands Lead Manufacturing Co Ltd | 2.2A(a) | AS7027 | Thallium | - | - | 1.80E+00 | - |
| Hilger Analytical Ltd | 4.5A(d) | AO0512 | Thallium Iodide | 2.72E+00 | - | 9.85E-01 | - |
| Total emissions | | | | 2.72E+00 | - | 9.85E-01 | |

C. CADMIUM AND MERCURY

C.1 Summary details of companies registered under 4.5 A (g/h)

C.1.1 Production / recovery 4.5 A (g)

AO0032 COOKSON MATTHEY CERAMICS AND MATERIALS LTD
Manufacture of cadmium sulphide pigments from cadmium metal.
Releases to air - cadmium, particulates, hydrogen sulphide, selenium, sulphur dioxide.
Releases to water - cadmium.

AU7745 RACO PROCESSES LTD
Cadmium plating operations and other plating operations using zinc, tin and silver. Local extraction exhausts are used, which discharge to three release points. Two of these points are extracted through wet scrubbers which are operated batchwise. The spent caustic liquors from which are treated in the same manner as the waste water streams. The third extraction point only sees the vapour from the water sealing baths. Cadmium rinse liquors and other cyanide rinse liquors are combined and treated with sodium hypochlorite to react out the cyanide. The liquor is then routed to the deionising plant. The conductivity of the return liquor is monitored and when it becomes too high the deionising unit is regenerated using sodium hydroxide and hydrochloric acid solutions.
Releases to air - metals and acid gases.
Releases to water - cadmium, chromium, copper, lead, nickel, zinc, silver, suspended solids and cyanides.

AL5976 NIPA LABORATORIES
Manufacture of potassium mercuric iodide, for sale as a bactericide.
Release to air - mercury and its compounds, iodine.
Releases to land - NP solids.
Abatement equipment - fume extracted from reactors is scrubbed using potassium iodide in a jet venturi scrubber.

AO1993 PHOSPHOR TECHNOLOGY ...
Manufacture of phosphors and inorganic luminescent materials for use in cathode ray tubes, x-ray intensifier screens, security printing, scintillation counting and other applications. Basically cadmium powders used.
This authorisation is specifically for the manufacture of phosphors containing cadmium. The process comprises of weighing of raw materials in fume cupboards, wet mixing of the materials, drying in an electric oven, crushing of the dry materials in a fume cupboard, firing of the materials, milling of the cooled phosphors, washing of the product to remove any excess cadmium containing flux, filtering of the washed phosphor, drying and then sieving before blending for despatch. The wet mixing, grinding, firing, drying, and product packaging operations are vented to a venturi scrubber, using sodium carbonate, and then discharged to atmosphere. All cadmium containing liquid effluent, including spent scrubber liquor, is treated with sodium carbonate followed by co-precipitation with zinc sulphate and sodium sulphide. The effluent is then filtered and discharged to sewer.

Releases to air - cadmium, gallium, indium, particulates.

Releases to water - cadmium, chromium, copper, lead, mercury, nickel, zinc.

Releases to land - cadmium, NP-solids.

C.1.2 Use / release - 4.5 A (h)

AO9706

ROSE BEARINGS LTD

Cadmium plating for the aerospace industry - preparation, plating and passivation operations.

Releases to land - cadmium, chromium, copper, mercury, nickel, zinc.

Releases to water - cadmium, chromium, copper, mercury, nickel, zinc.

AV1653

MARSHALL OF CAMBRIDGE AEROSPACE LTD

Cadmium electroplating process used to apply surface coatings to aerospace components.

Releases to land - cadmium.

Releases to water - cadmium, mercury.

AN8976

ASHTON AND MOORE LTD

Cadmium plating of small metal components for the defence and aerospace industries. The cadmium plating line consists of two lines of tanks; cleaning, pre-treatment and cadmium plating; and post-plating passivate solutions. An ion exchange plant is installed on the rinse tanks, allowing the rinse waters to operate in a closed loop system with no discharge to drain. The ion exchange plant includes a cation column for cadmium removal and an anion column for cyanide removal. To reduce the load on the ion exchange plant a static drag out tank is used between the plating and rinsing tanks. Similarly on the passivate line there is a cation exchange column for chromium removal and an anion exchange column for sulphate and other anions. The solution in the static rinse tank is returned to the chromate passivate and clear passivate tanks.

The ion exchange resins are regenerated periodically using a concentrated salt solution. Effluent generated from regeneration is drummed and sent for off-site disposal.

Liquid effluent from tanks discharging to drain are directed to three collection sumps; alkali and cyanide rinses collection sump; acid and chromium rinses collection and acid rinses collection sump. Alkali and cyanide rinses are transferred to a treatment tank for cyanide oxidation with sodium hypochlorite and is then sent to the pH control tank. Acid and chromium rinses from the other two collection sumps are transferred to the chromium treatment tank for reduction to trivalent chromium with sodium metabisulphite and then is sent to the pH control tank. Caustic soda is added to the pH control tank to precipitate metal hydroxides. The effluent is then sent to a coagulation tank where polyelectrolyte is added to aid settlement in the following settlement tank. The settled sludge is then taken off to a filter press, from where the filtrate is sent back to the acid rinses collection sump and the filter cake is stored awaiting off-site disposal. The liquor from the settlement tank is transferred to a final sump from where it discharges to sewer. Spent cadmium plating solutions, passivate solutions, hydrochloric acid based stripping solutions and effluent from regeneration of ion exchange resins are drummed and placed in a caged drum storage area prior to collection for treatment and disposal off-site.

Variation AT3086 - This variation introduces the cadmium recovery system on both the cadmium plating line and the passivate line. All rinsewaters are recycled through the cadmium recovery cells and ion exchange columns. There is now no routine discharge to sewer from the process.

Variation AZ6002 - Reduction in monitoring frequency and review of improvement programme. Releases to water - cadmium, mercury.

AO1390

JAMES M BROWN LTD

Manufacture of cadmium pigments. Cadmium red pigments are based on the $\text{CdS}_x\text{Se}_{1-x}$ matrix and yellow pigments on the $\text{Cd}_x\text{Zn}_{1-x}\text{S}$ matrix. These pigments are produced by precipitation from cadmium sulphate solution using sodium sulphide solution. The shade of the red pigments is determined by the amount of selenium dissolved in the sodium sulphide before precipitation. Similarly the shade of the yellow pigments depends on the amount of zinc sulphide. The pigment precipitation process leaves essentially no cadmium remaining in solution. After precipitation the pigment slurry is filter pressed and washed with water to remove any sodium sulphate solution. The filtrate and washings from the filter press are sent to the effluent treatment plant. The raw pigment is then dried and calcined to alter the crystal form and develop the properties associated with pigments. Then fired pigment is then ground and acid washed to remove the small quantity of cadmium that may have formed during the calcining process. The pigment is then washed and dried, all washings being routed to the effluent treatment plant. Manufacture of pigment/organic concentrates, "Dypols" is also carried out. These are pigments which are dispersed in an organic carrier medium. The manufacturing process involves the correct weights of pigment and carrier being mixed and melted before discharge into water, producing uniform pellets. The cooling water from this process is directed to the effluent treatment plant. The operator also produces blended pigments which consist of cadmium pigments and brought-in organic and inorganic pigments.

Abatement techniques - the weighing of raw materials for all processes is performed under local exhaust ventilation. Wherever possible waste pigments are separated into shade groups and added to future batches.

The effluent treatment plant takes in mixed effluent and it is treated batchwise with sodium carbonate until the pH is close to pH 9. Under these conditions the solubility of cadmium is very low. The effluent is then pumped to filter presses to remove both the suspended cadmium pigment and the precipitated zinc and cadmium carbonates. The pH of the filtrate is continuously monitored and the plant will "trip" if it varies from a given pH range. Further commercially confidential treatment of the effluent is also carried out.

The solid residue from the effluent treatment plant containing cadmium and zinc carbonates and pigment residues. The operator employs two processes for recovering cadmium from this residue. One process is commercially confidential. The second process involves slurring the residue with water and then adding sulphuric acid to take up the carbonate until pH 1 is obtained. The resulting solution of cadmium sulphate is decanted from the residue and re-precipitated as the carbonate. The carbonate is then recovered on a filter press and then dissolved in sulphuric acid. This cadmium sulphate solution can then be used in pigment manufacture, once trace inorganic impurities have been removed. The residue is washed and packed to be periodically shipped abroad to zinc/cadmium refineries for use as feedstock.

AO1608

COOKSON MATTHEY CERAMIC AND MATERIALS LTD

Batchwise production of a range of over 400 base colours. Includes production of orange and red pigments which comprise cadmium sulpho-selenide pigments encapsulated in zirconium silicate. The basic process steps are weighing of raw materials, mixing, calcining, cooling crushing, wet grinding in ball mills, drying and then further processing (underglaze/glaze stain/body stain, aqueous dispersions, organic dispersions and dry pigment blends). After wet milling the cadmium inclusion colours slurry is discharged into a steam-heated vat (60-80°C) and washed with a mixture of sulphuric acid and hydrogen peroxide, to remove unencapsulated cadmium pigment and free cadmium. After cooling to 30°C the contents of the vat are pumped through a filter press.

The first 600 gallons of concentrated washings are collected for soluble cadmium removal by precipitation with sodium carbonate at pH 9.5. The precipitate is then collected by filtration and the presscake is stored in bulk containers for transport off-site as special waste. The remainder of the washings is sent to the site effluent treatment plant. All operations which may lead to airborne dust generation are carried out under local exhaust ventilation systems which discharge to atmosphere via a bag filter installation. The calcining kilns are exhausted to atmosphere via stacks and production areas have internal floor drains which lead to the site's effluent treatment plant. All waste released to land is removed from site by licensed waste disposal contractors.

Release to water - cadmium, chromium, copper, fluorides, lead, selenium, sulphates, zinc.

Release to air - hydrogen chloride, hydrogen fluoride, lead, nitrogen oxides, particulates (antimony, lead, manganese, nickel, zinc, cadmium, selenium, chromium, barium), sulphur dioxide, VOC's

AU4215 ABBEY METAL FINISHING CO LTD

Cadmium plating process. The process can be divided into two main stages; pretreatment and cadmium plating/post treatments. Pretreatment consists of alkaline cleaning and acid etching/pickling. The rinse water from this section of the line is part of the recycled deionised water system. This water can pass through the deionisers up to eight times a day. The deionisers backwash once a day and this is sent to the effluent treatment plant. Cadmium plating and post treatments of passivation and stripping take place separately in a bunded area and this line has a completely separate water treatment system. This water treatment system consists of electrolytic recovery of cadmium using a Chemelec cell from dragout tank water, and ion exchange treatment of the rinse waters (closed loop system). The conductivity is monitored and when it rises to a certain level the unit alarms out and regeneration is initiated. The backwash is sent to a tank where the pH is controlled as to maximise the precipitation of cadmium as cadmium hydroxide. The precipitate is allowed to settle and then the liquor is discharged to sewer and the sludge remains in the backwash tank. When sufficient sludge has accumulated it is sent for disposal.

Releases to water - cadmium.

AN6990 CROMPTON LIGHTING

Manufacture of incandescent lamps. Paints used contain cadmium pigments. Bag filters are used on the exhausts from paint spraying operations. Washing of containers and equipment is needed between colour batches so that no contamination occurs. The washings are discharged to sewer via two weired sedimentation tanks which remove solids.

Releases to air - cadmium, particulates.

Releases to land - cadmium.

AN8372 BRITISH AEROSPACE DEFENCE

Cadmium plating process. Cadmium is recovered from the contaminated water in the static rinse tanks, by electro-deposition onto titanium electrodes in Chemelec cells. The electrodes are then transferred to the plating tanks where the cadmium redissolves and can then be reused. Rinse waters are provided for by a closed loop ion exchange system which removes anions and cations from the circulating solution. The ion exchange resins are regenerated using sodium hydroxide and hydrochloric acid. Cadmium is then recovered from the regenerant in the Chemelec cell. Effluent from the Chemelec cell is directed to the effluent treatment plant for pH adjustment, causing metal hydroxide to precipitate which can then be removed from the liquid effluent. A caustic scrubber is used to abate air emissions of acid gases.

Releases to water - cadmium.

AN8402 RAYOVAC EUROPE

Manufacture of mercuric oxide/zinc button cell batteries. Use bag filters and back-up bag filters in case of failure.

Releases to air - mercury, propan-2-ol, toluene, trichloroethylene.

Releases to land - mercury.

Releases to water - mercury.

AN9174 AP PRECISION HYDRAULICS

Cadmium electroplating of aircraft undercarriages. Contaminated rinse water from dragout tanks is routed to a BEWT Chemelec cell which removes the cadmium, allowing the water to be recycled back to the dragout tanks. Other rinse waters are routed to the effluent treatment plant for cyanide and sodium bisulphite treatment. It is then neutralised to precipitate metal sulphides, which then are allowed to settle. The liquor is then discharged to sewer and the solids sent to landfill. Other wastes are sent for licensed disposal.

Releases to land - cadmium.

Releases to water - cadmium, trichloroethylene.

AN9417 SILVERFIELD LTD

Cadmium plating process. Cadmium is applied as an electro deposited surface layer onto components for use in the aerospace industry, to provide corrosion protection. Initially, a layer of nickel is applied to the components and then the cadmium plating is achieved by immersion in a bath of cadmium cyanide.

Releases to air - trichloroethylene.

Release to water - cadmium.

Abatement - acid and alkali rinse waters are collected and treated separately. The acid effluent is treated with sodium metabisulphite to reduce hexavalent chromium to its trivalent form. The alkali effluent is treated with sodium hypochlorite to destroy any cyanide. The two effluents are then mixed and the pH is raised to precipitate out the metals as hydroxides. These metal hydroxides are then collected and sent for off-site disposal.

AN9883 KING & FOWLER LTD

Electroplating of steel copper and brass with cadmium. The main liquid effluent is contaminated rinse water which is sent to the site effluent treatment plant where it is mixed with other site effluents. The pH is adjusted, causing metal precipitation which settle. The clear liquor is then discharged to sewer and the solids collected for off-site disposal.

Releases to land - cadmium.

Releases to water - cadmium, trichloroethylene.

AO2426 LUCAS AEROSPACE ENGINE CONTROL SYSTEMS LTD

Cadmium plating process for electroplating aircraft components. Use of sodium cyanide and cadmium oxide. The liquid effluent produced comprises of contaminated rinse water. This is directed to the site effluent treatment plant where it mixes with other site effluents. At the effluent treatment plant metal hydroxides, including cadmium hydroxide are partially precipitated by adjusting the pH. The solids settle out and the clear liquor is discharged to sewer. The settled solids are then collected and sent to landfill. Other wastes are removed off site for licensed disposal.

Releases to land - cadmium.

Releases to water - cadmium, trichloroethylene. Releases to air - trichloroethylene.

AS6578

CML GROUP LTD

Electroplating Fe/Cu alloys with cadmium.

Releases to water - cadmium.

Abatement equipment - BEWT system removes cadmium from water.

AU1909

AKCROS CHEMICALS

Batch manufacture of a range of metal caboxylate soaps and subsequent blending of the soaps with other substances, including phosphite esters, dilutents and solvents. Also production of metal phenates/phosphites by batch incineration of metal oxides, hydroxides or carbonates, with phosphite esters, phosphorus acid, or mixtures thereof.

Release to air - metal (alkali and alkaline earth metals, cadmium, zinc, cobalt, strontium, and tin) oxide/hydroxide dusts and VOC's.

Release to water - solvents, metal salts, phenol, ethoxylates and other organics.

Release to land - filter cake, dust extraction (including metal oxides/hydroxides and organics).

AN7813

SOUTH WEST METAL FINISHING

Cadmium plating and bright dipping process - chemical cleaning involving alkaline soak and electro cleaning, acid pickling, sulphuric acid etching and undercoating. Cadmium plating and passivation. Wet scrubbers for air emissions. Aqueous effluent treated by oxidation, reduction, neutralisation and settlement stages. Metals removed as a hydroxide cake by filter press.

Releases to water - cadmium.

Releases to air - chlorine, nitrogen oxides.

AN9409

WESTLAND ENGINEERING LTD

Cadmium plating process involving the preparation of the substrate by removal of any previously applied cadmium, vapour degreasing, acid etching and applying undercoats where necessary followed by cadmium plating and passivation.

Gaseous effluent is evolved during degreasing operations are contacted with a cooler condenser before discharge to atmosphere. All aqueous effluents from the rinsing operations are collected in a holding tank and discharged untreated to the general site effluent system.

Variation AZ5324 introduced a cadmium control system designed to ensure zero cadmium discharge. The system involves the conversion of the standard continuous "drag-out" rinsing tanks to static rinse tanks and the use of a BEWT electrolytic cell to recover 99.5% of the cadmium drag out. The cadmium is stripped from cathodes of the cell in the cadmium strip bath from where it passed to a double skinned and banded cadmium anion waste storage tank before disposal. Furthermore the three running rinse tanks are connected to a closed loop system which circulates the contaminated rinse water through an ion exchange system, reducing the cadmium content to an almost demineralised quality, and back to the rinse tanks for reuse. The ion exchange system consists of carbon filters and anion/cation units. The water discharged from the ion exchange plant is monitored with a conductivity meter. At a predetermined conductivity the ion exchange plant is manually regenerated (approximately every 2 months). The regeneration is achieved using hydrochloric acid and sodium hydroxide solutions. The waste regenerant solutions are stored in a double skinned and banded waste storage tank before disposal.

Releases to air - trichloroethylene

Releases to water - cadmium.

AN9972

FLIGHT REFUELLING LTD

Chemical plating operations typically consisting of preparing the substrate by chemical cleaning and acid etching, applying undercoats where necessary and then cadmium plating followed by passivation. Low temperature stress relief and de-embrittlement techniques are also used where appropriate. Titanium pickling, and aluminium brightening processes are also performed on site. The cadmium plating rinse waters are treated by a BEWT water treatment plant comprising ion exchange columns. The effluent from the regeneration of the ion exchange resins passes to the effluent treatment plant before discharge to sewer. The effluent treatment plant comprises of oxidation, reduction, neutralisation and settlement stages. The metals are precipitated as hydroxides and removed as filter cake by filter press. The filter cake is subsequently sent to landfill through a licensed contractor.

Releases to air - hydrogen fluoride, nitrogen oxides.

Releases to water - cadmium, mercury.

AO0881

GKN WESTLAND INDUSTRIAL PRODUCTS LTD

Cadmium plating process consisting of three stages; pre-treatment, cadmium electroplating and post treatment. Pre-treatment involves all items undergoing a degreasing operation using trichloroethylene, followed by stress relieving, masking, vacuum-blasting and alkaline clean. Also depending on the metal to be plated a thin coating of nickel is applied to improve adhesion of the cadmium, or alternatively a sulphuric anodic etch treatment is available, and any previously applied cadmium is stripped using a solution of ammonium nitrate. Cadmium electroplating is achieved electrolytically from a sodium cyanide solution, followed by a cold and a warm water rinse. Post treatments include, removal of maskant with trichloroethylene, a dichromate dip to remove any cyanide, de-embrittlement, reactivation, cadmium passivation and further water rinses. At the time of issuing the authorisation, all liquid effluent entered the drainage system. However the operator intended to install a closed-loop effluent treatment system within the eighteen months prior to the authorisation. The closed-loop system involves positioning the entire cadmium plating process in a bunded area and recirculating rinsewater through an ion exchange system for reuse in the rinse baths. Gaseous effluent evolves from the degreasing operations and is vented to air after passing over cooling coils.

Releases to water - cadmium, mercury.

Releases to air - trichloroethylene.

AO8386

MOORES (WALISDOWN) LTD

Cadmium plating process involving preparing the substrate by chemical cleaning, acid etching and application of undercoats where necessary, followed by the cadmium plating and finishing treatments of passivation, low temperature stress relief and de-embrittlement. A BEWT water treatment plant is employed to treat the cadmium containing rinse water. The spent regenerant from the ion exchange columns which contains less than 5µg/l of cadmium passes to an effluent treatment plant using oxidation, reduction, neutralisation and settlement stages. Metal hydroxide sludge is removed from the effluent and the remaining filtrate is then discharged to sewer. The sludge passes to a further settlement stage prior to being transported off-site by contractor for disposal.

Releases to land - cadmium, Releases to water - cadmium.

AP3754

BRITISH AEROSPACE AIRBUS LTD

Cadmium plating process consisting of sulphuric acid anodic etch (ferrous components) and nickel strike (non-ferrous components), cadmium plating and chromate passivation. Rinse baths are necessary after each of these operations. The contaminated rinse waters from the etching and strike operations are directed to the site effluent treatment plant prior to discharge to sewer. The post cadmium plating rinse waters are maintained within a closed loop ion exchange system which removes cadmium and chromium from the contaminated rinse waters and recycles it back to the rinse baths. The ion exchange resin is periodically regenerated resulting in spent regenerant containing small amounts of cadmium, which is removed off-site for disposal.

Releases to air - nitrogen oxides, sulphur oxides.

Releases to land - cadmium.

AS3307

FAIREY HYDRAULICS LTD

Cadmium electroplating process for components used in the aerospace industry. Plating line consists of three main stages; pre-treatment of the substrate (vapour degreasing etc.), cadmium plating and post-treatment (rinsing and passivation). All of the process stages involving cadmium are connected to a cadmium control system designed to ensure zero cadmium discharge. The system uses electrolytic cells and ion exchange columns to remove the cadmium from the aqueous effluent. The resulting liquor is almost of demineralised water status and is then recycled back to the process. Cadmium recovered by the electrolytic cells is also recycled back to the process. Periodically the ion exchange columns are regenerated using hydrochloric acid (cationic resin) and sodium hydroxide (anionic resin). The spent hydrochloric acid regenerant will contain cadmium so this is then further passed to another electrolytic recovery cell. The resultant liquor from the cell may be further treated to remove cadmium in an ion exchange column before disposal off-site. The cadmium recovered in the secondary cell is too impure to reuse and so is also disposed of off-site. The spent sodium hydroxide regenerant will not normally contain any cadmium, however this may be directed via a cation polishing column before discharge to process drain where it mixes with effluent from other site processes for treatment before release to sewer.

Releases to air - trichloroethylene.

Releases to water - cadmium.

AW9439

CROSS MANUFACTURING CO (1938) LTD

Cadmium plating process. Variation AB1234 prevents the operation of the cadmium plating line after the 1 October 1998. This is due to the decision by the operator to shut down the line rather than carry out environmental improvements. The process produces an aqueous effluent containing cadmium which is pH adjusted using sodium hydroxide to precipitate out the cadmium hydroxide which are removed from the effluent by filtration. The effluent then enters a settlement tank prior to discharge to sewer.

Release to water - cadmium, mercury.

AB3048

DEUTTSCH LTD

Cadmium plating process for products used by the military. The plating line comprises of a plating bath and two rinse tanks, one static and the other running. The rinse baths are fitted with a BEWT electrolysis system to remove the cadmium from the rinse water. An etching line is also used which involves a running rinse bath. The rinse water from this operation and the running rinse water from the plating line, passes through an ion exchange column which removes the cadmium from the water. The resin is then regenerated with sulphuric acid solution. The spent

acid containing cadmium is then passed through another electrolytic cell to plate out the cadmium.

Releases to land - cadmium.

AN9093 GEC MARCONI INFRA-RED

Manufacture of infra-red detectors based on mercury cadmium telluride (MCT).

Releases to air - cadmium, mercury, tellurium.

Releases to water - cadmium, mercury.

AO0504 WESTLAND AEROSPACE AIRBUS LTD

Cadmium plating of aircraft component parts.

Releases to land - cadmium compounds.

Releases to air - trichloroethylene.

AO1748 PORTSMOUTH AVIATION LTD

Cadmium plating of aircraft component parts.

Releases to land - cadmium compounds.

Releases to water - cadmium compounds, chromium compounds, cyanides, mercury compounds, nickel compounds.

AO5085 BF GOODRICH

Cadmium plating of aircraft components. Other plating operations chrome, nickel etc. not covered. The plating and associated operations, such as cadmium stripping with ammonium nitrate, degreasing with trichloroethylene and chromate passivation, are carried out in a dedicated plating workshop. The plating is achieved using a solution consisting of cadmium oxide, sodium cyanide and sodium hydroxide. The plating operation is followed by a rinse stage. The water from this stage is continuously recycled through an ion exchange system. This is followed by chromate passivation and another rinse stage. The cadmium plating operations is bundled within the main bunding for the whole process. Any cadmium containing waste that is released to the bund, is then directed to a dedicated holding tank and is collected periodically by licensed waste disposal contractors. The rinse waters from the process are passed through a mixed resin bed to remove cadmium and cyanide. Waste from this process and from the passivation, stripping and cleaning operations are also disposed of by a waste disposal contractor.

Variation AZ6070 - this variation introduces the inclusion of the Nital Etch line and the fact that the cadmium rinse tanks are no longer in the cadmium plating tank bund. The Nital Etch line consists of a number of acid tanks and rinse tanks.

Releases to land - ammonium nitrate, cadmium compounds, cyanides, sodium dichromate, sulphuric acid, trichloroethylene.

AS0421 AJ WELLS & SONS

Vitreous enamelling process to produce certain colours which contain cadmium pigments.

Releases to air - cadmium.

Releases to water - cadmium.

Releases to land - cadmium.

Abatement equipment - use of dry filters, water bath for emissions reduction.

AV3150 RNAY FLEETLANDS

Cadmium plating process.

Releases to land - cadmium, chromium, cyanides, mercury.

Releases to water - cadmium, chromium, copper, lead, mercury, nickel, silver, zinc.

Releases to air - trichloroethylene.

AN7333 AVDEL SYSTEMS LTD

Cadmium plating of fastner components. The components are cleaned in several stages before the cadmium is electroplated. Excess plating solution is then rinsed off and the components dried.

Waste from the rinsing stage is sent to the effluent treatment plant where the cadmium content is reduced by hydroxide precipitation, flocculation and settlement, before discharge to sewer.

Sludge from the effluent treatment plant is disposed of to landfill.

Releases to water - cadmium.

AN7481 ROBERT STUART PLC

Cadmium plating process using an alkaline cyanide solution. After the plating bath, the components are rinsed in the drag out bath to remove the majority of the plating solution. This static rinse solution is used to top up the plating bath when required. The components are then rinsed in a bath of constant running water and it is the effluent from this operation that forms the majority of the process effluent. The process effluent is treated in the on-site effluent treatment plant, which also receives effluent, in much larger quantities, from other non-prescribed processes on site.

Releases to water - cadmium, mercury.

Releases to land - cadmium containing sludge from effluent treatment plant. The glass plates are cleaned and then plated. They are then removed from the plating bath and drained before being rinsed in a rinse bath. Periodically the drag out and rinse waters are sent to the effluent treatment plant where cadmium is electrolytically recovered in a Chemelec cell which can then be reused as anodic material. All running rinse waters from the process are passed to a cation and anion ion exchange plant through which the solution is recirculated until the conductivity reaches a set point, at which time it is discharged to sewer. Periodically the ion exchange resins are regenerated with sulphuric acid (cation) and sodium hydroxide (anion). The spent regenerant is stored in a tank awaiting disposal elsewhere.

AN8178 BP SOLAR LTD

Plating of glass with cadmium sulphide and cadmium telluride.

Releases to water - cadmium, mercury, sulphides, tellurium.

Releases to land - NP solids.

AN9450 WEST MIDDLESEX PLATING CO LTD

Electrodeposition of cadmium. The plating process is operated in a bunded area which is not connected to any drain or sewer. The system was designed and built to operate with "zero discharge" for cadmium. The electrodeposition of cadmium is achieved in an aqueous cyanide solution. After leaving the plating bath the items are rinsed in a water bath. This rinse bath is fitted with an electrolytic recovery cell which removes cadmium and destroys the cyanide. The remainder of the process is made up of five water tanks and three treatment tanks. The water tanks are connected to an ion exchange plant which maintains a pure water status which is indicated by a conductivity meter. The ion exchange resin is regenerated with sulphuric acid. The spent regenerant is passed through a recovery cell to remove the small amount of cadmium

present. It is then passed to a holding tank and then through a still to reuse the volume of the aqueous effluent by recovering distilled water, which is returned to the process. The resulting effluent is removed from the site periodically for disposal by contractors. The cadmium recovered from the process by the two electrolytic cells is stored on site for possible use as anode material for the plating operation.

Releases to land - cadmium.

AN9492 TRINITY AEROSPACE ENGINEERING LTD

Electrolytic cadmium plating process for aircraft components used in the civil aviation sector. The dedicated plating line is separately bunded and within the main bund the plating and passivation operations are individually bunded, as too are the areas for storage of process materials and waste products. The process consists of a number of stages; cleaning of the substrate in an alkaline soak solution; cadmium plating in cyanide solution, dragout rinse in de-ionised water, followed by three more static rinse baths and finally passivation in sodium dichromate and sulphuric acid followed by a drag out rinse and three rinse baths. All solid and liquid wastes are disposed of to a licensed waste disposal contractor.

Releases to air - trichloroethylene.

Releases to land - ammonium nitrate, cadmium compounds, cyanides, sodium dichromate, sulphuric acid.

AO0105 DALER ROWNEY LTD

Cadmium pigments are used in the production of artists paints. Operations that involve handling of powders are fitted with local exhaust ventilation which discharge to atmosphere via bag filters. There is an effluent treatment plant which treats liquid effluent to remove cadmium before it discharges to sewer. All solid waste which may be contaminated with cadmium are disposed of to land as special waste in sealed drums. The sludge from the effluent treatment plant is also disposed of to land.

Releases to land - cadmium compounds.

Releases to water - cadmium compounds, mercury compounds.

AO0539 COLART FINE ART AND GRAPHICS LTD

Batchwise production of artists paints which contain cadmium pigments. The process operations that involve handling of powders are fitted with local exhaust ventilation which discharge to atmosphere through bag filters. There is an effluent treatment plant which treats the aqueous effluent to remove cadmium before discharge to sewer. All solid waste which may contain cadmium are disposed of to land as special waste in sealed lined metal skips.

Releases to water - cadmium compounds, mercury compounds.

Releases to land - cadmium compounds.

A01063 GE LIGHTING

Use of mercury in the manufacture of fluorescent tubes and lamps.

Releases to air - ammonia, mercury, sulphur dioxide, particulates.

Releases to water - mercury, cadmium.

Releases to land - waste glass contaminated with mercury, dirty mercury and associated contaminated wastes, mercury contaminated vacuum pump oil, filter bags with particulate contamination. N.B mercury contaminated liquid waste are sent for further off-site processing before final disposal.

Abatement equipment - packed bed, ammonia scrubber, using sulphuric acid, on phosphorus plant. Bag filters on phosphorus milling/blending plant and waste glass compaction plant. Sulphur dioxide scrubber for storage facilities. Cryogenic mercury removal system on fine vacuum plant.

AO1691 COLTAX AEROSPACE LTD

Cadmium plating of aircraft components for both civil and military applications. Components are cadmium stripped, if needed, in ammonium nitrate solution and/or cleaned in an alkaline soak solution before being cadmium plated. After the plating bath, the components are passed through a static rinse bath, followed by further rinses, before passivation in sodium dichromate and sulphuric acid, which is again followed by further rinses. Effluent from the running rinses is fed to a cadmium effluent sump from where it is directed to the effluent treatment plant where it is treated with sodium hydroxide and sulphuric acid. This precipitates out the cadmium which forms a sludge which is tankered off-site by a licensed waste disposal contractor and the treated effluent is discharged to sewer.

Releases to air - trichloroethylene.

Releases to land - ammonium nitrate, cadmium compounds, cyanides, sodium dichromate.

Releases to water - cadmium, mercury.

AO2965 RADIANT METAL FINISHING PLC

Cadmium plating of components for use in the defence, aerospace and marine sectors. The plating line consists of a number of solution baths for cleaning, pre-treatment, plating, drag-out and rinsing of the articles. An electrolytic recovery cell is used to recover cadmium from the drag out solution, which is then reused in the process. The main source of effluent from the process is from the rinse baths which is routed directly to the effluent treatment plant which comprises of a carbon filter and cation and anion exchange columns. The spent regenerant from the cation resin is passed through an electrolytic cell and ion exchange column to remove cadmium before it is discharged to sewer. The spent anionic regenerant is discharged directly to sewer. All solid waste and spent passivation solution are disposed of by licensed waste disposal contractors.

Releases to water - cadmium, mercury.

AO5336 HUNTING AVIATION

Cadmium plating of metal components. The items, if required, are stripped in ammonium nitrate solution and then rinsed. All items to be plated are degreased in trichloroethylene prior to being plated. The plating solution used is cadmium cyanide, and once the plating is complete the components are drained and placed in a static rinse tank which is fitted with a Chemelec cell which electrolytically removes 99% of the cadmium from the rinse water and destroys the cyanide. The component is then further rinsed in counter current water rinse baths before more cleaning and passivation in a chromate solution bath. This is followed by further rinsing and then the finished article is then dried. The counter current rinse waters are continuously circulated through cation and anion exchange resins to remove heavy metals which can then be reused in the process. Periodically the ion exchange resins must be regenerated (indicated by the conductivity of the exiting water reaching a pre-set level). The spent regenerant is transferred to a storage tank from where it is passed through a Chemelec cell before discharge to sewer. Spent passivation solution cadmium sludges and trichloroethylene are collected and sent for disposal off-site.

Releases to air - 1,1,1-trichloroethane.

Releases to water - cadmium, chromium, cyanides, mercury, zinc. Releases to land - NP solids.

AO7452

WALKER AEC LTD

Cadmium plating process comprising of degreasing with trichloroethylene, pre-cleaning by electrolysis in a cyanide anodic/cathodic solution, rinsing with water, cadmium plating in a bath of cadmium cyanide, water rinsing and passivation with a chromate solution followed by a further water rinse. Rinse waters are collected and routed to the on-site effluent treatment system which uses polyelectrolyte and pH precipitation. The clarified effluent is sent to sewer, whilst the cadmium sludge, spent passivation solution and spent trichloroethylene are sent off-site for disposal/recovery.

Releases to air - trichloroethylene.

Releases to water - cadmium, chromium, cyanides, mercury.

Releases to land - NP solids.

AO7720

WALTON PLATING LTD

Cadmium plating process of metal products which undergo pretreatments such as stripping with ammonium nitrate and degreasing with trichloroethylene. The items are then cadmium plated and then rinsed in a static rinse bath which is fitted with a Chemelec cell which removes up to 99% of the aqueous cadmium dragged over from the plating bath, by continuously removing the cadmium and destroying the cyanide. The plated item is then rinsed further and may be cleaned or passivated by dipping it into chromate solution

Releases to air - trichloroethylene.

Releases to water - cadmium, chromium, cyanides, mercury.

Releases to land - NP solids.

AO8017

INGRAM AND GLASS LTD

Cadmium plating process. The components received can be first stripped using ammonium nitrate and then rinsed, after which stripped or unstripped components are degreased in a trichloroethylene bath. The components are then dried before being cadmium plated in an alkaline cyanide solution of cadmium, after which they are drained and put into a static rinse bath. This rinse bath is fitted with a ion exchange cell which removes 99% of the aqueous cadmium dragged over from the plating bath. The components are then further cleaned and may be passivated with a chromate solution. Rinse waters are collected and discharged to sewer. Spent process solutions and sludges are sent off-site for disposal/recovery.

Releases to water - cadmium, chromium, cyanides, mercury, zinc

Releases to land - NP solids.

AO0890

AT POETON (CARDIFF) LTD

Cadmium plating operations.

Releases to water - cadmium.

AO0938

GE AIRCRAFT ENGINE SERVICES LTD

Overhaul and rebuilding of aircraft engines. Process involves a cadmium stripping plant, where cadmium is electrochemically removed from components. The components are then replated with cadmium.

Releases to air - cadmium, fluorides, NP TOC, particulates, trichloroethylene.

Releases to land - cadmium.

Releases to water - cadmium, mercury.

Abatement equipment - cadmium recovery plant - receives wash water from stripping and plating plant drag out tanks, which is passed over electrodes in a Chemelec cell and the cadmium is

deposited onto the electrodes. Wash water from the stripping and plating plants is continually recirculated through an ion exchange unit to remove the cadmium. The regenerative fluid from the ion exchange unit is passed through a second Chemelec cell.

AO6880 TREFN ENGINEERING METAL TREATMENTS DIVISION LTD

Cadmium plating of components.

Releases to air - cadmium, particulates, trichloroethylene.

Releases to land - cadmium, NP solids.

Releases to water - cadmium.

AP4998 AB CONNECTORS LTD

Cadmium plating of aluminium or brass components.

Use of cadmium ball anodes, zincate solution, sodium cyanide etc.

Releases to air - cadmium.

Use of Chemelec cell cadmium recovery unit, cationic ion exchange scrubber with heavy metal selective resin.

C.2 Summary

The companies authorised under this category fall into several categories and include cadmium plating operations, and manufacturers of pigments and ceramics.

C.2.1 Emissions to air

From the emissions data provided by the CRI the most commonly authorised emissions to air from the companies under this section are - trichloroethylene and particulate matter.

There is a miscellaneous collection of specifically named species relevant only to individual applications covering the following - ammonia, sulphur dioxide, fluorides, iodine.

Several metals are also listed - cadmium, tellurium, mercury.

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|-------------------------|---|
| Cookson Matthey | hydrogen fluoride, NOx, particulates, sulphur dioxide |
| GE Aircraft | particulates, trichloroethylene, TOC |
| AP Precision Hydraulics | trichloroethylene |
| BF Goodrich | trichloroethylene |
| GE Lighting | particulates, sulphur dioxide |
| Coltax Aerospace | trichloroethylene |
| Fairey Hydraulics | trichloroethylene |
| Lucas Aerospace | trichloroethylene |
| Rayovac | trichloroethylene |
| Trefn Engineering | trichloroethylene |
| Silverfield | trichloroethylene |
| Walker AEC | trichloroethylene |
| Westland Aerospace | trichloroethylene |
| Westland Industrial | trichloroethylene |

C.2.2 Discharges to water

From the emissions data provided by the CRI the most commonly authorised emissions to water from the companies under this section are - cadmium, mercury...

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|-----------------|-----------|
| Cookson Matthey | sulphates |
|-----------------|-----------|

C.2.3 Discharges to land

From the emissions data provided by the CRI.

In terms of discharges > 1000 kg per annum the following have been reported:-

| | |
|-------------------|---------|
| Trefn Engineering | solids |
| Nipa Labs | solids |
| Rayovac | mercury |

C.3 Details of reported emissions of cadmium and mercury

| | |
|-----------|------------------------------------|
| Table C.1 | Emissions of cadmium and compounds |
| Table C1A | Emissions of cadmium to land |
| Table C.2 | Emissions of mercury and compounds |
| Table C2A | Emissions of mercury to land |

TABLE C.1 EMISSIONS DATA FOR CADMIUM AND ITS COMPOUNDS TO THE ENVIRONMENT

| OPERATOR | SECTOR | AUTH. NO | EMISSIONS 1993 (KG) | | EMISSIONS 1994 (KG) | | EMISSIONS 1995 (KG) | | EMISSIONS 1996 (KG) | |
|---|-----------|----------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | AIR | WATER | AIR | WATER | AIR | WATER | AIR | WATER |
| CONOCO LTD | 1.1 A (a) | AF6863 | - | 4.68E+01 | - | 8.01E+00 | - | 1.40E+01 | - | 1.50E+01 |
| BRITISH GAS PLC | 1.1 A (b) | AF7533 | - | 1.00E-03 | - | 1.00E-03 | - | - | - | - |
| TOTAL EMISSIONS FROM SECTOR 1.1 | | | - | 4.68E+01 | - | 8.01E+00 | - | 1.40E+01 | - | 1.50E+01 |
| BRITISH STEEL PLC | 1.2 A (a) | AF8548 | - | 8.00E-02 | - | 9.00E+00 | - | 4.00E+00 | - | 0.00E+00 |
| BRITISH STEEL PLC | 1.2 A (a) | AF7193 | - | 3.50E-02 | - | 3.60E-02 | - | 1.69E-01 | - | 1.68E-01 |
| COAL PRODUCTS LTD | 1.2 A (a) | AF6227 | - | 7.00E-01 | - | 6.00E-01 | - | 2.00E-01 | - | 0.00E+00 |
| MONCKTON COKE AND CHEMICAL CO LTD | 1.2 A (a) | AF7835 | - | 1.00E-04 | - | 1.00E-04 | - | 0.00E+00 | - | 0.00E+00 |
| MORGANITE ELECTRICAL CARBON LTD | 1.2 A (a) | AF9145 | - | 0.00E+00 | - | 0.00E+00 | - | - | - | - |
| SEVALCO LTD. | 1.2 A (a) | AF7916 | - | 4.10E+00 | - | 5.79E+00 | - | 6.65E+00 | - | 5.12E+00 |
| COALITE PRODUCTS LTD | 1.2 A (b) | AK7426 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| TOTAL EMISSIONS FROM SECTOR 1.2 | | | - | 4.92E+00 | - | 1.54E+01 | - | 1.10E+01 | - | 5.28E+00 |
| ALBRIGHT AND WILSON UK LTD | 1.3 A (a) | AA2984 | - | 8.14E-02 | - | 1.40E-02 | - | 5.90E-04 | - | 9.00E-04 |
| ALLIED STEEL AND WIRE LTD | 1.3 A (a) | AF8688 | - | 6.66E-01 | - | 1.00E+00 | - | 1.10E-04 | - | 1.19E+00 |
| AYLESFORD NEWSPRINT LTD | 1.3 A (a) | AA2941 | - | 5.15E-02 | - | 2.87E-02 | - | 0.00E+00 | - | 0.00E+00 |
| BOOTS COMPANY PLC | 1.3 A (a) | AA3450 | - | 2.95E-03 | - | 1.58E-02 | - | 6.15E-03 | - | 9.92E-03 |
| BP CHEMICALS LTD | 1.3 A (a) | AA2968 | - | 2.64E-02 | - | 3.42E-02 | - | - | - | - |
| BPB PAPER AND PACKAGING LTD | 1.3 A (a) | AA3409 | - | 3.35E-02 | - | 4.04E-02 | - | 3.85E-02 | - | 4.81E-02 |
| BRITISH ALCAN PRIMARY AND RECYCLING LTD | 1.3 A (a) | AA2011 | - | 3.00E+00 | - | 5.00E+00 | - | 0.00E+00 | - | - |
| BRITISH STEEL PLC | 1.3 A (a) | AA2216 | - | 1.70E-01 | - | 1.06E-01 | - | 9.80E-02 | - | 5.30E-02 |
| BRITISH STEEL PLC | 1.3 A (a) | AF8025 | - | 0.00E+00 | - | 1.40E-01 | - | 1.70E-02 | - | 0.00E+00 |
| BRITISH STEEL PLC | 1.3 A (a) | AF7266 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA3018 | - | 3.00E-04 | - | 1.00E-03 | - | 9.50E-05 | - | 8.47E-04 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2259 | - | 5.40E-04 | - | 2.90E-04 | - | 3.86E-04 | - | 7.07E-04 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2275 | - | 9.00E-04 | - | 5.00E-04 | - | 0.00E+00 | - | 0.00E+00 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2518 | - | 7.20E-05 | - | 2.00E-03 | - | - | - | - |

| | | | | | | | | | | |
|--|-----------|--------|---|----------|---|----------|---|----------|---|----------|
| BRITISH SUGAR PLC | 1.3 A (a) | AA2232 | - | - | - | - | - | 5.80E-01 | - | 5.00E-04 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2224 | - | 8.00E-04 | - | 1.69E-03 | - | 1.27E-03 | - | - |
| BRITISH SUGAR PLC | 1.3 A (a) | AA3034 | - | 7.56E-04 | - | 3.68E-03 | - | 7.12E-03 | - | 4.08E-04 |
| CLAYTON ANILINE CO | 1.3 A (a) | AA2330 | - | 1.00E-01 | - | 0.00E+00 | - | 0.00E+00 | - | - |
| CLAYTON ANILINE CO | 1.3 A (a) | AI2996 | - | - | - | 1.00E-01 | - | 0.00E+00 | - | 0.00E+00 |
| COURTAULDS CHEMICALS (HOLDINGS) LTD | 1.3 A (a) | AA2429 | - | 7.05E+00 | - | 9.90E-01 | - | 9.50E-01 | - | 0.00E+00 |
| COURTAULDS FIBRES LTD | 1.3 A (a) | AA5444 | - | 3.61E-02 | - | 8.00E-04 | - | 7.00E-04 | - | 7.00E-04 |
| EAST LANCASHIRE PAPER MILL CO LTD | 1.3 A (a) | AA2933 | - | 1.20E-01 | - | 1.20E-01 | - | 1.20E-01 | - | 3.00E-03 |
| EASTERN MERCHANT GENERATION LTD | 1.3 A (a) | AA3425 | - | 2.47E-03 | - | 3.40E-03 | - | 1.47E-03 | - | 2.16E-03 |
| EMPIRE PAPER LTD | 1.3 A (a) | AD5106 | - | 2.10E-03 | - | - | - | - | - | - |
| ENVIROENERGY LTD | 1.3 A (a) | AA4715 | - | 3.80E-03 | - | 3.98E-02 | - | - | - | - |
| FORGEMASTERS STEEL AND ENGINEERING LTD | 1.3 A (a) | AA2402 | - | 8.89E-01 | - | 8.39E-01 | - | - | - | - |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 1.3 A (a) | AF4704 | - | 1.50E-02 | - | 1.65E+00 | - | 3.80E-03 | - | 0.00E+00 |
| GLAXOCHEM LTD | 1.3 A (a) | AA2003 | - | 9.55E-03 | - | 1.54E-02 | - | 1.92E-02 | - | 2.37E-02 |
| GRIMETHORPE PFBC ESTABLISHMENT | 1.3 A (a) | AA2372 | - | - | - | - | - | - | - | - |
| HER MAJESTY'S NAVAL BASE, PORTSMOUTH | 1.3 A (a) | AJ3077 | - | - | - | 3.80E-02 | - | 1.18E-02 | - | 5.00E-02 |
| HYDRO AGRI (UK) LTD | 1.3 A (a) | AA3395 | - | 2.10E-02 | - | 1.10E-02 | - | 0.00E+00 | - | - |
| MOBIL OIL COMPANY LTD | 1.3 A (a) | AA3387 | - | 2.84E-01 | - | 4.22E-01 | - | 4.10E-01 | - | 0.00E+00 |
| NATIONAL POWER PLC | 1.3 A (a) | AA3182 | - | 0.00E+00 | - | 0.00E+00 | - | - | - | - |
| NATIONAL POWER PLC | 1.3 A (a) | AA3204 | - | 1.20E-02 | - | 4.85E-02 | - | 1.63E-01 | - | 9.69E-02 |
| NATIONAL POWER PLC | 1.3 A (a) | AF0920 | - | 8.05E-01 | - | 2.56E-01 | - | 1.46E-02 | - | 7.13E-03 |
| NATIONAL POWER PLC | 1.3 A (a) | AA3166 | - | 2.00E-02 | - | 6.00E-02 | - | 8.00E-01 | - | 0.00E+00 |
| NATIONAL POWER PLC | 1.3 A (a) | AA2470 | - | 7.50E+00 | - | 4.30E+01 | - | 0.00E+00 | - | 6.55E+00 |
| NATIONAL POWER PLC | 1.3 A (a) | AA2481 | - | 1.12E+00 | - | 1.14E+00 | - | 0.00E+00 | - | 5.07E+00 |
| NATIONAL POWER PLC - DIDCOT B | 1.3 A (a) | AO4003 | - | - | - | - | - | - | - | 0.00E+00 |
| PETERBOROUGH POWER LTD | 1.3 A (a) | AF9706 | - | 4.10E-03 | - | 2.70E-02 | - | 4.50E-02 | - | 4.20E-02 |
| PFIZER LTD | 1.3 A (a) | AF8211 | - | 1.00E-02 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| PHILLIPS PETROLEUM CO UK LTD | 1.3 A (a) | AA2976 | - | 1.25E+00 | - | 1.20E-03 | - | 0.00E+00 | - | 1.25E+00 |
| POWERGEN CHP LTD | 1.3 A (a) | AU9403 | - | - | - | - | - | - | - | 0.00E+00 |
| POWERGEN PLC | 1.3 A (a) | AB5873 | - | 5.00E-03 | - | 7.00E-03 | - | 2.53E-03 | - | 3.97E-02 |
| POWERGEN PLC | 1.3 A (a) | AA3000 | - | 1.55E+02 | - | 7.55E+01 | - | 2.05E+01 | - | 0.00E+00 |
| POWERGEN PLC | 1.3 A (a) | AA3344 | - | 2.00E-02 | - | 2.80E-04 | - | 3.50E-03 | - | - |

