

**THE IMPLICATIONS FOR INDUSTRY
OF INTERNATIONALLY RECOGNISED
ENVIRONMENTAL MANAGEMENT SYSTEM
(EMS) STANDARDS**

**Vol. II of II
Appendices**

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**Submitted in Partial Fulfilment of the
Requirements of the Degree of Doctor of
Philosophy, April 1999**

APPENDIX 1: EXPERIENCE SURVEY- POSTAL QUESTIONNAIRE

QUESTIONNAIRE ON BS 7750	
SECTION A - GENERAL INFORMATION	
Company Name:	Name of Site(s) Certified to BS 7750:
Contact Address:	Telephone No:
	No of Employees on Certified Site (s):
Contact Name:	Position:
Brief description of activities:	
Do you have any processes scheduled as Part A (regulated by HMIP) or Part B (regulated by the Local Authority) under the Environmental Protection Act 1990 ? If yes please specify.	
Scope of Certificate:	
Date of Certification to BS 7750:	
SECTION B - THE BENEFITS OF THE EMS	
1	What aspects of an EMS did your organisation have in place before starting to implement BS 7750?
2	What was your main reason for implementing BS 7750 (indicate with a ✓) To ensure legislative compliance ----- To meet pressure from customers ----- To improve public image ----- To achieve competitive advantage ----- To achieve financial savings ----- Others (please specify)

APPENDIX 1: EXPERIENCE SURVEY- POSTAL QUESTIONNAIRE

3	What has been the main benefit of implementing BS 7750 ?																																																															
3	<p>To what extent do you feel that the implementation of BS 7750 has led to the following improvements? (5 = substantial improvement, 0 = no improvement).</p> <table border="0"> <tr> <td>Improved understanding of legislation</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Increased legislative compliance</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Improved relationships with regulators</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Improved understanding of environmental impacts</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Improved relationships with suppliers</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Improved employee environmental awareness</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Improved public image</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Improved integration with health & safety management</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> <tr> <td>Improved integration with quality management</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr> </table>	Improved understanding of legislation	0	1	2	3	4	5	Increased legislative compliance	0	1	2	3	4	5	Improved relationships with regulators	0	1	2	3	4	5	Improved understanding of environmental impacts	0	1	2	3	4	5	Improved relationships with suppliers	0	1	2	3	4	5	Improved employee environmental awareness	0	1	2	3	4	5	Improved public image	0	1	2	3	4	5	Improved integration with health & safety management	0	1	2	3	4	5	Improved integration with quality management	0	1	2	3	4	5
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4	<p>In which of the following areas has BS 7750 led to environmental improvements (not including improvements required to meet legislation) ?</p> <table border="0"> <tr> <td>Reduced Atmospheric Releases</td><td>()</td> <td>Improved Monitoring</td><td>()</td></tr> <tr> <td>Reduced Releases to River</td><td>()</td> <td>Reduced Traffic</td><td>()</td></tr> <tr> <td>Reduced Releases to Sewer</td><td>()</td> <td>Reduced Material Usage</td><td>()</td></tr> <tr> <td>Reduced Waste Production</td><td>()</td> <td>Reduced Energy Usage</td><td>()</td></tr> <tr> <td>Increased Recycling</td><td>()</td> <td>Reduced Water Usage</td><td>()</td></tr> <tr> <td>Reduced Environmental Incidents</td><td>()</td> <td>Improved Containment</td><td>()</td></tr> </table> <p>Any specific examples of environmental improvements would be most appreciated:</p>	Reduced Atmospheric Releases	()	Improved Monitoring	()	Reduced Releases to River	()	Reduced Traffic	()	Reduced Releases to Sewer	()	Reduced Material Usage	()	Reduced Waste Production	()	Reduced Energy Usage	()	Increased Recycling	()	Reduced Water Usage	()	Reduced Environmental Incidents	()	Improved Containment	()																																							
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5	<p>Has the implementation of the standard led to financial savings ? Yes / No</p> <p>If yes please describe how these were achieved and if possible estimate the arising annual savings.</p> <p>Can you estimate of the total savings resulting from BS 7750 since implementation ?</p>																																																															
6	<p>Has certification led to any improved access to financial funding or reductions in insurance premiums ?</p> <p style="text-align: right;">Yes/No</p> <p>If yes please give details:</p>																																																															