| | | | | | | | | | | |
|---|-----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|
| POWERGEN PLC | 1.3 A (a) | AA3514 | - | 1.73E-03 | - | 2.10E-02 | - | 1.54E-02 | - | 0.00E+00 |
| POWERGEN PLC | 1.3 A (a) | AA2267 | - | 1.40E-02 | - | 3.54E+00 | - | 5.57E-01 | - | 4.62E-01 |
| POWERGEN PLC | 1.3 A (a) | AA3433 | - | 1.09E-02 | - | 1.19E-02 | - | 1.32E-02 | - | 1.38E-02 |
| SCM CHEMICALS LTD | 1.3 A (a) | AA3859 | - | 2.92E-02 | - | 1.70E-02 | - | 2.00E-04 | - | - |
| SHELL UK LTD | 1.3 A (a) | AA3379 | - | 3.00E-02 | - | 3.21E-02 | - | 3.77E-02 | - | 0.00E+00 |
| SOLVAY INTEROX LTD | 1.3 A (a) | AA7099 | - | 6.44E-01 | - | 1.60E-02 | - | 5.00E-03 | - | 0.00E+00 |
| TATE AND LYLE SUGARS PLC | 1.3 A (a) | AA2887 | - | 1.20E-01 | - | 1.19E-01 | - | 1.12E-01 | - | 1.25E-01 |
| TOYOTA MOTOR MANUFACTURING UK LTD | 1.3 A (a) | AE2897 | - | 1.80E+01 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| ANGLIAN POWER GENERATORS LTD | 1.3 A (b) | AM1461 | - | - | - | - | - | - | - | 1.90E-03 |
| BARKINS POWER LTD | 1.3 A (b) | AB3838 | - | 0.00E+00 | - | 7.30E-06 | - | 3.10E-02 | - | 2.60E-02 |
| BRITISH SUGAR PLC | 1.3 A (b) | AA3093 | - | 1.00E-03 | - | 1.48E-03 | - | - | - | - |
| COGENERATION INVESTMENTS LTD | 1.3 A (b) | AN7864 | - | - | - | 0.00E+00 | - | 6.60E-04 | - | 1.70E-03 |
| CORBY POWER LTD | 1.3 A (b) | AG6621 | - | 4.11E-02 | - | 1.30E+00 | - | 1.12E+00 | - | 1.00E+00 |
| DERWENT COGENERATION LTD | 1.3 A (b) | AE1203 | - | - | - | - | - | - | - | 2.65E+00 |
| ENFIELD ENERGY CENTRE LTD | 1.3 A (b) | AK9208 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| HUMBER POWER LTD | 1.3 A (b) | AH4195 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| KEADBY GENERATION LTD | 1.3 A (b) | AB4745 | - | 0.00E+00 | - | 0.00E+00 | - | 3.80E-02 | - | 2.21E-01 |
| MOWLEM FACILITIES MANAGEMENT | 1.3 A (b) | AR9311 | - | - | - | - | - | 1.30E-02 | - | 1.30E-02 |
| NATIONAL POWER PLC | 1.3 A (b) | AJ2747 | - | - | - | 3.30E-02 | - | 2.80E-01 | - | 8.90E-01 |
| POWERGEN PLC | 1.3 A (b) | AG8411 | - | 3.33E-03 | - | 4.93E-02 | - | 3.53E-02 | - | 2.99E-02 |
| POWERGEN PLC | 1.3 A (b) | AP2090 | - | - | - | - | - | 1.05E-02 | - | 0.00E+00 |
| REGIONAL POWER GENERATORS (BRIGG) LTD | 1.3 A (b) | AA6904 | - | 0.00E+00 | - | 2.00E-02 | - | 2.00E-02 | - | 2.80E-02 |
| ROLLS ROYCE POWER VENTURES LTD | 1.3 A (b) | AU2689 | - | - | - | - | - | - | - | 0.00E+00 |
| AVON TYRES LTD | 1.3 A (c) | AG8101 | - | 7.00E-04 | - | 5.00E-04 | - | 0.00E+00 | - | 0.00E+00 |
| CASTROL (UK) LTD | 1.3 A (c) | AG0097 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 3.00E-02 | - |
| CONTRACT POWER LTD | 1.3 A (c) | AF7690 | - | 3.33E-02 | - | 1.43E-02 | - | 0.00E+00 | - | 1.32E-05 |
| CRODA UNIVERSAL LTD | 1.3 A (c) | AF6316 | - | 3.44E-01 | - | 4.35E-02 | - | - | - | - |
| ENERGY SUPPLIES LTD | 1.3 A (c) | AF8092 | - | 3.25E-02 | - | 1.29E-02 | - | 1.47E-02 | - | 1.46E-02 |
| FIBROGEN LTD | 1.3 A (c) | AA3905 | - | 1.00E-03 | - | 5.00E-03 | - | 5.00E-03 | - | - |
| FIBROWATT LTD | 1.3 A (c) | AP0844 | - | - | - | - | - | - | - | - |
| HORTON KIRBY LTD | 1.3 A (c) | AF6839 | 7.00E-01 | - | 2.48E-01 | - | 1.84E+00 | - | 0.00E+00 | - |
| INTERNATIONAL FLAVOURS AND FRAGRANCES LTD | 1.3 A (c) | AN7031 | - | - | 1.00E-02 | - | 2.00E-02 | - | 1.00E+00 | - |

| | | | | | | | | | | |
|--|-----------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| P GARNETT AND SON LTD | 1.3 A (c) | AF8416 | - | - | - | - | 1.37E+02 | 2.10E-04 | 2.75E-02 | 2.50E-04 |
| SOLWAY INTEROX LTD | 1.3 A (c) | AL4872 | - | - | - | 1.60E-02 | - | 5.00E-03 | - | 8.00E-03 |
| TOTAL EMISSIONS FROM SECTOR 1.3 | | | 7.00E-01 | 1.97E+02 | 2.58E-01 | 1.36E+02 | 1.39E+02 | 2.61E+01 | 1.06E+00 | 1.99E+01 |
| ASSOCIATED PETROLEUM TERMINALS LTD | 1.4 A (a) | AG1794 | - | - | - | - | - | - | - | 9.90E-01 |
| CONOCO LTD | 1.4 A (a) | AF8173 | - | 2.80E-01 | - | 2.04E+00 | - | 3.08E+00 | - | 1.84E+00 |
| ESSO PETROLEUM CO LTD | 1.4 A (a) | AF8009 | - | 1.41E+02 | - | 2.48E+02 | - | 1.40E+02 | - | 1.16E+02 |
| LINDSEY OIL REFINERY LTD | 1.4 A (a) | AF6928 | - | 3.80E+00 | - | 5.50E-01 | - | 9.00E+00 | - | 9.40E+00 |
| SHELL UK LTD | 1.4 A (a) | AF6910 | - | 1.00E-02 | - | 3.50E-03 | - | 3.30E-03 | - | 0.00E+00 |
| CARLESS REFINING & MARKETING LTD | 1.4 A (c) | AB2963 | - | - | - | 9.20E-01 | - | 1.04E+00 | - | 0.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 1.4 A (c) | AF7240 | - | - | - | 1.90E-03 | - | 1.40E-03 | - | 1.09E-03 |
| TOTAL EMISSIONS FROM SECTOR 1.4 | | | - | 1.45E+02 | - | 2.52E+02 | - | 1.53E+02 | - | 1.28E+02 |
| ALLIED STEEL AND WIRE LTD | 2.1 A (a) | AR0322 | - | - | - | - | 1.00E+00 | - | 3.66E+00 | - |
| BRITISH STEEL PLC | 2.1 A (a) | AR0063 | - | - | - | - | - | 3.00E-02 | - | 2.10E-01 |
| CO-STEEL SHEERNESS | 2.1 A (a) | AP5986 | - | - | - | - | 2.30E+02 | 6.20E-02 | 0.00E+00 | 0.00E+00 |
| ALPHASTEEL LTD | 2.1 A (f) | AQ9944 | - | - | - | - | 1.60E-01 | - | 1.98E+00 | - |
| AVESTA SHEFFIELD LTD | 2.1 A (f) | AQ9596 | - | - | - | - | 5.20E-01 | - | 8.20E-02 | - |
| BRITISH STEEL ENGINEERING STEELS LTD | 2.1 A (f) | AQ9839 | - | - | - | - | - | 1.00E-14 | - | 1.00E-15 |
| BRITISH STEEL ENGINEERING STEELS LTD | 2.1 A (f) | AQ9855 | - | - | - | - | - | 0.00E+00 | - | 1.00E-15 |
| FORGEMASTERS STEEL AND ENGINEERING LTD | 2.1 A (f) | AQ5159 | - | - | - | - | - | 3.00E+00 | - | 0.00E+00 |
| SANDERSON KAYSER LTD | 2.1 A (f) | AQ9154 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| TOTAL EMISSIONS FROM SECTOR 2.1 | | | - | - | - | - | 2.32E+02 | 3.09E+00 | 5.72E+00 | 2.10E-01 |
| ABRAM ALLOYS LTD | 2.2 A (a) | AS5067 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| ABRAM ALLOYS LTD | 2.2 A (a) | AS5075 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| ASSOCIATED METAL TRADERS | 2.2 A (a) | AL4783 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| BRITANNIA REFINED METALS LTD | 2.2 A (a) | AS7850 | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| BRITISH NUCLEAR FUELS PLC | 2.2 A (a) | AS5598 | - | - | - | - | - | - | - | 0.00E+00 |
| BROOKSIDE METAL COMPANY LTD | 2.2 A (a) | AS6829 | - | - | - | - | 6.70E-01 | 8.00E-02 | 4.20E+01 | 3.80E-01 |
| IMI REFINERS LIMITED | 2.2 A (a) | AS6632 | - | - | - | - | 5.50E+00 | 2.67E-01 | 6.30E+01 | 3.60E+00 |
| INCO EUROPE LIMITED | 2.2 A (a) | AS6888 | - | - | - | - | - | - | - | 1.00E-01 |

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|---|-----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|
| MIDLANDS LEAD MANUFACTURING COMPANY LTD | 2.2 A (a) | AS7027 | - | - | - | - | - | - | 1.80E+00 | - |
| PARK P PATERSON | 2.2 A (a) | AS6624 | - | - | - | - | - | - | - | 6.50E-02 |
| THOMAS BOLTON LTD | 2.2 A (a) | AS7213 | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| ALENOY LTD | 2.2 A (b) | AS6080 | - | - | - | - | - | - | - | 3.00E-02 |
| INCO ALLOYS LTD | 2.2 A (c) | AS7035 | - | - | - | - | - | - | - | 3.00E-01 |
| SILVER LINING INDUSTRIES LTD | 2.2 A (c) | AS7833 | - | - | - | - | - | - | - | 1.00E-03 |
| CLIMAX MOLYBDENUM UK LTD | 2.2 A (d) | AS7337 | - | - | - | - | - | - | 0.00E+00 | - |
| DELTA ENFIELD METALS LTD | 2.2 A (d) | AS5059 | - | - | - | - | - | - | - | 0.00E+00 |
| EVER READY LTD | 2.2 A (d) | AS6101 | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| F E MOTTRAM (NON FERROUS) LTD | 2.2 A (d) | AS5938 | - | - | - | - | - | - | 1.04E-01 | - |
| BILLBRIME LTD | 2.2 A (e) | AH4853 | 0.00E+00 | - | - | - | - | - | - | - |
| BRITANIA RECYCLING LTD | 2.2 A (e) | AS6306 | - | - | - | - | - | - | - | 0.00E+00 |
| DELTA ENCON LTD | 2.2 A (e) | AG1930 | - | 3.13E-04 | - | - | - | 0.00E+00 | - | 0.00E+00 |
| DENSO MARSTON LTD | 2.2 A (e) | AT5615 | - | - | - | - | - | - | - | 0.00E+00 |
| DENSO MARSTON LTD | 2.2 A (e) | AT5623 | - | - | - | - | - | - | - | 2.00E-02 |
| FRYS METALS LTD | 2.2 A (e) | AS6861 | - | - | 0.00E+00 | - | - | - | 1.87E-01 | - |
| GEO NEALE LTD | 2.2 A (e) | AS7248 | - | - | - | - | - | - | 3.56E-01 | - |
| HJ ENTHOVEN AND SONS | 2.2 A (e) | AS7205 | - | - | - | - | - | - | 1.76E+01 | 9.90E+00 |
| MINING AND CHEMICAL PRODUCTS LTD | 2.2 A (e) | AS7272 | - | - | 0.00E+00 | - | - | - | 0.00E+00 | - |
| MOUNTSTAR METAL CORPORATION LTD | 2.2 A (e) | AS5962 | - | - | - | - | - | - | 2.99E-01 | - |
| FUSION AUTOMATION INC. | 2.2 A (f) | AS8139 | - | - | - | - | - | - | 0.00E+00 | - |
| THESSCO LTD | 2.2 A (f) | AS6837 | - | - | 0.00E+00 | - | - | - | 7.75E+00 | - |
| ALDEC LTD | 2.2 A (i) | AS6446 | - | - | - | - | - | - | 2.20E+01 | - |
| ENGELHARD LTD | 2.2 A (i) | AS8074 | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| LAWSON MARDON STAR LTD | 2.2 A (i) | AR8374 | - | - | 0.00E+00 | - | - | - | 0.00E+00 | - |
| TOTAL EMISSIONS FROM SECTOR 2.2 | | | 0.00E+00 | 3.13E-04 | 6.17E+00 | 3.47E-01 | 1.55E+02 | 1.44E+01 | | |

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|---------------------------------|-----------|--------|---|----------|---|----------|---|----------|---|----------|
| BLUE CIRCLE INDUSTRIES PLC | 3.1 A (a) | AH9499 | - | 3.00E-02 | - | 4.50E-01 | - | 3.90E-01 | - | 0.00E+00 |
| RUGBY GROUP PLC | 3.1 A (a) | AH8743 | - | - | - | - | - | 1.40E+00 | - | 9.80E-02 |
| BRITISH SUGAR PLC | 3.1 A (d) | AH8590 | - | - | - | 6.20E-02 | - | 2.90E-02 | - | 3.40E-02 |
| TOTAL EMISSIONS FROM SECTOR 3.1 | | | - | 3.00E-02 | - | 5.12E-01 | - | 1.82E+00 | - | 1.32E-01 |

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|--|-----------|--------|-----------------|-----------------|---|-----------------|---|-----------------|---|-----------------|
| PIRELLI GENERAL PLC | 3.3 A (a) | AI4212 | - | 0.00E+00 | - | 1.10E-01 | - | 1.02E-01 | - | 1.02E-01 |
| TOTAL EMISSIONS FROM SECTOR 3.3 | | | - | 0.00E+00 | - | 1.10E-01 | - | 1.02E-01 | - | 1.02E-01 |
| PILKINGTON'S TILES LTD | 3.5 A (a) | AI5154 | 0.00E+00 | - | - | - | - | - | - | - |
| TOTAL EMISSIONS FROM SECTOR 3.5 | | | 0.00E+00 | - | - | - | - | - | - | - |
| ICI CHEMICALS AND POLYMERS LTD | 4.1 A (a) | AK7868 | - | - | - | 6.80E+00 | - | 2.19E-03 | - | 2.15E-03 |
| UNION CARBIDE LTD | 4.1 A (b) | AK6845 | - | - | - | 7.00E-02 | - | 4.00E-01 | - | 2.00E-03 |
| ICI CHEMICALS AND POLYMERS LTD | 4.1 A (c) | AK6969 | - | - | - | 3.50E+00 | - | 5.00E-04 | - | 4.00E-04 |
| UNION CARBIDE LTD | 4.1 A (c) | AK6837 | - | - | - | 2.63E-01 | - | 7.00E-02 | - | 7.00E-02 |
| AH MARKS AND CO LTD | 4.1 A (d) | AM2026 | - | - | - | - | - | 1.50E+00 | - | 1.00E+00 |
| BASF PLC | 4.1 A (d) | AK6993 | - | - | - | 3.00E-02 | - | 1.46E-01 | - | 1.46E-01 |
| CRODA ADHESIVES LTD | 4.1 A (d) | AU8440 | - | - | - | - | - | - | - | 0.00E+00 |
| HARLOW CHEMICAL CO LTD | 4.1 A (d) | AJ4944 | - | - | - | 5.30E-01 | - | 1.00E+00 | - | 0.00E+00 |
| SYNTHOMER LTD | 4.1 A (d) | AK4117 | - | - | - | 1.50E-02 | - | 1.50E-01 | - | 1.50E+01 |
| TOTAL EMISSIONS FROM SECTOR 4.1 | | | - | - | - | 1.12E+01 | - | 3.27E+00 | - | 1.62E+01 |
| DUSSEK CAMPBELL LTD | 4.2 A (a) | AJ5789 | - | - | - | 7.00E-03 | - | 1.00E-02 | - | 4.70E-03 |
| LINPAC POLYMERS | 4.2 A (a) | AJ5762 | - | - | - | 4.10E-05 | - | 4.30E-05 | - | 2.27E-05 |
| MORGAN MATROC LTD | 4.2 A (a) | AO0164 | - | - | - | 0.00E+00 | - | 2.00E-02 | - | 2.00E-02 |
| AKZO NOBEL CHEMICALS LTD | 4.2 A (c) | AK3412 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| BASF PLC | 4.2 A (c) | AJ6505 | - | - | - | 2.20E+01 | - | 2.25E+01 | - | 5.80E+00 |
| CIBA-GEIGY PLC | 4.2 A (c) | AK8511 | - | - | - | 8.00E-01 | - | 1.70E+00 | - | 0.00E+00 |
| COURTAULDS COATINGS (HOLDINGS) LTD | 4.2 A (c) | AM7460 | - | - | - | 4.00E-01 | - | 3.00E-02 | - | 2.80E-01 |
| CRODA CHEMICALS LTD | 4.2 A (c) | AK9194 | - | - | - | 2.00E+00 | - | 2.00E+00 | - | 7.00E-02 |
| HAARMANN AND REIMER (BAYER PLC) | 4.2 A (c) | AK2050 | - | - | - | 9.60E+01 | - | 1.31E+00 | - | 2.15E+01 |
| HOLLAND DYES AND CHEMICALS LTD | 4.2 A (c) | AJ5193 | - | 0.00E+00 | - | 1.50E+00 | - | 0.00E+00 | - | 0.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (c) | AK7728 | - | - | - | 1.50E-02 | - | 1.00E-02 | - | 8.50E-03 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (c) | AK7841 | - | - | - | 1.00E+00 | - | 1.00E+00 | - | 3.50E-03 |
| PENTAGON CHEMICALS LTD | 4.2 A (c) | AL6352 | - | - | - | - | - | - | - | 8.00E-02 |
| PENTAGON CHEMICALS LTD | 4.2 A (c) | AW3279 | - | - | - | - | - | - | - | 8.00E-02 |

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|-------------------------------------|-----------|--------|---|----------|---|----------|---|----------|---|----------|
| RHONE-POULENC CHEMICALS LTD | 4.2 A (c) | AK7337 | - | - | - | - | - | 5.80E+01 | - | 3.60E+01 |
| ROBINSON BROTHERS LTD | 4.2 A (c) | AK6519 | - | - | - | 3.32E-01 | - | 0.00E+00 | - | 4.12E-01 |
| ALBION DYESTUFFS LTD | 4.2 A (d) | AK8473 | - | - | - | 1.00E-06 | - | 1.00E-06 | - | 2.00E-06 |
| BARFORD CHEMICALS LTD | 4.2 A (d) | AS4664 | - | - | - | - | - | - | - | 0.00E+00 |
| BORDEN CHEMICALS UK LTD | 4.2 A (d) | AJ1252 | - | 1.50E-03 | - | 1.20E-02 | - | 1.15E-02 | - | 1.50E-04 |
| BP CHEMICALS LTD | 4.2 A (d) | AK4591 | - | - | - | 1.29E-01 | - | 7.10E-02 | - | 2.30E-01 |
| BP CHEMICALS LTD | 4.2 A (d) | AK5709 | - | - | - | 3.00E-02 | - | 5.00E-02 | - | 3.80E-02 |
| CIBA-GEIGY PLC | 4.2 A (d) | AK3579 | - | - | - | 1.00E+01 | - | 2.00E-01 | - | 2.10E-02 |
| CIBA-GEIGY PLC | 4.2 A (d) | AO5042 | - | - | - | 1.00E-01 | - | 2.00E-01 | - | 0.00E+00 |
| COURTAULDS CHEMICALS (HOLDINGS) LTD | 4.2 A (d) | AK2335 | - | - | - | 3.46E+02 | - | 3.43E+02 | - | 2.98E+02 |
| COURTAULDS CHEMICALS (HOLDINGS) LTD | 4.2 A (d) | AL0702 | - | - | - | 0.00E+00 | - | 8.00E-03 | - | 3.51E-01 |
| COURTAULDS COATINGS (HOLDINGS) LTD | 4.2 A (d) | AK6756 | - | - | - | 8.60E+00 | - | 6.10E-02 | - | 9.80E-01 |
| COURTAULDS COATINGS (HOLDINGS) LTD | 4.2 A (d) | AM7451 | - | - | - | 5.80E-01 | - | 3.00E-02 | - | 2.80E-01 |
| COURTAULDS FIBRES LTD | 4.2 A (d) | AK6829 | - | - | - | 8.00E-03 | - | 7.00E-03 | - | 1.10E-02 |
| CRODA CHEMICALS LTD | 4.2 A (d) | AK9186 | - | - | - | 2.00E+00 | - | - | - | - |
| CRODA COLOURS LTD | 4.2 A (d) | AL1636 | - | - | - | 5.70E-03 | - | 7.00E-03 | - | 0.00E+00 |
| CRODA COLOURS LTD | 4.2 A (d) | AL1644 | - | - | - | 3.50E-02 | - | 2.80E-02 | - | 3.10E-02 |
| CRODA RESINS LTD | 4.2 A (d) | AJ8044 | - | - | - | 1.50E-02 | - | 4.00E-01 | - | 4.30E-01 |
| CRODA UNIVERSAL LTD | 4.2 A (d) | AK4257 | - | - | - | - | - | 6.00E-02 | - | 6.10E-02 |
| CYTEC INDUSTRIES UK LTD | 4.2 A (d) | AK8333 | - | - | - | 5.00E-01 | - | 5.00E-01 | - | 5.00E-01 |
| DU PONT (UK) LTD | 4.2 A (d) | AK7191 | - | - | - | 0.00E+00 | - | 3.70E-01 | - | 0.00E+00 |
| EXCHEM PLC | 4.2 A (d) | AH7194 | - | 6.20E-03 | - | 3.35E-03 | - | 0.00E+00 | - | 0.00E+00 |
| FOSECO LTD | 4.2 A (d) | AK6721 | - | - | - | - | - | - | - | - |
| GENZYME LTD | 4.2 A (d) | AK6730 | - | - | - | 9.60E-04 | - | 4.30E-04 | - | 4.60E-04 |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 4.2 A (d) | AJ2500 | - | - | - | 2.02E-07 | - | 4.40E-08 | - | 0.00E+00 |
| GLAXOCHEM LTD | 4.2 A (d) | AK5687 | - | - | - | 5.00E-01 | - | 8.00E-01 | - | 1.04E+00 |
| HAYS CHEMICAL DISTRIBUTION LTD | 4.2 A (d) | AK0235 | - | - | - | 5.10E-03 | - | 1.76E-03 | - | 1.76E-03 |
| HICKSON LTD | 4.2 A (d) | AK7965 | - | - | - | 2.15E+00 | - | 0.00E+00 | - | 0.00E+00 |
| HICKSON LTD | 4.2 A (d) | AL5097 | - | - | - | 8.13E-01 | - | 0.00E+00 | - | 0.00E+00 |
| HODGSON CHEMICALS LTD | 4.2 A (d) | AL1890 | - | - | - | 3.63E-04 | - | 7.54E-04 | - | 6.40E-04 |
| HOECHST UK LTD | 4.2 A (d) | AK5288 | - | - | - | - | - | - | - | - |
| HPG INDUSTRIAL COATINGS LTD | 4.2 A (d) | AK6799 | - | - | - | 5.56E-03 | - | 5.10E-02 | - | 1.19E-01 |

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| HPG INDUSTRIAL COATINGS LTD | 4.2 A (d) | AN2889 | - | - | - | 5.00E-05 | - | 5.10E-05 | - | 1.19E-01 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (d) | AK6705 | - | - | - | 0.00E+00 | - | 3.00E-02 | - | 2.60E-02 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (d) | AK8236 | - | - | - | 8.00E-04 | - | 0.00E+00 | - | 2.00E-04 |
| INTERNATIONAL FLAVOURS AND FRAGRANCES (GB) LTD | 4.2 A (d) | AK6918 | - | - | - | 7.50E-01 | - | 9.00E-02 | - | 1.00E-15 |
| INTERNATIONAL SPECIALITY CHEMICALS LTD | 4.2 A (d) | AK6861 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| J WYETH AND BROTHER LTD | 4.2 A (d) | AK5458 | - | - | - | 3.20E-01 | - | 1.60E-01 | - | 5.00E-02 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK5164 | - | - | - | 4.00E-03 | - | 1.05E-01 | - | 4.00E-03 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK6985 | - | - | - | 8.00E-02 | - | 7.00E-02 | - | 6.00E-02 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK7027 | - | - | - | 1.00E-06 | - | 9.00E-06 | - | 1.00E-05 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK7035 | - | - | - | - | - | - | - | - |
| MERCK LTD | 4.2 A (d) | AN8968 | - | - | - | - | - | 1.60E-01 | - | 2.70E-01 |
| MERCK SHARP AND DOHME LTD | 4.2 A (d) | AK8244 | - | - | - | 0.00E+00 | - | 9.49E-01 | - | 5.00E-02 |
| MITCHANOL INTERNATIONAL LTD | 4.2 A (d) | AK8112 | - | - | - | 0.00E+00 | - | 5.25E-02 | - | 5.10E+01 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AK4842 | - | - | - | 8.00E-03 | - | 1.00E-02 | - | 1.00E-02 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AK5334 | - | - | - | 1.27E-01 | - | 1.43E-01 | - | 5.00E-02 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AA6815 | - | - | - | 1.64E-04 | - | 0.00E+00 | - | 0.00E+00 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AK8988 | - | - | - | 1.64E-04 | - | 0.00E+00 | - | 0.00E+00 |
| RHONE-POULENC RORER LTD | 4.2 A (d) | AM4908 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| SANDOZ CHEMICALS (UK) LTD | 4.2 A (d) | AK8368 | - | - | - | 1.89E-01 | - | 0.00E+00 | - | 0.00E+00 |
| SMITHKLINE BEECHAM PLC | 4.2 A (d) | AJ3131 | - | 2.00E-02 | - | 1.00E-02 | - | 3.00E-02 | - | 0.00E+00 |
| STEPHENSON GROUP LTD | 4.2 A (d) | AO3414 | - | - | - | - | - | 3.40E-02 | - | 0.00E+00 |
| VICKERS LABORATORIES LTD | 4.2 A (d) | AR5138 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| WELLCOME FOUNDATION LTD | 4.2 A (d) | AK6853 | - | - | - | 6.00E-03 | - | 6.00E-03 | - | 0.00E+00 |
| WESTBROOK LANOLIN CO LTD | 4.2 A (d) | AK5962 | - | - | - | 8.20E-02 | - | 4.70E-02 | - | 0.00E+00 |
| WS SIMPSON & CO LTD | 4.2 A (d) | AL2128 | - | - | - | 1.75E+00 | - | 1.76E+00 | - | 0.00E+00 |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AF8297 | - | 4.00E+00 | - | 6.00E-03 | - | 0.00E+00 | - | - |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AK6187 | - | - | - | 6.00E-03 | - | 0.00E+00 | - | 1.92E+00 |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AK6128 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AM3006 | - | - | - | 1.00E-03 | - | 2.90E-01 | - | 0.00E+00 |
| CHEMCAT LTD | 4.2 A (f) | AL7499 | - | - | - | 8.90E-01 | - | 1.63E+00 | - | 1.34E+00 |
| SHEPPY LTD | 4.2 A (g) | AL7669 | - | - | - | 5.59E-02 | - | 2.50E-03 | - | 0.00E+00 |

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| ALLIED COLLOIDS LTD | 4.2 A (j) | AK7043 | - | - | - | 4.00E-04 | - | 3.70E-01 | - | 3.70E-01 |
| COURTAULDS FIBRES LTD | 4.2 A (j) | AK6772 | - | - | - | 2.00E-03 | - | 1.00E-03 | - | 1.00E-03 |
| HODGSON CHEMICALS LTD | 4.2 A (j) | AK3706 | - | - | - | 4.00E-05 | - | 1.63E-05 | - | 0.00E+00 |
| HPG INDUSTRIAL COATINGS LTD | 4.2 A (j) | AN1777 | - | - | - | 4.31E-03 | - | 1.03E-02 | - | 1.77E-02 |
| LEVER INDUSTRIAL LTD | 4.2 A (j) | AK6764 | - | - | - | 1.50E-03 | - | 3.47E-02 | - | 2.80E-02 |
| TECHNICAL ABSORBENTS LTD | 4.2 A (j) | AM8261 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 1.00E-15 |
| TOTAL EMISSIONS FROM SECTOR 4.2 | | | - | 4.03E+00 | 0.00E+00 | 5.00E+02 | 0.00E+00 | 4.38E+02 | 0.00E+00 | 4.22E+02 |
| AEROSTRUCTURES HAMBLE LTD | 4.3 A (a) | AL9556 | - | - | - | - | - | 3.40E-01 | - | 3.20E-05 |
| ALBRIGHT AND WILSON UK LTD | 4.3 A (a) | AL9009 | - | - | - | - | - | 2.85E+03 | - | 3.17E+03 |
| LAMBSON FINE CHEMICALS LTD | 4.3 A (a) | AM1445 | - | - | - | 0.00E+00 | - | 9.00E-06 | - | 0.00E+00 |
| HARCROS PIGMENTS EUROPE | 4.3 A (c) | AL4554 | - | - | - | 1.70E-02 | - | 1.60E-01 | - | 0.00E+00 |
| HARCROS PIGMENTS EUROPE | 4.3 A (c) | AU5327 | - | - | - | - | - | - | - | 2.50E-01 |
| HODGSON CHEMICALS LTD | 4.3 A (c) | AL9262 | - | - | - | 7.26E-04 | - | - | - | - |
| HOLLAND DYES AND CHEMICALS LTD | 4.3 A (c) | AL7731 | - | - | - | 1.80E-01 | - | 1.40E-01 | - | 1.60E-01 |
| PROCTER AND GAMBLE LTD | 4.3 A (c) | AL9173 | - | - | - | 1.62E-01 | - | 2.00E-01 | - | 0.00E+00 |
| SCM CHEMICALS LTD | 4.3 A (c) | AM0163 | - | - | - | 7.00E-02 | - | 2.70E-01 | - | 2.30E-01 |
| SEAL SANDS CHEMICALS LTD | 4.3 A (c) | AL6956 | - | - | - | 5.47E-03 | - | 0.00E+00 | - | 0.00E+00 |
| TIOXIDE (EUROPE) LTD | 4.3 A (c) | AL8282 | - | - | - | 2.00E+01 | - | 2.00E+01 | - | 1.50E+01 |
| ALUMASC LTD | 4.3 A (f) | AL8541 | - | - | - | 0.00E+00 | - | - | - | - |
| BRENT EUROPE LTD | 4.3 A (f) | AL8568 | - | - | - | 1.60E-02 | - | 0.00E+00 | - | 1.20E-02 |
| EXCHEM PLC | 4.3 A (f) | AM0201 | - | - | - | 8.00E-02 | - | 2.20E-02 | - | 0.00E+00 |
| HENKEL LTD | 4.3 A (f) | AG2987 | - | 1.70E-02 | - | 4.17E-03 | - | 3.34E-03 | - | 2.46E-02 |
| HICKSON LTD | 4.3 A (f) | AM9683 | - | - | - | 3.00E-04 | - | 0.00E+00 | - | 0.00E+00 |
| HYDRO AGRI (UK) LTD | 4.3 A (f) | AL9068 | - | - | - | - | - | 1.30E-02 | - | 1.00E-02 |
| ICI CHEMICALS AND POLYMERS LTD | 4.3 A (f) | AW5069 | - | - | - | - | - | - | - | 0.00E+00 |
| TIOXIDE (EUROPE) LTD | 4.3 A (f) | AL9149 | - | - | - | 9.00E-03 | - | 1.90E-02 | - | 1.00E-02 |
| TKR INTERNATIONAL LTD. | 4.3 A (f) | AP2472 | - | - | - | - | - | 2.00E-01 | - | 7.00E-01 |
| TOTAL EMISSIONS FROM SECTOR 4.3 | | | - | 1.70E-02 | - | 2.05E+01 | - | 2.87E+03 | - | 3.19E+03 |

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| ICI CHEMICALS AND POLYMERS LTD | 4.4 A (a) | AL7464 | - | - | - | 1.00E+01 | - | 7.00E-04 | - | 7.00E-04 |
| DEMAGLASS LIGHTING | 4.4 A (b) | AN3176 | - | - | - | - | - | 2.20E-02 | - | 2.80E-02 |
| H ARMITAGE AND CO LTD | 4.4 A (b) | AL7987 | - | - | - | 0.00E+00 | - | 5.54E-03 | - | 4.79E-03 |
| MONSANTO PLC | 4.4 A (b) | AN6787 | - | - | - | 0.00E+00 | - | 1.90E+00 | - | 1.00E+00 |
| QUISTWENS LTD | 4.4 A (b) | AL8398 | - | - | - | 2.46E-02 | - | 2.70E-03 | - | 0.00E+00 |
| ROBT JOWITT AND SON LTD | 4.4 A (b) | AL7197 | - | - | - | 1.00E-01 | - | 5.20E-02 | - | 0.00E+00 |
| SCM CHEMICALS LTD | 4.4 A (b) | AM0147 | - | - | - | 7.00E-01 | - | 8.00E-02 | - | 4.20E-01 |
| WOOLCOMBERS (PROCESSORS) LTD | 4.4 A (b) | AF4232 | - | 3.89E-02 | - | 1.80E-01 | - | 0.00E+00 | - | 0.00E+00 |
| ABBOTT LABORATORIES LTD | 4.4 A (d) | AM0945 | - | - | - | 1.68E-01 | - | 1.30E+00 | - | 0.00E+00 |
| BASF PLC | 4.4 A (d) | AL7502 | - | - | - | 3.00E-02 | - | 1.20E-01 | - | 6.00E-02 |
| BP CHEMICALS LTD | 4.4 A (d) | AL9998 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | - |
| CARGILL PLC | 4.4 A (d) | AQ1773 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| CONTRACT CHEMICALS (LEEDS) LTD | 4.4 A (d) | AL9858 | - | - | - | 1.00E+00 | - | 5.00E-02 | - | 0.00E+00 |
| ENGELHARD LTD | 4.4 A (d) | AL8452 | - | - | - | 7.00E-02 | - | 2.20E-02 | - | 1.62E-02 |
| ICI CHEMICALS AND POLYMERS LTD | 4.4 A (d) | AL7251 | - | - | - | 1.00E-03 | - | 1.00E-03 | - | 0.00E+00 |
| WARNER JENKINSON EUROPE LTD | 4.4 A (d) | AL8274 | - | - | - | 7.50E-02 | - | 1.00E-01 | - | 7.40E+02 |
| ZENECA LTD | 4.4 A (d) | AE6175 | - | 1.50E-02 | - | - | - | - | - | - |
| ELLIS AND EVERARD (UK) LTD | 4.4 A (e) | AP0585 | - | - | - | - | - | 4.20E-03 | - | 4.70E-03 |
| ELLIS AND EVERARD (UK) LTD | 4.4 A (e) | AP0593 | - | - | - | - | - | 3.00E-03 | - | 3.60E-03 |
| TEXAS INSTRUMENTS LTD | 4.4 A (e) | AL1008 | - | - | - | 7.10E-02 | - | 6.48E-02 | - | 6.17E-02 |
| TKR CHEMICAL MACHINING CO LTD | 4.4 A (c) | AL8576 | - | - | - | 1.80E-01 | - | 5.00E-02 | - | 0.00E+00 |
| WHATMAN INTERNATIONAL | 4.4 A (e) | AV3605 | - | - | - | - | - | - | - | 0.00E+00 |
| WHATMAN INTERNATIONAL | 4.4 A (e) | AV3608 | - | - | - | - | - | - | - | 0.00E+00 |
| TOTAL EMISSIONS FROM SECTOR 4.4 | | | - | 5.39E-02 | - | 1.26E+01 | - | 3.78E+00 | - | 7.42E+02 |
| BP CHEMICALS (ADDITIVES) LTD | 4.5 A (c) | AN9921 | - | - | - | 0.00E+00 | - | 2.83E-01 | - | 1.54E-01 |
| COURTAULDS FIBRES LTD | 4.5 A (c) | AN7970 | - | - | - | - | - | 6.35E+00 | - | 4.18E+00 |
| UCB FILMS PLC | 4.5 A (c) | AO2345 | - | - | - | - | - | 0.00E+00 | - | 9.00E-01 |
| ANZON LTD | 4.5 A (d) | AO0962 | - | - | - | 1.00E-01 | - | 8.30E-01 | - | 4.18E-01 |
| COOKSON MATTHEY CERAMICS AND MATERIALS LTD | 4.5 A (d) | AO0920 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| GEC-MARCONI MATERIALS TECHNOLOGY LTD | 4.5 A (d) | AN8682 | - | - | - | - | - | 0.00E+00 | - | 5.00E-03 |

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|--|-----------|--------|---|---|----------|----------|----------|----------|----------|----------|
| JOHNSON MATTHEY PLC | 4.5 A (d) | AN6477 | - | - | - | - | - | 4.80E+00 | - | 4.80E+00 |
| LEAD CHROME COLOURS LTD | 4.5 A (d) | AO1454 | - | - | - | - | - | 6.30E-01 | - | 3.00E-02 |
| PHOSPHOR TECHNOLOGY LTD | 4.5 A (d) | AO1993 | - | - | - | - | 0.00E+00 | 1.55E-02 | 0.00E+00 | 0.00E+00 |
| JOHNSON MATTHEY PLC | 4.5 A (e) | AN8712 | - | - | - | - | 1.92E+01 | 2.20E+00 | 2.95E+01 | 2.94E+00 |
| EARNSHAW LTD | 4.5 A (f) | AO0750 | - | - | - | 3.00E-02 | - | 5.54E-02 | - | 4.00E-02 |
| GEMALA BATTERY COMPANY LTD | 4.5 A (f) | AO1977 | - | - | - | 7.00E-02 | - | 2.60E-02 | - | 9.70E-02 |
| GULSON PLATING LTD | 4.5 A (f) | AO0865 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| HYDRO POLYMERS LTD | 4.5 A (f) | AO0725 | - | - | - | - | 1.40E-01 | - | 4.00E-02 | - |
| THERMOFOIL POLYMERS (UK) LTD | 4.5 A (f) | AO0598 | - | - | 3.00E-02 | 1.00E-03 | 0.00E+00 | 1.00E-05 | 4.20E-05 | 1.00E-05 |
| COOKSON MATTHEY CERAMICS AND MATERIALS LTD | 4.5 A (g) | AO0032 | - | - | - | - | 1.13E+01 | 9.68E-01 | 0.00E+00 | 0.00E+00 |
| DEUTSCH LTD | 4.5 A (g) | AB3048 | - | - | - | - | - | - | - | - |
| A B CONNECTORS LTD | 4.5 A (h) | AP4998 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| A J WELLS AND SONS | 4.5 A (h) | AS0421 | - | - | - | - | - | - | 8.26E-03 | 1.06E-05 |
| A T POETON (CARDIFF) LTD | 4.5 A (h) | AO0890 | - | - | - | 6.65E+00 | - | 1.10E+01 | - | 4.50E+00 |
| ABBAY METAL FINISHING CO LTD | 4.5 A (h) | AU4215 | - | - | - | - | - | - | - | 1.26E+02 |
| AP PRECISION HYDRAULICS LTD | 4.5 A (h) | AN9174 | - | - | - | 0.00E+00 | - | 4.30E+00 | - | 2.95E+00 |
| ASHTON AND MOORE LTD | 4.5 A (h) | AN8976 | - | - | - | 0.00E+00 | - | 4.45E+00 | - | 1.55E+00 |
| B.F.GOODRICH COMPONENT SERVICES LTD | 4.5 A (h) | AO5085 | - | - | - | - | - | - | - | - |
| BP SOLAR LTD | 4.5 A (h) | AN8178 | - | - | - | - | - | 4.80E-05 | - | 6.50E-05 |
| BRITISH AEROSPACE AIRBUS | 4.5 A (h) | AP3754 | - | - | - | - | - | - | - | - |
| CML GROUP LTD | 4.5 A (h) | AS6578 | - | - | - | - | - | - | - | 0.00E+00 |
| COLART FINE ART AND GRAPHICS LTD | 4.5 A (h) | AO0539 | - | - | - | - | - | 7.50E+00 | - | 0.00E+00 |
| COLTAX AEROSPACE LTD | 4.5 A (h) | AO1691 | - | - | - | - | - | 7.00E-03 | - | 0.00E+00 |
| COOKSON MATTHEY CERAMICS AND MATERIALS LTD | 4.5 A (h) | AO1608 | - | - | - | - | - | 1.60E+01 | - | 0.00E+00 |
| CROMPTON PARKINSON LTD | 4.5 A (h) | AN6990 | - | - | 4.88E-02 | - | 0.00E+00 | - | 0.00E+00 | - |
| CROSS MANUFACTURING CO (1938) LTD | 4.5 A (h) | AW9439 | - | - | - | - | - | - | - | - |
| DALER ROWNEY LTD | 4.5 A (h) | AO0105 | - | - | - | - | - | 2.80E+00 | - | 3.40E-01 |
| FAIREY HYDRAULICS LTD | 4.5 A (h) | AS3307 | - | - | - | - | - | - | - | 1.10E-01 |
| FLIGHT REFUELLING LTD | 4.5 A (h) | AN9972 | - | - | - | - | - | 2.00E-02 | - | 2.00E-02 |
| G E AIRCRAFT ENGINE SERVICES LTD | 4.5 A (h) | AO0938 | - | - | - | - | 6.00E-02 | 0.00E+00 | 2.36E+00 | 2.56E+00 |
| GE LIGHTING LTD | 4.5 A (h) | AO1063 | - | - | - | - | - | 4.70E-02 | - | 4.00E-02 |
| GEC-MARCONI INFRA-RED LTD | 4.5 A (h) | AN9093 | - | - | 0.00E+00 | 6.90E-01 | 0.00E+00 | 3.10E-01 | 0.00E+00 | 7.00E+02 |

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|--|-----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|
| HUNTING AVIATION A.E.D. | 4.5 A (h) | AO5336 | - | - | - | - | - | 3.06E-01 | - | 2.48E-02 |
| INDIAN DYESTUFF INDUSTRIES (EUROPE) LTD | 4.5 A (h) | AB4176 | - | 0.00E+00 | - | 3.00E-03 | - | 0.00E+00 | - | 0.00E+00 |
| INGRAM AND GLASS LTD | 4.5 A (h) | AO8017 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| ITT CANNON PLC | 4.5 A (h) | AO0563 | - | - | - | - | - | 7.20E-01 | - | 0.00E+00 |
| KING AND FOWLER LTD | 4.5 A (h) | AN9883 | - | - | - | 0.00E+00 | - | 2.90E+00 | - | 1.56E+00 |
| LUCAS AEROSPACE ENGINE CONTROL SYSTEMS LTD | 4.5 A (h) | AO2426 | - | - | - | 0.00E+00 | - | 2.02E+00 | - | 2.44E+00 |
| MARSHALL OF CAMBRIDGE AEROSPACE LTD. | 4.5 A (h) | AV1653 | - | - | - | - | - | - | - | 0.00E+00 |
| MARTIN BAKER AIRCRAFT COMPANY LTD | 4.5 A (h) | AR3399 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| MOORES (WALISDOWN) LTD | 4.5 A (h) | AO8386 | - | - | - | - | - | 3.30E-02 | - | 2.30E-02 |
| NORMALAIR-GARRETT LTD | 4.5 A (h) | AN6779 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | - |
| PORTSMOUTH AVIATION LTD | 4.5 A (h) | AO1748 | - | - | - | - | - | 0.00E+00 | - | 1.44E+00 |
| RADIANT METAL FINISHING PLC | 4.5 A (h) | AO2965 | - | - | - | 2.00E-02 | - | 2.58E-02 | - | 0.00E+00 |
| RNAY FLEETLANDS | 4.5 A (h) | AV3150 | - | - | - | - | - | - | - | 1.30E+01 |
| ROBERT STUART PLC | 4.5 A (h) | AN7481 | - | - | - | - | - | 2.00E+00 | - | 2.00E+00 |
| ROSE BEARINGS LTD | 4.5 A (h) | AO9706 | - | - | - | - | - | 2.08E-01 | - | 1.90E-02 |
| ROYAL ORDNANCE PLC | 4.5 A (h) | AN8372 | - | - | - | - | - | 5.50E-01 | - | 7.65E-01 |
| SILVERFIELD LTD | 4.5 A (h) | AN9417 | - | - | - | - | - | 2.28E-01 | - | 3.65E-02 |
| SOUTH WEST METAL FINISHING LTD | 4.5 A (h) | AN7813 | - | - | - | 0.00E+00 | - | 1.20E+00 | - | 0.00E+00 |
| TREFN ENGINEERING METAL TREATMENTS LTD | 4.5 A (h) | AO6880 | - | - | - | - | 1.00E-03 | 1.00E-01 | 1.00E-03 | 1.00E-01 |
| TRINITY AEROSPACE ENGINEERING LTD | 4.5 A (h) | AN9492 | - | - | - | - | - | - | - | - |
| UNIVERCELL BATTERY CO LTD | 4.5 A (h) | AF2086 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | - | - | - | - |
| WALKER AEC LTD | 4.5 A (h) | AO7452 | - | - | - | - | - | 4.00E-01 | - | 4.30E-01 |
| WALTON PLATING LTD | 4.5 A (h) | AO7720 | - | - | - | - | - | 1.25E+00 | - | 0.00E+00 |
| WEST MIDDX PLATING CO. LTD | 4.5 A (h) | AN9450 | - | - | - | - | - | - | - | - |
| WESTLAND AEROSPACE LTD | 4.5 A (h) | AO0504 | - | - | - | - | - | - | - | - |
| WESTLAND ENGINEERING LTD | 4.5 A (h) | AN9409 | - | - | - | - | - | 1.05E-02 | - | 0.00E+00 |
| WESTLAND INDUSTRIAL PRODUCTS LTD | 4.5 A (h) | AO0881 | - | - | - | - | - | 5.32E+00 | - | 3.80E+00 |
| BRITANNIA ALLOYS AND CHEMICALS LTD | 4.5 A (i) | AO1594 | - | - | - | - | - | 2.20E+00 | - | 0.00E+00 |
| BRITISH CHROME AND CHEMICALS | 4.5 A (i) | AN9727 | - | - | - | 0.00E+00 | - | 1.00E+00 | - | 1.00E+00 |
| FISHER SCIENTIFIC | 4.5 A (i) | AO2639 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| HARCROS CHEMICALS UK LTD | 4.5 A (i) | AO2671 | - | - | - | 3.10E+00 | - | 4.10E+00 | - | 3.70E+01 |
| ICI CHEMICALS AND POLYMERS LTD | 4.5 A (i) | AN8437 | - | - | - | - | - | 1.00E+00 | - | 1.00E+00 |

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|--|-----------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| SLI LIGHTING LTD | 4.5 A (i) | AO0784 | - | - | - | 2.50E-04 | - | 1.00E-02 | - | 2.00E-04 |
| UNION MINIERE OXYDE (UK) LTD | 4.5 A (i) | AN8496 | - | - | - | 2.90E-03 | - | 4.30E-05 | - | 7.70E-03 |
| WALTERISATION (UK) LTD | 4.5 A (i) | AO1721 | - | - | - | 0.00E+00 | - | 5.40E-03 | - | 6.24E-03 |
| WILLIAM BLYTHE LTD | 4.5 A (i) | AO1233 | - | - | - | - | - | 9.65E+00 | - | 8.72E+00 |
| BRITISH AEROSPACE DEFENCE LTD | 4.5 A (l) | AH9561 | - | 5.72E-05 | - | 0.00E+00 | - | 1.56E-03 | - | 8.02E-05 |
| ALCHEMA LTD | 4.5 A (m) | AP1590 | - | - | - | - | - | 3.50E-02 | - | 5.50E-02 |
| FERRO (GREAT BRITAIN) LTD | 4.5 A (m) | AN5349 | - | - | 0.00E+00 | 1.70E-02 | 2.40E-01 | 4.00E-02 | 9.10E-02 | 5.00E-03 |
| ROQUETTE CORBY LTD | 4.5 A (m) | AN8186 | - | - | - | - | - | 1.78E-01 | - | 1.90E-01 |
| TIOXIDE SPECIALITIES LTD | 4.5 A (m) | AO0695 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| AVDEL SYSTEMS LTD | 4.5 A (n) | AN7333 | - | - | - | - | - | 1.15E+01 | - | 1.25E+01 |
| ALBRIGHT AND WILSON UK LTD | 4.5 A (o) | AI6100 | - | 9.00E-01 | - | 4.01E+00 | - | 4.15E+00 | - | 0.00E+00 |
| TOTAL EMISSIONS FROM SECTOR 4.5 | | | 0.00E+00 | 9.00E-01 | 7.88E-02 | 1.47E+01 | 3.10E+01 | 1.14E+02 | 3.20E+01 | 9.38E+02 |
| FISONS PLC | 4.6 A (a) | AL8479 | - | - | - | 7.00E-05 | - | 7.00E-05 | - | 0.00E+00 |
| HYDRO AGRI (UK) LTD | 4.6 A (a) | AL9076 | - | - | - | - | - | 3.70E-02 | - | 0.00E+00 |
| KEMIRA INCE LTD | 4.6 A (a) | AL7855 | - | - | - | 5.00E-02 | - | 8.52E-04 | - | 2.00E-01 |
| MIRACLE GARDEN CARE | 4.6 A (a) | AL6816 | - | - | - | 2.80E-01 | - | 6.00E-04 | - | 8.90E-01 |
| ICI CHEMICALS AND POLYMERS LTD | 4.6 A (b) | AL8614 | - | - | - | - | - | 6.00E-03 | - | 6.90E-02 |
| PB KENT AND CO LTD | 4.6 A (b) | AN8194 | - | - | - | 3.20E-03 | - | 4.23E-02 | - | 2.00E-02 |
| SEABRIGHT INDUSTRIES LTD | 4.6 A (b) | AO0555 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| TOTAL EMISSIONS FROM SECTOR 4.6 | | | - | - | - | 3.33E-01 | - | 8.68E-02 | - | 1.18E+00 |
| CORY ENVIRONMENTAL LTD | 5.1 A (a) | AH8719 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| LEIGH ENVIRONMENTAL LTD | 5.1 A (a) | AG8551 | - | 6.79E-03 | - | 1.84E-02 | 0.00E+00 | 0.00E+00 | 2.60E+00 | 2.33E-04 |
| RECHEM INTERNATIONAL LTD | 5.1 A (a) | AG7946 | 1.93E+00 | 7.92E-01 | 2.90E+00 | 1.60E+00 | 2.00E+00 | 5.00E+00 | 8.00E-01 | 8.20E-01 |
| RECHEM INTERNATIONAL LTD | 5.1 A (a) | AG8047 | 2.00E+00 | 5.00E-01 | 7.00E+00 | 2.00E+00 | 9.80E-01 | 1.00E+00 | 1.00E+00 | 1.00E+00 |
| SCALFORD CONSTRUCTION CO LTD | 5.1 A (a) | AH1536 | - | - | - | - | 2.05E-01 | - | 0.00E+00 | - |
| WELLCOME FOUNDATION LTD | 5.1 A (a) | AG9264 | 0.00E+00 | - | 6.04E-02 | - | 1.00E-01 | - | 0.00E+00 | - |
| WHITE ROSE ENVIRONMENTAL | 5.1 A (a) | AR2996 | - | - | - | - | 6.06E-03 | - | 0.00E+00 | - |
| ENGELHARD LTD | 5.1 A (b) | AG7890 | 3.46E-01 | 2.37E-02 | 3.37E+00 | 3.50E-02 | 1.92E+00 | 8.10E-03 | 5.03E+00 | 3.80E-02 |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 5.1 A (b) | AG1069 | - | 0.00E+00 | - | 0.00E+00 | - | 1.75E-03 | - | 0.00E+00 |
| AEP (HAMPSHIRE) LTD | 5.1 A (c) | AG8276 | - | - | - | - | - | - | 3.00E+01 | - |

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|---|-----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| BEACON WASTE LTD | 5.1 A (c) | AG9639 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| CLEVELAND COUNTY COUNCIL | 5.1 A (c) | AG8322 | 1.22E+01 | - | 5.80E+01 | - | 0.00E+00 | - | 0.00E+00 | - | 3.62E+01 | - | 0.00E+00 | - |
| CLINICAL ENERGY LTD | 5.1 A (c) | AG8675 | 5.54E-02 | 5.28E-04 | 1.00E-02 | 8.82E-05 | 1.14E+00 | 2.71E-03 | 9.80E-02 | 5.14E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CLINICAL WASTE INCINERATION LTD | 5.1 A (c) | AG8357 | 1.01E+01 | 4.03E-01 | 1.21E+01 | 0.00E+00 | 7.51E+00 | 0.00E+00 | 4.60E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CLINICAL WASTE LTD | 5.1 A (c) | AN3435 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| CMR LTD | 5.1 A (c) | AG8039 | 1.00E-01 | - | 1.10E-01 | - | 7.00E-01 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| COVENTRY CITY COUNCIL | 5.1 A (c) | AG7881 | - | - | - | - | - | - | 6.49E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| DERBYSHIRE WASTE LTD | 5.1 A (c) | AG7920 | - | 0.00E+00 | - | 5.50E-02 | - | 5.02E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FORD MOTOR CO LTD | 5.1 A (c) | AG7814 | 2.70E+01 | - | 2.80E+01 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| GREATER MANCHESTER WASTE DISPOSAL AUTHORITY | 5.1 A (c) | AG8365 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GREATER MANCHESTER WASTE DISPOSAL AUTHORITY | 5.1 A (c) | AG8381 | 2.17E-01 | - | - | 2.36E-01 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| HUNTINGDON RESEARCH CENTRE LTD | 5.1 A (c) | AG8667 | 2.00E-01 | - | 6.00E-01 | - | 7.01E-01 | - | 5.69E-01 | - | 0.00E+00 | - | 0.00E+00 | - |
| LEIGH ENVIRONMENTAL LTD | 5.1 A (c) | AK2688 | 4.90E+00 | - | 6.90E+00 | - | 5.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| MEDICAL ENERGY (WORCS) LTD | 5.1 A (c) | AN3737 | - | - | 5.18E-01 | - | 7.00E-01 | - | 2.16E-01 | - | 0.00E+00 | - | 0.00E+00 | - |
| NORTH LONDON WASTE AUTHORITY | 5.1 A (c) | AG5269 | 4.50E+02 | 5.51E+00 | 5.04E+02 | 6.16E+00 | 2.24E+02 | 2.47E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NORTH TYNESIDE BOROUGH COUNCIL | 5.1 A (c) | AG8098 | 9.90E+01 | 5.00E+01 | - | - | - | - | - | - | - | - | - | - |
| NORTHWICK PARK HOSPITAL NHS TRUST | 5.1 A (c) | AG8012 | 6.90E+00 | - | 3.60E+00 | - | 1.41E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| KNOH INCINERATOR SERVICES LTD | 5.1 A (c) | AM2034 | - | - | 5.96E-01 | - | 5.60E+01 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| S GRUNDON (WASTE) LTD | 5.1 A (c) | AG8390 | 4.03E+00 | - | 7.40E+00 | - | 1.01E+01 | - | 3.60E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| SE LONDON COMBINED HEAT AND POWER LTD | 5.1 A (c) | AE7236 | 0.00E+00 | - | 2.50E+01 | - | 2.00E+00 | - | 3.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| SEVERN TRENT WATER LTD | 5.1 A (c) | AI0802 | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| SEVERN TRENT WATER LTD | 5.1 A (c) | AF2477 | - | - | - | - | 2.75E-01 | 4.60E-01 | 1.25E-01 | 1.29E+01 | - | - | - | - |
| SEVERN TRENT WATER LTD | 5.1 A (c) | AG3932 | - | 6.70E+01 | - | 1.38E+02 | - | 0.00E+00 | - | - | - | - | - | - |
| SHEFFIELD CITY COUNCIL | 5.1 A (c) | AG7784 | 2.64E+01 | 3.38E-03 | 6.40E+01 | 1.70E-01 | 1.73E+01 | 9.58E-02 | 3.86E+01 | 2.85E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SOUTHERN WATER SERVICES LTD | 5.1 A (c) | AG6877 | 3.00E-02 | - | 1.20E-01 | - | 5.20E-02 | - | 2.90E-02 | - | 0.00E+00 | - | 0.00E+00 | - |
| WASTENOTTS (RECLAMATION) LTD | 5.1 A (c) | AH0653 | 2.60E+01 | - | 1.14E+02 | - | 1.08E+02 | - | 2.20E-01 | - | 0.00E+00 | - | 0.00E+00 | - |
| WEST YORKSHIRE WASTE MANAGEMENT | 5.1 A (c) | AG8446 | 3.23E+01 | 1.05E+00 | 1.87E+01 | 1.47E+00 | 3.40E+01 | 3.60E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| WEST YORKSHIRE WASTE MANAGEMENT | 5.1 A (c) | AG8454 | 5.90E-01 | - | 5.70E-01 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| WOLVERHAMPTON METROPOLITAN BOROUGH COUNCIL | 5.1 A (c) | AG7954 | - | 5.00E-01 | - | 1.00E-03 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| YORKSHIRE ENVIRONMENTAL LTD | 5.1 A (c) | AM6293 | - | - | 2.10E-02 | - | 8.20E-02 | - | 1.36E+00 | - | 0.00E+00 | - | 0.00E+00 | - |

| | | | | | | | | | | |
|--|-----------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| YORKSHIRE WATER PLC | 5.1 A (c) | AG7733 | 4.50E-01 | - | 7.00E-02 | - | 0.00E+00 | - | 0.00E+00 | - |
| YORKSHIRE WATER PLC | 5.1 A (c) | AG7717 | 3.25E-02 | - | 8.92E-02 | - | 5.60E-01 | - | 1.67E+01 | - |
| YORKSHIRE WATER PLC | 5.1 A (c) | AG7741 | 7.00E-01 | - | 1.15E-01 | - | 1.02E+00 | - | 0.00E+00 | - |
| BLAGDEN PACKAGING LTD | 5.1 A (d) | AG7008 | - | 1.07E-02 | - | 1.07E-02 | - | 1.54E-02 | - | 1.23E-02 |
| LEIGH ENVIRONMENTAL LTD | 5.1 A (d) | AG8543 | - | - | 1.09E-01 | - | 8.00E-01 | - | 0.00E+00 | - |
| TOTAL EMISSIONS FROM SECTOR 5.1 | | | 7.05E+02 | 1.26E+02 | 9.17E+02 | 1.50E+02 | 4.76E+02 | 9.46E+00 | 2.10E+02 | 1.50E+01 |
| CHEMVIRON CARBON LTD | 5.2 A (a) | AG8403 | - | 0.00E+00 | - | 1.83E-01 | - | 9.00E-02 | - | 0.00E+00 |
| CHEMVIRON CARBON LTD | 5.2 A (a) | AC3612 | - | - | - | - | - | - | - | 0.00E+00 |
| CRODA SOLVENTS LTD | 5.2 A (a) | AG8462 | - | 1.19E-06 | - | 3.36E-06 | - | 8.75E-06 | - | 3.26E-06 |
| ELGA LTD | 5.2 A (a) | AG7822 | - | 5.88E-03 | - | 7.39E-03 | - | 1.23E-02 | - | 0.00E+00 |
| GRAFHAM CARBONS LTD | 5.2 A (a) | AG7806 | - | 2.99E-01 | - | 2.29E-01 | - | 5.33E-01 | - | 3.90E-01 |
| GRAFHAM CARBONS LTD | 5.2 A (a) | AI8498 | - | 0.00E+00 | - | 0.00E+00 | - | 1.10E-02 | - | 1.68E-01 |
| LANSTAR OIL REFINERIES | 5.2 A (a) | AG8110 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| ORCOL FUELS LTD | 5.2 A (a) | AI0039 | - | - | - | 7.50E-02 | - | 3.50E-01 | - | 1.10E-05 |
| SOLREC LTD | 5.2 A (a) | AG9248 | - | - | - | 1.53E-01 | - | 1.26E-01 | - | 6.80E-02 |
| CPL CARBONS LTD | 5.2 A (b) | AT6964 | - | - | - | - | - | - | - | 2.00E-03 |
| YORKSHIRE ENVIRONMENTAL LIMITED | 5.2 A (b) | AR2988 | - | - | - | - | 0.00E+00 | - | - | - |
| TOTAL EMISSIONS FROM SECTOR 5.2 | | | - | 3.05E-01 | - | 6.47E-01 | 0.00E+00 | 1.12E+00 | - | 6.28E-01 |
| CITY WORKS, BYKER RECLAMATION PLANT | 5.3 A (a) | AG8730 | 2.98E+00 | 2.01E-06 | 9.40E-01 | 2.00E-02 | 8.00E-01 | 8.00E-03 | 8.00E-01 | 1.66E-02 |
| ISLE OF WIGHT COUNTY COUNCIL | 5.3 A (a) | AG9124 | - | 1.58E-02 | - | 5.42E-03 | - | 2.72E-03 | - | 6.00E-03 |
| REPROTECH (PEBSHAM) LTD | 5.3 A (a) | AG8691 | - | 6.40E-03 | - | 2.70E-03 | - | 4.00E-03 | - | 0.00E+00 |
| TOTAL EMISSIONS FROM SECTOR 5.3 | | | 2.98E+00 | 2.22E-02 | 9.40E-01 | 2.81E-02 | 8.00E-01 | 1.47E-02 | 8.00E-01 | 2.26E-02 |
| A M PAPER MILL LTD | 6.1 A (b) | AU8474 | - | - | - | - | - | - | - | 7.76E-02 |
| AYLESFORD NEWSPRINT LTD | 6.1 A (b) | AP0313 | - | - | - | - | 6.10E-02 | - | 0.00E+00 | - |
| BPB PAPERBOARD - RADCLIFFE MILL | 6.1 A (b) | AU6854 | - | - | - | - | - | - | - | - |
| BRIDGEWATER PAPER CO LTD | 6.1 A (b) | AU7532 | - | - | - | - | - | - | - | 6.46E-01 |
| COLTHROP BOARD MILL LTD | 6.1 A (b) | AU8423 | - | - | - | - | - | - | - | 3.44E-01 |
| IGGESUND PAPER BOARD (WORKINGTON) LTD | 6.1 A (b) | AU3073 | - | - | - | - | - | - | - | 7.75E+00 |

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|--------------------------------------|-----------|--------|---|---|---|---|---|----------|---|----------|----------|
| JAMONT UK LTD | 6.1 A (b) | AU7311 | - | - | - | - | - | - | - | - | 1.56E-01 |
| KIMBERLY CLARK LTD | 6.1 A (b) | AU6820 | - | - | - | - | - | - | - | - | 7.34E-01 |
| KIMBERLY CLARK LTD | 6.1 A (b) | AU6722 | - | - | - | - | - | - | - | - | 0.00E+00 |
| KIMBERLY CLARK LTD | 6.1 A (b) | AU7117 | - | - | - | - | - | - | - | - | 0.00E+00 |
| KIMBERLY-CLARK LTD | 6.1 A (b) | AU7125 | - | - | - | - | - | - | - | - | 3.00E-01 |
| KRUGER TISSUE (MANUFACTURING) LTD | 6.1 A (b) | AU3332 | - | - | - | - | - | - | - | - | 0.00E+00 |
| SCA HYGIENE UK LTD | 6.1 A (b) | AU5491 | - | - | - | - | - | - | - | - | 0.00E+00 |
| SCA PACKAGING NEW HYTHE | 6.1 A (b) | AU8466 | - | - | - | - | - | - | - | - | 0.00E+00 |
| SHOTTON PAPER COMPANY PLC | 6.1 A (b) | AU7338 | - | - | - | - | - | - | - | - | 5.41E-01 |
| SMURFIT TOWNSEND HOOK | 6.1 A (b) | AU7737 | - | - | - | - | - | - | - | - | 0.00E+00 |
| SONOCO LTD - BOARD MILLS | 6.1 A (b) | AU7583 | - | - | - | - | - | - | - | - | 2.89E-01 |
| TOTAL EMISSIONS FROM SECTOR 6.1 | | | | | | | | | | | |
| | | | - | - | - | - | - | 6.10E-02 | - | 0.00E+00 | 1.08E+01 |
| HER MAJESTY'S NAVAL BASE, PORTSMOUTH | | | | | | | | | | | |
| | 6.5 A (a) | AU8059 | - | - | - | - | - | - | - | - | - |
| BUCKFAST SPINNING COMPANY LTD | | | | | | | | | | | |
| | 6.5 A (b) | AU7656 | - | - | - | - | - | - | - | - | 0.00E+00 |
| TOTAL EMISSIONS FROM SECTOR 6.5 | | | | | | | | | | | |
| | | | - | - | - | - | - | - | - | - | 0.00E+00 |
| PFIZER LTD | | | | | | | | | | | |
| | 6.9 A (a) | AU8083 | - | - | - | - | - | - | - | - | 0.00E+00 |
| TOTAL EMISSIONS FROM SECTOR 6.9 | | | | | | | | | | | |
| | | | - | - | - | - | - | - | - | - | 0.00E+00 |

Table C1A Emissions of Cadmium to Land

| OPERATOR | SECTOR | AUTHN. NO. | 1993 | 1994 | 1995 | 1996 |
|--|-----------|------------|-----------------|-----------------|-----------------|-----------------|
| FUSION AUTOMATION INC. | 2.2 A (f) | AS8139 | - | - | - | 0.00E+00 |
| BASF PLC | 4.2 A (c) | AJ6505 | - | 8.82E+03 | 3.40E+03 | 2.50E+01 |
| FOSECO LTD | 4.2 A (d) | AK6721 | - | 7.50E-03 | 6.02E-04 | 3.30E-05 |
| HOECHST UK LTD. | 4.2 A (d) | AK5288 | - | 5.00E-03 | 5.00E-03 | 1.50E-03 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK7035 | - | 5.00E-03 | 1.00E-03 | 4.00E-04 |
| PHOSPHOR TECHNOLOGY LTD | 4.5 A (d) | AO1993 | - | - | 0.00E+00 | 0.00E+00 |
| JOHNSON MATTHEY PLC | 4.5 A (e) | AN8712 | - | - | 4.40E+01 | 6.70E+01 |
| EARNSHAW LTD | 4.5 A (f) | AO0750 | - | 5.00E+00 | 5.00E+00 | 1.80E+01 |
| DEUTSCH LTD | 4.5 A (g) | AB3048 | 1.87E+01 | 6.80E+01 | 7.20E+01 | - |
| A J WELLS AND SONS | 4.5 A (h) | AS0421 | - | - | - | 7.46E-01 |
| AP PRECISION HYDRAULICS LTD | 4.5 A (h) | AN9174 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| B.F.GOODRICH COMPONENT SERVICES LTD | 4.5 A (h) | AO5085 | - | - | 0.00E+00 | 0.00E+00 |
| BRITISH AEROSPACE AIRBUS | 4.5 A (h) | AP3754 | - | - | 0.00E+00 | 4.00E-04 |
| COLART FINE ART AND GRAPHICS LTD | 4.5 A (h) | AO0539 | - | - | 5.70E+01 | 0.00E+00 |
| COLTAX AEROSPACE LTD | 4.5 A (h) | AO1691 | - | - | 0.00E+00 | 6.84E-07 |
| CROMPTON PARKINSON LTD | 4.5 A (h) | AN6990 | - | 5.52E-01 | 0.00E+00 | 0.00E+00 |
| DALER ROWNEY LTD | 4.5 A (h) | AO0105 | - | - | 7.69E+01 | 6.20E+01 |
| G E AIRCRAFT ENGINE SERVICES LTD | 4.5 A (h) | AO0938 | - | - | 0.00E+00 | 6.57E-01 |
| ITT CANNON PLC | 4.5 A (h) | AO0563 | - | - | 8.15E+01 | 0.00E+00 |
| KING AND FOWLER LTD | 4.5 A (h) | AN9883 | - | 0.00E+00 | 6.48E+01 | 5.48E+01 |
| LUCAS AEROSPACE ENGINE CONTROL SYSTEMS LTD | 4.5 A (h) | AO2426 | - | 0.00E+00 | 0.00E+00 | 5.82E+00 |
| MARSHALL OF CAMBRIDGE AEROSPACE LTD. | 4.5 A (h) | AV1653 | - | - | - | 0.00E+00 |
| MOORES (WALISDOWN) LTD | 4.5 A (h) | AO8386 | - | - | 0.00E+00 | 0.00E+00 |
| PORTSMOUTH AVIATION LTD | 4.5 A (h) | AO1748 | - | - | 0.00E+00 | 0.00E+00 |
| RNAY FLEETLANDS | 4.5 A (h) | AV3150 | - | - | - | 0.00E+00 |
| ROSE BEARINGS LTD | 4.5 A (h) | AO9706 | - | - | 3.37E+01 | 4.60E-01 |
| TREFN ENGINEERING METAL TREATMENTS LTD | 4.5 A (h) | AO6880 | - | - | 2.40E-01 | 1.80E-01 |
| TRINITY AEROSPACE ENGINEERING LTD | 4.5 A (h) | AN9492 | - | - | 5.30E-02 | 0.00E+00 |
| WEST MIDDX PLATING CO. LTD | 4.5 A (h) | AN9450 | - | - | 2.00E+00 | 2.00E+00 |
| WESTLAND AEROSPACE LTD | 4.5 A (h) | AO0504 | - | - | 2.23E+01 | 4.20E+00 |
| SEVERN TRENT WATER LTD | 5.1 A (c) | AF2477 | - | - | 2.20E+02 | 3.02E+02 |
| TOTAL ACROSS ALL SECTORS | | | 1.87E+01 | 8.89E+03 | 4.08E+03 | 5.43E+02 |

Table C2 Emissions Data for Mercury to the Environment

| OPERATOR | SECTOR | AUTH. NO | Emissions 1992 (kg) | | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|-----------------------------------|-----------|-------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | Air | Water | Air | Water | Air | Water | Air | Water | Air | Water |
| CONOCO LTD | 1.1 A (a) | AF6863 | | | | 2.70E-01 | | 3.43E-01 | | 1.00E+00 | | 1.00E+00 |
| | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.70E-01 | 0.00E+00 | 3.43E-01 | 0.00E+00 | 1.00E+00 | 0.00E+00 | 1.00E+00 |
| BRITISH STEEL PLC | 1.2 A (a) | AF7193 | - | - | - | 1.04E+00 | - | 2.01E+00 | - | 2.18E-01 | - | 1.63E-01 |
| COAL PRODUCTS LTD | 1.2 A (a) | AF6227 | - | - | - | 6.00E-01 | - | 5.00E-01 | - | 5.00E-01 | - | 1.60E+00 |
| COAL PRODUCTS LTD | 1.2 A (a) | AF8483 | - | - | - | 3.90E-09 | - | 3.03E-01 | - | 0.00E+00 | - | 0.00E+00 |
| COALITE PRODUCTS LTD | 1.2 A (a) | AF5972 | - | - | - | 0.00E+00 | - | 1.10E-01 | - | 1.60E-01 | - | 1.00E-01 |
| MONCKTON COKE AND CHEMICAL CO LTD | 1.2 A (a) | AF7835 | - | - | - | 2.83E-01 | - | 1.33E-01 | - | 0.00E+00 | - | 0.00E+00 |
| SEVALCO LTD. | 1.2 A (a) | AF7916 | - | - | - | 2.23E-01 | - | 1.24E+01 | - | 1.78E-01 | - | 1.91E+00 |
| COALITE PRODUCTS LTD | 1.2 A (b) | AK7426 | - | - | - | - | - | 4.00E-01 | - | 7.30E-02 | - | 1.57E-01 |
| Total for sector 1.2 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.15E+00 | 0.00E+00 | 1.58E+01 | 0.00E+00 | 1.13E+00 | 0.00E+00 | 3.93E+00 |
| ALBRIGHT AND WILSON UK LTD | 1.3 A (a) | AA2984 | - | 2.90E-02 | - | 6.19E-02 | - | 1.45E-02 | - | 1.40E-03 | - | 2.07E-03 |
| ALLIED COLLOIDS LTD | 1.3 A (a) | AA3298 | - | - | - | 3.00E-03 | - | 3.00E-03 | - | 2.00E-03 | - | 2.00E-03 |
| ALLIED STEEL AND WIRE LTD | 1.3 A (a) | AF8688 | - | 2.00E-03 | - | 9.50E-03 | - | 1.40E-02 | - | 8.20E-04 | - | 1.70E-01 |
| AYLESFORD NEWSPRINT LTD | 1.3 A (a) | AA2941 | - | - | - | 5.65E-03 | - | 5.71E-03 | - | 8.33E-03 | - | 0.00E+00 |
| BOOTS COMPANY PLC | 1.3 A (a) | AA3450 | - | 1.42E-02 | - | 1.44E-02 | - | 5.59E-02 | - | 2.41E-02 | - | 8.87E-03 |
| BP CHEMICALS LTD | 1.3 A (a) | AA2968 | - | 5.86E-02 | - | 6.19E-02 | - | 4.84E-02 | - | - | - | - |
| BPB PAPER AND PACKAGING LTD | 1.3 A (a) | AA3409 | - | 0.00E+00 | - | 3.36E-02 | - | 3.86E-02 | - | 4.14E-02 | - | 5.45E-02 |
| BRITISH NUCLEAR FUELS PLC | 1.3 A (a) | AA2283 | - | - | - | 1.70E-02 | - | 4.00E-02 | - | 8.00E-03 | - | 0.00E+00 |
| BRITISH STEEL PLC | 1.3 A (a) | AA2216 | - | 1.84E-01 | - | 4.25E-01 | - | 1.96E-01 | - | 1.22E-01 | - | 5.20E-02 |
| BRITISH STEEL PLC | 1.3 A (a) | AF8025 | - | - | - | 0.00E+00 | - | 2.40E-02 | - | 1.80E+02 | - | 0.00E+00 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA3018 | - | 2.49E-01 | - | 1.90E-02 | - | 9.00E-04 | - | 8.20E-04 | - | 1.81E-03 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2259 | - | 4.00E-02 | - | 5.40E-03 | - | 1.05E-03 | - | 1.82E-04 | - | 7.35E-04 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2275 | - | 2.40E-02 | - | 6.19E-02 | - | 2.50E-02 | - | 0.00E+00 | - | 0.00E+00 |

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|--|-----------|--------|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| BRITISH SUGAR PLC | 1.3 A (a) | AA2518 | - | 1.59E-04 | - | 7.60E-05 | - | 2.00E-03 | - | - | - | - |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2232 | - | - | - | - | - | - | - | 1.00E-01 | - | 7.00E-04 |
| BRITISH SUGAR PLC | 1.3 A (a) | AA2224 | - | 2.82E-02 | - | 1.77E-01 | - | 5.40E-02 | - | 3.14E-03 | - | - |
| BRITISH SUGAR PLC | 1.3 A (a) | AA3034 | - | 0.00E+00 | - | 3.02E-03 | - | 2.86E-02 | - | 4.63E-03 | - | 3.90E-04 |
| CERESTAR UK LTD | 1.3 A (a) | AB1061 | - | 1.50E-03 | - | 1.90E-03 | - | 2.00E-03 | - | 1.90E-03 | - | 2.00E-03 |
| CLAYTON ANILINE CO | 1.3 A (a) | AI2996 | - | - | - | - | - | 5.00E-01 | - | 0.00E+00 | - | 0.00E+00 |
| CLAYTON ANILINE CO | 1.3 A (a) | AA2330 | - | 8.50E-01 | - | 5.00E-01 | - | 0.00E+00 | - | 0.00E+00 | - | - |
| COLTHROP BOARD MILL LTD | 1.3 A (a) | AA3891 | - | 4.00E-02 | - | 3.25E-02 | - | 3.30E-02 | - | 1.92E-03 | - | 1.44E-03 |
| COURAGE (BREWING) LTD | 1.3 A (a) | AA8508 | - | 4.39E-02 | - | 6.20E-02 | - | 6.10E-02 | - | 6.50E-02 | - | 6.54E-02 |
| COURTAULDS CHEMICALS (HOLDINGS) LTD | 1.3 A (a) | AA2429 | - | 2.83E-01 | - | 8.60E-01 | - | 5.90E-01 | - | 2.39E-03 | - | 0.00E+00 |
| COURTAULDS FIBRES LTD | 1.3 A (a) | AA5444 | - | 3.75E-01 | - | 8.90E-02 | - | 1.10E-02 | - | 7.00E-03 | - | 9.00E-03 |
| DEFENCE RESEARCH AGENCY | 1.3 A (a) | AB3706 | - | - | - | - | - | - | - | - | - | 5.40E-04 |
| EAST LANCASHIRE PAPER MILL CO LTD | 1.3 A (a) | AA2933 | - | 6.00E-03 | - | 2.30E-03 | - | 2.30E-03 | - | 9.20E-04 | - | 6.40E-03 |
| EASTERN MERCHANT GENERATION LTD | 1.3 A (a) | AA3425 | - | - | - | 1.76E-02 | - | 8.20E-03 | - | 1.43E-03 | - | 7.22E-04 |
| EMPIRE PAPER LTD | 1.3 A (a) | AD5106 | - | 3.00E-04 | - | 6.00E-04 | - | - | - | - | - | - |
| ENVIROENERGY LTD | 1.3 A (a) | AA4715 | - | 9.70E-02 | - | 3.80E-03 | - | 3.98E-02 | - | - | - | - |
| FMC CORPORATION (UK) LTD | 1.3 A (a) | AA2313 | - | 8.00E-05 | - | 9.80E-05 | - | 1.40E-01 | - | 3.18E-04 | - | 3.83E-04 |
| FORGEMASTERS STEEL AND ENGINEERING LTD | 1.3 A (a) | AA2402 | - | - | - | 5.31E-02 | - | 2.40E-02 | - | - | - | - |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 1.3 A (a) | AF4704 | - | - | - | 1.50E-02 | - | 1.80E-03 | - | 4.20E-03 | - | 0.00E+00 |
| GLAXOCHEM LTD | 1.3 A (a) | AA2003 | - | - | - | 4.42E-02 | - | 3.90E-02 | - | 1.92E-02 | - | 2.37E-02 |
| GRIMETHORPE PFBC ESTABLISHMENT | 1.3 A (a) | AA2372 | - | 0.00E+00 | - | - | - | - | - | - | - | - |
| GUINNESS BREWING WORLDWIDE LTD | 1.3 A (a) | AB2564 | - | 7.99E-02 | - | 7.66E-02 | - | 1.00E-01 | - | 1.01E-01 | - | 1.66E-01 |
| HICKSON FINE CHEMICALS LTD | 1.3 A (a) | AA2364 | - | 1.47E-01 | - | 9.36E-02 | - | 6.21E-02 | - | 5.89E-02 | - | 5.60E-03 |
| HYDRO AGRI (UK) LTD | 1.3 A (a) | AA3395 | - | 2.10E-02 | - | 2.10E-02 | - | 1.10E-02 | - | 0.00E+00 | - | - |
| ICI CHEMICALS AND POLYMERS LTD | 1.3 A (a) | AA3123 | - | - | 1.60E+03 | 2.00E+00 | 2.40E+03 | - | 0.00E+00 | - | 0.00E+00 | - |
| ICI CHEMICALS AND POLYMERS LTD | 1.3 A (a) | AI1701 | - | - | 1.60E+03 | 2.00E+00 | 2.40E+03 | 2.00E+00 | 2.30E+03 | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 1.3 A (a) | AU5742 | - | - | - | - | - | - | - | - | 1.70E+03 | 1.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 1.3 A (a) | AA3077 | - | - | - | - | - | 5.90E-02 | - | 4.10E-02 | - | 3.89E-02 |
| ICI CHEMICALS AND POLYMERS LTD | 1.3 A (a) | AS2653 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| JAMES CROPPER PLC | 1.3 A (a) | AG5897 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 1.78E-03 | - | 2.13E-03 |
| JAMES CROPPER PLC | 1.3 A (a) | AU6447 | - | - | - | - | - | - | - | - | - | 0.00E+00 |

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|-------------------------------|-----------|--------|---|----------|---|----------|---|----------|---|----------|----------|----------|
| KODAK LTD | 1.3 A (a) | AA8834 | - | 1.33E-02 | - | 7.95E-03 | - | 8.00E-03 | - | 5.80E-03 | - | - |
| LONDON UNDERGROUND LTD | 1.3 A (a) | AB0855 | - | 0.00E+00 | - | 9.00E-02 | - | 5.20E-02 | - | 0.00E+00 | - | 2.70E-02 |
| MOBIL OIL COMPANY LTD | 1.3 A (a) | AA3387 | - | 0.00E+00 | - | 8.52E-01 | - | 1.18E+00 | - | 1.12E+00 | - | 0.00E+00 |
| NATIONAL POWER PLC | 1.3 A (a) | AA3182 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | - | - | - |
| NATIONAL POWER PLC | 1.3 A (a) | AA3204 | - | - | - | 4.50E-01 | - | 1.21E-01 | - | 1.81E-01 | - | 2.15E-01 |
| NATIONAL POWER PLC | 1.3 A (a) | AF0920 | - | 0.00E+00 | - | 8.05E-01 | - | 4.03E-01 | - | 4.94E-03 | - | 2.39E-03 |
| NATIONAL POWER PLC | 1.3 A (a) | AA3166 | - | - | - | 1.60E-01 | - | 1.40E-01 | - | 4.00E-02 | - | 0.00E+00 |
| NATIONAL POWER PLC | 1.3 A (a) | AA2461 | - | - | - | 1.58E-02 | - | - | - | - | - | - |
| NATIONAL POWER PLC | 1.3 A (a) | AA2470 | - | - | - | 1.51E+00 | - | 8.60E-01 | - | 0.00E+00 | - | 1.07E+00 |
| NATIONAL POWER PLC | 1.3 A (a) | AA2481 | - | - | - | 1.34E+00 | - | 9.30E-01 | - | 0.00E+00 | - | 2.59E+00 |
| NATIONAL POWER PLC | 1.3 A (a) | AA3107 | - | - | - | - | - | - | - | - | 0.00E+00 | - |
| NATIONAL POWER PLC - DIDCOT B | 1.3 A (a) | AO4003 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| NEW HOLLAND FORD LTD | 1.3 A (a) | AO4569 | - | - | - | - | - | - | - | 2.74E-03 | - | 0.00E+00 |
| PETERBOROUGH POWER LTD | 1.3 A (a) | AF9706 | - | 0.00E+00 | - | 5.52E-02 | - | 5.90E-02 | - | 3.60E-02 | - | 2.80E-02 |
| PFIZER LTD | 1.3 A (a) | AF8211 | - | 0.00E+00 | - | 1.28E-01 | - | 7.70E-03 | - | 8.30E-03 | - | 0.00E+00 |
| PHILLIPS PETROLEUM CO UK LTD | 1.3 A (a) | AA2976 | - | - | - | 5.00E-01 | - | 5.00E-04 | - | 0.00E+00 | - | 5.00E-01 |
| POWERGEN CHP LTD | 1.3 A (a) | AU9403 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| POWERGEN PLC | 1.3 A (a) | AB5873 | - | 1.10E-02 | - | 3.60E-02 | - | 6.00E-03 | - | 1.59E-02 | - | 7.97E-02 |
| POWERGEN PLC | 1.3 A (a) | AA3000 | - | - | - | 2.87E-02 | - | 5.51E-01 | - | 6.90E-01 | - | 0.00E+00 |
| POWERGEN PLC | 1.3 A (a) | AA3344 | - | - | - | 9.00E-02 | - | 7.10E-02 | - | 4.70E-03 | - | - |
| POWERGEN PLC | 1.3 A (a) | AA3514 | - | - | - | 3.30E-02 | - | 1.00E-03 | - | 2.48E-02 | - | 0.00E+00 |
| POWERGEN PLC | 1.3 A (a) | AA2267 | - | - | - | 3.49E-01 | - | 1.86E+00 | - | 1.20E+00 | - | 1.78E+00 |
| POWERGEN PLC | 1.3 A (a) | AA3433 | - | - | - | 7.09E-02 | - | 5.70E-02 | - | 6.01E-02 | - | 4.89E-02 |
| RADCLIFFE PAPER AND BOARD | 1.3 A (a) | AB7078 | - | - | - | 5.41E-03 | - | 1.02E-02 | - | 8.49E-03 | - | 1.92E-01 |
| RADCLIFFE PAPER AND BOARD | 1.3 A (a) | AK0154 | - | - | - | 5.41E-03 | - | 1.02E-02 | - | 8.49E-03 | - | 1.92E-01 |
| SAPPI EUROPE | 1.3 A (a) | AF6880 | - | - | - | 3.69E-02 | - | 4.22E-02 | - | 4.08E-02 | - | 0.00E+00 |
| SCM CHEMICALS LTD | 1.3 A (a) | AA3859 | - | 1.18E-01 | - | 1.46E-01 | - | 9.60E-02 | - | 8.13E-02 | - | - |
| SHELL UK LTD | 1.3 A (a) | AA3379 | - | - | - | 1.50E-01 | - | 1.21E+00 | - | 2.70E-03 | - | 0.00E+00 |

| OPERATOR | SECTOR | AUTH. NO | Emissions 1992 (kg) | | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---------------------------------------|-----------|----------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | Air | Water | Air | Water | Air | Water | Air | Water | Air | Water |
| SLOUGH TRADING ESTATE LTD | 1.3 A (a) | AA9253 | - | 1.31E+01 | - | 2.70E+01 | - | 2.28E-02 | - | 1.18E-02 | - | 8.86E-03 |
| SOLVAY INTEROX LTD | 1.3 A (a) | AA7099 | - | 0.00E+00 | - | 5.07E-01 | - | 5.00E-03 | - | 5.00E-03 | - | 0.00E+00 |
| ST REGIS PAPER CO LTD | 1.3 A (a) | AA2020 | - | 8.00E-03 | - | 1.00E-02 | - | 1.23E-02 | - | 1.28E-02 | - | 1.35E-02 |
| TATE AND LYLE SUGARS PLC | 1.3 A (a) | AA2887 | - | 5.40E-01 | - | 2.35E+00 | - | 2.29E+00 | - | 2.23E+00 | - | 2.44E+00 |
| TOWNSEND HOOK LTD | 1.3 A (a) | AA7714 | - | 3.00E-04 | - | 8.00E-04 | - | 5.57E-03 | - | 1.33E-03 | - | - |
| TOYOTA MOTOR MANUFACTURING UK LTD | 1.3 A (a) | AE2897 | - | 0.00E+00 | - | 7.20E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| UNIVERSITY OF LEEDS | 1.3 A (a) | AA3603 | - | 4.54E-05 | - | 1.23E-04 | - | 9.60E-05 | - | 0.00E+00 | - | - |
| VAUXHALL MOTORS LTD | 1.3 A (a) | AA8966 | - | 2.75E-03 | - | - | - | - | - | - | - | - |
| VAUXHALL MOTORS LTD | 1.3 A (a) | AA8966 | - | - | - | 2.82E-03 | - | 8.50E-03 | - | 9.00E-03 | - | 0.00E+00 |
| ANGLIAN POWER GENERATORS LTD | 1.3 A (b) | AM1461 | - | - | - | - | - | - | - | - | - | 6.20E-03 |
| BARKINS POWER LTD | 1.3 A (b) | AB3838 | - | - | - | 0.00E+00 | - | 1.40E-06 | - | 7.80E-02 | - | 6.50E-02 |
| BRITISH SUGAR PLC | 1.3 A (b) | AA3093 | - | 6.40E-02 | - | 6.68E-02 | - | 7.67E-02 | - | - | - | - |
| COGENERATION INVESTMENTS LTD | 1.3 A (b) | AN7864 | - | - | - | - | - | 0.00E+00 | - | 9.80E-04 | - | 5.70E-03 |
| CORBY POWER LTD | 1.3 A (b) | AG6621 | - | - | - | 1.21E-01 | - | 1.68E-01 | - | 1.12E-02 | - | 2.00E-01 |
| DERWENT COGENERATION LTD | 1.3 A (b) | AE1203 | - | - | - | 0.00E+00 | - | 9.20E-01 | - | 3.80E-01 | - | 1.40E-01 |
| ENFIELD ENERGY CENTRE LTD | 1.3 A (b) | AK9208 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| HUMBER POWER LTD | 1.3 A (b) | AH4195 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| KEADBY GENERATION LTD | 1.3 A (b) | AB4745 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 5.40E-02 | - | 2.16E-01 |
| MOWLEM FACILITIES MANAGEMENT | 1.3 A (b) | AR9311 | - | - | - | - | - | - | - | 2.60E+00 | - | 4.20E-04 |
| NATIONAL POWER PLC | 1.3 A (b) | AJ2747 | - | - | - | - | - | 4.40E-02 | - | 3.04E-01 | - | 9.70E-01 |
| POWERGEN PLC | 1.3 A (b) | AG8411 | - | - | - | 6.70E-05 | - | 3.38E-03 | - | 2.38E-03 | - | 7.85E-04 |
| POWERGEN PLC | 1.3 A (b) | AP2090 | - | - | - | - | - | - | - | 4.50E-03 | - | 0.00E+00 |
| REGIONAL POWER GENERATORS (BRIGG) LTD | 1.3 A (b) | AA6904 | - | - | - | 0.00E+00 | - | 1.48E-01 | - | 1.48E-01 | - | 1.76E+01 |
| ROLLS ROYCE POWER VENTURES LTD | 1.3 A (b) | AU2689 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| SCOTTISH HYDRO-ELECTRIC PLC | 1.3 A (b) | AM3812 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| SCOTTISH HYDROELECTRIC PLC | 1.3 A (b) | AQ1153 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| AVON TYRES LTD | 1.3 A (c) | AG8101 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |

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| CONTRACT POWER LTD | 1.3 A (c) | AF7690 | - | - | - | 3.80E-02 | - | 3.05E-03 | - | 0.00E+00 | - | 1.66E-06 |
| CRODA UNIVERSAL LTD | 1.3 A (c) | AF6316 | - | - | - | 7.20E-03 | - | 2.33E-02 | - | - | - | - |
| ENERGY SUPPLIES LTD | 1.3 A (c) | AF8092 | - | - | - | 9.66E-03 | - | 2.43E-03 | - | 1.94E-03 | - | 1.23E-03 |
| FIBROGEN LTD | 1.3 A (c) | AA3905 | - | 0.00E+00 | - | 3.00E-03 | - | 1.80E-02 | - | 1.60E-02 | - | - |
| FIBROWATT LTD | 1.3 A (c) | AP0844 | - | - | - | - | - | - | - | - | - | - |
| NESTLE (UK) LTD | 1.3 A (c) | AF7851 | - | - | - | 1.84E-01 | - | 7.91E-03 | - | 2.85E-04 | - | 3.23E-05 |
| P GARNETT AND SON LTD | 1.3 A (c) | AF8416 | - | - | - | - | - | - | - | 2.10E-04 | - | 9.60E-04 |
| SOLWAY INTEROX LTD | 1.3 A (c) | AL4872 | - | - | - | - | - | 5.00E-03 | - | 5.00E-03 | - | 8.00E-03 |
| Total for sector 1.3 | | | 0.00E+00 | 1.64E+01 | 3.20E+03 | 5.11E+01 | 4.80E+03 | 1.57E+01 | 2.30E+03 | 1.91E+02 | 1.70E+03 | 3.00E+01 |
| ASSOCIATED PETROLEUM TERMINALS LTD | 1.4 A (a) | AG1794 | - | - | - | - | - | - | - | - | - | 9.60E-01 |
| CONOCO LTD | 1.4 A (a) | AF8173 | - | - | - | 1.00E-02 | - | 3.20E-01 | - | 2.30E-01 | - | 1.50E-01 |
| ESSO PETROLEUM CO LTD | 1.4 A (a) | AF8009 | - | - | - | 7.10E+01 | - | 2.48E+02 | - | 5.00E+01 | - | 4.00E+00 |
| LINDSEY OIL REFINERY LTD | 1.4 A (a) | AF6928 | - | - | - | 2.40E-01 | - | 1.80E-01 | - | 3.00E-01 | - | 4.80E-01 |
| SHELL UK LTD | 1.4 A (a) | AF6910 | - | - | - | 1.00E-01 | - | 8.95E-02 | - | 8.00E-03 | - | 0.00E+00 |
| CARLESS REFINING & MARKETING LTD | 1.4 A (c) | AB2963 | - | - | - | - | - | 1.05E-01 | - | 1.30E-01 | - | 0.00E+00 |
| Total for sector 1.4 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.14E+01 | 0.00E+00 | 2.49E+02 | 0.00E+00 | 5.07E+01 | 0.00E+00 | 5.59E+00 |
| BRITISH STEEL PLC | 2.1 A (a) | AR0063 | - | - | - | - | - | - | - | 2.50E-01 | - | 2.00E-03 |
| CO-STEEL SHEERNESS | 2.1 A (a) | AP5986 | - | - | - | - | - | - | - | 1.00E-03 | - | 0.00E+00 |
| BRITISH STEEL ENGINEERING STEELS LTD | 2.1 A (f) | AQ9839 | - | - | - | - | - | - | - | 1.00E-14 | - | 1.00E-15 |
| Total for sector 2.1 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.51E-01 | 0.00E+00 | 2.00E-03 |
| ASSOCIATED METAL TRADERS | 2.2 A (a) | AL4783 | - | - | - | - | 5.30E-05 | 1.20E-06 | 7.00E-05 | 4.56E-02 | 2.50E-05 | 4.56E-02 |
| BRITANNIA REFINED METALS LTD | 2.2 A (a) | AS7850 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| BRITISH NUCLEAR FUELS PLC | 2.2 A (a) | AS5598 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| BRITISH NUCLEAR FUELS PLC | 2.2 A (a) | AS5601 | - | - | - | - | - | - | - | - | - | 6.00E-01 |
| IMI REFINERS LIMITED | 2.2 A (a) | AS6632 | - | - | - | - | - | - | - | 8.33E-03 | - | 3.00E-02 |
| INCO EUROPE LIMITED | 2.2 A (a) | AS6888 | - | - | - | - | - | - | - | - | - | 1.00E-02 |
| | 2.2 A (a) | AS7027 | - | - | - | - | - | - | - | - | 1.80E+00 | - |

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|--|-----------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| BNR EUROPE LTD | 3.3 A (a) | AI0659 | - | - | - | 0.00E+00 | - | 1.00E-04 | - | 0.00E+00 | - | 0.00E+00 |
| HES OPTICAL (UK) LTD | 3.3 A (a) | AO4232 | - | - | - | - | - | 3.00E-05 | - | 5.00E-06 | - | - |
| PIRELLI GENERAL PLC | 3.3 A (a) | AI4212 | - | - | - | 0.00E+00 | - | 4.00E-04 | - | 0.00E+00 | - | 1.42E-03 |
| Total for sector 3.3 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.30E-04 | 0.00E+00 | 5.00E-06 | 0.00E+00 | 1.42E-03 |
| ICI CHEMICALS AND POLYMERS LTD | 4.1 A (a) | AK7868 | - | - | - | - | - | 3.50E+00 | - | 1.70E+00 | - | 2.20E-04 |
| UNION CARBIDE LTD | 4.1 A (b) | AK6845 | - | - | - | - | - | 3.70E-01 | - | 4.00E-01 | - | 2.70E-01 |
| CHEMOXY INTERNATIONAL PLC | 4.1 A (c) | AK8201 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.1 A (c) | AK6969 | - | - | - | - | - | 1.75E+00 | - | 1.00E-02 | - | 8.00E-03 |
| INTERNATIONAL SPECIALITY CHEMICALS LTD | 4.1 A (c) | AK4494 | - | - | - | - | - | 1.00E-02 | - | 1.00E-02 | - | 1.00E-02 |
| SHELL UK LTD | 4.1 A (c) | AK4001 | - | - | - | - | - | 9.84E-02 | - | 3.63E-02 | - | 2.20E-02 |
| UNION CARBIDE LTD | 4.1 A (c) | AK6837 | - | - | - | - | - | 1.31E-01 | - | 7.00E-02 | - | 7.00E+02 |
| AH MARKS AND CO LTD | 4.1 A (d) | AM2026 | - | - | - | - | - | - | - | 4.60E+00 | - | 3.00E+00 |
| CRODA ADHESIVES LTD | 4.1 A (d) | AU8440 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| HARLOW CHEMICAL CO LTD | 4.1 A (d) | AJ4944 | - | - | - | - | - | 3.00E-02 | - | 6.00E-02 | - | 0.00E+00 |
| SYNTHOMER LTD | 4.1 A (d) | AK4117 | - | - | - | - | - | 1.50E-02 | - | 1.50E-01 | - | 1.50E+01 |
| Total for sector 4.1 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.90E+00 | 0.00E+00 | 7.04E+00 | 0.00E+00 | 7.18E+02 |
| BAYER PLC | 4.2 A (a) | AK4893 | - | - | - | - | - | 0.00E+00 | - | 1.30E-02 | - | 1.50E-02 |
| DUSSEK CAMPBELL LTD | 4.2 A (a) | AJ5789 | - | - | - | - | - | 1.00E-03 | - | 1.00E-03 | - | 4.10E-04 |
| EUROPEAN VINYLs CORPORATION (UK) LTD | 4.2 A (a) | AP8730 | - | - | - | - | - | - | - | - | - | 3.78E-01 |
| EUROPEAN VINYLs CORPORATION (UK) LTD | 4.2 A (a) | AT6298 | - | - | - | - | - | - | - | - | - | 3.78E-01 |
| HYDRO POLYMERS LTD | 4.2 A (a) | AK4583 | - | - | - | - | - | 1.42E-02 | - | 2.13E-02 | - | 2.60E-03 |
| MORGAN MATROC LTD | 4.2 A (a) | AO0164 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (b) | AK6039 | - | - | - | - | - | 0.00E+00 | - | 5.00E-01 | - | 0.00E+00 |
| AKZO NOBEL CHEMICALS LTD | 4.2 A (c) | AK3412 | - | - | - | - | - | 1.50E-02 | - | 0.00E+00 | - | 0.00E+00 |
| ALBRIGHT AND WILSON UK LTD | 4.2 A (c) | AK8686 | - | - | - | - | - | 5.71E-01 | - | 1.60E-01 | - | 0.00E+00 |
| ALBRIGHT AND WILSON UK LTD | 4.2 A (c) | AQ9910 | - | - | - | - | - | 5.71E-01 | - | 1.60E-01 | - | 4.00E-01 |
| BITMAC LTD | 4.2 A (c) | AJ7269 | - | - | - | 0.00E+00 | - | 5.40E-02 | - | 9.00E-03 | - | 9.70E-03 |
| CIBA-GEIGY PLC | 4.2 A (c) | AK8511 | - | - | - | - | - | 4.00E-02 | - | 6.00E-02 | - | 0.00E+00 |
| COURTAULDS COATINGS (HOLDINGS) LTD | 4.2 A (c) | AM7460 | - | - | - | - | - | 5.00E-03 | - | 1.40E-02 | - | 4.00E-03 |

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|-------------------------------------|-----------|--------|---|---|---|----------|---|----------|---|----------|---|----------|
| CRODA CHEMICALS LTD | 4.2 A (c) | AK9194 | - | - | - | - | - | 2.00E+00 | - | 2.00E+00 | - | 7.00E-02 |
| DTBA LTD | 4.2 A (c) | AL1482 | - | - | - | - | - | 1.00E+00 | - | 1.00E+00 | - | 1.00E+00 |
| HAARMANN AND REIMER (BAYER PLC) | 4.2 A (c) | AK2050 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| HOLLAND DYES AND CHEMICALS LTD | 4.2 A (c) | AJ5193 | - | - | - | 0.00E+00 | - | 2.28E+00 | - | 2.00E+00 | - | 2.30E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (c) | AK7728 | - | - | - | - | - | 4.80E+00 | - | 2.70E+00 | - | 1.90E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (c) | AO2388 | - | - | - | - | - | - | - | 1.00E+01 | - | 1.00E+01 |
| LUNDBECK PHARMACEUTICALS LTD | 4.2 A (c) | AK8899 | - | - | - | - | - | 1.00E-01 | - | 9.00E-03 | - | 2.10E+02 |
| PENTAGON CHEMICALS LTD | 4.2 A (c) | AL6352 | - | - | - | - | - | - | - | - | - | 9.00E-02 |
| PENTAGON CHEMICALS LTD | 4.2 A (c) | AW3279 | - | - | - | - | - | - | - | - | - | 9.00E-02 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (c) | AK7337 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| ROBINSON BROTHERS LTD | 4.2 A (c) | AK6519 | - | - | - | - | - | 5.00E-03 | - | 0.00E+00 | - | 6.00E-03 |
| ALBION DYESTUFFS LTD | 4.2 A (d) | AK8473 | - | - | - | - | - | 2.30E-03 | - | 2.10E-03 | - | 2.30E-03 |
| ALBRIGHT AND WILSON UK LTD | 4.2 A (d) | AJ9296 | - | - | - | - | - | 1.00E-02 | - | 1.00E-02 | - | 1.00E-02 |
| ANCHOR CHEMICAL (UK) LTD | 4.2 A (d) | AK7078 | - | - | - | - | - | 1.95E-01 | - | 9.00E-02 | - | 8.00E-02 |
| BARFORD CHEMICALS LTD | 4.2 A (d) | AS4664 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| BORDEN CHEMICALS UK LTD | 4.2 A (d) | AJ1252 | - | - | - | 1.50E-04 | - | 5.00E-03 | - | 1.00E-04 | - | 0.00E+00 |
| BP CHEMICALS LTD | 4.2 A (d) | AK4591 | - | - | - | - | - | 3.70E-02 | - | 2.90E-02 | - | 3.00E-02 |
| BP CHEMICALS LTD | 4.2 A (d) | AK5709 | - | - | - | - | - | 2.80E-01 | - | 1.00E-01 | - | 5.90E-02 |
| BP CHEMICALS LTD | 4.2 A (d) | AK5725 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| BRENT EUROPE LTD | 4.2 A (d) | AJ7684 | - | - | - | - | - | 1.60E-02 | - | 0.00E+00 | - | 2.00E-02 |
| CHEMOXY INTERNATIONAL PLC | 4.2 A (d) | AK7892 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| CHEMOXY INTERNATIONAL PLC | 4.2 A (d) | AK7906 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| CHEMOXY INTERNATIONAL PLC | 4.2 A (d) | AK8228 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| CIBA-GEIGY PLC | 4.2 A (d) | AK3579 | - | - | - | - | - | - | - | 1.10E+00 | - | 1.09E+00 |
| CIBA-GEIGY PLC | 4.2 A (d) | AO5042 | - | - | - | - | - | 7.00E-01 | - | 1.10E+00 | - | 0.00E+00 |
| CLEVELAND CHEMICALS LTD | 4.2 A (d) | AL3248 | - | - | - | - | - | 1.00E-02 | - | 1.00E-03 | - | 0.00E+00 |
| COURTAULDS CHEMICALS (HOLDINGS) LTD | 4.2 A (d) | AK2335 | - | - | - | - | - | 3.50E+01 | - | 3.43E+01 | - | 2.98E+01 |
| COURTAULDS CHEMICALS (HOLDINGS) LTD | 4.2 A (d) | AK4702 | - | - | - | - | - | 6.75E+01 | - | 1.14E+00 | - | 6.90E-01 |
| COURTAULDS CHEMICALS (HOLDINGS) LTD | 4.2 A (d) | AL0702 | - | - | - | - | - | 0.00E+00 | - | 6.80E-02 | - | 5.33E-02 |
| COURTAULDS COATINGS (HOLDINGS) LTD | 4.2 A (d) | AK6756 | - | - | - | - | - | 4.30E+00 | - | 2.70E-02 | - | 9.00E-03 |
| COURTAULDS COATINGS (HOLDINGS) LTD | 4.2 A (d) | AM7451 | - | - | - | - | - | 9.00E-03 | - | 1.40E-02 | - | 4.00E-03 |

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|--|-----------|--------|---|---|---|----------|----------|----------|----------|----------|----------|----------|
| COURTAULDS FIBRES LTD | 4.2 A (d) | AK6829 | - | - | - | - | - | 4.90E-02 | - | 4.30E-02 | - | 6.80E-02 |
| CRODA CHEMICALS LTD | 4.2 A (d) | AK9186 | - | - | - | - | - | 2.00E+00 | - | - | - | - |
| CRODA COLOURS LTD | 4.2 A (d) | AK6900 | - | - | - | - | - | 1.50E-01 | - | 9.30E-02 | - | 6.90E-02 |
| CRODA COLOURS LTD | 4.2 A (d) | AL1636 | - | - | - | - | - | 9.60E-03 | - | 1.10E-03 | - | 0.00E+00 |
| CRODA COLOURS LTD | 4.2 A (d) | AL1644 | - | - | - | - | - | 5.10E-02 | - | 4.70E-02 | - | 5.20E-02 |
| CRODA RESINS LTD | 4.2 A (d) | AJ8044 | - | - | - | - | - | 7.20E-03 | - | 2.70E-03 | - | 5.40E-03 |
| CRODA UNIVERSAL LTD | 4.2 A (d) | AK4257 | - | - | - | - | - | - | - | 5.60E-02 | - | 6.10E-02 |
| CYTEC INDUSTRIES UK LTD | 4.2 A (d) | AK8333 | - | - | - | - | - | 1.00E+00 | - | 1.00E+00 | - | 1.00E+00 |
| DU PONT (UK) LTD | 4.2 A (d) | AK7191 | - | - | - | - | - | 0.00E+00 | - | 8.40E-02 | - | 0.00E+00 |
| EKA NOBEL LTD | 4.2 A (d) | AK5326 | - | - | - | - | - | 6.30E-04 | - | 1.21E-02 | - | 0.00E+00 |
| EXCHEM PLC | 4.2 A (d) | AH7194 | - | - | - | 4.00E-03 | - | 3.60E-03 | - | 0.00E+00 | - | 0.00E+00 |
| FORMICA LTD | 4.2 A (d) | AK3897 | - | - | - | - | - | 1.80E+00 | - | 3.00E+01 | - | 0.00E+00 |
| FOSECO LTD | 4.2 A (d) | AK6721 | - | - | - | - | - | - | - | - | - | - |
| GENZYME LTD | 4.2 A (d) | AK6730 | - | - | - | - | - | 1.80E-03 | - | 3.40E-03 | - | 8.50E-04 |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 4.2 A (d) | AK4524 | - | - | - | - | - | 5.00E-05 | - | 0.00E+00 | - | - |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 4.2 A (d) | AJ2500 | - | - | - | - | - | 2.90E-07 | - | 8.00E-09 | - | 0.00E+00 |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 4.2 A (d) | AK4516 | - | - | - | - | - | 5.00E-05 | - | 0.00E+00 | - | 0.00E+00 |
| GLAXOCHEM LTD | 4.2 A (d) | AK5687 | - | - | - | - | - | 3.00E-01 | - | 4.00E-01 | - | 6.20E-01 |
| HAYS CHEMICAL DISTRIBUTION LTD | 4.2 A (d) | AK0227 | - | - | - | - | - | 4.50E-03 | - | 0.00E+00 | - | 0.00E+00 |
| HAYS CHEMICAL DISTRIBUTION LTD | 4.2 A (d) | AK0235 | - | - | - | - | - | 5.30E-03 | - | 6.92E-02 | - | 6.92E-02 |
| HICKSON LTD | 4.2 A (d) | AK7965 | - | - | - | - | - | 6.60E-01 | - | 0.00E+00 | - | 0.00E+00 |
| HICKSON LTD | 4.2 A (d) | AL5097 | - | - | - | - | - | 5.42E-01 | - | 0.00E+00 | - | 0.00E+00 |
| HODGSON CHEMICALS LTD | 4.2 A (d) | AL1865 | - | - | - | - | - | 2.29E-03 | - | 1.82E-03 | - | 1.09E-03 |
| HODGSON CHEMICALS LTD | 4.2 A (d) | AL1890 | - | - | - | - | - | 1.66E-04 | - | 5.26E-04 | - | 4.98E-04 |
| HOECHST UK LTD | 4.2 A (d) | AK5288 | - | - | - | - | - | - | - | - | - | - |
| HPG INDUSTRIAL COATINGS LTD | 4.2 A (d) | AK6799 | - | - | - | - | - | 9.86E-04 | - | 1.70E-04 | - | 4.71E-03 |
| HPG INDUSTRIAL COATINGS LTD | 4.2 A (d) | AN2889 | - | - | - | - | - | 1.00E-05 | - | 1.67E-07 | - | 4.70E-03 |
| ICI CHEMICALS AND POLYMERS LTD | 4.2 A (d) | AO9277 | - | - | - | - | - | - | 0.00E+00 | 1.00E+01 | 0.00E+00 | 1.00E+01 |
| INTERNATIONAL FLAVOURS AND FRAGRANCES (GB) LTD | 4.2 A (d) | AK6918 | - | - | - | - | - | 1.50E-01 | - | 9.00E-02 | - | 1.00E-15 |
| INTERNATIONAL SPECIALITY CHEMICALS LTD | 4.2 A (d) | AK6861 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |

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| J WYETH AND BROTHER LTD | 4.2 A (d) | AK5458 | - | - | - | - | - | 4.00E-02 | - | 5.00E-02 | - | 3.00E-02 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK5164 | - | - | - | - | - | 1.10E-01 | - | 4.00E-03 | - | 1.16E-01 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK6985 | - | - | - | - | - | 1.07E+00 | - | 9.70E-01 | - | 8.00E-01 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK7027 | - | - | - | - | - | 1.00E-06 | - | 9.00E-06 | - | 1.00E-05 |
| KNOLL PHARMACEUTICALS LTD | 4.2 A (d) | AK7035 | - | - | - | - | - | - | - | - | - | - |
| LAPORTE FLUORIDES | 4.2 A (d) | AK8872 | - | - | - | - | - | 1.67E-02 | - | 6.00E-04 | - | 1.00E-15 |
| M AND J POLYMER LTD | 4.2 A (d) | AK7744 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| M AND J POLYMER LTD | 4.2 A (d) | AK7795 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| MERCK LTD | 4.2 A (d) | AN8968 | - | - | - | - | - | - | - | 6.00E-02 | - | 6.40E-02 |
| MERCK SHARP AND DOHME LTD | 4.2 A (d) | AK8244 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 7.00E-03 |
| MERCK SHARP AND DOHME LTD | 4.2 A (d) | AK6942 | - | - | - | - | - | 0.00E+00 | - | 7.00E-01 | - | 0.00E+00 |
| MITCHANOL INTERNATIONAL LTD | 4.2 A (d) | AK8112 | - | - | - | - | - | 0.00E+00 | - | 7.00E-04 | - | 5.00E-01 |
| PERSTORP FERGUSON LTD | 4.2 A (d) | AK6225 | - | - | - | - | - | 2.00E-02 | - | 6.30E-02 | - | 1.40E-02 |
| PFIZER LTD | 4.2 A (d) | AL0427 | - | - | - | - | - | 4.00E-01 | - | 4.01E-01 | - | 0.00E+00 |
| RHONE-POULENC AGRICULTURE LTD | 4.2 A (d) | AK7230 | - | - | - | - | - | 3.00E-01 | - | 2.00E-01 | - | 3.00E-01 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AK4842 | - | - | - | - | - | 1.05E-01 | - | 4.00E-01 | - | 4.03E-01 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AK5334 | - | - | - | - | - | 1.25E-01 | - | 2.60E-02 | - | 7.00E-03 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AA6815 | - | - | - | - | - | 2.57E-03 | - | 0.00E+00 | - | 0.00E+00 |
| RHONE-POULENC CHEMICALS LTD | 4.2 A (d) | AK8988 | - | - | - | - | - | 2.57E-03 | - | 0.00E+00 | - | 0.00E+00 |
| RHONE-POULENC RORER LTD | 4.2 A (d) | AM4908 | - | - | - | - | - | 6.00E-04 | - | 3.45E-01 | - | 3.01E-01 |
| ROBINSON BROTHERS LTD | 4.2 A (d) | AB7086 | - | 0.00E+00 | - | 2.00E-03 | - | 0.00E+00 | - | 0.00E+00 | - | - |
| ROCHE PRODUCTS LTD | 4.2 A (d) | AJ9776 | - | - | - | - | - | 8.50E-05 | - | 4.00E-04 | - | 6.50E-05 |
| SANDOZ CHEMICALS (UK) LTD | 4.2 A (d) | AK8368 | - | - | - | - | - | 2.80E-02 | - | 0.00E+00 | - | 0.00E+00 |
| SIGMA-ALDRICH COMPANY LTD | 4.2 A (d) | AY8942 | - | - | - | - | - | - | - | - | - | - |
| SMITHKLINE BEECHAM PLC | 4.2 A (d) | AK3218 | - | - | - | - | - | 6.00E-03 | - | 6.40E-01 | - | 0.00E+00 |
| SMITHKLINE BEECHAM PLC | 4.2 A (d) | AJ3131 | - | - | - | 2.00E-02 | - | 1.50E-02 | - | 8.00E-02 | - | 0.00E+00 |
| SOLVAY INTEROX LTD | 4.2 A (d) | AK7817 | - | - | - | - | 5.00E-03 | - | 6.00E-03 | - | 1.00E-02 | - |
| STEPHENSON GROUP LTD | 4.2 A (d) | AO3414 | - | - | - | - | - | - | - | 6.79E-04 | - | 0.00E+00 |
| THOR CHEMICAL INTERNATIONAL | 4.2 A (d) | AL5330 | - | - | - | - | - | 2.49E+00 | - | 0.00E+00 | - | 0.00E+00 |
| VICKERS LABORATORIES LTD | 4.2 A (d) | AR5138 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| WELLCOME FOUNDATION LTD | 4.2 A (d) | AK6853 | - | - | - | - | - | 1.30E-01 | - | 1.30E-01 | - | 0.00E+00 |

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| WESTBROOK LANOLIN CO LTD | 4.2 A (d) | AK5962 | - | - | - | - | - | 1.00E-02 | - | 3.20E-02 | - | 0.00E+00 |
| WS SIMPSON & CO LTD | 4.2 A (d) | AL2128 | - | - | - | - | - | 2.00E-02 | - | 2.00E-02 | - | 0.00E+00 |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AF8297 | - | 0.00E+00 | - | 0.00E+00 | - | 1.00E-03 | - | 0.00E+00 | - | - |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AK6187 | - | - | - | - | - | 1.00E-03 | - | 0.00E+00 | - | 1.37E+00 |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AK6128 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| YORKSHIRE CHEMICALS PLC | 4.2 A (d) | AM3006 | - | - | - | - | - | 1.00E-03 | - | 3.00E-02 | - | 0.00E+00 |
| ZENECA LTD | 4.2 A (d) | AL6794 | - | - | - | - | - | 2.00E-01 | - | 1.80E-02 | - | 3.63E-01 |
| SHEPPY LTD | 4.2 A (g) | AL7669 | - | - | - | - | - | 3.44E-02 | - | 6.30E-04 | - | 0.00E+00 |
| ICI PLC | 4.2 A (i) | AM7265 | - | - | - | - | - | 4.00E-02 | - | 2.60E+00 | - | 1.50E+00 |
| ALLIED COLLOIDS LTD | 4.2 A (j) | AK7043 | - | - | - | - | - | 4.00E-02 | - | 9.30E-01 | - | 9.30E-01 |
| BONAR POLYMERS LTD | 4.2 A (j) | AK5997 | - | - | - | - | - | 1.20E-03 | - | 2.00E-04 | - | 0.00E+00 |
| CHEMVIRON SPECIALITY CHEMICALS LTD | 4.2 A (j) | AW0164 | - | - | - | - | - | - | - | - | - | 2.00E-03 |
| COURTAULDS FIBRES LTD | 4.2 A (j) | AK6772 | - | - | - | - | - | 9.40E-01 | - | 1.80E+00 | - | 2.20E+00 |
| DENTSPLY LTD | 4.2 A (j) | AL6999 | - | - | - | - | - | 4.00E-02 | - | 4.00E-02 | - | 4.00E-02 |
| HODGSON CHEMICALS LTD | 4.2 A (j) | AK3706 | - | - | - | - | - | 4.00E-04 | - | 2.34E-04 | - | 0.00E+00 |
| HPG INDUSTRIAL COATINGS LTD | 4.2 A (j) | AN1777 | - | - | - | - | - | 7.64E-04 | - | 3.30E-05 | - | 7.00E-04 |
| ICI ACRYLICS PLC | 4.2 A (j) | AO8548 | - | - | - | - | - | - | - | 3.00E-01 | - | 1.80E-01 |
| LEVER INDUSTRIAL LTD | 4.2 A (j) | AK6764 | - | - | - | - | - | 2.30E-04 | - | 4.16E-04 | - | 5.00E-04 |
| TECHNICAL ABSORBENTS LTD | 4.2 A (j) | AM8261 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 1.00E-15 |
| Total for sector 4.2 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.62E-02 | 5.00E-03 | 1.32E+02 | 6.00E-03 | 1.08E+02 | 1.00E-02 | 2.80E+02 |

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| AEROSTRUCTURES HAMBLE LTD | 4.3 A (a) | AL9556 | - | - | - | - | - | - | - | 1.92E-03 | - | 1.06E-02 |
| ALBRIGHT AND WILSON UK LTD | 4.3 A (a) | AL9009 | - | - | - | - | - | - | - | 7.00E+00 | - | 9.00E+00 |
| LAMBSON FINE CHEMICALS LTD | 4.3 A (a) | AM1445 | - | - | - | - | - | 0.00E+00 | - | 1.58E-05 | - | 0.00E+00 |
| DRYWITE LTD | 4.3 A (c) | AL8428 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| HARCROS PIGMENTS EUROPE | 4.3 A (c) | AL4554 | - | - | - | - | - | 4.79E-02 | - | 2.30E-01 | - | 0.00E+00 |
| HARCROS PIGMENTS EUROPE | 4.3 A (c) | AU5327 | - | - | - | - | - | - | - | - | - | 2.70E-01 |
| HODGSON CHEMICALS LTD | 4.3 A (c) | AL9262 | - | - | - | - | - | 2.08E-03 | - | - | - | - |
| HOLLAND DYES AND CHEMICALS LTD | 4.3 A (c) | AL7731 | - | - | - | - | - | 1.60E-02 | -- | 6.00E-02 | - | 9.00E-02 |

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| PROCTER AND GAMBLE LTD | 4.3 A (c) | AL9173 | - | - | - | - | - | 3.23E-02 | - | 0.00E+00 | - | 0.00E+00 |
| SCM CHEMICALS LTD | 4.3 A (c) | AM0163 | - | - | - | - | - | 2.26E+00 | - | 5.40E-01 | - | 4.70E-01 |
| SEAL SANDS CHEMICALS LTD | 4.3 A (c) | AL6956 | - | - | - | - | - | 2.70E-02 | - | 0.00E+00 | - | 0.00E+00 |
| TIOXIDE (EUROPE) LTD | 4.3 A (c) | AL8282 | - | - | - | - | - | 5.00E+00 | - | 5.00E+00 | - | 5.00E+00 |
| ALBRIGHT AND WILSON UK LTD | 4.3 A (f) | AM0040 | - | - | - | - | - | 1.00E-02 | - | 1.00E-02 | - | 2.10E-02 |
| ALUMASC LTD | 4.3 A (f) | AL8541 | - | - | - | - | - | 2.70E-03 | - | - | - | - |
| BRENT EUROPE LTD | 4.3 A (f) | AL8568 | - | - | - | - | - | 1.60E-02 | - | 0.00E+00 | - | 1.20E-02 |
| EURO COLOUR (PIGMENTS) LTD | 4.3 A (f) | AL8509 | - | - | - | - | - | 2.00E-01 | - | 1.70E-01 | - | 2.00E-01 |
| EXCHEM PLC | 4.3 A (f) | AM0201 | - | - | - | - | - | 1.30E-02 | - | 4.70E-02 | - | 0.00E+00 |
| HENKEL LTD | 4.3 A (f) | AG2987 | - | 0.00E+00 | - | 7.00E-04 | - | 3.02E-03 | - | 1.87E-03 | - | 6.54E-03 |
| HICKSON LTD | 4.3 A (f) | AM9683 | - | - | - | - | - | 5.00E-04 | - | 0.00E+00 | - | 0.00E+00 |
| HYDRO AGRI (UK) LTD | 4.3 A (f) | AL9068 | - | - | - | - | - | - | - | 1.00E-02 | - | 1.00E-02 |
| ICI CHEMICALS AND POLYMERS LTD | 4.3 A (f) | AW5069 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| POINTING LTD | 4.3 A (f) | AL9661 | - | - | - | - | - | 4.80E-03 | - | 2.19E-05 | - | 0.00E+00 |
| PRESSWELD LTD | 4.3 A (f) | AK9089 | - | - | - | - | - | 1.00E-03 | - | - | - | - |
| PRESSWELD LTD | 4.3 A (f) | AL7685 | - | - | - | - | - | 8.40E-03 | - | - | - | - |
| TKR INTERNATIONAL LTD | 4.3 A (f) | AP2472 | - | - | - | - | - | - | - | 2.00E-03 | - | 3.00E-03 |

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| Total for sector 4.3 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.00E-04 | 0.00E+00 | 7.64E+00 | 0.00E+00 | 1.31E+01 | 0.00E+00 | 1.51E+01 |
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|------------------------------------|-----------|--------|---|---|---|---|----------|----------|----------|----------|----------|----------|
| ASSOCIATED OCTEL CO LTD | 4.4 A (a) | AL7529 | - | - | - | - | - | 7.59E+01 | - | 3.75E+01 | - | 4.46E+01 |
| HAYS CHEMICAL DISTRIBUTION LTD | 4.4 A (a) | AL9319 | - | - | - | - | - | - | 5.14E+00 | 4.60E-02 | 1.56E+02 | 3.60E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.4 A (a) | AL7294 | - | - | - | - | - | - | 1.48E+00 | 2.45E+02 | 8.48E+02 | 2.40E+02 |
| RHONE-POULENC CHEMICALS LTD | 4.4 A (a) | AL8606 | - | - | - | - | 4.00E+01 | 1.00E-01 | 1.19E+02 | 3.90E+00 | 1.11E+02 | 3.70E-01 |
| RYVAN CHEMICALS CO LTD | 4.4 A (a) | AM1178 | - | - | - | - | - | 5.00E-03 | - | 5.00E-03 | - | 5.00E-03 |
| AGREVO UK LTD | 4.4 A (b) | AL7308 | - | - | - | - | - | 1.80E+00 | - | 1.10E-01 | - | 2.40E-02 |
| ASSOCIATED OCTEL CO LTD | 4.4 A (b) | AL8533 | - | - | - | - | - | 1.90E+00 | - | 3.00E-01 | - | 3.00E-01 |
| DEMA GLASS LIGHTING | 4.4 A (b) | AN3176 | - | - | - | - | - | - | - | 1.70E-02 | - | 2.20E-02 |
| GREAT LAKES CHEMICALS (EUROPE) LTD | 4.4 A (b) | AL8169 | - | - | - | - | - | 3.00E-04 | - | 9.31E-05 | - | 1.20E-06 |
| H ARMITAGE AND CO LTD | 4.4 A (b) | AL7987 | - | - | - | - | - | 0.00E+00 | - | 4.62E-04 | - | 3.99E-04 |
| ICI CHEMICALS AND POLYMERS LTD | 4.4 A (b) | AL7456 | - | - | - | - | - | - | - | 5.00E-04 | - | 2.99E+00 |

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|--------------------------------|-----------|--------|---|----------|---|----------|----------|----------|----------|----------|----------|----------|
| INTERCONNECTION SYSTEMS LTD | 4.4 A (b) | AI8285 | - | - | - | 1.50E-02 | - | 2.48E-02 | - | 8.40E-02 | - | 1.20E-01 |
| LAMINOX LTD | 4.4 A (b) | AL8975 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| MONSANTO PLC | 4.4 A (b) | AN6787 | - | - | - | - | - | 0.00E+00 | - | 5.00E-01 | - | 1.60E+00 |
| QUISTWENS LTD | 4.4 A (b) | AL8398 | - | - | - | - | - | 4.33E-02 | - | 4.50E-05 | - | 0.00E+00 |
| ROBT JOWITT AND SON LTD | 4.4 A (b) | AL7197 | - | - | - | - | - | 1.00E-02 | - | 1.00E-02 | - | 0.00E+00 |
| SCM CHEMICALS LTD | 4.4 A (b) | AM0147 | - | - | - | - | - | 2.26E+00 | - | 2.36E+00 | - | 3.05E+00 |
| TIOXIDE EUROPE LTD | 4.4 A (b) | AL8363 | - | - | - | - | - | 0.00E+00 | - | 5.00E+00 | - | 2.00E+00 |
| WOOLCOMBERS (PROCESSORS) LTD | 4.4 A (b) | AF4232 | - | 0.00E+00 | - | 1.46E-02 | - | 2.30E-02 | - | 0.00E+00 | - | 0.00E+00 |
| HAYS CHEMICAL DISTRIBUTION LTD | 4.4 A (c) | AL9327 | - | - | - | - | - | - | 7.00E-03 | - | 5.20E-03 | - |
| RHONE-POULENC CHEMICALS LTD | 4.4 A (c) | AL8622 | - | - | - | - | 3.00E-02 | - | 7.00E-02 | - | 7.00E-02 | - |
| ABBOTT LABORATORIES LTD | 4.4 A (d) | AM0945 | - | - | - | - | - | 8.10E-02 | - | 4.00E-01 | - | 0.00E+00 |
| CARGILL PLC | 4.4 A (d) | AQ1773 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| CONTRACT CHEMICALS (LEEDS) LTD | 4.4 A (d) | AL9858 | - | - | - | - | - | 5.00E-01 | - | 5.00E-02 | - | 0.00E+00 |
| DEFENCE RESEARCH AGENCY | 4.4 A (d) | AM0651 | - | - | - | - | - | 1.40E-03 | - | 9.00E-03 | - | 3.00E-04 |
| ENGELHARD LTD | 4.4 A (d) | AL8452 | - | - | - | - | - | 8.68E-02 | - | 2.01E-02 | - | 2.20E-02 |
| FISONS PLC | 4.4 A (d) | AL4716 | - | - | - | - | - | 9.40E-02 | - | 9.90E-02 | - | 5.40E-02 |
| ICI CHEMICALS AND POLYMERS LTD | 4.4 A (d) | AL7243 | - | - | - | - | 0.00E+00 | - | 1.10E+00 | - | 6.00E-02 | - |
| ICI CHEMICALS AND POLYMERS LTD | 4.4 A (d) | AL7251 | - | - | - | - | - | 1.00E-03 | - | 1.00E-03 | - | 0.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.4 A (d) | AK4109 | - | - | - | - | - | - | - | 1.60E+00 | - | 1.60E+00 |
| NIPA LABORATORIES LTD | 4.4 A (d) | AL7715 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| NUFARM UK LTD | 4.4 A (d) | AL6018 | - | - | - | - | - | 1.00E-01 | - | 4.30E-02 | - | 0.00E+00 |
| TSL GROUP PLC | 4.4 A (d) | AG3843 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| TSL GROUP PLC | 4.4 A (d) | AL6808 | - | - | - | - | - | 5.20E-02 | - | 5.00E-02 | - | 4.80E-02 |
| WARNER JENKINSON EUROPE LTD | 4.4 A (d) | AL8274 | - | - | - | - | - | 1.18E-01 | - | 7.30E-02 | - | 1.16E-01 |
| ZENECA LTD | 4.4 A (d) | AE6175 | - | 2.24E-02 | - | 7.20E-02 | - | - | - | - | - | - |
| ELLIS AND EVERARD (UK) LTD | 4.4 A (e) | AP0585 | - | - | - | - | - | - | - | 4.20E-03 | - | 5.63E-03 |
| ELLIS AND EVERARD (UK) LTD | 4.4 A (e) | AP0593 | - | - | - | - | - | - | - | 3.00E-03 | - | 3.60E-03 |
| TEXAS INSTRUMENTS LTD | 4.4 A (e) | AL1008 | - | - | - | - | - | 2.10E-02 | - | 1.57E-02 | - | 1.26E-02 |

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|--------------------------------------|-----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| TKR CHEMICAL MACHINING CO LTD | 4.4 A (e) | AL8576 | - | - | - | - | - | 2.30E-04 | - | 1.30E-04 | - | 0.00E+00 |
| TSL GROUP PLC | 4.4 A (e) | AL8690 | - | - | - | - | - | 8.80E-02 | - | 1.00E-02 | - | 1.20E-02 |
| WHATMAN INTERNATIONAL | 4.4 A (e) | AV3605 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| WHATMAN INTERNATIONAL | 4.4 A (e) | AV3608 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| Total for sector 4.4 | | | 0.00E+00 | 2.24E-02 | 0.00E+00 | 1.02E-01 | 4.00E+01 | 8.32E+01 | 1.27E+02 | 2.97E+02 | 1.11E+03 | 3.01E+02 |
| | | | | | | | | | | | | |
| ICI PLC | 4.5 A (b) | AO2175 | - | - | - | - | - | 3.00E-01 | - | 3.30E+00 | - | 2.60E+00 |
| ALBRIGHT AND WILSON UK LTD | 4.5 A (c) | AN9123 | - | - | - | - | - | 0.00E+00 | - | 1.00E-02 | - | 1.00E-02 |
| COURTAULDS FIBRES LTD | 4.5 A (c) | AN7970 | - | - | - | - | - | - | - | 8.70E+00 | - | 6.79E+00 |
| CRODA COLOURS LTD | 4.5 A (c) | AO0776 | - | - | - | - | - | 0.00E+00 | - | 3.20E-02 | - | 1.00E-02 |
| DEGUSSA LTD | 4.5 A (c) | AO1292 | - | - | - | - | - | - | - | 2.00E-01 | - | 2.96E-01 |
| STERLING ORGANICS LTD | 4.5 A (c) | AO1357 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| UCB FILMS PLC | 4.5 A (c) | AO2345 | - | - | - | - | - | - | - | 1.39E+01 | - | 2.50E+00 |
| ANZON LTD | 4.5 A (d) | AO0962 | - | - | - | - | - | 2.00E-03 | - | 1.80E-02 | - | 1.70E-03 |
| GE LIGHTING LTD | 4.5 A (d) | AO0857 | - | - | - | - | - | 0.00E+00 | - | 1.00E-04 | - | 0.00E+00 |
| GEC-MARCONI MATERIALS TECHNOLOGY LTD | 4.5 A (d) | AN8682 | - | - | - | - | - | - | - | 0.00E+00 | - | 2.00E+03 |
| JOHNSON MATTHEY PLC | 4.5 A (d) | AN6477 | - | - | - | - | - | - | 2.05E+00 | 2.40E-01 | 1.20E+00 | 1.80E-01 |
| JOHNSON MATTHEY PLC | 4.5 A (e) | AN8712 | - | - | - | - | - | - | 2.83E+01 | 6.00E-01 | 2.50E+00 | 8.00E-02 |
| GBL LTD | 4.5 A (f) | AO2469 | - | - | - | - | - | 2.50E-05 | - | 7.30E-05 | - | 5.90E-05 |
| UOP LTD | 4.5 A (f) | AN8488 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| BRITISH SUGAR PLC | 4.5 A (g) | AG5803 | - | - | 9.89E-04 | - | 5.50E-04 | - | - | - | - | - |
| NIPA LABORATORIES LTD | 4.5 A (g) | AL5976 | - | - | - | - | 1.78E-03 | - | 8.00E-05 | - | 1.00E-06 | - |
| ASHTON AND MOORE LTD | 4.5 A (h) | AN8976 | - | - | - | - | - | 0.00E+00 | - | 6.50E-03 | - | 7.00E-03 |
| BP SOLAR LTD | 4.5 A (h) | AN8178 | - | - | - | - | - | - | - | 4.80E-07 | - | 6.50E-07 |
| COLART FINE ART AND GRAPHICS LTD | 4.5 A (h) | AO0539 | - | - | - | - | - | - | - | 5.00E-02 | - | 0.00E+00 |
| COLTAX AEROSPACE LTD | 4.5 A (h) | AO1691 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| CROSS MANUFACTURING CO (1938) LTD | 4.5 A (h) | AW9439 | - | - | - | - | - | - | - | - | - | - |
| DALER ROWNEY LTD | 4.5 A (h) | AO0105 | - | - | - | - | - | - | - | 3.00E-03 | - | 3.00E-03 |
| EEV LTD | 4.5 A (h) | AN9069 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | - | - |
| FLIGHT REFUELLING LTD | 4.5 A (h) | AN9972 | - | - | - | - | - | - | - | 3.60E-06 | - | 3.60E-06 |
| G E AIRCRAFT ENGINE SERVICES LTD | 4.5 A (h) | AO0938 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |

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|---|-----------|--------|---|----------|---|----------|----------|----------|----------|----------|----------|----------|
| GE LIGHTING LTD | 4.5 A (h) | AO1063 | - | - | - | - | - | - | 1.14E+02 | 1.64E-01 | 1.21E+02 | 1.94E+01 |
| GEC-MARCONI INFRA-RED LTD | 4.5 A (h) | AN9093 | - | - | - | - | 8.60E-03 | 1.80E-01 | 3.40E-03 | 1.30E-01 | 3.00E-03 | 1.10E-01 |
| HUNTING AVIATION A.E.D. | 4.5 A (h) | AO5336 | - | - | - | - | - | - | - | 6.12E-05 | - | 3.00E-03 |
| INDIAN DYESTUFF INDUSTRIES (EUROPE) LTD | 4.5 A (h) | AB4176 | - | 0.00E+00 | - | 0.00E+00 | - | 3.00E-03 | - | 0.00E+00 | - | 0.00E+00 |
| INGRAM AND GLASS LTD | 4.5 A (h) | AO8017 | - | - | - | - | - | - | - | 0.00E+00 | - | 7.00E-05 |
| ITT CANNON PLC | 4.5 A (h) | AO0563 | - | - | - | - | - | - | - | 2.80E-02 | - | 0.00E+00 |
| MARSHALL OF CAMBRIDGE AEROSPACE LTD. | 4.5 A (h) | AV1653 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| MARTIN BAKER AIRCRAFT COMPANY LTD | 4.5 A (h) | AR3399 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| MARTIN BAKER AIRCRAFT COMPANY LTD | 4.5 A (h) | AR3399 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| PORTSMOUTH AVIATION LTD | 4.5 A (h) | AO1748 | - | - | - | - | - | - | - | 0.00E+00 | - | 3.70E-04 |
| RADIANT METAL FINISHING PLC | 4.5 A (h) | AO2965 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| RAYOVAC EUROPE LTD | 4.5 A (h) | AN8402 | - | - | - | - | 3.51E+00 | 3.60E-01 | 0.00E+00 | 0.00E+00 | 1.13E+00 | 3.40E-02 |
| RNAY FLEETLANDS | 4.5 A (h) | AV3150 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| ROBERT STUART PLC | 4.5 A (h) | AN7481 | - | - | - | - | - | - | - | 2.00E-02 | - | 2.00E-02 |
| ROSE BEARINGS LTD | 4.5 A (h) | AO9706 | - | - | - | - | - | - | - | 7.00E-04 | - | 1.00E-03 |
| TUNGSTEN MANUFACTURING CO LTD | 4.5 A (h) | AS7655 | - | - | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| WALKER AEC LTD | 4.5 A (h) | AO7452 | - | - | - | - | - | - | - | 2.00E-02 | - | 2.00E-02 |
| WALTON PLATING LTD | 4.5 A (h) | AO7720 | - | - | - | - | - | - | - | 7.00E-04 | - | 0.00E+00 |
| WESTLAND INDUSTRIAL PRODUCTS LTD | 4.5 A (h) | AO0881 | - | - | - | - | - | - | - | 4.00E-03 | - | 4.00E-03 |
| BRITISH CHROME AND CHEMICALS | 4.5 A (i) | AN9727 | - | - | - | - | - | 0.00E+00 | - | 1.00E-01 | - | 1.00E-01 |
| FISHER SCIENTIFIC | 4.5 A (i) | AO2639 | - | - | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| HARCROS CHEMICALS UK LTD | 4.5 A (i) | AO2671 | - | - | - | - | - | 3.90E-01 | - | 8.20E-01 | - | 5.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 4.5 A (i) | AN8437 | - | - | - | - | - | - | - | 1.00E+00 | - | 1.00E+00 |
| LEVERTON-CLARKE LTD | 4.5 A (i) | AO1942 | - | - | - | - | - | 0.00E+00 | - | 2.00E-03 | - | 2.00E-03 |
| SLI LIGHTING LTD | 4.5 A (i) | AO0784 | - | - | - | - | 5.40E-01 | 2.50E-04 | 4.11E+00 | 8.70E-01 | 6.91E+00 | 6.00E-03 |
| WALTERISATION (UK) LTD | 4.5 A (i) | AO1721 | - | - | - | - | - | 0.00E+00 | - | 1.30E-04 | - | 4.33E-05 |
| ICI CHEMICALS AND POLYMERS LTD | 4.5 A (l) | AN8321 | - | - | - | - | - | - | - | 3.10E-01 | - | 4.00E-01 |
| ALCHEMA LTD | 4.5 A (m) | AP1590 | - | - | - | - | - | - | - | 7.20E-02 | - | 1.10E-01 |
| ROQUETTE CORBY LTD | 4.5 A (m) | AN8186 | - | - | - | - | - | - | - | 8.90E-02 | - | 1.90E-01 |
| TIOXIDE SPECIALITIES LTD | 4.5 A (m) | AO0695 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| ZENECA LTD | 4.5 A (m) | AN7961 | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 3.60E-01 |

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|--------------------------------|-----------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| AKCROS CHEMICALS | 4.5 A (o) | AG3258 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 6.00E-05 |
| ALBRIGHT AND WILSON UK LTD | 4.5 A (o) | AN9140 | - | - | - | - | - | 0.00E+00 | - | 1.00E-02 | - | 1.00E-02 |
| ALBRIGHT AND WILSON UK LTD | 4.5 A (o) | AN9158 | - | - | - | - | - | 0.00E+00 | - | 1.00E-02 | - | 1.00E-02 |
| ALBRIGHT AND WILSON UK LTD | 4.5 A (o) | AI6100 | - | - | - | 8.01E-01 | - | 4.03E+00 | - | 4.15E+00 | - | 0.00E+00 |
| ALBRIGHT AND WILSON UK LTD | 4.5 A (o) | AM7605 | - | - | - | - | - | 1.70E-01 | - | 1.70E+01 | - | 4.20E-01 |
| Total for sector 4.5 | | | 0.00E+00 | 0.00E+00 | 9.89E-04 | 8.01E-01 | 4.06E+00 | 5.44E+00 | 1.48E+02 | 5.19E+01 | 1.33E+02 | 2.04E+03 |
| FISONS PLC | 4.6 A (a) | AL8479 | - | - | - | - | - | 8.00E-05 | - | 8.00E-05 | - | 0.00E+00 |
| HYDRO AGRI (UK) LTD | 4.6 A (a) | AL9076 | - | - | - | - | - | - | - | 3.40E-02 | - | 0.00E+00 |
| KEMIRA INCE LTD | 4.6 A (a) | AL7855 | - | - | - | - | - | 1.02E+00 | - | 4.10E+00 | - | 4.00E-01 |
| MIRACLE GARDEN CARE | 4.6 A (a) | AL6816 | - | - | - | - | - | 1.60E-02 | - | 1.00E-04 | - | 1.00E-02 |
| ICI CHEMICALS AND POLYMERS LTD | 4.6 A (b) | AL8614 | - | - | - | - | - | - | - | 7.00E-01 | - | 9.60E-02 |
| Total for sector 4.6 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E+00 | 0.00E+00 | 4.83E+00 | 0.00E+00 | 5.06E-01 |
| DOW CHEMICAL COMPANY LTD | 4.7 A (a) | AK3196 | - | - | - | - | - | 4.70E-01 | - | 6.00E-01 | - | 6.00E-01 |
| Total for sector 4.7 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.70E-01 | 0.00E+00 | 6.00E-01 | 0.00E+00 | 6.00E-01 |
| EVANS MEDICAL LTD | 4.8 A (a) | AO0768 | - | - | - | - | - | - | - | 5.50E+00 | - | 3.00E+00 |
| WRAFTON LABORATORIES LTD | 4.8 A (a) | AL0656 | - | - | - | - | - | 0.00E+00 | - | - | - | - |
| Total for sector 4.8 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.50E+00 | 0.00E+00 | 3.00E+00 |

| OPERATOR | SECTOR | AUTH. NO | Emissions 1992 (kg) | | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|-----------|----------|---------------------|-------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | Air | Water | Air | Water | Air | Water | Air | Water | Air | Water |
| CORY ENVIRONMENTAL LTD | 5.1 A (a) | AH8719 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| FINE ORGANICS LTD | 5.1 A (a) | AG8578 | - | - | 3.40E-02 | - | 9.38E-01 | - | 1.53E+00 | - | 2.40E-01 | - |
| LEIGH ENVIRONMENTAL LTD | 5.1 A (a) | AG8551 | - | - | - | 1.36E-03 | - | 3.69E-03 | 0.00E+00 | 0.00E+00 | 1.51E+01 | 1.58E-04 |
| RECHEM INTERNATIONAL LTD | 5.1 A (a) | AG7946 | - | - | - | 3.80E-01 | - | 2.90E+00 | - | 4.47E-01 | - | 2.50E-01 |
| RECHEM INTERNATIONAL LTD | 5.1 A (a) | AG8047 | - | - | 3.00E+00 | 2.00E-01 | 7.00E+00 | 2.20E-01 | 2.69E+00 | 5.00E-02 | 0.00E+00 | 6.00E-02 |
| SCALFORD CONSTRUCTION CO LTD | 5.1 A (a) | AH1536 | - | - | - | - | - | - | 1.93E-01 | - | 0.00E+00 | - |
| WELLCOME FOUNDATION LTD | 5.1 A (a) | AG9264 | - | - | - | - | 7.30E-03 | - | 1.10E-02 | - | 0.00E+00 | - |
| WHITE ROSE ENVIRONMENTAL | 5.1 A (a) | AR2996 | - | - | - | - | - | - | 1.18E-04 | - | 0.00E+00 | - |
| DEFENCE TEST AND EVALUATION ORGANISATION | 5.1 A (b) | AL9530 | - | - | - | - | 0.00E+00 | - | 6.50E-01 | - | 0.00E+00 | - |
| ENGELHARD LTD | 5.1 A (b) | AG7890 | - | - | - | 9.15E-03 | - | 1.96E-02 | - | 3.28E-03 | - | 1.53E-02 |
| GLAXO RESEARCH AND DEVELOPMENT LTD | 5.1 A (b) | AG1069 | - | - | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.00E-02 | 5.50E-04 | 0.00E+00 | 0.00E+00 |
| ICI CHEMICALS AND POLYMERS LTD | 5.1 A (b) | AI5162 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| ICI CHEMICALS AND POLYMERS LTD | 5.1 A (b) | AI5162 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| AEP (HAMPSHIRE) LTD | 5.1 A (c) | AG8276 | - | - | - | - | - | - | - | - | 9.00E+00 | - |
| BEACON WASTE LTD | 5.1 A (c) | AG9639 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| CLEVELAND COUNTY COUNCIL | 5.1 A (c) | AG8322 | - | - | 2.02E+01 | - | 1.92E+02 | - | 0.00E+00 | - | 5.35E+01 | - |
| CLINICAL ENERGY LTD | 5.1 A (c) | AG8675 | - | - | 1.91E-03 | 2.64E-03 | 4.10E-02 | 4.62E-05 | 2.61E+01 | 1.13E-02 | 8.50E+00 | 8.57E-03 |
| CLINICAL WASTE INCINERATION LTD | 5.1 A (c) | AG8357 | - | - | 5.44E+00 | 6.95E-01 | 5.10E+00 | 0.00E+00 | 3.11E+00 | 0.00E+00 | 2.70E+00 | 0.00E+00 |
| CLINICAL WASTE LTD | 5.1 A (c) | AN3435 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| CMR LTD | 5.1 A (c) | AG8039 | - | - | 2.10E+00 | - | 6.00E-02 | - | 4.00E-01 | - | 0.00E+00 | - |
| COVENTRY CITY COUNCIL | 5.1 A (c) | AG7881 | - | - | - | - | - | - | - | - | 2.93E+01 | - |
| DERBYSHIRE WASTE LTD | 5.1 A (c) | AG7920 | - | - | - | - | - | - | - | - | 0.00E+00 | - |
| FORD MOTOR CO LTD | 5.1 A (c) | AG7814 | - | - | 8.00E-04 | - | 1.80E-03 | - | 0.00E+00 | - | 0.00E+00 | - |
| GREATER MANCHESTER WASTE DISPOSAL AUTHORITY | 5.1 A (c) | AG8365 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| GREATER MANCHESTER WASTE DISPOSAL AUTHORITY | 5.1 A (c) | AG8381 | - | - | - | 1.26E-01 | - | 1.98E-02 | - | 0.00E+00 | - | 0.00E+00 |

| | | | | | | | | | | | | |
|---------------------------------------|-----------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| HUNTINGDON RESEARCH CENTRE LTD | 5.1 A (c) | AG8667 | - | - | 4.70E-02 | - | 1.09E-01 | - | 6.90E-02 | - | 5.01E-01 | - |
| LEIGH ENVIRONMENTAL LTD | 5.1 A (c) | AK2688 | - | - | 6.10E+00 | - | 4.80E+00 | - | 4.50E+00 | - | 0.00E+00 | - |
| MEDICAL ENERGY (WORCS) LTD | 5.1 A (c) | AN3737 | - | - | - | - | 5.18E-01 | - | 7.78E+01 | - | 3.60E-02 | - |
| NORTH LONDON WASTE AUTHORITY | 5.1 A (c) | AG5269 | - | - | 1.23E+02 | 1.04E-01 | 3.80E+01 | 1.18E-01 | 7.08E+01 | 2.59E-01 | 0.00E+00 | 0.00E+00 |
| NORTH TYNESIDE BOROUGH COUNCIL | 5.1 A (c) | AG8098 | - | - | 2.30E+01 | 1.40E+02 | - | - | - | - | - | - |
| NORTHWICK PARK HOSPITAL NHS TRUST | 5.1 A (c) | AG8012 | - | - | 4.00E-01 | 1.50E-01 | 6.50E+00 | 7.59E-01 | 5.23E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RNOH INCINERATOR SERVICES LTD | 5.1 A (c) | AM2034 | - | - | - | - | 5.40E+00 | - | 4.50E+00 | - | 0.00E+00 | - |
| S GRUNDON (WASTE) LTD | 5.1 A (c) | AG8390 | - | - | 2.46E+01 | - | 2.35E+01 | - | 4.57E+01 | - | 4.90E+01 | - |
| SE LONDON COMBINED HEAT AND POWER LTD | 5.1 A (c) | AE7236 | 0.00E+00 | - | 0.00E+00 | - | 3.80E+01 | - | 3.20E+01 | - | 6.00E+01 | - |
| SEVERN TRENT WATER LTD | 5.1 A (c) | AI0802 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| SEVERN TRENT WATER LTD | 5.1 A (c) | AF2477 | - | - | - | - | - | - | 5.09E+00 | 5.09E+00 | 2.87E+00 | 2.36E+00 |
| SHEFFIELD CITY COUNCIL | 5.1 A (c) | AG7784 | - | - | 1.47E+02 | 2.99E-04 | 6.18E+00 | 9.80E-04 | 9.26E+00 | 9.58E-02 | 8.05E+00 | 0.00E+00 |
| SOUTHERN WATER SERVICES LTD | 5.1 A (c) | AG6877 | - | - | 3.00E-02 | - | 1.27E+00 | - | 1.65E-01 | - | 1.29E-01 | - |
| WASTENOTTS (RECLAMATION) LTD | 5.1 A (c) | AH0653 | - | - | 6.00E+01 | - | 8.46E+01 | - | 8.07E+01 | - | 6.20E+00 | - |
| WEST YORKSHIRE WASTE MANAGEMENT | 5.1 A (c) | AG8446 | - | - | 1.35E+01 | 8.00E-02 | 7.29E+01 | 6.00E-02 | 4.60E+01 | 4.00E-02 | 0.00E+00 | 0.00E+00 |
| WEST YORKSHIRE WASTE MANAGEMENT | 5.1 A (c) | AG8454 | - | - | 6.00E-03 | - | 5.20E-02 | - | 0.00E+00 | - | 0.00E+00 | - |
| YORKSHIRE ENVIRONMENTAL LTD | 5.1 A (c) | AM6293 | - | - | - | - | 2.10E-02 | - | 6.00E-01 | - | 5.84E-01 | - |
| YORKSHIRE WATER PLC | 5.1 A (c) | AG7733 | - | - | 8.91E+00 | - | 7.01E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| YORKSHIRE WATER PLC | 5.1 A (c) | AG7717 | - | - | 3.67E+00 | - | 4.45E+00 | - | 2.59E+00 | - | 1.93E+01 | - |
| YORKSHIRE WATER PLC | 5.1 A (c) | AG7741 | - | - | 7.17E+00 | - | 1.01E+01 | - | 9.70E+00 | - | 0.00E+00 | - |
| BLAGDEN PACKAGING LTD | 5.1 A (d) | AG7008 | - | - | - | 1.07E-02 | - | 1.07E-02 | - | 1.84E-02 | - | 4.60E-03 |
| LEIGH ENVIRONMENTAL LTD | 5.1 A (d) | AG8543 | - | - | - | - | 1.08E+01 | - | 2.93E+01 | - | 0.00E+00 | - |
| Total for sector 5.1 | | | 0.00E+00 | 0.00E+00 | 4.48E+02 | 1.42E+02 | 5.19E+02 | 4.11E+00 | 4.59E+02 | 6.02E+00 | 2.65E+02 | 2.70E+00 |

| OPERATOR | SECTOR | AUTH. NO | Emissions 1992 (kg) | | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---------------------------------------|-----------|----------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | Air | Water | Air | Water | Air | Water | Air | Water | Air | Water |
| CHEMOXY INTERNATIONAL PLC | 5.2 A (a) | AG8420 | - | - | - | 4.00E+00 | - | 2.10E+00 | - | 8.90E-01 | - | 3.30E-01 |
| CHEMVIRON CARBON LTD | 5.2 A (a) | AG8403 | - | - | - | 0.00E+00 | - | 6.00E-03 | - | 9.40E-03 | - | 0.00E+00 |
| CHEMVIRON CARBON LTD | 5.2 A (a) | AC3612 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| CRODA SOLVENTS LTD | 5.2 A (a) | AG8462 | - | - | - | 1.19E-06 | - | 3.36E-06 | - | 8.75E-06 | - | 3.26E-06 |
| ELGA LTD | 5.2 A (a) | AG7822 | - | - | - | 1.50E-03 | - | 5.29E-02 | - | 5.85E-02 | - | 0.00E+00 |
| GRAFHAM CARBONS LTD | 5.2 A (a) | AG7806 | - | - | - | 3.70E-02 | - | 5.20E-02 | - | 4.60E-02 | - | 5.10E-02 |
| GRAFHAM CARBONS LTD | 5.2 A (a) | AI8498 | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 1.00E-03 | - | 2.37E-02 |
| CPL CARBONS LTD | 5.2 A (b) | AT6964 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| YORKSHIRE ENVIRONMENTAL LIMITED | 5.2 A (b) | AR2988 | - | - | - | - | - | - | 0.00E+00 | - | - | - |
| Total Sector 5.2 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.04E+00 | 0.00E+00 | 2.21E+00 | 0.00E+00 | 1.00E+00 | 0.00E+00 | 4.05E-01 |
| CITY WORKS, BYKER RECLAMATION PLANT | 5.3 A (a) | AG8730 | - | - | 1.12E-01 | 1.94E-06 | 2.17E+00 | 4.00E-03 | 1.05E+00 | 5.00E-03 | 1.05E+00 | 2.02E-03 |
| ISLE OF WIGHT COUNTY COUNCIL | 5.3 A (a) | AG9124 | - | - | - | 6.90E-04 | - | 2.94E-03 | - | 5.70E-04 | - | 2.31E-03 |
| REPROTECH (PEBSHAM) LTD | 5.3 A (a) | AG8691 | - | - | - | 2.72E-03 | - | 1.13E-03 | - | 7.00E-05 | - | 0.00E+00 |
| Total Sector 5.3 | | | 0.00E+00 | 0.00E+00 | 1.12E-01 | 3.41E-03 | 2.17E+00 | 8.07E-03 | 1.05E+00 | 5.64E-03 | 1.05E+00 | 4.33E-03 |
| A M PAPER MILL LTD | 6.1 A (b) | AU8474 | - | - | - | - | - | - | - | - | - | 2.21E-02 |
| ARJO - WIGGINS | 6.1 A (b) | AU7206 | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| AYLESFORD NEWSPRINT LTD | 6.1 A (b) | AP0313 | - | - | - | - | - | - | 6.10E-02 | - | 0.00E+00 | - |
| BPB PAPERBOARD - RADCLIFFE MILL | 6.1 A (b) | AU6854 | - | - | - | - | - | - | - | - | - | - |
| BRIDGEWATER PAPER CO LTD | 6.1 A (b) | AU7532 | - | - | - | - | - | - | - | - | - | 1.28E-01 |
| COLTHROP BOARD MILL LTD | 6.1 A (b) | AU8423 | - | - | - | - | - | - | - | - | - | 8.30E-03 |
| DANISCO PAPER | 6.1 A (b) | AU7451 | - | - | - | - | - | - | - | - | - | - |
| DANISCO PAPER | 6.1 A (b) | AU7460 | - | - | - | - | - | - | - | - | - | - |
| DEXTER NONWOVENS | 6.1 A (b) | AU0139 | - | - | - | - | - | - | - | - | - | - |
| IGGESUND PAPER BOARD (WORKINGTON) LTD | 6.1 A (b) | AU3073 | - | - | - | - | - | - | - | - | - | 3.87E-01 |
| JAMONT UK LTD | 6.1 A (b) | AU7311 | - | - | - | - | - | - | - | - | - | 2.40E-02 |

| | | | | | | | | | | | | | |
|-----------------------------------|-----------|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| KIMBERLY CLARK LTD | 6.1 A (b) | AU6820 | - | - | - | - | - | - | - | - | - | - | 6.00E-03 |
| KIMBERLY CLARK LTD | 6.1 A (b) | AU6722 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| KIMBERLY CLARK LTD | 6.1 A (b) | AU7117 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| KIMBERLY-CLARK LTD | 6.1 A (b) | AU7125 | - | - | - | - | - | - | - | - | - | - | 3.00E-01 |
| KRUGER TISSUE (MANUFACTURING) LTD | 6.1 A (b) | AU3332 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| SCA HYGIENE UK LTD | 6.1 A (b) | AU5491 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| SCA PACKAGING NEW HYTHE | 6.1 A (b) | AU8466 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| SHOTTON PAPER COMPANY PLC | 6.1 A (b) | AU7338 | - | - | - | - | - | - | - | - | - | - | 1.35E-01 |
| SMURFIT TOWNSEND HOOK | 6.1 A (b) | AU7737 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| SONOCO LTD - BOARD MILLS | 6.1 A (b) | AU7583 | - | - | - | - | - | - | - | - | - | - | 2.40E-02 |
| Total for sector 6.1 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.10E-02 | 0.00E+00 | 0.00E+00 | 1.03E+00 | |
| | | | | | | | | | | | | | |
| BUCKFAST SPINNING COMPANY LTD | 6.5 A (b) | AU7656 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| Total for sector 6.5 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| | | | | | | | | | | | | | |
| PFIZER LTD | 6.9 A (a) | AU8083 | - | - | - | - | - | - | - | - | - | - | 0.00E+00 |
| Total for sector 6.9 | | | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | |

Table C2A - Emissions of Mercury to Land

| COMPANY | SECTOR | AUTH NO. | 1993 | 1994 | 1995 | 1996 |
|---------------------------|---------|----------|-----------------|-----------------|-----------------|-----------------|
| FOSECO LTD | 4.2A(d) | AK6721 | - | 7.50E-03 | 7.70E-04 | 4.26E-05 |
| HOECHST UK LTD | 4.2A(d) | AK5288 | - | 5.00E-03 | 5.00E-03 | 1.50E-03 |
| KNOLL PHARMACEUTICALS LTD | 4.2A(d) | AK7035 | - | 4.00E-04 | 0.00E+00 | 6.00E-03 |
| JOHNSON MATTHEY PLC | 4.5A(e) | AN8712 | - | - | 2.30E+00 | 0.00E+00 |
| EEV LTD | 4.5A(h) | AN9069 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| GE LIGHTING LTD | 4.5A(h) | AO1063 | - | - | 7.16E+02 | 1.00E-03 |
| RAYOVAC EUROPE LTD | 4.5A(h) | AN8402 | - | 2.58E+03 | 0.00E+00 | 2.37E+02 |
| RNAY FLEETLANDS | 4.5A(h) | AV3150 | - | - | - | 0.00E+00 |
| ROSE BEARINGS LTD | 4.5A(h) | AO9706 | - | - | 9.20E-02 | 0.00E+00 |
| LEVERTON-CLARKE LTD | 4.5A(i) | AO1942 | - | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EVANS MEDICAL LTD | 4.8A(a) | AO0768 | - | - | 6.60E+00 | 9.10E+00 |
| S GRUNDON (WASTE) LTD | 5.1A(c) | AG8390 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SEVERN TRENT WATER LTD | 5.1A(c) | AF2477 | - | - | 1.21E+01 | 1.40E+01 |
| TOTAL | | | 0.00E+00 | 2.58E+03 | 7.37E+02 | 2.60E+02 |

D. CHROMIUM/MAGNESIUM/MANGANESE/NICKEL / ZINC

D.1 Summary details of companies registered under 4.5 A (i)

D.1.1 Production - 4.5 A (i)

AN9018 COOKSON MATTHEY CERAMICS AND MATERIALS LTD

Calcination of inorganic materials (metal oxides, silicates etc.) to produce inorganic pigments or glaze materials, to react oxides with clay products to produce controlled crystal growth and to calcine chalk to a fully reactive oxide state. The process stages consist of weighing and mixing of the raw materials, loading the mixture into saggars, calcining in a tunnel kiln, emptying the product from the saggars and then packaging.

Dust extraction equipment is used in the weighing, mixing, saggar loading and emptying and packaging areas. The extraction gases from these areas pass through individual dust filtration systems before being vented to atmosphere via individual stacks. Gases from the kiln are vented through a dedicated stack. All waste powders collected from dust extraction units are recycled to the process. All other solid waste is stored in skips prior to landfill disposal. The liquid effluent is directed to the site effluent treatment plant where it is treated for suspended solids before discharge to sewer.

(For further information see Cremer & Warner, 1993).

Releases to air - carbon monoxide, chromium compounds, hydrogen chloride, hydrogen fluoride, lead, nickel compounds, nitrogen oxides, particulates, sulphur oxides.

AO0415 KEINER AND CO LTD

Manufacture of a range of colour pigments for use in industrial paints, plastics, road markings, fibre glass and other surface coating industries. Pigments based on lead chromate and barium chromate crystals.

Releases to air - chromium, lead, nitrogen oxides, sulphur dioxide.

Releases to water - chromium, lead, copper and zinc, NP-suspended solids.

Abatement equipment - bag filters. Effluent treatment plant adjusts pH of liquid effluent and precipitates out any dissolved metal compounds before discharge to Chisworth Brook. Sludge is allowed to dewater before off-site disposal.

AO0636 ALBRIGHT & WILSON UK LTD

Production of nickel sulphamate, by the reaction of nickel powder and sulphamic acid, in the presence of hydrogen peroxide. Nickel powder is added to the reaction vessel containing weak nickel sulphamate solution. Sulphamic acid and hydrogen peroxide is then added at a controlled rate, whilst the vessel is held at 55°C. The product is then passed through a series of filters and drummed for sale.

(For further information see Cremer & Warner, 1993).

Releases to air - nickel, particulates.

Abatement equipment - extracted air from the nickel powder chute loading area is passed through dust collection before discharge to atmosphere. Air extracted from the sulphamic acid addition hopper is passed through a filter pad before discharged to atmosphere. Process liquors from filter washings and plant wash outs are collected before discharge to the on-site effluent treatment plant (covered by AI6100).

AO0644 ALBRIGHT & WILSON UK LTD

Production of Accomet C, (a hexavalent/trivalent chromium solution), by the reduction of hexavalent chromium oxide with starch under reflux. Silica is then complexed with the solution to form an emulsion. Chromic acid and water is added to a preheated reactor. A starch solution is then added to the reactor at a rate that the heat of reaction is sufficient to cause the reactor contents to continue to reflux. When the reaction equilibrium is reached the contents are filtered and held in holding tanks ready for the next production stage. When required, this solution is combined with silica in a mixing vessel. The finished product from this stage is then drummed for sale. (*For further information see Cremer & Warner, 1993*).

Releases to air - particulates.

Abatement equipment - extracted air from LEV's pass through a dust collection system prior to discharge to atmosphere at a height greater than 3m above roof height. The reactor breathes via a vent on the reflux condenser. Process liquors are discharged via the site effluent treatment plant (covered by AI6100).

AO1381 JAMES M BROWN LTD

Manufacture of zinc oxide, zinc phosphate and zinc stearate. Two process routes are used to manufacture zinc oxide, the direct and indirect processes. The indirect process is used to manufacture the majority of product and the direct process is used to manufacture smaller quantities. The indirect process charges electrolytic zinc ignots to crucibles mounted in refractory lined gas-fired furnaces. The flue gases are used to heat incoming air before venting via bag filters to abate zinc oxide emissions in the case of crucible failure. The furnaces are also enclosed within cabinets which are vented to bag filters to prevent any fugitive emissions. As the crucible is heated the zinc vapour emerges from the hole in the crucible lid where it is oxidised to form zinc oxide. The hot zinc oxide and entrained air is drawn through ducting where it is cooled by dilution and radiation. The zinc oxide is collected in bag filters. The zinc oxide is then either blended and packed and sold as powder product, or transferred to a pelleting plant packed and sold in pellet form. The direct process uses zinc residuals which are batch fed to a rotary kiln where the zinc vaporises and burns to form zinc oxide in a combustion chamber at the end of the furnace. The zinc oxide is drawn through ducting and collected in a bag filter. The process downstream of the filter is the same as that for the direct process.

The zinc phosphate plant is run on a campaign basis. Zinc oxide is slurried in water, reacted with phosphoric acid, producing zinc phosphate. The resultant slurry is centrifuged, and the filtrate is discharged to sewer via a zinc phosphate effluent treatment plant. The filtered zinc phosphate is dried, ground, blended, sieved and packed.

The zinc stearate plant is also run on a campaign basis. Zinc oxide is slurried and treated with stearic acid to produce approximately a 50% solids slurry. This is then dried and milled before grading and packaging. (*For further information see Cremer & Warner, 1993*).

Releases to air - particulates.

AO1586

BRITANNIA ALLOYS & CHEMICALS LTD

Process for producing zinc oxide by burning zinc vapour in air. The zinc oxide produced is of high purity and is a white powder of sub-micron size which is used as a pigment, in pharmaceuticals, in rubber production, in the manufacture of other zinc chemicals and as an animal feed supplement.

The process consists of a melting stage where plates of high grade zinc are melted in a melt bath fired by two natural gas immersion tube burners. From here the molten zinc overflows to the top of the Electro-Thermal furnace (ETF) where the zinc vaporises. The vapour passes through a refractory pipe into a brick lined combustion chamber. The zinc vapour is burnt in the combustion chamber by controlled ingress of air. A dense white fume is formed which is drawn off from the top of the chamber by a fan which pulls through a bag filter. The combustion conditions (temperature, turbulence, zinc vapour to air ratio, residence time) determine the zinc oxide particle shape, and size distribution. The larger particles are not sucked upwards, and fall to the base of the chamber along with lumps of oxide and re-condensed zinc. This fallout oxide is screened off-site to produce a saleable low grade product and an oversize product which is sent for smelting off-site. The length of ducting between the top of the combustion chamber and the bag filter, along with the addition of dilution air, cools the fume from 1000°C to about 120°C at the filter inlet. The bag filter contains 144 6" diameter x 2m long Nomex bags and are cleaned by a reverse jet pulse system. The product is then removed for packing by a screw feeder.

Failure of the product bag filter has the potential to release particulates to the environment. To prevent or minimise any release due to the bag filter failure it checked regularly and is fitted with a standby fan and stack.

(For further information see Cremer & Warner, 1993).

Releases to air - zinc compounds.

AO1594

BRITANNIA ALLOYS & CHEMICALS LTD

Production of zinc oxide by burning zinc vapour in air, which is then used as feedstock for the production of zinc phosphate. Zinc oxide produced formed in one of two retorts is drawn along ducting and collected in a fabric bag filter and is then transferred via a screw feeder into the phosphate plant building where it is discharged into intermediate bulk containers. The phosphate plant operates on a batch basis. The zinc phosphate is slurried with water and phosphoric acid is then added. When the reaction is complete the slurry is discharged to a holding tank from where it is pumped to a rotary vacuum drum filter. The zinc phosphate is washed and separated as filter cake. The filter cake is then dried from where it is passed to a classifier/mill. The product may be either zinc phosphate dihydrate or tetrahydrate depending on the drying conditions. After the mill the product is pneumatically conveyed through bag filters and silos to a bagging machine (it may be passed through a microniser for further particle size reduction prior to the bagging machine).

Abatement techniques - liquid effluent is treated with sodium carbonate to precipitate dissolved metals, followed by settlement and filtration. Particulate emissions are abated using cyclones, stacks and bag filters. Solid waste is recycled as far as possible.

Variation AR0900 - Revision of improvement programme.

Variation AS9615 - Extension of completion dates for Improvement Conditions.

Variation AU3545 - Replacement of retorts by an electro-thermal furnace; changes to monitoring requirements and improvement programme.

Releases to air - nitrogen oxides, particulates, sulphur dioxide, zinc compounds.

Releases to water - cadmium, lead, zinc.

AO1934 LANCASHIRE CHEMICAL WORKS LTD

Batch manufacture of a wide range of chrome chemicals, both as intermediates for other processes on site and as final products. Product range includes - chromium sulphate, chromium salts, chrome syntans (tanning solutions) and magnesium dichromate.

Releases to air - chromium, hydrogen chloride, sulphur dioxide, hydrogen sulphide, ammonia, acetic acid nitrogen oxides, particulates.

Abatement equipment - cyclones and wet scrubbers. Effluent treatment plant removes chromium from liquid wastes prior to discharge to sewer.

AO2639 FISHER SCIENTIFIC

Batchwise manufacture of an extensive range of organic and inorganic chemicals, both in liquid and solid form. The plant is divided between two adjoining buildings, the Multipurpose Process Plant (MPP) and the Multipurpose Distillation Plant (MPD). An abatement plant is used which consists of two gas scrubbers to which manufacturing plant and vacuum pumps can be vented. Reflux condensers are also employed to minimise release to atmosphere. These are either water or glycol cooled depending on the process being operated. Liquid effluent is treated and discharged on a batch basis. Three holding tanks are used, the contents of which are sampled and analysed before discharge to sewer.

Releases to air - ammonia, hydrogen chloride, nickel, nitrogen oxides, particulates, sulphur dioxide, VOCs Class A&B.

Releases to water - cadmium, chromium, copper, lead, mercury, nickel, chlorinated organics, zinc.

AV3036 WM CANNING LTD

Envelope application covering a range of processes, for the production of materials used in the surface treatment of metals. The processes have an annual consumption of raw materials of less than 100 tonnes. The products may be in either solids (powders or granules) or water-based liquids. Most processes involve wet or dry blending of the raw materials and transfer to containers for sale, and cleaning of the blending equipment. The formulated products include, ammonium hydrosulphide, potassium polysulphide, cadmium plating salts and antimony based compounds. Processes that are likely to produce gaseous hydrogen halides are performed in the acid mixing area under local extraction ventilation which is ducted to one of two caustic soda scrubbers before venting to two stacks. Cadmium salt blending is performed under a dedicated LEV system exhausting to its own stack via a bag filter. All other processes are carried out under various LEV systems which vent outside of the building. Scrubber liquors and washings are discharged to sewer via the site effluent treatment plant. Washings from cadmium salt blending are drummed off for disposal as special waste together with the filter dust from the cadmium salts bag filter.

Releases to air - ammonia, hydrogen chloride, hydrogen fluoride, hydrogen sulphide, sulphur dioxide, cadmium and its compounds, antimony and its compounds, chromium and its compounds, nickel and its compounds, particulates and carbon disulphide.

Releases to water - scrubber liquors, equipment/floor washings.

AN9727 BRITISH CHROME & CHEMICALS

(For further information see Cremer & Warner, 1993).

UK sole manufacturer of primary chromium compounds by extraction from chrome ore.

The site incorporates a number of processes and support facilities for the manufacture of a range of chromium chemicals for use by a number of varied industries such as, manufacture of chromium metal, metal finishing and the manufacture of wood preservatives. This authorisation covers the primary processing area, the site effluent treatment plant, the residue disposal facility and the site utilities. In the primary processing area chromite ore is dried, milled and stored in a silo. The ore, sodium carbonate and process residue is calcined, oxidising insoluble trivalent chromium to soluble hexavalent sodium chromate. The soluble sodium chromate is separated from the residue and then purified in the Leach plant. A proportion of the residue is dried and recycled to the process whilst the remainder is slurried and sent for landfill disposal. The sodium chromate is acidified in the Evaporation Plant to yield sodium dichromate and crude sodium sulphate by-product. The sodium dichromate is then either concentrated for use as feedstock for other processes on site, or is processed for direct sale. It is diluted and sold as sodium dichromate solution, or it undergoes evaporative crystallisation to produce sodium dichromate crystals (anhydrous or dihydrate).

The effluent treatment plant removes hexavalent chromium from the crude sodium sulphate solution from the chromic oxide plant. This is achieved by reduction of the hexavalent chromium to insoluble trivalent chromium precipitate, using liquid sulphur dioxide, sulphuric acid and sodium hydroxide solution. The resulting slurry is classified and the liquor which contains sodium sulphate solution is preferentially recycled to the Pure Salt Plant.

Bag filters are generally used to abate "dry" particulates, whilst demister pads are used on all exhausts where "wet" releases to air are possible. Exhausts from the Crude and Pure Salt Plants, containing soluble sodium sulphate are routed through a scrubber and demister device system. Variation AX3690 introduces the use of a new bag filter and processing of an alternative feedstock, resulting in increased recovery of hexavalent chromium prior to residue landfill. A rotary vacuum is also introduced to the residue treatment stage in order to significantly reduce the hexavalent chromium content of the residue.

Releases to air - carbon dioxide, carbon monoxide, chromium, nitrogen oxides, particulates, sulphur dioxides.

Releases to water - cadmium, mercury, NP-suspended solids.

Releases to land - general waste, not containing any prescribed substances is sent for off-site landfill. All process waste is disposed of on-site in engineered landfills.

AN9735 BRITISH CHROME & CHEMICALS

Manufacture of a range of chromium chemicals for use in a wide variety of industries such as wood preservation products, metal finishing and leather tanning.

Releases to air - chromium, nitrogen oxides, sulphur dioxides.

AN9743 BRITISH CHROME & CHEMICALS

This authorisation covers the production of potassium dichromate by the reaction between chromic acid solution and potassium hydroxide solution. The potassium dichromate is subsequently boiled, treated with sodium chlorate, crystallised, centrifuged and dried in a thermal venturi drier. It is then cooled in a fluidized bed prior to packaging. Liquor from the centrifuge is recycled back to the reactor after passing through an evaporator system. The same plant is also

used for the campaign production of ammonium dichromate from the basic reaction between liquid ammonia and chromic acid solution.

The evaporator vent has no associated abatement equipment whereas both the drier and product system vents are fitted with wet scrubbing systems. The drier scrubber consists of a wetted (potassium or ammonium dichromate solution) cyclone and demister, whereas the product scrubber comprises of a wetted cyclone, irrigated packing and a demister. The cyclone and packing are also fed with dilute potassium or ammonium dichromate solution. There are no liquid wastes from this process as all streams are recycled to the process or into other processes on-site via the effluent treatment plant. Non process solid wastes are disposed of to landfill off-site. (*For further information see Cremer & Warner Ltd, 1993*).

Releases to air - chromium.

AN9751 BRITISH CHROME & CHEMICALS

Production of chromic oxides.

Releases to air - ammonia, chromium, nitrogen oxides, particulates, sulphur dioxides.

AN9760 BRITISH CHROME & CHEMICALS

This authorisation covers the production of chromic acid from sodium dichromate solution and sulphuric acid. The by-product of this reaction is sodium bisulphate. This reaction is exothermic and because of this reactants are fed in a controlled manner to a reaction vessel, fitted with external cooling jackets and internal cooling coils, from header tanks. The reactor slurry is then centrifuged and the cake is washed and dried in a gas-fired rotary drier. The dry product consists of fine crystals which are compacted, granulated and sieved to remove fines prior to packaging. The liquor from the centrifuge stage is recycled to the process in the evaporation plant. The process results in some trace amounts of chlorine being released to air. The chlorine is generated from the oxidation of chloride which is an impurity in the raw material, and sodium carbonate, which is a feedstock for the production of sodium dichromate. The reactor and the compaction process are vented through one scrubber and the drier through another. Both of these scrubbers are packed columns irrigated with chromic acid. The exhaust from these scrubbers pass through a demister prior to discharge to atmosphere. The spent liquors from the scrubbers are recycled to the process in the leach plant.

Variation BA1834 - this variation covers the new chromic acid plant which is to replace the existing one. Commissioning of the new plant is scheduled for April 1998. The new plant will continue to use the process route of the reaction between sodium dichromate solution and sulphuric acid to produce chromic acid. However there are a number of process changes that are designed to increase production capacity and improve operating standards. These changes include the chloride being oxidised with sodium persulphate and the resulting chlorine is then scrubbed with caustic soda solution. The remaining hypochlorite solution is used on the chrometans plant. Also the releases of chromium are minimised by using a combination of scrubbers, demisters and disengagement pots. Furthermore the process and process equipment have been designed to produce a non-dusting product and minimise processing of dry chromic acid.

Releases to air - chlorine, chromium, nitrogen oxides, sulphur dioxide.

AO0245 AQUASPERSIONS LTD

Production of antimony oxide dispersions in water and other chemicals. Physical process involving no chemical reactions. LEV systems to fabric scrubbers.

Releases to air - antimony, particulates, VOCs.

Releases to water - antimony, sulphur, zinc.

AO0784 SLI LIGHTING

Mercury spillages are treated with zinc or sulphur and then vacuumed up. Activated carbon filters are used to reduce mercury releases to air.

Releases to air - mercury, sulphur dioxide, VOCs.

Releases to water - cadmium, mercury.

AO2604 HARCROS CHEMICALS

(For further information see Cremer & Warner, 1993).

Releases to air - particulates.

AO2671 HARCROS CHEMICALS

Production of zinc oxide, (crucible, rotary kiln and electric furnace processes) by "indirect" processes, and zinc dust via an electric furnace process. Lime or sulphuric acid used to adjust pH and precipitate metal hydroxides. Suspended solids removed by settling. Water sprays in outside areas to minimise dusting.

Releases to air - particulates containing cadmium and zinc, carbon dioxide.

Releases to water - cadmium, lead, mercury, NP-BOD, NP-suspended solids, zinc.

Abatement equipment - bag filters.

AN8437 ICI CHEMICALS AND POLYMERS LTD

Production of a range of catalysts using aluminium, calcium, chromium, iron, magnesium, nickel, palladium, zinc and rare earth metals. Typical process involves dissolving the metal in nitric acid and then treating with either sodium carbonate, ammonia or sodium hydroxide solutions, to precipitate insoluble metal carbonates and hydroxides. The precipitate is collected and washed before heat treatment, which converts it to the dry metal oxide powder. The oxide powder is then mixed with binders and lubricants and is then formed into suitable shapes - pellets, extrudates or granules. An alternative manufacturing process produces inert supports by mixing of powders and forming in to shapes, as above. The inert supports are then impregnated with soluble metal salts followed by further heat treatment.

Releases to air - ammonia, chromium, nickel, nitrogen oxides, particulates, sulphur dioxide, VOCs.

Releases to water - mercury, cadmium and sodium and ammonium nitrates discharged to sewer.

Release to land - magnesium oxide, solids from settling pits and general process wastes are disposed of to land off-site.

Abatement equipment - dust filters, the dissolver is fitted with a wet scrubber to reduce NO_x emissions, liquid effluent is treated to remove suspended solid which may contain metals.

AO0679 ALBRIGHT & WILSON UK LTD

(For further information see Cremer & Warner, 1993).

Batch production of complex copper/chromium catalysts. Includes chromium trioxide (chrome acid flake) which is dissolved in water and aqueous ammonia solution to give ammonium dichromate. Use ammonia as feedstock.

Releases to air - chromium, copper, nitrogen oxides, particulates.

Releases to water - chromium.

AO1233 WILLIAM BLYTHE LTD

(For further information see Cremer & Warner, 1993).

Manufacture of zinc chlorides and associated compounds.

(zinc fines, zinc slab, zinc chloride, zinc ammonium chloride, zinc sulphite dihydrate, zinc stannate, zinc nitrate and magnesium nitrate). Use of zinc and magnesium oxide.

Releases to air - ammonia, arsenic compounds, hydrogen chloride, hydrogen cyanide, hydrogen sulphide, nitrogen oxides, particulates, sulphur oxides, VOCs.

Releases to water - arsenic, cadmium, copper, heavy metals (ex cadmium / mercury), tin.

Releases to land - NP-solids.

AO1012 CUPRINOL LTD

Envelope for batch production of series of zinc carboxylates involving reaction of zinc oxide powder with varying mixtures of carboxylic acids (7-13 C atoms). Reaction takes place in the presence of aliphatic hydrocarbon solvents.

Releases to air - VOCs, zinc compounds.

Releases to land - zinc compounds.

Abatement equipment - DCE filters.

AN8496 UNION MINIERE OXYDE (UK) LTD

Semi-continuous production of zinc oxide from zinc metal. Zinc is boiled in refractory retorts. The zinc vapour is oxidised in the air and then drawn through a cyclone into a bag filter system and exhaust air is then released to atmosphere. The coarse zinc oxide fraction is removed by a cyclone and blown into open hanging sleeve filters. Some of the product is further processed to pellets in a batch pelletiser consisting of a vacuum press, noduliser and sieves.

Releases to air - nitrogen oxides, sulphur oxides, zinc compounds.

Releases to water - cadmium compounds.

AO1128 RGM COLOURS AND CHEMICALS LTD

Production of chromium compounds - chromium III oxide and chromium III hydroxide. Two processes which both involve the high temperature reduction of chromium VI to chromium III.

Oxide process - mix solid sodium dichromate with solid sulphur ion starch and feed to kiln.

Carbon dioxide and sulphur dioxide liberated. Sulphur dioxide removed in wet scrubber recirculated with a solution of sodium dichromate. Recycle scrubber liquor to next batch.

Hydroxide process - Sodium dichromate reduced by boric acid in gas fired kilns. Oxides of carbon released.

Both solid products are bagged and the dust extracted via fabric filters.

Releases to air - carbon monoxide, chromium compounds, sulphur dioxide.

Releases to water - chromium compounds.

Releases to land - NP-solids.

AO1721 WALTERISATION (UK) LTD

Production of surface coatings/cleaning chemicals. Use zinc oxide, magnesium carbonate, chromium trioxide, nickel nitrate in sacks. Air emissions are filtered prior to discharge to remove particulates. Aqueous wastes are pH adjusted and polyelectrolytes added. Metal hydroxide complexes settle out.

Releases to air - chromium, copper compounds, manganese, nickel, nitrogen oxides, particulates, zinc.

Releases to water - cadmium, chromium, copper compounds, manganese, mercury compounds, nickel, silver, zinc.

Releases to land - NP-solids.

AO1942 LEVERTON CLARKE LTD

Manufacture of chromium based products for use in refrigeration and chiller units. Multi-purpose plant with each reactor having a scrubber which is a packed tower fitted with recirculating alkaline solution to neutralise fume and remove particulates. Reaction of metal hydroxides/carbonates with inorganic acids to form salts.

Releases to air - hydrogen bromide, hydrogen chloride, nitric acid.

Releases to water - total bromides, chromium; total fluorides, mercury, NP-aqueous residues, NP-COD, NP-suspended solids, total sulphates, total sulphides.

Releases to land - mercury.

AN7562 INCO EUROPE LTD

(For further information see Cremer & Warner, 1993).

Nickel salts production.

Releases to air - nickel compounds.