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7	<p>Has certification led to a reduction in the number of visits from enforcing authorities ? Yes/No</p> <p>If yes please give details:</p>
8	<p>Has certification improved your competitive advantage or allowed you to bid for previously unavailable tenders? Yes/No</p> <p>If yes please give details:</p>
9	<p>Do you believe certification has improved you public image ? Yes / No</p> <p>If so in what way ?</p>
SECTION C - THE COSTS OF THE EMS	
10	<p>How long did it take your organisation to achieve certification to the standard ?</p> <p>How many people did you have working on implementing BS 7750 ?</p>
11	<p>Can you estimate the man hours spent implementing the standard ?</p> <p>Can you estimate the total cost of implementing the standard (excluding capital spending on new equipment, process improvements etc) ?</p> <p>Which area of the standard did you find the most time consuming ?</p>
12	<p>Did you have a member of staff responsible for the environment before BS 7750? Yes / No</p> <p>Was a new member of staff employed to implement the standard ? Yes / No</p> <p>If no who was given this responsibility ?</p>
13	<p>Have you used external consultants in the development of BS 7750 ? Yes / No</p> <p>If yes are you willing to give details (e.g Company Name and Costs ?)</p>
14	<p>How much environmental training of employees did the standard require ?</p> <p>Was this provided internally ? Yes / No</p> <p>Can you estimate the man hours required to provide this training ?</p>

APPENDIX 1: EXPERIENCE SURVEY- POSTAL QUESTIONNAIRE

15	<p>Did BS 7750 result in any capital spending on environmental protection e.g new equipment, process changes, bunding etc</p> <p style="text-align: right;">Yes / No</p> <p>If yes please specify:</p>
16	<p>Can you estimate the total man hours spent maintaining the system ?</p> <p>Can you estimate the total cost of maintaining the system ?</p>
17	<p>Have you assessed your suppliers environmental performance ?</p> <p style="text-align: right;">Yes / No</p> <p>If yes, has this so far influenced your source of suppliers?</p> <p style="text-align: right;">Yes / No</p> <p>Do you intend to ask your suppliers to become BS 7750 certified ?</p> <p style="text-align: right;">Yes / No</p>
18	<p>Can you estimate the costs of having the EMS certified ?</p>
19	<p>Are there any particular disadvantages of the BS 7750 approach or requirements you feel are not beneficial ?</p>
20	<p>Do you think your organisation would have developed a formal environmental management system without the publication of BS 7750 ?</p> <p style="text-align: right;">Yes / No</p>

APPENDIX 1.2: EXPERIENCE SURVEY- PARTICIPATING COMPANIES

<i>Company Name</i>	<i>Location</i>	<i>Certification Body</i>	<i>Industrial Sector</i>	<i>Number of Employees</i>	<i>Process Classification*</i>	<i>Starting Position Prior to BS 7750</i>
Akzo Nobel Chemicals Ltd	Kent	BSI	Speciality Chemicals	132	Not Prescribed	<ul style="list-style-type: none"> • Environmental Monitoring
Alcan Smelting & Power UK	Scotland	BSI	Metal Smelting	172	Part A	<ul style="list-style-type: none"> • Preparatory Review • Environmental Policy • Environmental Targets • Management Programme • External Audit
Anaplast Ltd	Scotland	Lloyd's	Packaging Manufacture	170	Part B	<ul style="list-style-type: none"> • Waste Control • Energy Reduction • Recycling
Applied Chemicals	Coventry	Aspects	Industrial Lubricants / Cleaners	150	Not Prescribed	<ul style="list-style-type: none"> • Testing and Monitoring • Waste Reduction • Legislative Compliance
Arjo Wiggins Fine Papers Ltd	Kent	BSI	Paper Manufacture	230	Not Prescribed	<ul style="list-style-type: none"> • Auditing • Management Review
Auto-Smart Ltd	Staffordshire	Aspects	Automotive Cleaning Chemicals	55	Not Prescribed	<ul style="list-style-type: none"> • Reference in Design Procedures
The Beacon Press Ltd	East Sussex	SGS	General Printers	70	Not Prescribed	<ul style="list-style-type: none"> • Approx 70% of BS 7750
BICC Cables Ltd	Manchester	BASC	Telecommunication Cables	350	Part B	<ul style="list-style-type: none"> • Copper Recycling
BOC Gases Europe	Liverpool	Lloyd's	Industrial gasses	60	Part A	<ul style="list-style-type: none"> • Spill Contingency • Legislative Compliance • Waste Procedures

APPENDIX 1.2: EXPERIENCE SURVEY- PARTICIPATING COMPANIES

Company Name	Location	Certification Body	Industrial Sector	Number of Employees	Process Classification*	Starting Position Prior to BS 7750
Carson Office Furniture Systems	Essex	Trada	Wood Based Office Products	160	Part B	<ul style="list-style-type: none"> • Environmental Policy • Product Analysis • Supplier Probiity • Legislative Compliance • Objectives & Targets • Legislative Compliance
Curtis Fine Papers	Scotland	Lloyd's	Printing and Writing Papers	350	Part B	<ul style="list-style-type: none"> • Legislative Compliance
Dunlop Limited, Precision Rubber Division (Shepshed and Bagworth Sites)	Leicestershire	Lloyd's	Precision Rubber Products	162 (Shepsted) 98 (Bagworth)	Part B	<ul style="list-style-type: none"> • Legislative Compliance
Epson Telford Ltd.	Shropshire	Lloyd's	Computer Printers	1,700	Not Prescribed	<ul style="list-style-type: none"> • None
Gleaner Oils Ltd	Scotland	BSI	Oil and Gas Distribution	130	Not Prescribed	<ul style="list-style-type: none"> • None
Lindsey Oil Refinery Ltd	South Humberside	Lloyd's	Oil Refining	500	Part A	<ul style="list-style-type: none"> • Environmental Monitoring • Complaint Procedure • Local Liaison Committee
NDM Manufacturing	Shropshire	Lloyd's	Automotive Air Conditioning	650	Not Prescribed	<ul style="list-style-type: none"> • Environmental Policy • Targets • Working Groups • Environmental Committee • Environmental Co-ordinators

APPENDIX 1.2: EXPERIENCE SURVEY- PARTICIPATING COMPANIES

Company Name	Location	Certification Body	Industrial Sector	Number of Employees	Process Classification*	Starting Position Prior to BS 7750
P P Payne	Nottingham	SGS	Packaging Products	252	Part B	<ul style="list-style-type: none"> • Spill Containment • Waste Documentation
Philips Components	Lancashire	SGS	Screens for TVs and Monitors	400	Part B	<ul style="list-style-type: none"> • Legislative Compliance • Environmental Monitoring
Ricoh UK Products Ltd	Shropshire	BSI	Office Automation Equipment	740	Part A & Part B	<ul style="list-style-type: none"> • Process Monitoring • Waste Recycling / Reduction • Environmental Committee • Environmental Policy • 60% of Records Required
Shields Special Metals Ltd	Essex	DNV	Dismantling and Recycling Electro Mechanical Equipment	100	Not Prescribed	<ul style="list-style-type: none"> • Environment procedures under ISO 9002 for work practices.
Thomas Swan & Co Ltd,	Co Durham	Aspects	Speciality Chemicals	145	Part A	<ul style="list-style-type: none"> • Approx 70% of BS 7750
Wavin Buildings Products Ltd	Wiltshire	Aspects	Plastic Pipes and Fittings for the Building Industry.	500	Not Prescribed	<ul style="list-style-type: none"> • Recycling • Legislative Compliance

* As categorised by Environmental Protection (Prescribed Processes and Substances) 1991