Releases to water - nickel compounds and heavy metals.

Abatement equipment - process effluent treated with caustic, thickened and sand filtered.

AO0571 GRILLO ZINCOXIDE (UK) LTD

Zinc oxide production, granular or powdered form, in a range of purities.

Releases to air - zinc oxide particulates and other metal compounds.

Abatement equipment - bag filters.

D.2 Summary

The companies authorised under this category fall into several categories and include many metal processing operations for which a common theme is the release of metal vapours, particulates and liberated gaseous products due to the reaction of acids on metals. Many of the standard abatement techniques for the removal of particulate matter and off-gas scrubbing are to be found in this sector but often additional modified systems are required to suit process specific requirements.

D.2.1 Emissions to air

From the emissions data provided by the CRI the most commonly authorised emissions to air from the companies under this section are - particulates, NO_x, sulphur dioxide, chromium (compounds), VOCs, nickel (compounds), hydrogen chloride.

There are no specifically named organic species.

Several other metals are also listed - lead, copper, antimony, zinc compounds, mercury, manganese and arsenic compounds.

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|----------------------|---|
| Albright & Wilson | NO _x , particulates |
| Britannia Alloys | NO _x , zinc compounds, sulphur dioxide, particulates |
| British Chrome | ammonia, carbon dioxide, NO _x , chromium, carbon monoxide, particulates, sulphur dioxide |
| ICI | ammonia, nickel, NO _x , particulates, sulphur dioxide, VOCs |
| James Brown | particulates |
| Harcros | particulates |
| Keiner | NO _x , sulphur dioxide |
| Lancashire Chemicals | NO _x |
| SLI Lighting | sulphur dioxide |
| Union Miniere | NO _x , sulphur dioxide |
| Wm Blythe | hydrogen chloride, NO _x , sulphur dioxide, VOCs |

D.2.2 Discharges to water

From the emissions data provided by the CRI the most commonly authorised emissions to water from the companies under this section are :- cadmium, mercury, chromium, zinc, lead and suspended solids. Other metals include antimony, copper, nickel, manganese, silver, arsenic, tin.

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|-----------------|-----------------------------|
| Aquapersions | antimony, sulphur, zinc |
| British Chrome | chromium, suspended solids |
| Harcros | BOD, suspended solids, zinc |
| Leverton Clarke | bromides |
| Wm Blythe | heavy metals |

D.2.3 Discharges to land

From the emissions data provided by the CRI only zinc, mercury, aqueous residues and solids are listed.

In terms of discharges > 1000 kg per annum the following have been reported:-

| | |
|-----------------|------------------|
| Leverton Clarke | aqueous residues |
| RGM Colours | solids |

D.3 Details of reported emissions of chromium, magnesium, manganese, nickel and zinc

| | |
|-----------|--|
| Table D.1 | Emissions data for chromium and its compounds |
| Table D.2 | Emissions data for magnesium and its compounds |
| Table D.3 | Emissions data for manganese and its compounds |
| Table D.4 | Emissions data for nickel and its compounds |
| Table D.5 | Emissions data for zinc and its compounds |

Table D.1 Emissions data for chromium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth No. | Chemical | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|----------|------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| British Gas PLC | 1.1A(a) | AF7517 | Chromium | - | 8.00E-02 | - | 1.36E-01 | - | 1.80E+00 | - | - |
| Conoco Ltd. | 1.1A(a) | AF6863 | Chromium | - | 5.91E-01 | - | 4.48E+00 | - | 1.80E+01 | - | 7.00E+00 |
| British Gas PLC | 1.1A(b) | AF7533 | Chromium | - | 1.00E-02 | - | 1.00E-02 | - | - | - | - |
| Sevalco Ltd. | 1.2A(a) | AF7916 | Chromium | - | 3.96E+01 | - | 5.43E+01 | - | 2.25E+01 | - | 1.86E+01 |
| Coal Products Ltd. | 1.2A(a) | AF6227 | Chromium | - | 3.30E+00 | - | 3.40E+00 | - | 4.00E+00 | - | 0.00E+00 |
| National Power PLC | 1.3A(a) | AA3204 | Chromium | - | - | - | - | - | - | - | - |
| Powergen PLC | 1.3A(a) | AA2267 | Chromium | - | 0.00E+00 | - | 3.19E+00 | - | 4.06E+00 | - | 1.01E+01 |
| National Power PLC | 1.3A(a) | AA3107 | Chromium cpds | - | - | - | - | - | - | 0.00E+00 | - |
| BP Chemical Ltd. | 1.3A(a) | AA1996 | Chromium | - | - | - | - | - | 2.01E+02 | - | 1.71E+02 |
| Castrol UK Ltd. | 1.3A(c) | AG0097 | Chromium cpds | 0.00E+00 | - | 6.00E-03 | - | 0.00E+00 | - | 0.00E+00 | - |
| International Flavours and Fragrances(GB) Ltd. | 1.3A(c) | AN7031 | Chromium | - | - | 1.80E-01 | - | 5.72E+00 | - | 3.00E+00 | - |
| P Garnett and Son Ltd. | 1.3A(c) | AF8416 | Chromium cpds | - | - | - | - | 3.28E+00 | - | 3.78E-01 | - |
| Esso Petroleum Co. Ltd. | 1.4A(a) | AF8009 | Chromium | - | - | - | 4.08E+02 | - | 1.50E+02 | - | 1.08E+02 |
| Esso Petroleum Co. Ltd. | 1.4A(a) | AT6298 | Chromium | - | - | - | - | - | - | - | - |
| Conoco Ltd. | 1.4A(a) | AF8173 | Chromium | - | 2.27E+00 | - | 1.38E+01 | - | 8.79E+00 | - | 1.11E+01 |
| Lidsey Oil Refinery Ltd. | 1.4A(a) | AF6928 | Chromium | - | 1.40E+01 | - | 6.11E+00 | - | 2.60E+01 | - | 5.43E+01 |
| ICI Chemicals and Polymers | 1.4A(c) | AF7240 | Chromium cpds | - | 5.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 |
| Carless Refining and Marketing Ltd. | 1.4A(c) | AB2963 | Chromium | - | - | - | 7.26E+00 | - | 6.36E+00 | - | 0.00E+00 |
| Total emissions from sector 1 | | | | 0.00E+00 | 6.49E+01 | 1.86E-01 | 5.01E+02 | 9.00E+00 | 4.42E+02 | 3.38E+00 | 3.80E+02 |

[illegible]

| | | | | | | | | | | | |
|---|---------|--------|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| BP Chemical Ltd. | 4.1A(b) | AL1385 | Chromium | - | - | - | 0.00E+00 | - | - | - | - |
| Shell UK Ltd. | 4.1A(c) | AK4001 | Chromium | - | - | - | 2.00E+01 | - | 0.00E+00 | - | - |
| European Vinyls Corporation (UK) Ltd | 4.2A(a) | AP8730 | Chromium | - | - | - | - | - | - | - | 1.74E+02 |
| European Vinyls Corporation (UK) Ltd | 4.2A(a) | AT6298 | Chromium | - | - | - | - | - | - | - | - |
| European Vinyls Corporation (UK) Ltd | 4.2A(a) | AP8730 | Chromium | - | - | - | - | - | - | - | - |
| Hydro Polymers Ltd. | 4.2A(a) | AK4583 | Chromium | - | - | - | 1.54E+02 | - | 0.00E+00 | - | 0.00E+00 |
| BASF PLC | 4.2A(c) | AJ6505 | Chromium | - | - | - | 9.25E+02 | - | 1.29E+03 | - | 4.00E+01 |
| Ciba-Geigy PLC | 4.2A(c) | AK8511 | Chromium | - | - | - | 2.40E+00 | - | 4.50E+01 | - | 0.00E+00 |
| Haarmann and Reimer (Bayer PLC) | 4.2A(c) | AK2050 | Chromium | - | - | - | 2.42E+02 | - | 3.26E+02 | - | 2.88E+02 |
| Zeueca Ltd. | 4.2A(d) | AL6794 | Chromium | - | - | - | - | - | 3.30E+01 | - | 6.20E+01 |
| Du Pont (UK) Ltd. | 4.2A(d) | AK3803 | Chromium | - | - | 3.41E+03 | - | 2.30E+03 | - | 2.51E+03 | - |
| Exchem PLC | 4.2A(d) | AH7194 | Chromium | - | 1.23E-01 | - | 8.15E+00 | - | 0.00E+00 | - | 0.00E+00 |
| Jotun Polymer (UK) Ltd. | 4.2A(d) | AK8171 | Chromium | - | - | - | - | - | - | 6.00E-02 | - |
| Merck Sharp and Dohme Ltd. | 4.2A(d) | AK8244 | Chromium | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 1.38E+00 |
| Borden Chemicals UK Ltd. | 4.2A(d) | AJ1252 | Chromium | 1.50E-02 | - | 2.40E-02 | - | 2.30E-02 | - | 3.00E-04 | - |
| Sandoz Chemicals (UK) Ltd. | 4.2A(d) | AK8368 | Chromium | - | - | - | 2.36E+00 | - | 0.00E+00 | - | 0.00E+00 |
| Albright and Wilson | 4.3A(a) | AL9009 | Chromium | - | - | - | - | - | 2.63E+04 | - | 2.82E+04 |
| Tioxide (Europe) Ltd. | 4.3A(c) | AL8282 | Chromium | - | - | - | - | - | 1.43E+04 | - | 7.58E+03 |
| Rolls-Royce PLC | 4.3A(f) | AL7596 | Chromium | - | - | - | 3.65E+00 | - | 2.56E+00 | - | 2.08E+00 |
| Exchem PLC | 4.3A(f) | AM0201 | Chromium | - | - | - | 6.60E+00 | - | 1.16E+01 | - | 0.00E+00 |
| IMI Titanium Ltd. | 4.3A(f) | AL8355 | Chromium | - | - | - | 1.00E+00 | - | - | - | - |
| ICI Chemicals and Polymers | 4.4A(b) | AL7456 | Chromium | - | - | - | - | - | 9.00E+00 | - | 4.30E+01 |
| Tioxide (Europe) Ltd. | 4.4A(b) | AL8363 | Chromium | - | - | - | 8.00E+02 | - | 5.00E+02 | - | 4.00E+02 |
| ICI Chemicals and Polymers | 4.4A(d) | AL7243 | Chromium | - | - | - | 0.00E+00 | - | 1.65E+01 | - | 1.60E+00 |
| TKR Chemical Machining Co. Ltd. | 4.4A(c) | AL8576 | Chromium | - | - | - | 1.80E-01 | - | 2.40E-01 | - | 0.00E+00 |
| ICI Chemicals and Polymers | 4.6A(b) | AL8614 | Chromium | - | - | - | - | - | 1.30E+02 | - | 1.56E+01 |
| Total emissions from sector 4 (excl 4.5) | | | | 1.50E-02 | 1.23E-01 | 3.41E+03 | 2.17E+03 | 2.30E+03 | 4.29E+04 | 2.51E+03 | 3.68E+04 |

| Company | Sector | Auth No. | Chemical | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|----------|------------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Lead Chrome Colours Ltd. | 4.5A(d) | AO1454 | Chromium | - | - | - | - | - | 2.50E+00 | 1.09E+01 | 0.00E+00 |
| Phosphor Technology Ltd. | 4.5A(d) | AO1993 | Chromium | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Yuasa Battery (UK) Ltd. | 4.5A(d) | AG9493 | Chromium | - | 1.00E-15 | - | 5.00E-01 | - | 2.67E+00 | - | 2.21E+00 |
| William Blythe Ltd. | 4.5A(d) | AO1225 | Chromium cpds | - | - | - | - | 2.50E-01 | - | 9.70E-02 | - |
| Rentokil Ltd. | 4.5A(d) | AO1241 | Chromium | - | - | - | 0.00E+00 | - | 3.50E-03 | - | 2.82E-03 |
| Cookson Matthey Ceramics and Materials Ltd. | 4.5A(d) | AO0920 | Chromium | - | - | - | - | - | - | 0.00E+00 | - |
| James Kent (Ceramic Materials) Ltd. | 4.5A(d) | AN1432 | Chromium | - | - | - | - | 2.00E-05 | - | 3.00E-05 | - |
| Johnson Matthey PLC. (Note 1) | 4.5A(e) | AN8712 | Chromium | - | - | - | - | - | 8.00E-01 | - | 1.29E+00 |
| Gemafa Battery Company Ltd. | 4.5A(f) | AO1977 | Chromium cpds | - | - | - | 2.50E-01 | - | 2.85E-01 | - | 1.14E+00 |
| Jotun Polymer (UK) Ltd. | 4.5A(f) | AG3401 | Chromium | 0.00E+00 | - | 5.00E-02 | - | 5.00E-02 | - | 0.00E+00 | - |
| Thermofoil Polymers (UK) Ltd. | 4.5A(f) | AO0598 | Chromium | - | - | 3.00E+00 | - | 1.90E-02 | - | 5.74E+00 | - |
| Gulson Plating Ltd. | 4.5A(f) | AO0865 | Chromium | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Hunting Aviation A.E.D. | 4.5A(h) | AO5336 | Chromium | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| ITT Cannon PLC | 4.5A(h) | AO0563 | Chromium | - | - | - | - | - | 2.05E+00 | - | 0.00E+00 |
| Portsmouth Aviation Ltd. | 4.5A(h) | AO1748 | Chromium cpds | - | - | - | - | - | 0.00E+00 | - | 2.52E+01 |
| Rnay Fleetlands (Note 2) | 4.5A(h) | AV3150 | Chromium | - | - | - | - | - | - | - | 4.00E+01 |
| Rose Bearings Ltd. (Note 3) | 4.5A(h) | AO9706 | Chromium | - | - | - | - | - | 1.54E+00 | - | 5.62E+00 |
| Cookson Matthey Ceramics and Materials Ltd. | 4.5A(h) | AO1608 | Chromium | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Ingram and Glass Ltd. | 4.5A(h) | AO8017 | Chromium | - | - | - | - | - | 3.70E+00 | - | 1.74E+00 |
| Walker AEC Ltd. | 4.5A(h) | AO7452 | Chromium | - | - | - | - | - | 5.50E+00 | - | 4.90E+00 |
| Walton Plating Ltd. | 4.5A(h) | AO7720 | Chromium | - | - | - | - | - | 4.50E-01 | - | 0.00E+00 |
| RGM Colours and Chemicals Ltd. | 4.5A(i) | AO1128 | Chromium cpds | - | - | - | - | 0.00E+00 | 5.00E+00 | 0.00E+00 | 5.00E+00 |
| British Chrome and Chemicals | 4.5A(i) | AN9760 | Chromium | - | - | 0.00E+00 | - | 4.80E+01 | - | 1.00E+02 | - |
| British Chrome and Chemicals | 4.5A(i) | AN9743 | Chromium | - | - | 0.00E+00 | - | 2.90E+02 | - | 8.60E+02 | - |
| British Chrome and Chemicals | 4.5A(i) | AN9751 | Chromium | - | - | 0.00E+00 | - | 2.94E+03 | - | 3.25E+03 | - |
| British Chrome and Chemicals | 4.5A(i) | AN9735 | Chromium | - | - | 0.00E+00 | - | 2.05E+03 | - | 3.78E+03 | - |

| | | | | | | | | | | | |
|---|---------|--------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| British Chrome and Chemicals | 4.5A(i) | AN9727 | Chromium | - | - | 0.00E+00 | 0.00E+00 | 1.57E+04 | 8.85E+02 | 1.25E+04 | 1.35E+03 |
| ICI Chemicals and Polymers | 4.5A(i) | AF1454 | Chromium cpds | 0.00E+00 | - | - | - | - | - | - | - |
| Albright and Wilson | 4.5A(i) | AO0679 | Chromium | - | - | - | - | 3.06E+02 | - | 2.15E+02 | - |
| Keiner and Co. Ltd. | 4.5A(i) | AO0415 | Chromium | - | - | 0.00E+00 | 0.00E+00 | 2.50E-01 | 2.80E-01 | 6.00E-01 | 3.04E+01 |
| Lancashire Chemical Works Ltd. | 4.5A(i) | AO1934 | Chromium | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Walterisation (UK) Ltd. | 4.5A(i) | AO1721 | Chromium | - | - | 0.00E+00 | 0.00E+00 | 8.05E-02 | 5.14E-02 | 4.17E-02 | 9.36E+00 |
| Leverton-Clarke Ltd. | 4.5A(i) | AO1942 | Chromium | - | - | - | 1.00E-01 | - | 1.00E-01 | - | 1.00E-01 |
| ICI Chemicals and Polymers | 4.5A(i) | AN8437 | Chromium | - | - | - | - | 8.00E+02 | - | 4.00E+02 | - |
| Fisher Scientific | 4.5A(i) | AO2639 | Chromium | - | - | - | - | - | 2.80E+00 | - | 4.60E+00 |
| Cookson Matthey Ceramics and Materials Ltd. | 4.5A(i) | AN9018 | Chromium cpds | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Chemviron Carbon Ltd. | 4.5A(m) | AF6936 | Chromium cpds | 9.10E-02 | - | 0.00E+00 | - | - | - | - | - |
| Total emissions from sector 4.5 | | | | 9.10E-02 | 1.00E-15 | 3.05E+00 | 8.50E-01 | 2.21E+04 | 9.13E+02 | 2.11E+04 | 1.48E+03 |

Note 1: 1.32E +03 reported to land in 1995; 1.36 E +03 in 1996 Note 2: 1.80E +01 reported to land in 1996

Note 3: 4.43E +01 reported to land in 1995, 4.86E +01 in 1996

| | | | | | | | | | | | |
|--------------------------------------|---------|--------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Rechem International Ltd. | 5.1A(a) | AG7946 | Chromium | - | - | - | 1.41E+01 | - | 3.70E+00 | - | 2.25E+01 |
| Rechem International Ltd. | 5.1A(a) | AG8047 | Chromium | - | 1.00E+00 | - | 1.05E+00 | - | 1.70E+00 | - | 1.20E+00 |
| S Grondon (Waste) Ltd. | 5.1A(c) | AG8390 | Chromium cpds | 1.81E+00 | - | 3.87E+00 | - | 4.51E+00 | - | 4.20E+00 | - |
| Hunting Research Centre Ltd. | 5.1A(c) | AG8667 | Chromium | 1.94E+00 | - | 2.28E-01 | - | 4.84E-01 | - | 2.19E-01 | - |
| Northwick Park Hospital NHS Trust | 5.1A(c) | AG8012 | Chromium cpds | 1.30E+00 | - | 1.91E+00 | - | 2.50E-01 | - | 0.00E+00 | - |
| RNOH Incinerator Services Ltd. | 5.1A(c) | AM2034 | Chromium cpds | - | - | - | - | 1.98E+01 | - | 0.00E+00 | - |
| Chemviron Carbon Ltd. | 5.2A(a) | AG8403 | Chromium | - | 0.00E+00 | - | 3.90E-01 | - | 4.49E-01 | - | 0.00E+00 |
| Solrec Ltd. | 5.2A(a) | AG9258 | Chromium | - | - | - | 1.32E+00 | - | 8.06E-01 | - | 4.45E-01 |
| Total emissions from sector 5 | | | | 5.05E+00 | 1.00E+00 | 6.01E+00 | 1.69E+01 | 2.50E+01 | 6.66E+00 | 4.42E+00 | 2.41E+01 |

| | | | | | | | | | | | |
|--------------------------------------|---------|--------|----------|---|---|---|---|---|---|---|-----------------|
| HM Naval Base, Portsmouth | 6.5a(a) | AU8059 | Chromium | - | - | - | - | - | - | - | - |
| Pfizer Ltd. | 6.9A(a) | AU8083 | Chromium | - | - | - | - | - | - | - | 0.00E+00 |
| Total emissions from sector 6 | | | | - | - | - | - | - | - | - | 0.00E+00 |

Table D2 Emissions data for magnesium and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | |
|----------------|---------|-----------|-------------------|---------------------|-------|------|
| | | | | Air | Water | Land |
| Billbrime Ltd. | 2.2A(e) | AH4853 | Magnesium | 0.00E+00 | - | - |

Table D.3 Emissions data for manganese and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|-----------|---------------------|-------|---------------------|-----------------|---------------------|------------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Conoco Ltd. | 1.1A(a) | AF6863 | Manganese | - | - | - | 1.09E+03 | - | 1.687E+00 | - | 1.75E+00 |
| Total emissions from sector 1 | | | | - | - | - | 1.09E+03 | - | 1.687E+00 | - | 1.75E+00 |
| Co-Steel Sheerness | 2.1A(a) | AP5986 | Manganese | - | - | - | - | 9.60E+03 | - | 0.00E+00 | - |
| Delta Enfield Metals Ltd. | 2.2A(d) | AS5059 | Manganese | - | - | - | - | - | - | - | - |
| Billbrime Ltd. | 2.2A(e) | AH4853 | Manganese | 0.00E+00 | - | - | - | - | - | - | - |
| Mining and Chemical Products Ltd. | 2.2A(g) | AS2530 | Manganese | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Total emissions from sector 2 | | | | 0.00E+00 | - | - | - | 9.60E+03 | - | 0.00E+00 | - |
| Pilkington's Tiles Ltd | 3.5A(a) | AI5154 | Manganese | 0.00E+00 | - | - | - | - | - | - | - |
| Ferro (Great Britain) Ltd | 3.5A(a) | AI4174 | Manganese | 0.00E+00 | - | 0.00E+00 | - | - | - | - | - |
| James Kent (Ceramic Materials) Ltd. | 3.5A(a) | AH8689 | Manganese | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Total emissions from sector 3 | | | | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Jotun Polymer (UK) Ltd. | 4.2A(d) | AK8171 | Manganese | - | - | - | - | - | - | 6.00E-02 | - |
| Tioxide (Europe) Ltd. | 4.3A(c) | AL8282 | Manganese | - | - | - | 9.86E+05 | - | 5.36E+05 | - | 2.27E+05 |
| Total emissions from sector 4 (excl. 4.5) | | | | - | - | - | 9.86E+05 | - | 5.36E+05 | 6.00E-02 | 2.27E+05 |

| | | | | | | | | | | | |
|---|---------|--------|----------------|-----------------|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Cookson Matthey Ceramics and Materials Ltd. | 4.5A(a) | AI0624 | Manganese | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| James Kent (Ceramic Materials) Ltd. | 4.5A(d) | AN1432 | Manganese | - | - | 2.00E-05 | - | 3.00E-05 | - | - | - |
| Johnson Matthey PLC. (Note 1) | 4.5A(e) | AN8712 | Manganese | - | - | - | - | - | - | - | - |
| Gemala battery Company Ltd. | 4.5A(f) | AO1977 | Manganese cpds | - | - | 1.50E+00 | - | 2.82E-01 | - | 1.07E+00 | - |
| Jotun Polymer (UK) Ltd. | 4.5A(f) | AG3401 | Manganese | 0.00E+00 | - | 1.50E-02 | - | 6.00E-03 | - | - | - |
| Walkerisation (UK) Ltd. | 4.5A(i) | AO1721 | Manganese | - | - | 0.00E+00 | 0.00E+00 | 4.40E-03 | 1.13E-01 | 1.10E-03 | 3.38E-01 |
| Total emissions from sector 4.5 | | | | 0.00E+00 | - | 1.50E-02 | 1.50E+00 | 1.04E-02 | 3.95E-01 | 1.13E-03 | 1.41E+00 |
| Northwick Park Hospital NHS Trust | 5.1A(c) | AG8012 | Manganese cpds | 4.00E-01 | - | 2.90E-01 | - | 2.10E-01 | - | 0.00E+00 | - |
| S Grondon (Waste) Ltd. | 5.1A(c) | AG8390 | Manganese cpds | 0.00E+00 | - | 6.50E-01 | - | 7.50E-01 | - | 1.55E+00 | - |
| Huntingdon research Centre Ltd. | 5.1A(c) | AG8667 | Manganese | - | - | 3.03E-01 | - | 6.59E-01 | - | 4.65E-01 | - |
| RNOH Incinerator Services Ltd. | 5.1A(c) | AM2034 | Manganese cpds | - | - | 2.00E+00 | - | 3.60E+00 | - | 0.00E+00 | - |
| Total emissions from sector 5 | | | | 4.00E-01 | - | 3.24E+00 | - | 5.22E+00 | - | 2.01E+00 | - |

Note 1: 1.18E +02 reported to land in 1995; 1.48E +02 in 1996

Table D.4 Emissions data for nickel and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|-----------|-------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Conoco Ltd. | 1.1A(a) | AF6863 | Nickel | - | 1.17E+00 | - | 7.91E+00 | - | 2.20E+01 | - | 8.00E+00 |
| British Gas plc | 1.1A(b) | AF7533 | Nickel | - | - | - | 1.00E-02 | - | - | - | - |
| Coal Products Ltd. | 1.2A(a) | AF6227 | Nickel | - | 1.11E+01 | - | 1.33E+01 | - | 1.35E+01 | - | 9.90E+00 |
| Castrol UK Ltd. | 1.3A(c) | AG0097 | Nickel Cpds | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| BP Chemicals Ltd. | 1.3A(a) | AA1996 | Nickel | - | - | - | - | - | 2.06E+02 | - | 1.86E+02 |
| HM Naval Base Portsmouth | 1.3A(a) | AJ3077 | Nickel | - | - | - | 1.82E-01 | - | 4.72E-01 | - | 1.00E-02 |
| National Power Plc | 1.3A(a) | AA3204 | Nickel | - | - | - | - | - | - | - | - |
| National Power Plc | 1.3A(a) | AA3107 | Nickel Cpds | - | - | - | - | - | - | 0.00E+00 | - |
| Powergen Plc | 1.3A(a) | AA3344 | Nickel | 8.10E+02 | - | 2.60E+03 | - | 2.70E+03 | - | - | - |
| Powergen Plc | 1.3A(a) | AA3000 | Nickel | - | 6.57E+02 | - | 2.44E+02 | - | 1.23E+02 | - | 0.00E+00 |
| Powergen Plc | 1.3A(a) | AA2267 | Nickel | - | 0.00E+00 | - | 1.00E+00 | - | 5.64E+00 | - | 2.29E+00 |
| Horton Kirby Ltd | 1.3A(c) | AF6839 | Nickel | 6.05 | - | 4.73 | - | 8.00E+00 | - | 0.00E+00 | - |
| International Flavours and Fragrances GB Ltd. | 1.3A(c) | AN7031 | Nickel | - | - | 2.40E-01 | - | 3.02E+00 | - | 2.00E+00 | - |
| P Garnett and Son Ltd. | 1.3A(c) | AF8416 | Nickel Cpds | - | - | - | - | 3.74E+00 | - | 7.25E+00 | - |
| Carless Refining & Marketing Ltd. | 1.4A(c) | AB2963 | Nickel | - | - | - | - | - | 6.04E+00 | - | 0.00E+00 |
| Conoco Ltd. | 1.4A(a) | AF8173 | Nickel | - | 6.26E+00 | - | 6.55E+01 | - | 5.16E+01 | - | 4.36E+01 |
| Esso Petroleum Co. Ltd. | 1.4A(a) | AF8009 | Nickel | - | - | - | 3.88E+02 | - | 5.10E+02 | - | 7.97E+02 |
| Lidsey Oil Refinery Ltd. | 1.4A(a) | AF6928 | Nickel | 2.20E+01 | 2.20E+01 | - | 6.01E+01 | - | 6.30E+01 | - | 1.04E+02 |
| Texaco Ltd. | 1.4A(a) | AF7894 | Nickel | - | - | - | 2.00E+02 | - | 3.00E+02 | - | 0.00E+00 |
| Total emissions from sector 1 | | | | 8.38E+02 | 6.98E+02 | 2.60E+03 | 9.80E+02 | 2.71E+03 | 1.30E+03 | 9.25E+00 | 1.15E+03 |

| Company | Sector | Auth. No. | Chemical released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|---|---------|-----------|-------------------------|---------------------|-------|---------------------|-------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Allied Steel and Wire Ltd. | 2.1A(a) | AR0322 | Nickel & Nickel Cpds | - | - | - | - | 3.40E+00 | 3.00E+00 | 4.50E+01 | 1.94E+00 |
| British Steel plc | 2.1A(a) | AR0063 | Nickel | - | - | - | - | - | 3.00E-02 | - | 2.80E-01 |
| British Steel plc | 2.1A(a) | AR0080 | Nickel | - | - | - | - | - | 1.40E+01 | - | 4.90E+01 |
| Co-Steel Sheerness | 2.1A(a) | AP5986 | Nickel | - | - | - | - | 6.30E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Alphasteel Ltd. | 2.1A(f) | AQ9944 | Nickel | - | - | - | - | 2.40E-01 | 2.51E+00 | 4.14E+00 | 2.67E+00 |
| Avesta Sheffield Ltd. | 2.1A(f) | AQ9596 | Nickel | - | - | - | - | 1.52E+01 | - | 1.81E+00 | - |
| British Steel Engineering Steels Ltd | 2.1A(f) | AQ9855 | Nickel | - | - | - | - | - | 2.90E+00 | - | 1.00E-01 |
| Forgemasters Steel and Engineering Ltd. | 2.1A(f) | AQ5159 | Nickel | - | - | - | - | - | 3.70E+02 | - | 0.00E+00 |
| Weardale Steel (wolsingham) Ltd | 2.1A(f) | AR0390 | Nickel Cpds | - | - | - | - | - | 1.30E-01 | - | 9.00E-02 |
| Britannia Refined Metals Ltd. | 2.2A(a) | AS7850 | Nickel Cpds | - | - | - | - | - | - | - | 0.00E+00 |
| British Nuclear Fuels plc | 2.2A(a) | AS5601 | Nickel | - | - | - | - | - | - | - | 6.00E+00 |
| Brookside Metal Co. Ltd. | 2.2A(a) | AS6829 | Nickel | - | - | - | - | 8.30E-01 | 2.00E-02 | 8.10E+01 | 6.10E-01 |
| IMI Refineries Ltd | 2.2A(a) | AS6632 | Nickel | - | - | - | - | 0.00E+00 | 5.83E+00 | 1.40E+01 | 4.40E+01 |
| Thomas Bolton Ltd. | 2.2A(a) | AS7213 | Nickel | - | - | - | - | - | - | 0.00E+00 | 0.00E+00 |
| Alenoy Ltd. | 2.2A(b) | AS6080 | Nickel | - | - | - | - | - | - | - | 6.00E-01 |
| Inco Alloys Ltd. | 2.2A(c) | AS7035 | Nickel | - | - | - | - | - | - | 1.70E+02 | 0.00E+00 |
| British Steel plc | 2.2A(d) | AS6977 | Nickel | - | - | - | - | - | - | - | 7.02E+01 |
| Delta Enfield Metals Ltd. | 2.2A(d) | AS5059 | Nickel | - | - | - | - | - | - | - | 0.00E+00 |
| Delta Extruded Metals Company Ltd. | 2.2A(d) | AR0187 | Nickel | - | - | - | - | - | - | 1.00E+00 | - |
| Delta Extruded Metals Company Ltd. | 2.2A(d) | AS5741 | Nickel | - | - | - | - | - | - | 0.00E+00 | - |
| Wednesbury Tube Company Ltd | 2.2A(d) | AS5423 | Nickel | - | - | - | - | - | - | - | 0.00E+00 |
| Delta Encon Ltd. | 2.2A(e) | AG1930 | Nickel | 2.00E+00 | - | 2.00E-01 | - | 1.60E-01 | - | 0.00E+00 | - |
| Denso Marston Ltd. | 2.2A(e) | AT5623 | Nickel | - | - | - | - | - | - | - | 1.00E-01 |
| Denso Marston Ltd. | 2.2A(e) | AT5615 | Nickel | - | - | - | - | - | - | - | - |
| HJ Entoven and Sons | 2.2A(e) | AS7205 | Nickel | - | - | - | - | - | - | - | 6.00E+00 |
| Aldec Ltd | 2.2A(i) | AS6446 | Nickel | - | - | - | - | - | - | 2.20E+01 | 9.60E-01 |

| | | | | | | | | | | | |
|--------------------------------------|---------|--------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Engelhard | 2.2A(i) | AS8074 | Nickel | - | - | - | - | - | - | 0.00E+00 | - |
| Lawson Mardon Star Ltd. | 2.2A(i) | AR8374 | Nickel | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Total emissions from sector 2 | | | | 2.00E+00 | - | 2.00E-01 | - | 8.28E+01 | 3.98E+02 | 3.39E+02 | 1.83E+02 |
| Rugby Group Plc | 3.1A(a) | AH8743 | Nickel | - | - | - | - | - | 4.30E+00 | - | 2.46E+00 |
| Pirelli General Plc | 3.3A(a) | AI4212 | Nickel | - | 0.00E+00 | - | 3.10E-01 | - | 2.22E-01 | - | 3.87E-01 |
| Vitreous Enamels Ltd | 3.5A(a) | AI1256 | Nickel | 0.00E+00 | - | 1.88E+01 | - | 1.99E+01 | - | 1.50E+01 | - |
| Total emissions from sector 3 | | | | 0.00E+00 | 0.00E+00 | 1.88E+01 | 3.10E-01 | 1.99E+01 | 4.52E+00 | 1.50E+01 | 2.84E+00 |
| BP Chemicals Ltd. | 4.1A(b) | AL1385 | Nickel | - | - | - | 0.00E+00 | - | - | - | - |
| Ciba-Geigy plc | 4.2A(c) | AK8511 | Nickel | - | - | - | 2.50E+01 | - | 1.66E+02 | - | 0.00E+00 |
| Haarmann and Reimer (Bayer Plc) | 4.2A(c) | AK2050 | Nickel | - | - | - | 6.00E+01 | - | 8.02E+01 | - | 1.34E+02 |
| Haarmann and Reimer (Bayer Plc) | 4.2A(c) | AK2050 | Nickel | - | - | - | 6.00E+01 | - | 8.02E+01 | - | 1.34E+02 |
| European Vinyls Corporation (UK) Ltd | 4.2A(a) | AP8730 | Nickel | - | - | - | - | - | - | - | 2.74E+01 |
| European Vinyls Corporation (UK) Ltd | 4.2A(a) | AT6298 | Nickel | - | - | - | - | - | - | - | - |
| ICI Chemicals & Polymers Ltd. | 4.2A(b) | AK6039 | Nickel | - | - | - | 0.00E+00 | - | 1.40E+01 | - | - |
| Borden Chemicals UK Ltd. | 4.2A(d) | AJ1252 | Nickel | - | 4.50E-12 | - | 3.50E-02 | - | 3.400E-02 | - | 6.00E-06 |
| Exchem Plc | 4.2A(d) | AH7194 | Nickel | - | 3.80E-02 | - | 5.14E+00 | - | 0.00E+00 | - | 0.00E+00 |
| Merck Sharp and Dohme Ltd. | 4.2A(d) | AK8244 | Nickel | - | - | - | 0.00E+00 | - | 0.00E+00 | - | 1.81E+01 |
| Albright & Wilson UK Ltd. | 4.3A(a) | AL9009 | Nickel | - | - | - | - | - | 4.22E+03 | - | 4.68E+03 |
| Tioxide (europe) Ltd. | 4.3A(c) | AL8282 | Nickel | - | - | - | - | - | 1.60E+03 | - | 9.70E+02 |
| Exchem Plc | 4.3A(f) | AM0201 | Nickel | - | - | - | 5.30E+00 | - | 6.60E+00 | - | 0.00E+00 |
| IMI Titanium Ltd. | 4.3A(f) | AL8355 | Nickel | - | - | - | 2.00E+00 | - | - | - | - |
| Peter Tilling Plastics Ltd. | 4.3A(f) | AL8312 | Nickel Cpds | - | - | - | - | - | - | - | - |
| Rolls Royce Plc | 4.3A(f) | AL7596 | Nickel | - | - | - | 5.11E+01 | - | 3.80E+01 | - | 2.86E+01 |

| | | | | | | | | | | | |
|--|---------|--------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ICI Chemicals & Polymers Ltd. | 4.4A(a) | AL7294 | Nickel | - | - | - | - | - | - | - | 5.64E+01 |
| ICI Chemicals & Polymers Ltd. | 4.4A(b) | AL7456 | Nickel | - | - | - | - | - | 1.80E+01 | - | 7.41E+01 |
| ICI Chemicals & Polymers Ltd. | 4.4A(d) | AL7243 | Nickel | - | - | - | 0.00E+00 | - | 3.23E+01 | - | 3.20E+00 |
| Philips Printed Circuits (UK) Ltd. | 4.4A(e) | AL9521 | Nickel | - | - | - | - | - | 7.30E+00 | - | 2.47E+02 |
| TKR Chemical Machining Co. Ltd. | 4.4A(e) | AL8576 | Nickel | - | - | - | 1.80E-01 | - | 9.50E-01 | - | 0.00E+00 |
| ICI Chemicals & Polymers Ltd. | 4.6A(b) | AL8614 | Nickel | - | - | - | - | - | 6.00E+02 | - | 9.56E+02 |
| Total emissions from sector 4 (excl. 4.5) | | | | - | 3.80E-02 | - | 2.09E+02 | - | 6.86E+03 | - | 7.33E+03 |
| James Kent Ceramic Materials Ltd. | 4.5A(d) | AN1432 | Nickel | - | - | - | - | 2.00E-05 | - | 3.00E-05 | - |
| Phosphor Technology Ltd. | 4.5A(d) | AO1993 | Nickel | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Yuasa Battery (UK) Ltd. | 4.5A(d) | AG9493 | Nickel | - | 4.80E-01 | - | 2.93E+00 | - | 4.42E+00 | - | 2.76E+00 |
| Johnson Matthey Plc (Note 1) | 4.5A(c) | AN8712 | Nickel | - | - | - | - | - | 3.15E+01 | - | 3.13E+01 |
| CBL Ceramics (Note 2) | 4.5A(f) | AO0954 | Nickel Cpds | - | - | - | 6.30E+00 | - | 1.01E+00 | - | 8.40E-01 |
| Gemala Battery Company Ltd. | 4.5A(f) | AO1977 | Nickel Cpds | - | - | - | 2.50E-01 | - | 2.68E-01 | - | 1.14E+00 |
| Gulson Plating Ltd. | 4.5A(f) | AO0865 | Nickel | - | - | - | - | 0.00E+00 | - | 1.26E-01 | - |
| Portsmouth Aviation Ltd | 4.5A(h) | AO1748 | Nickel Cpds | - | - | - | - | - | 0.00E+00 | - | 1.59E+00 |
| Rnay Fleetlands | 4.5A(h) | AV3150 | Nickel | - | - | - | - | - | - | - | 1.59E+00 |
| Rose Bearings Ltd. (Note 3) | 4.5A(h) | AO9706 | Nickel | - | - | - | - | - | 1.37E-01 | - | 6.80E-01 |
| Cookson Matthey Ceramics and Materials Ltd. | 4.5A(i) | AN9018 | Nickel Cpds | - | - | - | - | 0.00E+00 | - | 3.00E-02 | - |
| Fisher Scientific | 4.5A(i) | AO2639 | Nickel | - | - | - | - | 0.00E+00 | 1.40E+01 | 0.00E+00 | 1.12E+00 |
| ICI Chemicals & Polymers Ltd. | 4.5A(i) | AN8437 | Nickel | - | - | - | - | 2.80E+03 | - | 2.10E+03 | - |
| Walterisation (UK) Ltd. | 4.5A(i) | AO1721 | Nickel | - | - | 0.00E+00 | 0.00E+00 | 2.07E-02 | 1.48E-02 | 1.50E-02 | 4.69E-02 |
| Inco Europe Ltd. | 4.5A(k) | AJ2119 | Nickel | 0.00E+00 | - | 6.10E-01 | - | 9.00E-03 | - | 0.00E+00 | - |
| Total emissions from sector 4.5 | | | | 0.00E+00 | 4.80E-01 | 6.10E-01 | 9.48E+00 | 2.80E+03 | 5.13E+01 | 2.10E+03 | 4.10E+01 |

Note 1: 4.28E +03 reported in 1996

Note 2: 2.25E +02 reported in 1996

Note 3: 9.9E -01 reported in 1995; 1.19E +00 in 1996

| Company | Sector | Auth. No. | Chemical | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|-----------------------------------|---------|-----------|----------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Huntingdon Research centre Ltd. | 5.1A(c) | AG8667 | Nickel | 1.109 | - | 0.1872 | - | 2.56E-01 | - | 1.64E-01 | - |
| Rechem International Ltd. | 5.1A(a) | AG7946 | Nickel | - | 1.43E+00 | - | 4.20E+00 | - | 3.60E+00 | - | 3.98E+00 |
| Rechem International Ltd. | 5.1A(a) | AG8047 | Nickel | - | 7.00E+00 | - | 9.97E+00 | - | 1.14E+01 | - | 6.80E+00 |
| Northwick Park Hospital NHS Trust | 5.1A(c) | AG8012 | Nickel Cpds | 2.30E-01 | - | 7.50E-01 | - | 1.30E-01 | - | 0.00E+00 | - |
| RNOH Incinerator Services Ltd. | 5.1A(c) | AM2034 | Nickel Cpds | - | - | 7.10E+00 | - | 4.50E+01 | - | 0.00E+00 | - |
| S Grundon Waste Ltd. | 5.1A(c) | AG8390 | Nickel Cpds | 5.80E-02 | - | 2.00E-01 | - | 2.40E-01 | - | 4.23E+00 | - |
| Chemviron Carbon Ltd. | 5.2A(a) | AG8403 | Nickel | - | 0.00E+00 | - | 1.68E+00 | - | 1.03E+00 | - | 0.00E+00 |
| Solrec Ltd. | 5.2A(a) | AG9248 | Nickel | - | - | - | 1.44E+00 | - | 9.61E+00 | - | 2.23E-01 |
| Total emissions from sector 5 | | | | 1.40E+00 | 8.43E+00 | 8.24E+00 | 1.73E+01 | 4.56E+01 | 2.56E+01 | 4.39E+00 | 1.10E+01 |
| Pfizer Ltd. | 6.9A(a) | AU8083 | Nickel | - | - | - | - | - | - | - | - |
| Total emissions from sector 6 | | | | - | - | - | - | - | - | - | - |

Table D.5 Emissions data for zinc and its compounds to the environment

Information taken from the Chemical Release Inventory, supplied by the Environment Agency

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|------------------------------------|---------|-----------|-------------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Conoco Ltd | 1.1A(a) | AF6863 | Zinc | - | 1.86E+03 | - | 4.47E+03 | - | 6.12E+03 | - | 7.58E+03 |
| British Gas Plc | 1.1A(a) | AF7517 | Zinc | - | 1.00E+01 | - | 3.97E+01 | - | 2.25E+01 | - | - |
| Air Products (GB) Ltd | 1.1A(a) | AW4194 | Zinc | - | - | - | - | - | - | - | - |
| British Gas Plc | 1.1A(b) | AF7533 | Zinc | - | 1.00E-02 | - | 1.50E-02 | - | - | - | - |
| Coal Products Ltd | 1.2A(a) | AF6227 | Zinc | - | 6.14E+01 | - | 4.41E+01 | - | 4.15E+01 | - | 4.50E+01 |
| Sevalco Ltd | 1.2A(a) | AF7916 | Zinc | - | 6.50E+01 | - | 6.64E+01 | - | 6.67E+01 | - | 8.97E+01 |
| BP Chemical Ltd | 1.3A(a) | AA1996 | Zinc | - | - | - | - | - | 1.18E+03 | - | 3.25E+02 |
| Powergen Plc | 1.3A(a) | AA2267 | Zinc | - | 0.00E+00 | - | 1.31E+01 | - | 3.54E+01 | - | 9.61E+00 |
| Powergen Plc | 1.3A(a) | AA3000 | Zinc | - | 3.01E+02 | - | 1.32E+02 | - | 0.00E+00 | - | - |
| National Power Plc | 1.3A(a) | AA3107 | Zinc cpds | - | - | - | - | - | - | - | - |
| National Power Plc | 1.3A(a) | AA3204 | Zinc | - | - | - | - | - | - | - | - |
| HM Naval Base | 1.3A(a) | AJ3077 | Zinc | - | - | - | 2.54E-01 | - | 3.07E-01 | - | 3.00E-01 |
| Avon Tyres Ltd | 1.3A(c) | AG8101 | Zinc | - | 8.10E+00 | - | 6.20E+00 | - | 0.00E+00 | - | 0.00E+00 |
| Lindsey Oil Refinery | 1.4A(a) | AF6928 | Zinc | - | 4.28E+02 | - | 7.26E+01 | - | 1.11E+02 | - | 1.27E+02 |
| Texaco Ltd | 1.4A(a) | AF7894 | Zinc | - | - | - | 7.00E+02 | - | 1.00E+03 | - | - |
| Esso Petroleum Co Ltd | 1.4A(a) | AF8009 | Zinc | - | 1.07E+03 | - | 1.23E+04 | - | 1.29E+03 | - | 2.07E+03 |
| Conoco Ltd | 1.4A(a) | AF8173 | Zinc | - | 2.10E+01 | - | 1.35E+02 | - | 1.14E+02 | - | 1.50E+02 |
| Associated Petroleum Terminals Ltd | 1.4A(a) | AG1794 | Zinc | - | - | - | - | - | - | - | 1.94E+01 |
| Carless Refining & Marketing Ltd | 1.4A(c) | AB2963 | Zinc | - | - | - | 1.12E+01 | - | 2.73E+01 | - | - |
| Total emissions for sector 1 | | | | - | 3.83E+03 | - | 1.80E+04 | - | 1.00E+04 | - | 1.04E+04 |