APPENDIX 1.3: EXPERIENCE SURVEY- EMS DRIVERS, BENEFITS & DISADVANTAGES

<i>Company Name</i>	<i>Main Driver for EMS Implementation</i>	<i>Comments on Main Benefit of adopting BS 7750</i>	<i>Comments on Disadvantages of adopting BS 7750</i>
Akzo Nobel Chemicals Ltd	<ul style="list-style-type: none"> Legislative Compliance 	"Cost savings - the project paid for itself in less than a year".	"None"
Alcan Smelting & Power UK	<ul style="list-style-type: none"> Legislative compliance and Public Image 	"Employees are more aware of environmental impact and how they perform their jobs to minimise environmental effects. They now report minor incidents".	"None"
Anaplast Ltd	<ul style="list-style-type: none"> Public Image 	"All employees quickly become aware of the part they must play to maintain and achieve the standard".	"Establishing realistic objectives and targets"
Applied Chemicals	<ul style="list-style-type: none"> Competitive Advantage 	"Systematic approach, improved waste management, improved environmental performance".	"Lack of reward for exceeding set objectives and targets. Set a target of 25% reduction in special waste and achieved 48%. This makes our job harder in subsequent years."
Arjo Wiggins Fine Papers Ltd	<ul style="list-style-type: none"> Competitive Advantage 	"Competitive advantage".	"None"
Auto-Smart Ltd	<ul style="list-style-type: none"> Pressures from Customers 	"Improved efficiency, less wastage both in time as well as resources".	"None"
The Beacon Press Ltd	<ul style="list-style-type: none"> Competitive Advantage 	"Cost savings".	No comment
BICC Cables Ltd	<ul style="list-style-type: none"> Pressures from Customers 	"Employee motivation".	"None"
BOC Gases Europe	<ul style="list-style-type: none"> Legislative Compliance 	"Better trained workforce; more rigorous action planning; improved legislative compliance".	"Indirect effects from customers activities offer little benefit."
Carson Office Furniture Systems	<ul style="list-style-type: none"> Financial Savings 	"Public image".	"Communications register unnecessary"

APPENDIX 1.3: EXPERIENCE SURVEY- EMS DRIVERS, BENEFITS & DISADVANTAGES

Company Name	Main Driver for EMS Implementation	Comments on Main Benefit of adopting BS 7750	Comments on Disadvantages of adopting BS 7750
Curtis Fine Papers	<ul style="list-style-type: none"> Competitive Advantage 	"Consistent approach to managing environmental issues".	"Too early to comment"
Dunlop Limited, Precision Rubber Division (Shepshed and Bagworth Sites)	<ul style="list-style-type: none"> Pilot Site in the Introduction of a Company wide EMS 	"Through the effects analysis all disciplines are now more focused on the impacts of our activities".	No comment
Epson Telford Ltd.	<ul style="list-style-type: none"> Pilot Site for company in Japan 	"You actively look to improve performance in certain areas, so the mechanisms to achieve improvements are sought".	"Bureaucratic; some parts of the standard are interpreted differently by different parties and it may be difficult relating certain clauses to organisations."
Gleaner Oils Ltd	<ul style="list-style-type: none"> Pressures from Customers 	"A worthwhile management discipline for the security, continuity and success of our Company".	"None"
Lindsey Oil Refinery Ltd	<ul style="list-style-type: none"> Legislative Compliance 	"Staff environmental awareness improved; better appreciation of corrective action; management commitment confirmed".	"None"
NDM Manufacturing	<ul style="list-style-type: none"> Legislative Compliance 	No comment	"None"
P P Payne	<ul style="list-style-type: none"> Pressures from Customers 	"Waste minimisation; better understanding of effects of the process (effects register is a very useful tool)".	"Lack of the requirement to report performance."
Philips Components	<ul style="list-style-type: none"> Legislative Compliance 	"Employee awareness; improvements in energy conservation; improvement in waste control".	"None"
Ricoh (UK) Products Ltd	<ul style="list-style-type: none"> Pressure from Parent Company 	"Clear responsibility / accountability; management programme traceable to objectives; cost reduction, improved community relations; more professional approach to Environmental Committee meetings; improved supplier /	"None"

APPENDIX 1.3: EXPERIENCE SURVEY- EMS DRIVERS, BENEFITS & DISADVANTAGES

<i>Company Name</i>	<i>Main Driver for EMS Implementation</i>	<i>Comments on Main Benefit of adopting BS 7750</i>	<i>Comments on Disadvantages of adopting BS 7750</i>
		subcontractor / employee awareness".	
Shields Special Metals Ltd	<ul style="list-style-type: none"> Competitive Advantage 	"Securing contracts with major plcs"	"None, although certification bodies can be over zealous in auditing."
Thomas Swan & Co Ltd,	<ul style="list-style-type: none"> Financial Savings 	"Public image".	No comment
Wavin Buildings Products Ltd	<ul style="list-style-type: none"> Public Image 	"Improving overall awareness throughout the organisation of environmental issues".	"None"