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--------------------------------------|---------|-----------|----------------------|---------------------|-------|---------------------|-------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Co-Steel Sheerness | 2.1A(a) | AP5986 | Zinc | - | - | - | - | - | 1.10E+00 | - | - |
| British Steel Plc | 2.1A(a) | AR0063 | Zinc | - | - | - | - | - | 1.80E-01 | - | 1.69E+00 |
| British Steel Plc | 2.1A(a) | AR0080 | Zinc | - | - | - | - | - | 7.30E+01 | - | 4.83E+02 |
| Allied Steel and Wire Ltd | 2.1A(a) | AR0322 | zinc | - | - | - | - | 4.20E+02 | 6.00E+00 | 3.15E+02 | 1.35E+00 |
| British Steel Plc | 2.1A(a) | AR0349 | Zinc | - | - | - | - | - | 1.60E+03 | - | 1.73E+03 |
| Forgemasters Steel & Engineering Ltd | 2.1A(f) | AQ5159 | Zinc | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| British Steel Engineering Steels Ltd | 2.1A(f) | AQ9855 | Zinc | - | - | - | - | - | 1.02E+01 | - | 5.00E-01 |
| Alphasteel Ltd | 2.1A(f) | AQ9944 | Zinc | - | - | - | - | 4.00E-01 | 2.51E+00 | 1.02E+03 | 2.67E+00 |
| Weardale Steel (Wolsingham) Ltd | 2.1A(f) | AR0390 | Zinc cpds | - | - | - | - | - | 1.20E+01 | - | 1.20E+01 |
| IMI Refineries Ltd | 2.2A(a) | AL8355 | Zinc | - | - | - | - | - | - | - | - |
| British Nuclear Fuels Plc | 2.2A(a) | AS5601 | Zinc | - | - | - | - | - | - | - | 4.00E+01 |
| IMI Refineries Ltd | 2.2A(a) | AS6632 | Zinc | - | - | - | - | 1.01E+03 | 3.31E+01 | 1.29E+04 | 1.89E+02 |
| Brookside Metal Company Ltd | 2.2A(a) | AS6829 | Zinc | - | - | - | - | - | 1.80E+00 | 2.66E+01 | 2.12E+03 |
| Inco Europe Ltd (Note 1) | 2.2A(a) | AS6888 | Zinc cpds | - | - | - | - | - | - | - | - |
| Thomas Bolton Ltd | 2.2A(a) | AS7213 | Zinc | - | - | - | - | - | - | - | - |
| Britannia Refined Metals Ltd | 2.2A(a) | AS7850 | Zinc cpds | - | - | - | - | - | - | - | - |
| Alenoy Ltd | 2.2A(b) | AS6080 | Zinc | - | - | - | - | - | - | - | 4.19E+00 |
| Inco Alloys Ltd | 2.2A(c) | AS7035 | Zinc | - | - | - | - | - | - | - | 1.38E+02 |
| Delta Enfield Metals Ltd | 2.2A(d) | AS5059 | Zinc | - | - | - | - | - | - | - | - |
| Wednesbury Tube Company Ltd | 2.2A(d) | AS5423 | Zinc | - | - | - | - | - | - | - | - |
| Ever Ready Ltd | 2.2A(d) | AS6101 | Zinc | - | - | - | - | - | - | - | - |
| British Steel Plc | 2.2A(d) | AS6977 | Zinc | - | - | - | - | - | - | - | 2.49E+00 |
| Delta Encon Ltd | 2.2A(e) | AG1930 | Zinc | 2.40E+01 | - | 1.00E+00 | - | 6.30E-01 | - | - | - |
| Billbrime Ltd | 2.2A(e) | AH4853 | Zinc | 0.00E+00 | - | - | - | - | - | - | - |
| Britannia Recycling Ltd | 2.2A(e) | AS6306 | Zinc | - | - | - | - | - | - | - | - |
| HJ Enthoven & Sons | 2.2A(e) | AS7205 | Zinc | - | - | - | - | - | - | - | 4.86E+01 |

| | | | | | | | | | | | |
|--------------------------------------|---------|--------|------|-----------------|---|-----------------|---|-----------------|-----------------|-----------------|-----------------|
| Denso Marston Ltd | 2.2A(e) | AT5615 | Zinc | - | - | - | - | - | - | - | - |
| Denso Marston Ltd | 2.2A(e) | AT5623 | Zinc | - | - | - | - | - | - | - | - |
| Fusion Automatic Inc. | 2.2A(f) | AS8139 | Zinc | - | - | - | - | - | - | - | - |
| Aldec Ltd | 2.2A(i) | AS6446 | Zinc | - | - | - | - | - | - | - | - |
| Total emissions from sector 2 | | | | 2.40E+01 | - | 1.00E+00 | - | 1.43E+03 | 1.74E+03 | 1.43E+04 | 4.78E+03 |

Note 1: 5.06E+04 reported to land in 1996

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--------------------------------------|---------|-----------|-------------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Rugby Group plc | 3.1A(a) | AH8743 | Zinc | - | - | - | - | - | - | - | 5.27E+00 |
| Pirelli General Plc | 3.3A(a) | AI4212 | Zinc | - | 0.00E+00 | - | 1.30E-01 | - | 2.88E-01 | - | 6.64E-01 |
| Total emissions from sector 3 | | | | - | 0.00E+00 | - | - | - | - | - | - |
| ICI Chemicals & Polymers Ltd | 4.1A(a) | AK7833 | Zinc | - | - | - | 1.00E+02 | - | 5.00E+01 | - | 5.50E+01 |
| BP Chemical Ltd | 4.1A(b) | AL1385 | Zinc | - | - | - | 8.25E+02 | - | - | - | - |
| Morgan Matroc Ltd | 4.2A(a) | AO0164 | Zinc | - | - | - | 0.00E+00 | - | 1.03E+01 | - | 6.60E+00 |
| European Vinyls Corporation (UK) Ltd | 4.2A(a) | AP8730 | Zinc | - | - | - | - | - | - | - | 7.19E+01 |
| European Vinyls Corporation (UK) Ltd | 4.2A(a) | AT6298 | Zinc | - | - | - | - | - | - | - | 7.19E+01 |
| ICI Chemicals & Polymers Ltd | 4.2A(b) | AK6039 | Zinc | - | - | - | - | - | 2.50E+01 | - | - |
| BASF Plc | 4.2A(c) | AJ6505 | Zinc | - | - | - | 2.95E+02 | - | 3.32E+02 | - | 1.70E+02 |
| Haarman and Reimer (Bayer Plc) | 4.2A(c) | AK2050 | Zinc | - | - | - | 6.28E+03 | - | 6.52E+03 | - | 7.21E+03 |
| Synpac Pharmaceuticals Ltd | 4.2A(c) | AK5270 | Zinc | - | - | - | 3.99E+02 | - | 4.06E+02 | - | 2.97E+02 |
| Rhone Poulenc Chemicals Ltd | 4.2A(c) | AK7337 | Zinc | - | - | - | - | - | - | - | 6.90E+02 |
| Ciba-Geigy Plc | 4.2A(c) | AK8511 | Zinc | - | - | - | 1.27E+02 | - | 2.98E+02 | - | - |
| Exchem Plc | 4.2A(d) | AH7194 | Zinc | - | 1.20E-02 | - | 7.60E-01 | - | 0.00E+00 | - | - |
| Warner Jmkinson Europe Ltd | 4.2A(d) | AI8919 | Zinc cpds | - | - | - | - | - | - | - | - |
| Borden Chemicals UK Ltd | 4.2A(d) | AJ1252 | Zinc | - | 3.30E-02 | - | 2.00E-01 | - | 3.40E-02 | - | 4.50E-05 |

| | | | | | | | | | | | |
|--|---------|--------|-----------|---|-----------------|---|-----------------|---|-----------------|---|-----------------|
| Mitchanol International Ltd | 4.2A(d) | AK8112 | Zinc | - | - | - | - | - | 9.00E+00 | - | 1.76E+03 |
| Merck Sharp and Dohme Ltd | 4.2A(d) | AK8244 | Zinc | - | - | - | 5.61E+01 | - | 1.10E+02 | - | 2.39E+01 |
| Sandoz Chemicals (UK) Ltd | 4.2A(d) | AK8368 | Zinc | - | - | - | 5.90E+00 | - | - | - | - |
| WS Simpson & Co Ltd | 4.2A(d) | AL2128 | Zinc | - | - | - | 1.75E+03 | - | 1.35E+03 | - | - |
| Zeneca Ltd | 4.2A(d) | AL6794 | Zinc | - | - | - | 3.80E+02 | - | 3.75E+02 | - | 7.32E+02 |
| Yorkshire Chemicals Plc | 4.2A(d) | AM3006 | Zinc | - | - | - | 5.00E+01 | - | 9.70E+01 | - | - |
| ICI Plc | 4.2A(i) | AM7265 | Zinc | - | - | - | 2.37E+02 | - | 4.19E+02 | - | 6.90E+02 |
| Lever Industrial Ltd | 4.2A(j) | AK6764 | Zinc cpds | - | - | - | 2.85E+00 | - | 4.66E+00 | - | 2.03E+00 |
| Albright & Wilson UK Ltd | 4.3A(a) | AL9009 | Zinc | - | - | - | - | - | 4.47E+04 | - | 4.75E+04 |
| Tioxide Europe Ltd | 4.3A(c) | AL8282 | Zinc | - | - | - | 3.72E+04 | - | 2.41E+04 | - | 1.20E+04 |
| Exchem Plc | 4.3A(f) | AM0201 | Zinc | - | - | - | 1.92E+01 | - | 3.01E+01 | - | - |
| Ryvan Chemicals Co Ltd | 4.4A(a) | AM1178 | Zinc | - | - | - | 1.20E+02 | - | 1.20E+02 | - | 1.20E+02 |
| ICI Chemicals & Polymers Ltd | 4.4A(b) | AL7456 | Zinc | - | - | - | - | - | - | - | 1.75E+02 |
| Monsanto Plc | 4.4A(b) | AN6787 | Zinc | - | - | - | 0.00E+00 | - | 2.73E+02 | - | 2.65E+02 |
| Monsanto Plc | 4.4A(c) | AL7618 | Zinc | - | - | - | - | - | 2.58E+02 | - | 6.94E+01 |
| ICI Chemicals & Polymers Ltd | 4.4A(d) | AL7243 | Zinc | - | - | - | - | - | 8.75E+01 | - | 4.80E+00 |
| TKR Chemical Machining Co Ltd | 4.4A(e) | AL8576 | Zinc | - | - | - | - | - | 7.50E-01 | - | - |
| ICI Chemicals & Polymers Ltd | 4.6A(b) | AL8614 | Zinc | - | - | - | - | - | 5.50E+02 | - | 6.64E+02 |
| Total emissions from sector 4 (excl. 4.5) | | | | - | 4.50E-02 | - | 4.78E+04 | - | 8.01E+04 | - | 7.25E+04 |

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|-------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| ICI plc | 4.5A(b) | AO2175 | Zinc | - | - | - | 1.36E+01 | - | 6.10E+01 | - | 7.00E+01 |
| Courtaulds Fibres Ltd | 4.5A(c) | AN7970 | Zinc | - | - | - | - | - | 3.38E+05 | - | 2.15E+05 |
| Anxon Ltd | 4.5A(d) | AO0962 | Zinc | - | - | - | 3.54E-01 | - | 3.40E+00 | - | 2.60E+00 |
| James Kent (Ceramic Materials) Ltd | 4.5A(d) | AN1432 | Zinc | - | - | - | - | - | 0.00E+00 | - | 7.00E-05 |
| Johnson Matthey plc | 4.5A(d) | AN6248 | Zinc | - | - | - | - | 1.10E+00 | - | 0.00E+00 | - |
| Phosphor Technology Ltd | 4.5A(d) | AO1993 | Zinc | - | - | - | - | - | 0.00E+00 | - | - |
| Yuasa Battery (UK) Ltd | 4.5A(d) | AG9493 | Zinc | - | 2.51E+00 | - | 1.14E+01 | - | 1.10E+01 | - | 9.27E+00 |
| Johnson Matthey plc (Note 1) | 4.5A(e) | AN8712 | Zinc | - | - | - | - | - | 4.08E+01 | - | 1.17E+01 |
| CBL Ceramics Ltd | 4.5A(f) | AO0954 | Zinc cpds | - | - | 2.50E+00 | - | 2.66E-01 | - | 3.90E-01 | - |
| Gemala Battery Company Ltd | 4.5A(f) | AO1977 | Zinc cpds | - | - | - | 2.00E+00 | - | 3.83E-01 | - | 3.02E+00 |
| Cookson Matthey Ceramics and Materials Ltd | 4.5A(h) | AO1608 | Zinc | - | - | - | - | - | 0.00E+00 | - | - |
| Hunting Aviation A.E.D | 4.5A(h) | AO5336 | Zinc | - | - | - | - | - | 0.00E+00 | - | 0.00E+00 |
| Ingram and Glass Ltd | 4.5A(h) | AO8017 | Zinc | - | - | - | - | - | 4.90E+00 | - | 4.35E-01 |
| RNAY Fleetlands | 4.5A(h) | AV3150 | Zinc | - | - | - | - | - | - | - | 4.40E-01 |
| Rose Bearings Ltd (Note 2) | 4.5A(h) | AO9706 | Zinc | - | - | - | - | - | 7.53E-01 | - | 3.00E-01 |
| Aquapersions Ltd | 4.5A(i) | AO0245 | Zinc | - | - | - | - | - | 1.82E+03 | - | 1.73E+03 |
| Brittania Alloys and Chemicals Ltd | 4.5A(i) | AO1594 | Zinc | - | - | - | - | 5.59E+03 | 6.80E+01 | 1.40E+04 | 3.20E+00 |
| Fisher Scientific | 4.5A(i) | AO2639 | Zinc | - | - | - | - | 1.87E+01 | - | - | - |
| Harcros Chemicals UK Ltd | 4.5A(i) | AO2671 | Zinc | - | - | - | 1.02E+03 | - | 1.190E+03 | - | 9.77E+02 |
| Walterisation (UK) Ltd | 4.5A(i) | AO1721 | Zinc | - | - | 0.00E+00 | 0.00E+00 | 1.46E-01 | 1.62E+00 | 1.44E-01 | 1.69E+00 |
| Brittania Alloys and Chemicals Ltd | 4.5A(i) | AO1586 | Zinc cpds | - | - | 0.00E+00 | - | 2.24E+03 | - | 1.45E+03 | - |
| Cuprinol Ltd (Note 3) | 4.5A(i) | AO1012 | Zinc cpds | - | - | - | - | 0.00E+00 | - | - | - |
| Union Miniere Oxyde UK Ltd | 4.5A(i) | AN8496 | Zinc cpds | - | - | 9.35E+02 | - | 1.14E+02 | - | 1.75E+02 | - |
| Chemviron Carbon Ltd | 4.5A(m) | AF6936 | Zinc cpds | 4.00E-03 | - | 0.00E+00 | - | - | - | - | - |
| | | | | 4.00E-03 | 2.51E+00 | 9.38E+02 | 1.05E+03 | 7.96E+03 | 3.42E+05 | 1.56E+04 | 2.17E+05 |

Note 1:- 6.42E +02 reported to land in 1995; 9.45E +02 in 1996

Note 2:- 1.27E +01 reported to land in 1995; 2.60E +00 in 1996

Note 3:- 4.10E -03 reported to land in 1995

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--|---------|-----------|----------------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Rechem International Ltd | 5.1A(a) | AG7946 | Zinc | - | 8.91E+01 | - | 6.63E+01 | - | 7.50E+01 | - | 2.80E+01 |
| Rechem International Ltd | 5.1A(a) | AG8047 | Zinc | - | 5.00E+00 | - | 1.52E+01 | - | 1.70E+01 | - | 1.00E+01 |
| Defence Test & Evaluation Organisation | 5.1A(b) | AL9530 | Zinc | - | - | 0.00E+00 | - | 1.83E+01 | - | - | - |
| Northwick Park Hospital Trust | 5.1A(c) | AG8012 | Zinc cpds | 5.16E+01 | - | 1.30E+02 | - | - | - | - | - |
| S Grndon (Waste) Ltd | 5.1A(c) | AG8390 | Zinc cpds | 2.46E+02 | - | 3.31E+02 | - | 8.90E+02 | - | 6.86E+02 | - |
| RNOH Incinerator Services Ltd | 5.1A(c) | AM2034 | Zinc cpds | - | - | 0.00E+00 | - | 1.63E+02 | - | - | - |
| Chemviron Carbon Ltd | 5.2A(a) | AG8403 | Zinc cpds | - | 0.00E+00 | - | 4.70E+00 | - | 4.69E+00 | - | - |
| Solrec Ltd | 5.2A(a) | AG9248 | Zinc | - | - | - | 8.40E+00 | - | 1.05E+01 | - | 1.62E+01 |
| Total emissions from sector 5 | | | | 2.97E+02 | 9.41E+01 | 4.61E+02 | 9.46E+01 | 1.07E+03 | 1.07E+02 | 6.86E+02 | 5.42E+01 |
| HM Naval Base | 6.5A(a) | AU8059 | Zinc | - | - | - | - | - | - | - | - |
| Pfizer Ltd | 6.9A(a) | AU8083 | Zinc | - | - | - | - | - | - | - | - |
| Total emissions from sector 6 | | | | - | - | - | - | - | - | - | - |

E. METAL CARBONYL

E.1 Summary details of companies registered 4.5 A (j, k)

E.1.1 Manufacture - 4.5 A (j)

NONE - No manufacture of metal carbonyl in UK

E.1.2 Use - 4.5 A (k)

AJ2119 INCO EUROPE LTD

(For further information see Cremer & Warner, 1993).

Pilot plant to evaluate the manufacture of nickel coated carbon fibre. Nickel carbonyl, hydrogen sulphide, carbon monoxide and carbon fibre are heated to produce thermal decomposition of the nickel carbonyl, which causes nickel to be deposited onto the carbon fibre.

Release to air - nickel, nitrogen oxides (as NO₂).

F. AMMONIA

F.1 Summary details of companies registered under 4.5 A (l, m)

F.1.1 Manufacture / recovery - 4.5 A (l)

AN8321 ICI CHEMICALS & POLYMERS

Processing of steam, air and natural gas or propane in the presence of catalyst to produce a gaseous mixture of hydrogen and nitrogen which is then purified and used to catalytically synthesise ammonia. The ammonia product is then condensed in a refrigeration loop to produce liquid ammonia product. Abatement of intermittent releases is by incineration in flare stacks.

(For further information see Chem Systems Ltd, 1994)

Releases to air - ammonia, methanol, nitrogen oxides.

Releases to water - ammonia, mercury, NP-TOC.

AH9561 BRITISH AEROSPACE PLC

Releases to water - cadmium compounds, cyanides.

F.1.2 Use / release - 4.5 A (m)

AF6936 CHEMVIRON CARBON

Manufacture of activated carbon & regeneration. Use of metal salts and ammoniacal solution.

Releases to air - ammonia, chromium compounds, copper compounds, ethylamine, molybdenum, nitrogen oxides, particulates, silver compounds, zinc compounds.

Releases to land - ammonium sulphate, NP-solids.

Abatement equipment - pulse jet dust collector, sulphuric acid, packed tower, scrubber, dust bags.

AN8186 ROQUETTE (CORBY) LTD

Batch production of caramel colours for the food industry - (starch hydrolysate is heated in the presence of ammonia).

Release to air - sulphur dioxide, NO_x, Carbon monoxide and VOC's.

Releases to water - cadmium, mercury.

Abatement equipment - caustic scrubber (caustic contains mercury).

AN8585 INORGTECH

Envelope authorisation for the small scale manufacture of specialised fine inorganic chemicals.

The plant is a batch, multipurpose and flexible facility, able to carry out development and small scale production. Raw materials used are organic solvents inorganic salts, dimethylamine, metals and their oxides, ammonia.

Releases to air - ammonia, dimethylamine, hydrogen bromide, hydrogen chloride, VOCs

Abatement equipment - condensers, scrubbing systems.

AO1195 RHONE-POULENC AGRICULTURE LTD

Manufacture of CEBA.

Releases to air - ammonia, propionitrile, VOCs class B.

Releases to land - NP-aqueous residues, NP-solids.

Abatement equipment - air absorption system to reduce ammonia emissions, DCE dust units.

AO1217 RHONE-POULENC AGRICULTURE LTD

Manufacture of sodamide using sodium and ammonia.

(For further information see *Chem Systems Ltd, 1994*).

Releases to air - ammonia.

Releases to land - NP-oil & oil/solid mixtures.

Abatement equipment - water absorption columns to reduce ammonia emissions.

AP0674 DALAU LTD

Manufacture of chemically etched polyfluoroethylene (PTFE)

Use of sodium metal and anhydrous liquid ammonia.

Emissions to air of ammonia abated by packed bed water scrubber.

Releases to air - ammonia.. Releases to water - ammonia.

AN2366 MICRO IMAGE TECHNOLOGY LTD

Manufacture of ammonia solution and ammonium fluoride by bubbling gaseous ammonia through water or dilute hydrofluoric acid, respectively.

Releases to air - ammonia, fluorides. Abatement equipment - scrubber.

AN5349 FERRO (GB) LTD

Manufacture of inorganic pigments and decoration colours by mixing of raw materials, calcining (pigments only), milling, drying (pigments only), sieving and bagging. Releases to air occur from the three furnaces, via 3m tall stacks and from local exhaust vents serving the mechanical operations. Any washings are sent to the effluent treatment plant which then discharges to sewer.

Releases to air - antimony, cadmium, lead and particulates.

Releases to water - cadmium.

AA9229 GREAT LAKES CHEMICALS EUROPE LTD

Batch production of ammonium bromide by the reaction between hydrogen bromide solution (48%) and ammonia solution (35%). The ammonia solution is added to a vessel containing the hydrogen bromide, below the liquid level to minimise the possibility of an ammonia release to atmosphere. Ammonia solution is added until all the hydrogen bromide has been converted to ammonium bromide, and then urea or ammonium phosphate additives may be added along with a filter aid. The product is then circulated through an in-line cartridge filter to remove unwanted solids. The final product is then run off to drums for sale. Any hydrogen bromide / ammonia released from the process passes to two packed towers in series. The first absorber is sodium hydroxide irrigated whilst the second is irrigated with hydrobromic acid solution. Any aqueous wastes are pH adjusted before release to sewer. Solid waste is disposed of via a contractor.

(For further information see *Chem Systems Ltd, 1994*)

Releases to air - ammonia, hydrogen bromide.

AG2766 TIOXIDE SPECIALITIES LTD

Manufacture of tetra isopropyl titanate (TITP) by a process whereby titanium tetrachloride is reacted with isopropyl alcohol (IPA) in a batch reactor to produce the intermediate, dichloro diisopropyl titanate and hydrogen chloride. Anhydrous ammonia is then added to neutralise the hydrogen chloride and to produce the required final product and ammonium chloride as by-product. All gaseous effluent passes to the abatement plant where most of the volatile material is condensed and returned to a holding tank.

AH2389 ZENECA LTD

Operation of a number of fermentation processes which produce products for the Zeneca Life Science Molecules and Quorn businesses. Quorn and poly-unsaturated fatty acids are produced by the monoseptic, aerobic fermentation processes. Ammonia is used as a reagent in these processes.

Releases to air - VOCs.

Releases to water - NP-BOD, NP-suspended solids.

AN6272 HICKSON & WELCH LTD

Manufacture of approximately 200 tonne p.a. of two substituted pyridine compounds used as intermediates in herbicide production. Scrubbers using a variety of circulating liquors are employed to abate gaseous emissions. All aqueous effluent is discharged to the site effluent treatment plant (AK7965), and all solid waste is disposed of off-site.

Variation AZ0497 - this variation is to incorporate improved abatement equipment into the authorisation. Certain vessels now vent via a common vent header to a vent header into a brine cooled vent condenser followed by a seal pot and carbon bed adsorbers before discharge to atmosphere. Chlorine slip will be treated as in the original authorisation, with an alkaline scrubber but now it exhaust through carbon beds adsorbers before release to atmosphere.

Releases to air - amines, chlorine, hydrogen chloride, sulphur dioxide, VOCs.

AN7961 ZENECA LTD

Releases to air - ammonia, VOCs class A, VOCs class B.

Releases to water - mercury.

AO0237 HAMPSHIRE CHEMICAL LTD

Envelope authorisation covering the batch manufacture of a range of organic speciality chemicals, chelating agents and metal cyanides used in the pharmaceutical and agrochemical industries. Ammonia is produced as a by-product. During the reaction the ammonia is continuously distilled from the batch and recovered and either recycled or sold. The majority of reactors on the Chelate Plant vent to a scrubbing system which comprises of three packed columns. The primary scrubber is circulated with dilute ammonia whilst the other two are fed with water. The reactor on the Sodium Cyanide Plant vents to a sodium hydroxide scrubber. (*For further information see WS Atkins Consultants Ltd, 1994*)

Releases to air - ammonia, hydrogen cyanide, formaldehyde, VOCs classes A&B.

Releases to water - cyanides, nitrogen compounds, NP-COD.

AO0695 TIOXIDE SPECIALITIES LTD

Envelope authorisation covering the reaction of metal chlorides with aliphatic alcohols, producing the required metal alkoxide. Gaseous ammonia is used in the process which reacts with the hydrogen chloride produced as by-product from the reaction. Consequentially ammonium chloride is formed which can be sold within the galvanising and fertilizer industries. Abatement equipment used to minimise gaseous releases to air include water circulation scrubbers, water cooled and refrigerated condensers. All liquid effluent is routed through an effluent pit prior to discharge. All wastes which are not able to be recycled, sold or sent to the effluent pit are disposed of via off-site incineration, landfill or an off-site licensed treatment plant, depending on their composition.

Releases to air - ammonia, heptanes, propan-2-ol, VOCs.

Releases to water - cadmium, mercury.

AO1284 BROTHERTON SPECIALITY PRODUCTS LTD

Production of a range of products involving the use of ammonia. Products include, ammonium hydroxide, ammonium carbonate, ammonium bicarbonate, ammonium salts of carboxylic acids, ammonium oxalate, ferrous ammonium sulphate and copper ammonium carbonate. Anhydrous ammonia is the principle raw material which is delivered onto site by road tanker, stored and then mixed with demineralised water to produce an ammonia solution, as required. Abatement equipment employed includes water or ammonia solution scrubbers, which are used to abate gaseous ammonia and carbon dioxide. The spent scrubbing liquors (ammonium hydroxide/carbonate) can be recycled to the process.

Releases to air - ammonia.

AO1314 EXWOLD TECHNOLOGY LTD

Manufacture of alkali metal and ammonium glyphosates for use as herbicides. In the manufacture of sodium glyphosates accurate quantities of the raw materials are dosed to a mixer, where a neutralisation reaction occurs, producing a paste like product and gaseous ammonia as a by-product. The ammonia is abated using a packed column circulating an acidic solution. The paste in the mixer is then transferred to a paste extruder from where the extrudate is dried in a fluidised bed, from where air and water are exhausted via a cyclone and venturi scrubber. The dried product is then packaged for sale. Solid process waste, packaging materials and liquid effluent are disposed of by incineration off-site.

Variation BA3543 covers the installation of a bag filter, in series with and between the existing dry cyclone and water venturi scrubber. This maximises recycle of recovered material from the bag filter and also minimises the amount of scrubbing water used.

Releases to air - amines, ammonia, particulates.

AO1365 CHIREX LTD

Multi-purpose - use/release of ammonia. Envelope authorisation. Use scrubbers, water cooled and chilled condensers and carbon adsorption.

Releases to air - ammonia, bromine, carbon monoxide, chlorine, fluorine, hydrogen bromide, hydrogen chloride, hydrogen fluoride, hydrogen iodide, hydrogen sulphide, iodine, nitrogen oxides, organic sulphides & mercaptan, particulates, phosphorus trichloride, sulphur oxides, VOCs class A, VOCs class B.

Releases to land - NP-solids.

AP1590 ALCHEMA LTD

Releases to air - ammonia, particulates.

Releases to water - ammonia, cadmium, copper, mercury.

AI3755 CRODA KERR LTD

Manufacture of potassium salt complex, potassium allophonate for blending with additives to form a fire extinguishing product. The reaction produces ammonia as a by-product. Effluent gases are scrubbed with sulphuric acid. The process comprises of charging raw materials to an electrically heated reactor, and blending under reduced pressure, discharging the reaction mix for further ingredient addition, mixing, blending and screening before product packaging. All solids handling equipment is vented via bag filters.

Releases to air - ammonia.

AN3419 HERCULES LTD

Production of cationic resins from reaction between formaldehyde, dicyanamide and ammonium chloride. Emissions to air are abated using a low energy venturi scrubber unit with a recirculating pump. Dust abatement is via LEV systems and aqueous effluents are routed to the site settling ponds where the effluent is pH adjusted causing metals compounds to precipitate. The precipitate is then allowed to settle.

Small release of ammonia from scrubbing system.

Releases to air - ammonia, formaldehyde.

AN8429 CERESTAR UK LTD

Use of ammonia to produce caramel food colours. Sulphur dioxide, ammonia, carbon dioxide and soluble organic compounds in the gaseous process effluent are abated using a water scrubber. The ammonia storage facility has a dedicated scrubbing unit. Spent scrubber solutions from both units are routed to the effluent treatment plant where the pH is adjusted by lime neutralisation prior to discharge to sewer.

Releases to air - ammonia, sulphur oxides, VOCs.

AN8569 CRODA COLLOIDS LTD

Manufacture of sodium heptonate from glucose and sodium cyanide. Ammonia is released and removed in a sulphuric acid irrigated scrubber. Careful control of the pH is required in the reaction to eliminate the possible generation of hydrogen cyanide. Product from drier is concentrated by evaporation, crystallised, centrifuged and ring dried. Gases exit the drier containing particulates, which are removed in a cyclone and bag filter.

Releases to air - ammonia.

Releases to water - nitrogen compounds, NP-suspended solids.

AN9930 ZENECA

Manufacture of calcium carbonate from calcium hydroxide and carbon dioxide by a process which uses ammonia.

Releases to air - particulates and ammonia.. Releases to water - ammoniacal nitrogen.

Abatement equipment - mop scrubbers and bag filters.

AO0229 CRODA KERR LTD

Manufacture of fire fighting foams based on hydrolysed animal protein. The process comprises of three stages; hydrolysis of animal protein, acid neutralisation with sulphuric acid, producing hydrogen sulphide as a by-product and final product formulation.

The animal protein is hydrated with lime in an autoclave at 2 bar and 130°C, producing ammonia and calcium sulphate. The ammonia remains in solution as ammonium hydroxide, but during acid neutralisation ammonium sulphate is formed. All gaseous emissions from this stage are vented to a scrubbing system consisting of a venturi tower and a packed tower in series, circulating caustic soda solution to abate hydrogen sulphide emissions. During stages two and three gaseous ammonia is formed which is abated by passing the gaseous stream through a sulphuric acid scrubber. A second packed tower, circulating caustic soda, is then used to remove traces of acid mist carried over from the previous scrubber. The spent scrubber solution (ammonium sulphate solution) from the acid scrubber is used for agricultural purposes or sent to waste water treatment. After the acid neutralisation stage solids (calcium sulphate and animal residues) are removed by filtration. The filtrate (raw foam product) is concentration corrected by the addition of water or evaporation, and then dosed with additives, typically glycols and surfactants.

Releases to air - ammonia, hydrogen sulphide.

Releases to water - sodium salt solutions from caustic scrubber

Releases to land - filter cake to landfill.

AO0385 BRUNNER MOND (UK) LTD

Soda Ash manufacture. Integrated Ammonia-soda process. Reaction between limestone (Calcium carbonate) and brine to give sodium carbonate and calcium chloride solution. Ammonia is dissolved in the brine to aid the process. Large usage/release of ammonia to air and water.

(For further information see Chem Systems Ltd, 1994)

Releases to air - ammonia, carbon monoxide, hydrogen sulphide, particulates.

Releases to water - ammonia, cresol (all isomers), phenol, sodium chloride.

AO0440 ZENECA LTD

Paraquat manufacture. Aqueous ammonia scrubber is used to remove ammonia and pyridine from gaseous effluent.

Releases to air - ammonia, nitrogen oxides.

AO1268 JOSEPH CROSFIELD & SONS LTD

Production of a range of nickel catalysts supported on alumina. An aqueous nickel solution is prepared by mixing ammonia solution, nickel and an ammonium salt. Use water irrigated scrubber and bag filter for solids handling. Aqueous streams that could contain nickel are collected and treated in a dedicated system. After settling trace nickel solid is removed in a sand filter. Ion exchange to remove dissolved nickel in aqueous phase. Regenerate ion exchange by sulphuric acid then precipitate out nickel using sodium hydroxide. Recycle nickel from filter press.

(For further information see Cremer & Warner, 1993).

Releases to air - ammonia, particulates.

Releases to land - NP-solids.

AO1276 CROSFIELD LIMITED

Manufacture of Y-zeolite and silica gels. Ammonia is used in an ion exchange stage within the process to produce these materials.

Releases to air - ammonia, particulates.

Releases to water - ammonia, NP-COD, NP-suspended solids.

Releases to land - NP-solids.

Abatement equipment - dust and bag filters.

AO1373 CONTRACT CHEMICALS (WARRINGTON) LTD

Batch production of a range of chemicals involving use or release of ammonia (trichloroacetamide, methane sulphonamide, guanazole, aminopropane-diol, 1-3 diaminopropan-2-ol). Ammonia is scrubbed in packed tower with dilute sulphuric acid media.

Releases to air - ammonia, VOCs.

Releases to land - NP-aqueous residues, NP-solids.

AO1420 GLAXO OPERATIONS UK LTD

Bulk manufacture of griseofulvin antibiotic. Use of ammonia in the fermentation stage releases carbon dioxide. Dust extraction units are employed with fabric filters. A water scrubber is also used to remove particulates.

Releases to air - acetone, carbon dioxide, heptanes, methanol.

AO1519 ALBRIGHT & WILSON (UK) LTD

Manufacture of ammonium phosphates. Ammonia is reacted with phosphoric acid, producing an ammonium phosphate slurry and ammonia and water vapour emissions. Ammonia vapour is abated using a phosphoric acid scrubbing system. The resulting ammonium phosphate spent scrubber solution is used as scrubbing media for the dust scrubbers which abate the fine particulates evolved when the ammonium phosphate slurry is dried.

Releases to air - ammonia.

AO1527 ALBRIGHT & WILSON (UK) LTD

Manufacture of ammonium polyphosphates from polyphosphoric acid, monoammonium phosphate, urea and zinc oxide. Emissions of urea and ammonia are abated by a two stage scrubber system consisting of a venturi scrubber using water, which removes urea particles and some ammonia, and secondly a packed column using phosphoric acid to remove the remaining ammonia. Bag filters are also used on bagging areas.

Releases to air - ammonia.

AP6575 CONTRACT CHEMICALS (WARRINGTON) LTD

Production of sodium and potassium cyanates. Reaction of powdered urea with appropriate carbonate to give the cyanate. Ammonia and carbon dioxide released to scrubbing system. Co-current spray condenser and packed column with sulphuric acid scrubbing media. Spent scrubber liquor of 25% ammonium sulphate produced.

Releases to air - particulates.

Releases to land - NP-aqueous residues, NP-solids.

AQ2664 RENTOKIL LTD

Pilot plant and development processes to produce ammoniacal copper boron wood preservatives using various methods. Raw materials include ammonia, copper sulphate and boric acid.

Releases to air - ammonia, arsenic and its compounds, VOCs, VOCs class B.

Abatement equipment - Sulphuric acid packed tower on reactor to capture unreacted ammonia.

AV7520 SUTCLIFFE SPEAKMAN CARBONS LTD

Production of activated carbon products for use in pharmaceuticals and personnel respirator equipment. Activated carbon raw material is treated with solutions of chemicals some of which are dissolved in aqueous ammonia. The treated carbon is subsequently dried which causes ammonia and particulates to be evolved. Dust abatement systems are fitted on carbon handling operations using bag filters and HEPA filters. Gaseous emissions are abated using a sulphuric acid scrubber (pH controlled between 4 and 5). The spent scrubber liquors (ammonium sulphate solution) is sent for licensed waste disposal.

Releases to air - ammonia, particulates.

AO8904 QUISTWENS LTD

Production of iodine related chemical compounds and ferric ammonium citrate. Acidified iron citrate solution and ammonia solution is mixed and concentrated by heating. Off-gases to water scrubber which is then recycled to next batch.

No CRI release data.

AH5817 JOHNSON MATTHEY PLC

Coating of catalyst blocks used in automotive exhaust systems. An impregnated solution containing oxalic acid and ammonium metavanadate is applied to the blocks which are ceramic with a coating of alumina and platinum in a batch operation. During drying stages ammonia and carbon monoxide are released and removed in a catalytic convertor stage to nitrogen, carbon dioxide and water.

Releases to air - ammonia, carbon monoxide, nitrogen oxides.

Releases to land - NP-oil & oil/solid mixtures, NP-solids.

AN5055 ENGELHARD CLAL UK LTD

Production of annealed metal alloy wire. Ammonia is catalytically cracked to give nitrogen and hydrogen in stoichiometric ratio which is fed to annealing furnaces where it provides the required non-carbonising reduced conditions.

Releases to air - ammonia.

Releases to land - ammonium chloride.

AO0580 MULTICORE SOLDERS LTD

Production of flux products used in soldering of a range of ferrous and non-ferrous alloys. Release of ammonia from reaction where ammonia is liberated by heating an amine with an ammonium salt. Batch process. Packed scrubber on vent is water irrigated.

No CRI data.

AO9714 FLUOROCARBON COMPANY LTD.

Etching of polyfluoroethylene (PTFE) using sodium in liquid ammonia. Ammonia released and removed in packed tower to give ammonia solution. Bath of sodium/ammonia in which PTFE items are immersed and then transferred to water quenching bath before washing in open water bath. Unreacted sodium converted to sodium hydroxide by water.

No CRI data.

F.2 Summary

Within section 4.5, 25 of the total 46 release authorisations are granted under section 'm' processes (see Figure F.1) which involve the use or release of ammonia. The range of processes registered under this section is varied including metal finishers, inorganic chemicals, pigments and colours, soda ash, zeolites/catalysts, foodstuffs and PTFE etching. Only one process is authorised under sub-section 'l', the manufacture and recovery of ammonia.

F.2.1 Emissions to air

The five major reported releases of ammonia registered under section 4.5 are as follows:-

| | |
|---|-------------|
| ICI Chemicals (ammonia manufacture) | 4.2E+05 kg* |
| Crosfield (zeolite manufacture) | 1.7E+05 kg* |
| British Chrome and Chemicals (production of chromic oxides) | 1.4E+05 kg* |
| Joseph Crosfield (catalyst manufacture) | 9.0E+04 kg* |
| Brunner Mond (soda ash manufacture) | 8.9E+04 kg* |

* air emissions 1996.

Other authorised emissions to air include particulates, VOCs, methanol and acetone.

F.2.2 Discharges to water

In terms of discharges > 1000 kg per annum the following have been reported:-

| | |
|---------------|--|
| Brunner Mond | ammonia, cresol, phenol, sodium chloride |
| Crosfield Ltd | ammonia, suspended solids |
| Dalau Ltd | ammonia |

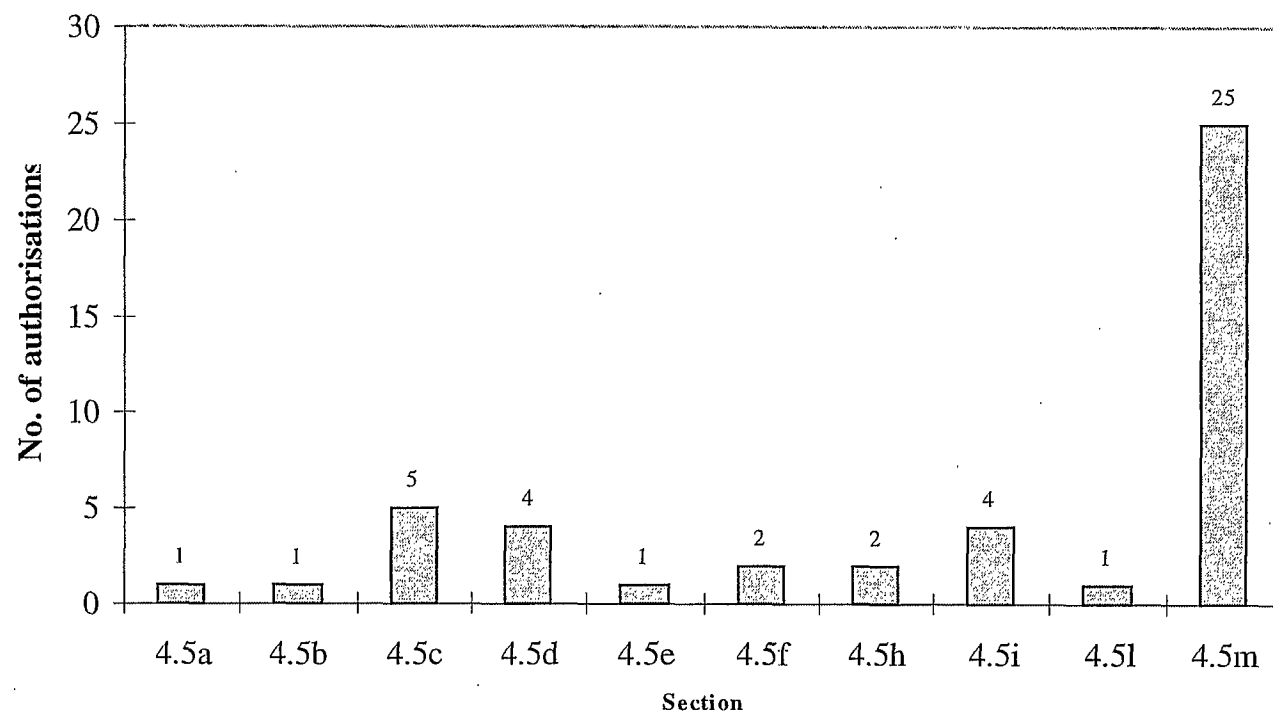
F.2.3 Discharges to land

In terms of discharges > 1000 kg per annum the following have been reported:-

| | |
|------------------|-------------------|
| Chemviron Carbon | ammonium sulphate |
| Croda Kerr Ltd | solids |
| Crosfield Ltd | solids |
| Rhone Poulenc | solids |
| Agriculture Ltd | |

F.3 Details of reported emissions of ammonia

| | |
|------------|---|
| Figure F.1 | Authorisations for ammonia releases (sector 4.5) |
| Figure F.2 | Ammonia release authorisations (all sectors) |
| Figure F.3 | Ammonia emissions to air from acid / inorganic / fertilizer processes |
| Table F.1 | Emissions data for ammonia |



a - manufacture of hydrogen cyanide
or hydrogen sulphide
d - production of antimony, arsenic, etc.
h - use of cadmium or mercury
m - use or release of ammonia

b - use of hydrogen cyanide
or hydrogen sulphide
e - recovery of any metal listed in d
i - production of Cr/Mg/Mn/Ni/Zn

c - release of hydrogen cyanide
or hydrogen sulphide
f - use of any metal listed in d
l - manufacture or recovery of ammonia

Figure F.1

Authorisations for ammonia releases (Sector 4.5)

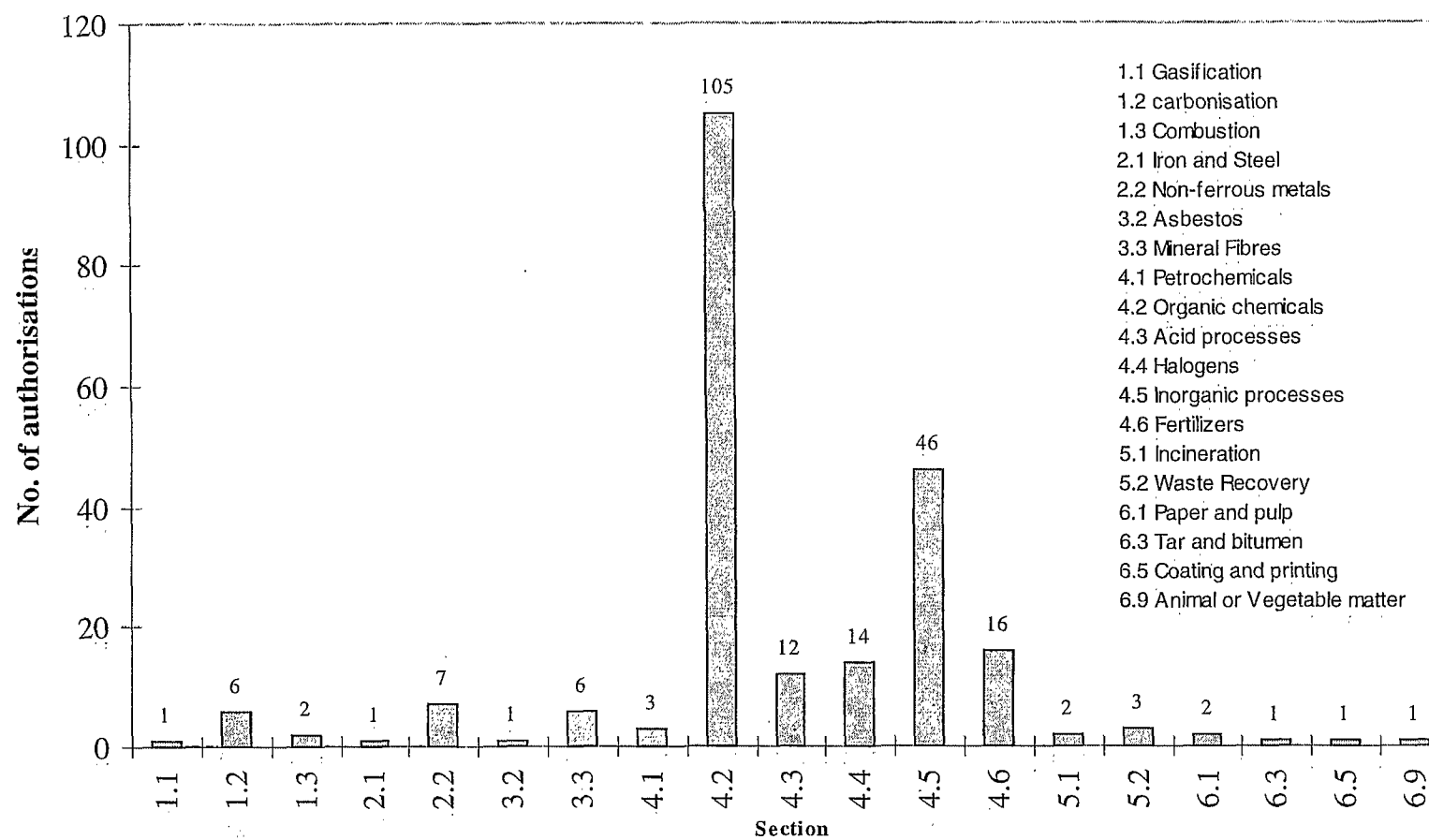


Figure F.2 Ammonia release authorisations (all sectors)