APPENDIX 1.4: EXPERIENCE SURVEY - ENVIRONMENTAL IMPROVEMENTS & COST SAVINGS

<i>Company Name</i>	<i>Quantification of Savings</i>	<i>Environmental Improvements</i>
Akzo Nobel Chemicals Ltd	£80,000 pa	<ul style="list-style-type: none"> • Reduced releases to river • Reduced waste • Increased recycling • Improved monitoring • Reduced raw material usage • Improved containment
Alcan Smelting & Power UK	Not applicable	<ul style="list-style-type: none"> • Reduced air releases • Reduced released to river • Reduced waste production • Reduced incidents • Improved monitoring • Improved containment
Anaplast Ltd	Not applicable	<ul style="list-style-type: none"> • Reduced energy usage • Improved monitoring • Improved containment
Applied Chemicals	£100,000 (through waste reduction techniques and energy/natural resource utilisation)	<ul style="list-style-type: none"> • Reduced air releases • Reduced releases to sewer • Increased recycling • Reduced energy usage • Reduced waste production • Improved containment
Arjo Wiggins Fine Papers Ltd	Not quantified	<ul style="list-style-type: none"> • Improved monitoring

APPENDIX 1.4: EXPERIENCE SURVEY - ENVIRONMENTAL IMPROVEMENTS & COST SAVINGS

<i>Company Name</i>	<i>Quantification of Savings</i>	<i>Environmental Improvements</i>
Auto-Smart Ltd	Not quantified	<ul style="list-style-type: none"> • Reduced energy usage • Improved monitoring • Reduced waste • Improved containment
The Beacon Press Ltd	Not quantified	<ul style="list-style-type: none"> • Reduced releases to river • Increased recycling • Improved monitoring • Reduced energy usage • Improved containment
BICC Cables Ltd	£500,000/annum estimated through waste management.	<ul style="list-style-type: none"> • Reduced waste • Increased recycling • Reduced incidents • Improved monitoring • Reduced raw material usage • Reduced energy usage • Reduced water usage
BOC Gases Europe	Not quantified	<ul style="list-style-type: none"> • Reduced releases to river • Reduced energy usage • Improved monitoring • Reduced material usage • Improved containment

APPENDIX 1.4: EXPERIENCE SURVEY - ENVIRONMENTAL IMPROVEMENTS & COST SAVINGS

<i>Company Name</i>	<i>Quantification of Savings</i>	<i>Environmental Improvements</i>
Carson Office Furniture Systems	£30,000/annum estimated through waste management and energy management	<ul style="list-style-type: none"> • Reduced waste • Increased recycling • Reduced incidents • Improved monitoring • Reduced raw material usage • Reduced energy usage • Reduced water usage • Improved containment
Curtis Fine Papers	Not applicable	<ul style="list-style-type: none"> • Reduced energy usage • Improved monitoring • Reduced waste production • Improved containment
Dunlop Limited, Precision Rubber Division (Shepshed and Bagworth Sites)	Reductions in insurance premiums as a result of preventative procedural actions now in place	<ul style="list-style-type: none"> • Reduced air releases • Improved monitoring
Epson Telford Ltd.	£105,200/a saved through reduced landfill costs by increased recycling of office paper. £24,000/a saved through returning and reusing wooden pallets.	<ul style="list-style-type: none"> • Reduced air releases • Increased recycling • Improved containment
Gleaner Oils Ltd	Use of diesel cars for high mileage uses; energy saving ideas from staff - reduced temperature of boiler heating heavy fuel.	<ul style="list-style-type: none"> • Reduced waste • Improved monitoring • Reduced energy usage • Improved containment