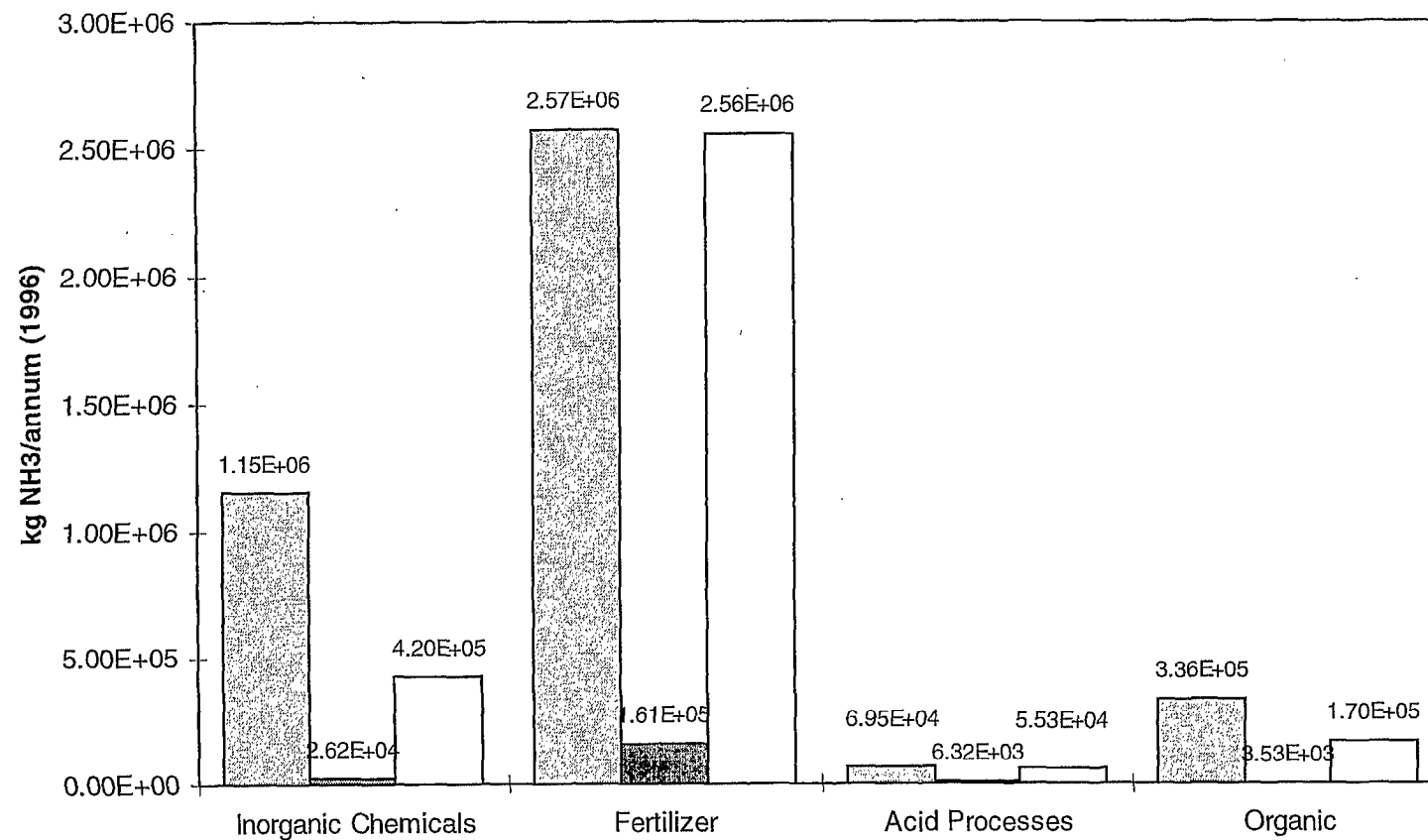


Figure F.3 Ammonia emissions to air from acid / inorganic / fertilizer processes

Table F.1 Emissions data for ammonia to the environment

Information taken from the Chemical Release Inventory, provided by the Environment Agency

| Company | Sector | Auth. No. | Emissions 1993(kg) | | Emissions 1994(kg) | | Emissions 1995(kg) | | Emissions 1996(kg) | |
|-------------------------------|---------|-----------|--------------------|-------|--------------------|-------|--------------------|----------|--------------------|----------|
| | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Brunner Mond and Co | 4.5A(a) | AO0393 | - | - | - | - | 0.00E+00 | 0.00E+00 | 5.10E+04 | 8.06E+05 |
| ICI plc | 4.5A(b) | AO2175 | - | - | 2.20E+01 | - | 1.44E+04 | - | 1.60E+04 | - |
| Degussa Ltd | 4.5A(c) | AO1292 | - | - | - | - | 9.78E+03 | 9.36E+04 | 7.38E+03 | 1.70E+05 |
| Cyanamid | 4.5A(c) | AO1730 | - | - | 0.00E+00 | - | 9.81E+00 | - | 2.23E+01 | - |
| Angus Fire Armour | 4.5A(c) | AN9204 | - | - | - | - | 8.02E+03 | - | 6.48E+03 | - |
| James Robinson Ltd | 4.5A(c) | AN9212 | - | - | 1.90E+03 | - | 0.00E+00 | - | 0.00E+00 | - |
| Viscose Closures Ltd | 4.5A(c) | AO0911 | - | - | 1.02E+04 | - | 1.02E+04 | - | 1.01E+04 | - |
| Cynamid | 4.5A(d) | AK9992 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Johnson Matthey plc | 4.5A(d) | AN6477 | - | - | - | - | - | - | - | - |
| Johnson Matthey plc | 4.5A(d) | AN7040 | - | - | - | - | - | - | - | - |
| Johnson Matthey plc | 4.5A(d) | AN8364 | - | - | - | - | 1.23E+03 | - | 1.88E+03 | - |
| Chirex Ltd | 4.5A(d) | AK1274 | - | - | 8.00E+01 | - | 2.25E+03 | - | 2.76E+03 | - |
| Chemson Ltd | 4.5A(d) | AN9344 | - | - | 0.00E+00 | - | 5.90E+02 | - | 5.66E+02 | - |
| BP Chemicals | 4.5A(e) | AN9816 | - | - | 0.00E+00 | - | 1.41E+04 | - | 1.39E+04 | - |
| UOP Ltd | 4.5A(f) | AN8488 | - | - | - | - | - | - | 1.04E+02 | - |
| Gulson Plating Ltd | 4.5A(f) | AO0865 | - | - | - | - | 0.00E+00 | - | 2.51E-01 | - |
| GE Lighting Ltd | 4.5A(h) | AO1063 | - | - | - | - | 4.55E+01 | - | 4.55E+01 | - |
| Tungsten manufacturing Co Ltd | 4.5A(h) | AS7655 | - | - | - | - | - | - | 0.00E+00 | - |
| British chrome and Chemicals | 4.5A(i) | AN9751 | - | - | - | - | 1.12E+05 | - | 1.39E+05 | - |
| ICI Chemicals and Polymers | 4.5A(i) | AN8437 | - | - | - | - | 5.00E+03 | - | 5.00E+03 | - |
| William Blythe Ltd | 4.5A(i) | AO1233 | - | - | - | - | 5.60E+01 | - | 9.23E+01 | - |
| Fisher Scientific | 4.5A(i) | AO2639 | - | - | - | - | 3.20E+00 | - | 7.60E+00 | - |
| ICI Chemicals and Polymers | 4.5A(i) | AN8321 | - | - | - | - | 3.75E+05 | - | 4.20E+05 | - |
| Albright and Wilson UK Ltd | 4.5A(m) | AO1527 | - | - | - | - | - | - | 1.21E+02 | - |
| Croda Colloids | 4.5A(m) | AN8569 | - | - | - | - | - | - | 0.00E+00 | - |
| Zeneca Ltd | 4.5A(m) | AN9930 | - | - | - | - | - | 1.17E+01 | 8.80E+04 | 1.36E+01 |
| Brunner Mond and Co | 4.5A(m) | AO0385 | - | - | - | - | 1.68E+04 | 6.62E+05 | 8.90E+04 | 5.09E+05 |
| Zeneca Ltd | 4.5A(m) | AO0440 | - | - | - | - | - | - | - | - |

| | | | | | | | | | | |
|--|---------|--------|-----------------|----------|-----------------|----------|-----------------|-----------------|-----------------|-----------------|
| Joseph Crosfield and sons Ltd | 4.5A(m) | AO1268 | - | - | - | - | 9.00E+04 | - | 9.00E+04 | - |
| Crosfield Ltd | 4.5A(m) | AO1276 | - | - | - | - | 1.70E+05 | 2.20E+05 | 1.70E+05 | 2.98E+05 |
| Contract Chemicals | 4.5A(m) | AO1373 | - | - | - | - | 5.00E+00 | - | 5.00E+00 | - |
| Zeneca Ltd | 4.5A(m) | AN7961 | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Hampshire Chemicals Ltd | 4.5A(m) | AO0237 | - | - | 0.00E+00 | - | 2.80E+00 | - | 5.20E+00 | - |
| Exwold Technology Ltd | 4.5A(m) | AO1314 | - | - | - | - | 1.64E+01 | - | 1.43E+01 | - |
| Micro Image Technology Ltd | 4.5A(m) | AN2366 | - | - | 1.50E+03 | - | 1.60E+03 | - | 1.16E+02 | - |
| Great Lakes Chemicals | 4.5A(m) | AA9229 | 3.13E+00 | - | 1.30E+00 | - | 0.00E+00 | - | 1.80E-02 | - |
| Chemviron Carbon | 4.5A(m) | AF6936 | 0.00E+00 | - | 0.00E+00 | - | - | - | - | - |
| Dalau Ltd | 4.5A(m) | AP0674 | - | - | - | - | 9.62E+01 | 1.67E+03 | - | - |
| Engelhard-Clal | 4.5A(m) | AN5055 | - | - | 3.80E-01 | - | 4.00E-01 | - | 6.90E-01 | - |
| Hercules Ltd | 4.5A(m) | AN3419 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Cerestar | 4.5A(m) | AN8429 | - | - | - | - | 4.34E+04 | - | 1.58E+04 | - |
| Sutcliffe Speakman Carbons Ltd | 4.5A(m) | AV7520 | - | - | - | - | - | - | 1.18E+01 | - |
| Johnson Matthey plc | 4.5A(m) | AH5817 | 4.41E+01 | - | 7.90E+01 | - | 1.00E+01 | - | 5.05E+01 | - |
| Croda Kerr Ltd | 4.5A(m) | AI3755 | 1.00E-01 | - | 1.00E+00 | - | 1.60E+01 | - | 1.05E+01 | - |
| Rentokil Ltd | 4.5A(m) | AQ2664 | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Rhone Poulenc Agriculture Ltd | 4.5A(m) | AO1195 | - | - | 2.00E-15 | - | 2.00E-15 | - | 2.00E-15 | - |
| Rhone Poulenc Agriculture Ltd | 4.5A(m) | AO1217 | - | - | - | - | - | - | - | - |
| Alchemia Ltd | 4.5A(m) | AP1590 | - | - | - | - | 3.46E+02 | 3.35E+02 | 2.75E+02 | 0.00E+00 |
| Inorgtech | 4.5A(m) | AN8585 | - | - | - | - | 2.00E+01 | - | 1.50E+01 | - |
| Brotherton Speciality Chemicals | 4.5A(m) | AO1284 | - | - | 1.61E+03 | - | 2.90E+04 | - | 2.60E+04 | - |
| Total emissions from sector 4.5 | | | 4.73E+01 | - | 1.54E+04 | - | 9.04E+05 | 9.78E+05 | 1.15E+06 | 1.78E+06 |

| Company | Sector | Auth. No. | Emissions 1993(kg) | Emissions 1994(kg) | Emissions 1995(kg) | Emissions 1996(kg) |
|------------------------------------|---------|-----------|--------------------|--------------------|--------------------|--------------------|
| Hickson Manaro Ltd | 4.3A(a) | AM0937 | 1.60E+02 | 1.13E+02 | - | 3.40E+01 |
| Seal Sands Chemicals Ltd | 4.3A(c) | AL6956 | 0.00E+00 | 0.00E+00 | - | 0.00E+00 |
| Alean Chemicals Ltd | 4.3A(c) | AL7235 | 1.34E+04 | 8.40E+04 | - | 5.53E+04 |
| Akros Chemicals Ltd | 4.3A(c) | AV3753 | - | - | - | 7.00E+00 |
| Kodak Ltd | 4.3A(c) | AL6760 | - | - | - | 5.00E-01 |
| Brotherton Speciality Products Ltd | 4.3A(c) | AL7995 | 9.50E+02 | 0.00E+00 | - | 0.00E+00 |
| ICI Chemicals and polymers Ltd | 4.3A(d) | AL7561 | 2.00E+03 | 4.50E+03 | - | 5.92E+03 |
| Exchem Plc | 4.3A(d) | AM0201 | - | 5.00E+03 | - | 5.00E+03 |
| ICI Chemicals and polymers Ltd | 4.3A(f) | AW5069 | - | - | - | 0.00E+00 |
| Dycal International | 4.3A(f) | AM6846 | 1.24E+03 | 0.00E+00 | - | 3.23E+03 |
| Kodak Ltd | 4.3A(f) | AL6778 | 0.00E+00 | 0.00E+00 | - | 0.00E+00 |
| IMI Titanium Ltd | 4.3A(f) | AL8355 | 1.74E+02 | - | - | - |
| Total emissions from sector 4.3 | | | | | | |
| | | | 1.79E+04 | 9.37E+04 | - | 6.95E+04 |
| Kemira Ince Ltd | 4.6A(a) | AL7855 | 9.16E+05 | 2.96E+06 | 0.00E+00 | 2.82E+00 |
| ICI Fertilisers Ltd | 4.6A(a) | AL7553 | 1.80E+04 | 1.00E-14 | - | 1.00E-14 |
| Billericay farm services Ltd | 4.6A(a) | AS5563 | - | - | - | 0.00E+00 |
| Hydro Charter Ltd | 4.6A(a) | AL9203 | 2.45E+03 | 8.68E+02 | - | 1.74E+02 |
| Miracle Garden Care | 4.6A(a) | AL6816 | 2.80E+03 | 1.28E+04 | - | 1.18E+03 |
| Hydro agri (UK) Ltd | 4.6A(a) | AL9076 | - | 2.82E+03 | - | 3.42E+03 |
| Hydro Charter Ltd | 4.6A(a) | AL9181 | 2.87E+03 | 2.04E+03 | - | 3.04E+03 |
| Omex Agriculture Ltd | 4.6A(a) | AN2242 | 0.00E+00 | 5.00E+01 | - | 2.50E+01 |
| Hydro Charter Ltd | 4.6A(a) | AL9238 | 1.37E+03 | 6.16E+02 | - | 1.70E+01 |
| Omex Agriculture Ltd | 4.6A(a) | AL6972 | 2.00E-01 | 1.00E+00 | - | 4.00E+00 |
| Landowner Liquid Fertilisers Ltd | 4.6A(a) | AL8444 | - | 2.23E-04 | - | 1.50E-04 |
| Hydro Charter Ltd | 4.6A(a) | AL9190 | 2.86E+03 | 1.35E+03 | - | 2.06E+03 |
| Allied colloids | 4.6A(a) | AM0317 | 1.50E+01 | 2.00E+00 | - | 5.00E+00 |
| ICI Chemicals and Polymers Ltd | 4.6A(b) | AL8614 | - | 1.68E+06 | 8.34E+05 | 2.56E+06 |
| PB Kent and Co Ltd | 4.6A(b) | AN8194 | 1.00E-14 | 3.40E+02 | - | 1.93E+03 |
| Seabright Industries Ltd | 4.6A(b) | AO0555 | - | 0.00E+00 | - | 0.00E+00 |
| Total emissions from sector 4.6 | | | | | | |
| | | | 9.46E+05 | 4.66E+06 | 8.34E+05 | 2.57E+06 |
| | | | - | 9.90E+04 | - | 8.88E+05 |

F.3.1 Summary

Authorisations for release of ammonia to atmosphere have been granted over a wide range of industrial sectors (see Figure F2) The largest number of authorisations (105) have been granted under section 4.2, the manufacture and use of organic chemicals. In contrast, the number of authorisations granted under section 4.5, inorganic chemical processes and section 4.6, chemical fertilizer production are 46 and 16 respectively.

The sector with greatest ammonia emissions is fertilizer production (Figure F3). This is dominated by two facilities; ICI Chemicals and Kemira Ince Ltd, each with a mass emission exceeding 2500 tonnes/annum. Ammonia emissions from the inorganic chemical sector are approximately 20% of those from the fertilizer manufacturing sector. This is to be expected since the major use of ammonia is for fertilizer manufacture. Similarly, emissions from the organic sector are 20% of that from the inorganic chemical sector.

G. PHOSPHORUS

G.1 Summary details of companies registered under 4.5 A (n, o)

G.1.1 Production - 4.5 A (n)

None

G.1.2 Use / release - 4.5 A(o)

AI6100 ALBRIGHT & WILSON (UK) LTD

Envelope for manufacture of phosphorus chlorides, oxides, oxychlorides, phosphoric acids. (Also site ETP). (*For further information see Cremer & Warner Ltd, 1992*).

Releases to air - chlorine, hydrogen chloride, nitrogen oxides, phosphates, phosphorus.

Releases to water - cadmium, mercury.

Abatement equipment - water and caustic scrubbing system to remove oxides of phosphorus, hydrogen chloride, chlorine, phosphorus trichloride, phosphorus oxychloride etc.

AM7605 ALBRIGHT & WILSON (UK) LTD

Manufacture of gaseous phosphine by a continuous process reacting phosphorus with steam to produce phosphine and phosphoric acid. The phosphoric acid is filtered off and used elsewhere. The unreacted phosphorus is recycled, however the removal of phosphorus vapour and steam from the phosphine stream is commercially confidential. (*For further information see Cremer & Warner Ltd, 1992*).

Releases to air - phosphates, phosphine.

Releases to water - mercury.

Abatement equipment - water spray/filter demister system.

AO0628 ALBRIGHT & WILSON (UK) LTD

(*For further information see Cremer & Warner Ltd, 1992*).

Releases to air - diphosphorus pentoxide, hydrogen chloride, hydrogen sulphide, nitrogen oxides, chlorinated organics, particulates, sulphur dioxide.

AO0946 COURTAULDS CHEMICALS LTD

Releases to air - hydrogen chloride, phosphate esters, VOCs classes A&B.

Releases to water - tris (2-chloro-1-methylethyl) phosphate, tris (2-chloroethyl) phosphate.

AO1055 COALITE PRODUCTS LTD

Releases to air - nitrogen oxides, sulphur dioxide, VOCs.

AN9387

CLARIANT UK (SANDOZ CHEMICALS (UK) LTD)

Envelope authorisation for the manufacture of a variety of phosphate esters from phosphorus compounds by formaldehyde condensate reactions. Quantities are extremely small, 15 tonnes p.a. compared to 20 000 tonnes p.a. total site output. The reactor and mixing vessel vent to the roof of the building via extraction fans. Any reactors handling potentially volatile materials are fitted with water cooled condensers. Process effluent is directed to the site effluent treatment plant (AK8368) before discharge to sewer. All other processes are registered under section 4.2.

Releases to air - formaldehyde, VOCs, phosphorus compounds.

AO0334

ALLIED COLLOIDS LTD

Releases to air - zz dummy IPC substance.

AG3258

AKCROS SERVICES

Production of organic phosphate esters from the reaction of phosphorus pentoxide (P_4O_{10}) with various hydroxylic compounds of the type ROH. Vapours are drawn into the vacuum pump system where a proportion will be entrained or dissolved in the circulating water. The contaminated water is routed to the effluent treatment plant before discharge to sewer. Vapour releases from raw material handling vent direct to atmosphere. Solid waste such as spent filter bags are sent to land fill.

Releases to water - mercury.

AN9824

HERCULES LTD

Manufacture and emulsification of organic chemicals which are used in the production of paper. This is an envelope authorisation covering chlorination and dimerisation reactions. Process involves the use of phosphorus trichloride.

Releases to air - hydrogen chloride.

Abatement equipment - condensers and scrubbers.

AT9289

AKCROS SERVICES

Batch production of a range of organic (alkyl and aryl) phosphite esters and acid phosphites, involving the use of phosphorus trichloride. Hydrochloric acid vapour is formed during the process which is abated using a water absorption system.

Releases to air - hydrogen chloride (and other volatile chlorides), phenol, VOCs class B.

AU0180

LIBRA CHEMICALS LTD

Production of organic phosphate esters from reaction of phosphorus pentoxide or phosphoric acid with various hydroxylic compounds. Process vapours are drawn into a vacuum pump system where a portion are entrained/dissolved in the circulating water. The recirculating water is then routed to the effluent treatment plant for pH adjustment before discharge to sewer. Vapours extracted from raw materials handling and product drum filling are released directly to the atmosphere.

Releases to air - VOCs.

AN9131

ALBRIGHT & WILSON

Manufacture of alkyl phosphate esters for use in paints as plasticisers and as levelling agents in polishes. The plant operates continuously producing approximately 3000 t.p.a. Phosphorus oxychloride is reacted with an alcohol in the presence of a catalyst under reduced pressure. Hydrochloric acid is a by-product which is removed via absorption to be sold as product. The ester product is washed and filtered before packing into drums or sent to storage tanks for despatch by road tankers. All loading of tankers/filling of drums is performed in a facility which incorporates a caustic scrubber to abate any fumes. A scrubber is also used during road tanker unloading of the phosphorus oxychloride. Gaseous releases from the reactor are vented via a carbon condenser. Any uncondensed gases are absorbed in a subsequent water scrubber. Aqueous waste is directed to the effluent storage tanks from where it is taken for off-site disposal at a licensed facility.

(For further information see *Cremer & Warner Ltd, 1992*).

AN9123

ALBRIGHT & WILSON

Production of styrene phosphoric acid (SPA) and alkyl ketene dimer (AKD) in a multi-purpose plant. Styrene phosphonic acid is manufactured by the hydrolysis of the complex formed after phosphorylating styrene. The SPA formed is then crystallised in water and the resultant slurry is filtered, dried and packed into containers for sale. Alkyl Ketene Dimer is manufactured by chlorinating a fatty acid to form an acid chloride. This is added to an amine in a solvent to produce a monomer that is subsequently dimerised to form a wax. The wax is then cast into kegs for use in the paper chemicals industry. Plant abatement equipment includes carbon block condensers, a tail gas caustic soda scrubber, an acid storage scrubber, a main water scrubber and an amine recovery scrubber using weak hydrochloric acid solution. Waste from the AKD and SPA plants are routed to the site effluent treatment plant where it is mixed with other site wastes and lime slurry is then added. When the pH and suspended solids content is satisfactory the effluent discharges to sewer. All solid waste is sent for off-site disposal at licensed facilities.

Releases to air - hydrogen chloride, styrene

AN9140

ALBRIGHT & WILSON (UK) LTD

Manufacture of Amgard V6 - a chlorinated diphosphate ester flame retardant. Process involves the addition of a polyhydric alcohol to phosphorus trichloride in a carrier solvent in the presence of a catalyst. Hydrochloric acid is a by-product of this reaction which is absorbed using a two-stage scrubbing system. The excess phosphorus trichloride is stripped and recovered. Fresh solvent is added and the reactants are chlorinated, this intermediate is then ethoxylated in the presence of another catalyst. The crude product is then washed, dehydrated, filtered, stabilised and packed in drums.

Releases to air - 1,2 dichloroethane, alcohols, ethylene oxide, hydrogen chloride, nitrogen oxides, sulphur oxides, VOCs classes A&B. (For further information see *Cremer & Warner Ltd, 1992*).

Releases to water - 1,2 dichloroethane, mercury.

G.2 Summary

Many of the standard abatement techniques for the removal of phosphorus are to be found in this sector but often additional modified systems are required to suit process specific requirements. For example the removal of associated organic or particulate material, in addition to the phosphorus. Fourteen authorisations have been identified for this sector and the sector is dominated by Albright & Wilson in terms of the scale and complexity of operations and the number of relevant authorisations.

G.2.1 Emissions to air

From the emissions data provided by the CRI the most commonly authorised emissions to air from the companies under this section are - hydrogen chloride, VOCs, NOx, Sulphur dioxide and various named species of phosphorus compounds.

There is a miscellaneous collection of specifically named organic species relevant only to individual applications covering the following - phenol, alcohols, ethylene oxide

No metals are listed.

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|-------------------|---|
| Albright & Wilson | 1,2 dichloroethane, NOx, VOCs, phosphates, phosphine, sulphur dioxide |
| Coalite Products | sulphur dioxide |
| Courtaulds | VOCs |

G.2.2 Discharges to water

From the emissions data provided by the CRI emissions to water from the companies are not extensively reported. Those listed under this section include mercury, cadmium, specific phosphate compounds and ethylene dichloride.

From the emissions data provided by the CRI no releases to water are reported > 1000 kg per annum.

G.2.3 Discharges to land

From the emissions data provided by the CRI no releases to land are reported > 1000 kg per annum.

G.2.4 Phosphorus and phosphorus compounds manufacturing facilities

Phosphorus authorisations

- At present, there are 14 separate authorisations for release of phosphorus, four of which are registered as section 4.5 processes, with only one registered under sub-section 'o'
- Three processes are authorised to discharge phosphorus oxychloride, all registered under section 4.2, organic chemicals
- Four processes have authorisations for release of phosphine, all registered as 4.5 processes
- Three authorisations for release of phosphorus trichloride have been granted, two under section 4.2, and one under section 4.5
- Six processes are authorised for phosphorus pentoxide emissions, only one of which is a section 4.5 process.

Emissions of phosphorus and its compounds

- Only three processes release significant quantities of phosphorus to air :-
 - IMI Refineries Ltd 575 kg/a - Sector 2.2A(d)
 - A Cohen and Co - 528 kg/a - Sector 2.2A(d)
 - Union Camp Chemicals Ltd - 1334 kg/a - Sector 4.2A(d)
- All other processes have air emissions close to zero.
- Emissions of phosphorus oxychloride to atmosphere are reported as zero or very close. Agrevo UK Ltd report 0.1kg phosphorus oxychloride emissions for 1996.
- Emissions of phosphine from Albright and Wilson UK Ltd are 1700 kg/a for 1996. This process is registered under section 4.5
- Phosphorus trichloride emissions from authorised processes are close to zero. Agrevo UK Ltd report an emission for 1996 of 0.1kg.
- Emissions of phosphorus pentoxide from Albright and Wilson UK Ltd were 24.6 kg for 1996.

G.3 Details of reported emissions of phosphorus compounds

Table G.1 Emissions data for phosphorus and specific phosphorus compounds

Table G.1 Emissions data for phosphorus and specific phosphorous compounds to the environment

| Company | Sector | Auth. No. | Chemical Released | Emissions 1993 (kg) | | Emissions 1994 (kg) | | Emissions 1995 (kg) | | Emissions 1996 (kg) | |
|--------------------------------------|----------|-----------|---------------------------|---------------------|----------|---------------------|----------|---------------------|----------|---------------------|----------|
| | | | | Air | Water | Air | Water | Air | Water | Air | Water |
| Croda Application Chemicals Ltd | 1.4A (c) | AF7673 | Phosphorus Pentoxide | 7.20E-01 | - | 2.50E+01 | - | 0.00E+00 | - | 0.00E+00 | - |
| Total emissions from sector 1 | | | | 7.20E-01 | - | 2.50E+01 | - | 0.00E+00 | - | 0.00E+00 | - |
| IMI Refineries Ltd | 2.2A (a) | AS6632 | Phosphorus | - | - | - | - | 7.58E+00 | - | 5.75E+02 | - |
| Brookside Metal Co | 2.2A (a) | AS6829 | Phosphorus | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Delta ExtrudedMetals Co | 2.2A (d) | AR0187 | Phosphorus | - | - | - | - | 2.00E-01 | - | 2.50E-01 | - |
| IMI Wolverhampton Metal Ltd | 2.2A (d) | AS6993 | Phosphorus | - | - | - | - | - | - | 0.00E+00 | - |
| Delta Encon Ltd | 2.2A (e) | AG1930 | Phosphorus | 0.00E+00 | - | 0.00E+00 | - | 9.10E-02 | - | 0.00E+00 | - |
| A Cohen and Co. | 2.2A(d) | AS7612 | Phosphorus | - | - | - | - | - | - | 5.28E+02 | - |
| Total emissions from sector 2 | | | | 0.00E +00 | - | 0.00E+00 | - | 7.87E+00 | - | 1.10E+03 | - |
| Shell Uk Ltd | 4.1A (b) | AN4369 | Phosphorus Pentoxide | - | - | - | - | - | - | 0.00E+00 | - |
| BOC Ltd | 4.2A (c) | AK3501 | Phosphine | - | - | 1.00E+00 | - | 1.00E+00 | - | 1.00E+00 | - |
| Holland Dyes and Chemicals Ltd | 4.2A (c) | AJ5193 | Phosphorus Oxychloride | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Agrevo UK Ltd | 4.2A (d) | AJ4871 | Phosphorus Oxychloride | - | - | 0.00E+00 | - | 8.00E-02 | - | 1.00E-01 | - |
| Agrevo UK ltd | 4.2A (d) | AJ4871 | Phosphorus Trichloride | - | - | 0.00E+00 | - | 8.00E-02 | - | 1.00E-01 | - |
| Baker Performance Chemicals | 4.2A (d) | AK8945 | Phosphorus Pentoxide | - | - | 7.20E-06 | - | 2.00E-06 | - | 7.00E-06 | - |
| Union Camp Chemicals Ltd | 4.2A (d) | AK5202 | Phosphorus | - | - | 7.87E+02 | - | 2.35E+03 | - | 1.33E+03 | - |
| Astra Charnwood | 4.2A (d) | AK6870 | Phosphorus | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Yorkshire Chemicals plc | 4.2A (d) | AM2956 | Phosphorus Oxychloride | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | |
|--|----------|--------|----------------------------|----------|---|-----------------|---|-----------------|---|-----------------|---|
| Sterling organics ltd | 4.2A (e) | AL8878 | Diphosphorus Pentasulphide | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Sterling organics ltd | 4.2A (e) | AL8878 | Phosphorus Trichloride | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Sterling organics ltd | 4.2A (e) | AL8878 | Phosphorus pentoxide | - | - | - | - | - | - | 0.00E+00 | - |
| Aga Gas Ltd | 4.2A(c) | AM6862 | Phosphine | - | - | 1.25E+01 | - | 3.25E+01 | - | 4.20E+01 | - |
| Albright and Wilson Uk Ltd | 4.4A (d) | AM0023 | Phosphorus Pentoxide | - | - | 2.43E+01 | - | 1.17E+02 | - | 2.46E+01 | - |
| Total emissions from sector 4 (excl. 4.5) | | | | | | 0.00E+00 | - | 8.25E+02 | - | 2.50E+03 | - |
| Wafer Technology Ltd | 4.5A (d) | AO0121 | Phosphorus | - | - | - | - | 0.00E+00 | - | 0.00E+00 | - |
| Nortel ltd | 4.5A (d) | AO1625 | Phosphine | - | - | 0.00E+00 | - | 1.80E+02 | - | 0.00E+00 | - |
| GEC Marconi Materials Technology Ltd | 4.5A (d) | AN8682 | Phosphorus | - | - | - | - | 0.00E+00 | - | 4.70E-02 | - |
| Epitaxial products Int Ltd | 4.5A (f) | AO0610 | Phosphorus | - | - | 2.50E-02 | - | 8.50E-02 | - | 1.47E-01 | - |
| Chirex Ltd | 4.5A (m) | AO1365 | phosphorus trichloride | - | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Albright and Wilson Uk Ltd | 4.5A (o) | A00628 | Phosphorus Pentoxide | - | - | - | - | 8.50E+01 | - | 0.00E+00 | - |
| Albright and Wilson Uk Ltd | 4.5A (o) | AM7605 | Phosphorus | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - | 0.00E+00 | - |
| Albright and Wilson Uk Ltd | 4.5A (o) | AM7605 | Phosphine | - | - | - | - | 1.71E+03 | - | 1.68E+03 | - |
| Total emissions from sector 4.5 | | | | | | 0.00E+00 | - | 2.5E-02 | - | 1.98E+03 | - |
| BOC Ltd | 5.1A (b) | AG7873 | Phosphorus | 0.00E+00 | - | 3.50E-02 | - | 4.24E-01 | - | 1.00E-14 | - |
| Leigh Env Ltd | 5.1A (c) | AK2688 | Phosphorus | - | - | - | - | 1.32E+01 | - | 0.00E+00 | - |
| Total emissions from sector 5 | | | | | | 0.00E+00 | - | 3.5E-02 | - | 1.74E+01 | - |

H. FERTILIZERS

H.1 Summary details of companies registered under 4.6 A (a, b)

H.1.1 Manufacture - 4.6 A (a)

AL6972 OMEX AGRICULTURE LTD

Batch manufacture of fluid suspension and soluble fertilizers. Products range from urea and ammonium nitrate solutions through to complex NPK, sodium, magnesium and trace elements suspensions in varying quantities.

Releases to air - ammonia, phosphoric acid, Sulphur dioxide, and fertilizer dust.

Abatement equipment - scrubber to abate ammonia emissions. Waste scrubber liquor is recycled to the process.

AL8479 LEVINGTON HORTICULTURE (FISONS)

Batch aqueous liquid fertilizer production from phosphoric acid and potassium hydroxide.

Releases to air - particulates.

Releases to water - cadmium, mercury.

AL9076 HYDRO AGRI (UK) LTD

Ammonium nitrate fertilizer production, either in liquid or granulated form.

Releases to air - ammonia from storage vessel vents and also from pressure relief valves, when nitric acid plant is off-line.

Releases to air - ammonia, ammonium nitrate, NO_x, sulphur dioxide.

Releases to water - ammonia, ammonium nitrate, cadmium, mercury.

Abatement equipment - water scrubber with cooling coils to maintain favourable absorption conditions, to abate ammonia released from process. Acid drip tank collects nitric acid drained from plant and returns it to storage. Acid residues from equipment washing is sent to the neutralisation pit before discharge. Demineralised water plant - cation resin removes ammonia and ammonium ions and the anion resin removes nitrate ions. The cation resin is regenerated with sulphuric acid and the anion resin with sodium hydroxide. Regeneration streams and condensate containing too much ammonia and ammonium nitrate are sent to chemical effluent sump. Exhaust air from the granulation process is vented through a scrubber.

AL9181 HYDRO CHAFER LTD

Liquid fertilizer production. Anhydrous ammonia is dissolved in water. This is either used in direct applications or it is reacted with phosphoric acid to produce ammonium phosphate solutions, which can then be blended with other nutrients.

Releases to air - ammonia.

Abatement equipment - water vent scrubbers on ammonia storage tanks. The waste liquor from the scrubber is sent to the on-line diluter. The thermal relief valves on the anhydrous ammonia lines are also vented via the vent scrubber. All operations are contained within bunds to prevent any fertilizer reaching the water course. The sumps from the bunds are pumped to lagoons.

(8000m³) and this contaminated water is then recycled for use in the process. Mercury and cadmium impurities from the phosphoric acid are precipitated out of the fertilizer mixture. These precipitates are collected from settling tanks and are washed and blended with stock and sold as slurry fertilizer in the autumn.

AL9190 HYDRO CHAFER LTD

Liquid fertilizer production. Anhydrous ammonia is dissolved in water. This is either used in direct applications or it is reacted with phosphoric acid to produce ammonium phosphate solutions, which can then be blended with other nutrients.

Releases to air - ammonia.

Releases to water - chlorides, nitrates, nitrogen compounds, NP suspended solids, phosphates, potassium, sodium, sulphates.

AN2242 OMEX AGRICULTURE

Production of fluid suspension and soluble fertilizers. See authorisation AL6972 for details, as this is the same process operated in a different location.

Releases to air - ammonia.

Releases to water - ammonia.

AS5563 BILLERICAY FARM SERVICES LTD

Batch fluid suspension and solution fertilizers. Products range from urea/ammonium nitrate solutions through complex NPK, sodium, magnesium and trace elements suspension mixtures.

Releases to air - ammonia, NO_x, sulphur dioxide

Abatement equipment - ammonia storage is vented via a water seal. Drainage and spillage are sent to a sump and then storage for reformulation into the finished product.

AL8444 LANDOWNER LIQUID FERTILIZERS

Manufacture of liquid and slurry agricultural fertilizers.

Releases to air - ammonia, particulates, NO_x, sulphur dioxide. (The raw materials of phosphoric acid, sulphuric acid, ammonia solutions, urea, ammonium salts and potassium chloride are reacted in open stirred vessels which are vented directly to atmosphere.)

Abatement equipment - ammonia storage is vented via an acid seal which is recirculated and sprayed into vent pipe during off loading. Any spillages and washings are recycled to the process.

AL7553 ICI FERTILIZERS LTD

Manufacture of up to 1800t per day of prilled ammonium nitrate and blending of associated fertilizers. The raw materials for the process are ammonia, magnesite and nitric acid. The magnesite and the nitric acid are combined to produce magnesium nitrate. The ammonia is then added to precipitate out any unwanted iron and aluminium. The solids are then separated from the liquor by centrifuge and filtration. The filtered liquor and nitric acid and ammonia are reacted in the neutraliser vessel to yield ammonium nitrate solution. The resultant vapours are scrubbed in an ammonium nitrate packed tower followed by a PTFE fibre filter to remove ammonium nitrate droplets. The product ammonium nitrate solution is fed to a falling film evaporator for concentration. The resulting hot air/steam mixture is blown to the fibre filter. Ammonia is added

to replace that lost in the evaporator prior to the liquor being pumped to the top of the prill tower. The prills collected at the bottom of the tower are cooled further in a fluidised bed. Fume from prilling is passed to the fibre filter where it mixes with exhaust from the evaporator. Fume is scrubbed with acidic ammonium nitrate and steam condensate solutions which is passed through stainless steel mesh and fine glass fibre candles respectively. The cooled prills are finally screened, with the oversize and fine fractions being recycled to the process, and then packaged for sale.

Varition AP6630 covers the installation of an evaporative cooler in the scrubber liquor circulation loop.

Releases to air - ammonia, ammonium nitrate, particulates.

Releases to water - nitrogen compounds, BOD, NP suspended solids.

Abatement equipment - neutraliser scrubber system.

AL9238 HYDRO CHAFER LTD

Manufacture of liquid fertilizers for use by direct application in agriculture. The process routes rely upon the main reaction between ammonia solution and phosphoric acid, yielding ammonium phosphates, which are subsequently processed to produce the desired product. The ammonia solution is obtained by mixing anhydrous ammonia and water in a controlled dilution process. The ammonia dissolution plant and the ammonia storage facilities are vented to atmosphere through a water scrubber. The resulting dilute ammonia solution from the scrubber is recycled to the process. The phosphoric acid and ammonia solutions are fed to two open stainless steel vessels where the reaction occurs until the pH is optimised at 6.5 - 7.5. The resultant solution is then pumped to tanks where any solid material is allowed to settle out. This solution undergoes further processing and blending to produce the desired product specification. Other process routes are based on the production of primary urea-ammonium nitrate mixtures, which is achieved by mixing ammonium nitrate and urea in the same open vessels as mentioned above.

Releases to air - ammonia.

AM0317 ALLIED COLLOIDS LTD

Production of liquid ammonium sulphate fertilizer. The process involves a two stage neutralisation of ammonium bisulphate with ammonia.

Releases to air - ammonia from venting of reaction and storage vessels.

Releases to water - dilute ammonium sulphate and ammonia solutions from vessel washing are released to sewer.

Abatement equipment - packed column scrubbers to abate venting emissions.

AL8616 MIRACLE GARDEN CARE (MANUFACTURING)

Manufacture of single superphosphate using the Broadfield process and manufacture of granular compound fertilizers using the steam granulation process.

Releases to air - ammonia, hydrogen fluoride, particulates, sulphur dioxide

Releases to water - cadmium, mercury

AL7855 KEMIRA INCE LTD

Manufacture of ammonium nitrate, NPK fertilizers. Abatement equipment on the nitrate plant includes an aqueous effluent treatment plant which strips the ammonia from the liquid waste streams for recycle to the process, whilst all gaseous effluent is treated in two stage scrubbing

system before discharge to atmosphere. The NPK plant has wet impingement scrubbers for treating gaseous effluent to remove fumes before discharge to air and bag filters are used on the exhaust routes from product handling operations.

(For further information see *Chem Systems Ltd, 1994*).

Releases to air - ammonia, NO_x, particulates, sulphur dioxide.

Releases to water - ammonia, cadmium, mercury, heavy metals, NP suspended solids.

Releases to land - NP solids.

AL7669 SHEPPY LTD

Production of phosphatic fertilizers (single superphosphate) made by interaction of imported phosphate rock and concentrated sulphuric acid (70%).

Releases to water - sewer discharge containing cadmium and mercury.

Abatement equipment - bag filter on exhaust from grinding operations which are performed under a slight vacuum. Dust, odours and acid gases produced by the main reaction are swept through two scrubbing systems in series. The exit gas is then discharged to atmosphere via a 17m stack.

AL9203 HYDRO CHAFER LTD

Releases to air - ammonia.

H.1.2 Conversion of fertilizers to granules - 4.6 A (b)

AL8436 LEVINGTON HORTICULTURE (FISONS)

Production of granular fertilizers from vermiculite.

Abatement equipment - exhaust gases from vermiculite exfoliator are filtered using a bag filter before discharge to atmosphere. Exhaust gases from the drier are wet scrubbed before discharge to atmosphere. The waste liquor from the scrubber is sent to lagoons for settlement and evaporation before discharge. Other stages of the process which produce dust are vented via bag filters.

AN8194 PB KENT AND CO LTD

Manufacture of fertilizers by blending or mixing processes.

Abatement equipment - bag filters and wet scrubber to abate particulates and a packed scrubbing tower using water or dilute sulphuric acid to remove residual ammonia, produced in the drier when products containing urea are handled.

Releases to air - ammonia, particulates.

Releases to water - cadmium.

AL8614 ICI CHEMICALS & POLYMERS

Ammonium nitrate based fertilizers. (2 ammonia plants, 2 nitric acid plants, 1 ammonium nitrate plant, 1 fertilizer blending plant, 1 ammonia solution plant, 3 carbon dioxide liquefaction and purification plants.) (For further information see *Chem Systems Ltd, 1994*).

Releases to air - ammonia, ammonium nitrate, NO_x.

Releases to water - all site liquid effluent is discharged to the river via outfall pipe, the main substances being ammonium nitrate and ammonia. Others include arsenic, cadmium, chromium, iron, mercury, nickel, nitrates, NP aqueous residues, BOD, COD, oil & oil/solid mixtures, suspended solids, phenols and zinc.

Abatement equipment - scrubbed filter to abate ammonia and ammonium nitrate dust. Air from blending and packing operations are exhausted to atmosphere.

H.2 Summary

The companies authorised under this category are all fertilizer companies.

H.2.1 Emissions to air

From the emissions data provided by the CRI the most commonly authorised emissions to air from the companies under this section are ammonia, NO_x, sulphur dioxide and particulates.

There is a miscellaneous collection of specifically named species relevant only to individual applications covering the following - hydrogen fluoride, ammonium nitrate.

Several metals are also listed

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|---------------------|--|
| Fisons Plc | particulates |
| Hydro Agri | ammonia, ammonium nitrate, NO _x |
| Hydro Chafer | ammonia |
| ICI | ammonia, ammonium nitrate, NO _x , nitrogen compounds as ammonia |
| Kemira | ammonia, NO _x , particulates, sulphur dioxide |
| Miracle Garden Care | ammonia, hydrogen fluoride, particulates, sulphur dioxide |
| PB Kent | ammonia |

H.2.2 Discharges to water

From the emissions data provided by the CRI the most commonly authorised emissions to water from the companies under this section are - cadmium, mercury, ammonia and suspended solids. Other metals include zinc, arsenic, chromium, iron, nickel.

In terms of discharges >1000 kg per annum the following have been reported:-

| | |
|------------|---|
| Hydro Agri | ammonia, ammonium nitrate |
| ICI | ammonia, iron, nitrates, BOD, COD, Oil & Oil/solid mixtures, suspended solids |
| Kemira | ammonia, heavy metals (ex mercury/cadmium), suspended solids |

H.2.3 Discharges to land

From the emissions data provided by the CRI.

In terms of discharges > 1000 kg per annum the following have been reported:-

| | |
|--------|--------------------------|
| ICI | aqueous residues, solids |
| Kemira | solids |

I. REFERENCES

AEA Industrial Technology, 1992, Pollution Control at Works using Cadmium, Mercury and their Compounds, DoE Report No: DoE/HMIP/RR/92/054.

Chem Systems, 1994, Pollution Control for Ammonia Processes, DoE Report No: DoE/HMIP/RR/94/017.

Cremer & Warner Ltd, 1992, Pollution Control for Phosphorus Processes, DoE Report No: DoE/HMIP/RR/93/061.

Cremer & Warner Ltd, 1993, Pollution Control for Metal Carbonyl Processes and the Manufacture of Compounds of Chromium, Magnesium, Manganese, Nickel and Zinc, DoE Report No: DoE/HMIP/RR/93/069.

Davy Consultants, 1994, Pollution Control for Antimony, Arsenic etc. Processes, DoE Report No: DoE/HMIP/RR/94/022.

WS Atkins Consultants, 1994, A Review of the Available Techniques for Pollution Control in the Manufacture or use of Hydrogen Cyanide and Hydrogen Sulphide, DoE Report No: DoE/HMIP/RR/94/021.

WS Atkins Consultants, 1994, Pollution Control for Chemical Fertilizer and Acid Processes, DoE Report No: DoE/HMIP/RR/94/032.