APPENDIX 1.4: EXPERIENCE SURVEY - ENVIRONMENTAL IMPROVEMENTS & COST SAVINGS

<i>Company Name</i>	<i>Quantification of Savings</i>	<i>Environmental Improvements</i>
Lindsey Oil Refinery Ltd	Not quantified	<ul style="list-style-type: none"> • Increased recycling • Reduced energy usage • Reduced waste production • Improved containment
NDM Manufacturing	£50,000 through waste reductions and energy savings	<ul style="list-style-type: none"> • Reduced waste • Increased recycling • Reduced raw material usage • Reduced energy usage
P P Payne	£12,750 waste reduction; £7,200 saved through disposal costs, £30,000 reduced raw material consumption.	<ul style="list-style-type: none"> • Reduced waste • Increased recycling • Reduced incidents • Improved monitoring • Reduced raw material usage • Reduced water usage • Improved containment.
Philips Components	£150,000 in 1996 through energy reduction, water reduction and reduced waste disposal.	<ul style="list-style-type: none"> • Increased recycling • Reduced incidents • Improved monitoring • Reduced raw material usage • Reduced energy usage • Reduced water usage • Improved containment

APPENDIX 1.4: EXPERIENCE SURVEY - ENVIRONMENTAL IMPROVEMENTS & COST SAVINGS

<i>Company Name</i>	<i>Quantification of Savings</i>	<i>Environmental Improvements</i>
Ricoh (UK) Products Ltd	£100-200,000 pa	<ul style="list-style-type: none"> • Reduced releases to river • Reduced waste • Increased recycling • Improved monitoring • Reduced raw material usage • Reduced energy usage • Reduced water usage • Improved containment
Shields Special Metals Ltd	£35,000/a	<ul style="list-style-type: none"> • Reduced air releases • Reduced waste production • Increased recycling • Reduced raw material usage • Reduced energy usage • Reduced water usage
Thomas Swan & Co Ltd	Not quantified	<ul style="list-style-type: none"> • Reduced waste • Increased recycling
Wavin Buildings Products Ltd	Not quantified	<ul style="list-style-type: none"> • Reduced waste production • Increased recycling • Improved monitoring • Reduced raw material usage • Improved containment

APPENDIX 1.5: EXPERIENCE SURVEY : RESOURCE REQUIREMENTS

Company Name	Resource Requirements During Implementation							Maintenance Costs (Hours / year)
	Timescale (months)	No of people	Total Hours*	Total Cost	Capital Costs	Certification Fees	Most Time Consuming	
Akzo Nobel Chemicals Ltd	18	8	5,107	£55,000	Not quantified	£5,000	Effects Register	Not quantified
Alcan Smelting & Power UK	14	2	2,000	Approx £30,000	None	£700	Operational Control	200
Anaplast Ltd	36	2	Not quantified	Not quantified	Not quantified	Not quantified	No Comment	1000
Applied Chemicals	36	7	> 3000	Approx £45,000	Not quantified	Not quantified	No comment	300
Arjo Wiggins Fine Papers Ltd	18	1	5,107	£150,000	Not quantified	Not quantified	Effects Register	500
Auto-Smart Ltd	24	2	851	£15,000 - £20,000	£20,000	Not quantified	No comment	250
The Beacon Press Ltd	12	3	Not quantified	£20,000	Not quantified	Not quantified	Effects Register	Not quantified
BICC Cables Ltd	5	4	Not quantified	No additional cost	Not quantified	£3,500 plus £10,000/a surveillance	Effects Register	360
BOC Gases Europe	17	3	1,702	£40,000	Not quantified	Not quantified	No comment	Not quantified
Carson Office Furniture Systems	18	6	3,000	£20,000	£10,000	£3,000	Manuals / Procedures	Not quantified

APPENDIX 1.5: EXPERIENCE SURVEY : RESOURCE REQUIREMENTS

<i>Company Name</i>	<i>Resource Requirements During Implementation</i>							<i>Maintenance Costs (Hours / year)</i>
	<i>Timescale (months)</i>	<i>No of people</i>	<i>Total Hours*</i>	<i>Total Cost</i>	<i>Capital Costs</i>	<i>Certification Fees</i>	<i>Most Time Consuming</i>	
Curtis Fine Papers	24	8	2,500	£37,000	£2.5 m / a	Not quantified	No comment	400
Dunlop Limited, Precision Rubber Division (Shepshed and Bagworth Sites)	24-36	9	Not quantified	Not quantified	Not quantified	Not available	No comment	Not available
Epson Telford Ltd.	7	5	2,800	£55,000	£50,000 budget for equipment expenditure for 1996.	Not quantified	No comment	3000
Gleaner Oils Ltd	24	6	Not quantified	Not quantified	Yes (bundling tanks, spill kits for vehicles etc)	Not quantified	Effects Register	Not quantified
Lindsey Oil Refinery Ltd	24	2	3,405	£51,000	Not quantified	Not quantified	No comment	420
NDM Manufacturing	9	10	Not quantified	£10,000	Yes (bundling of a process and provision of emergency spillage equipment).	Not quantified	Effects Register	Not quantified

APPENDIX 1.5: EXPERIENCE SURVEY : RESOURCE REQUIREMENTS

Company Name	Resource Requirements During Implementation							Maintenance Costs (Hours / year)
	Timescale (months)	No of people	Total Hours*	Total Cost	Capital Costs	Certification Fees	Most Time Consuming	
P P Payne	6	6	800	£12,000	£6000	Not quantified	Internal Procedures	1175
Philips Components	9	1	1500	£22,000	None	Not quantified	Effects Register	Not quantified
Ricoh (UK) Products Ltd	7	12	2300	£12,000	Not quantified	Not quantified	Effects Register	4000
Shields Special Metals Ltd	14	1	Not quantified	Not quantified	None	£10,000	Effects Register and Procedures	Not quantified (£30,000/a)
Thomas Swan & Co Ltd,	24	7	Not quantified	£30,000	Yes	Not quantified	Effects Register	Not quantified
Wavin Buildings Products Ltd	24	4	800-1000	£20,000	None	£6,000	Effects Register	Not quantified

* Assuming 226 days a year at 7.5 hours a day i.e 1695 hours a year

APPENDIX 2.1: SOLVAY INTEROX'S EMS - IMPLEMENTATION PROGRAMME

YEAR 1													
Tasks	Weeks	1994				1995							
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP
Company Induction	1												
Identification of BS 7750 Requirements	1												
Identification of EMAS Requirements	1												
Strategy for Integration with ISRS/ISO 9000	4												
Determination of Project Stages	2												
Draft Environmental Management Manual	4												
TCS Induction & Mini-Project	4												
Develop New Environmental Policy	2												
Develop Effects Assessment Methodology	4												
Pilot Effects Procedure on Capa Plant	4												
Co-ordinate Effects Assessment of Site	6												
Procedures for New Legislation	4												
Register of Regulations & Policy Requirements	4												
Supervise Supplier Assessment Project	3												
Training Procedures	4												
TOTAL WEEKS	48												

APPENDIX 2.1: SOLVAY INTEROX'S EMS - IMPLEMENTATION PROGRAMME

YEAR 2													
Tasks	Weeks	1995					1996						
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP
Completion of Effects Assessment	4												
EQS Software Trial & Assessment	4												
Proposals for HSE Integration	2												
Draft new RCLP Integrated HSE Manual	2												
Emission Inventory Procedures	8												
Environmental Auditing Procedures	4												
Review Contractor Awareness Procedures	2												
Procedures for Objectives & Targets	6												
Update Effects Assessment & Procedure	4												
Identify Operational Control Procedures	5*												
Final Report	2												
Supporting Studies, Courses, Papers etc	4												
TOTAL	47												

* Time available within TCS project

APPENDIX 2.1: SOLVAY INTEROX'S EMS - IMPLEMENTATION PROGRAMME

YEAR 3													
Tasks	Weeks	1996				1997							
		OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP
RCLP Manual Issue & Communication	3												
Sewer Effluent Simulation & Procedure	0.5												
Environmental Programme	2												
Update Register of Regulations & Procedure	2												
Issue Enviro Group Procedures Manual	2												
Operational Control Procedure	5												
Training Needs Analysis, Plan & Procedure	5												
Update Induction Handout	1												
Auditing (including training)	5												
Management Review Procedure	1												
New Developments Procedure	3												
TOTAL	47												

APPENDIX 2.2: SOLVAY INTEROX'S EMS - ENVIRONMENTAL POLICY CHECKLIST

COMMITMENTS	GUIDING POLICIES						COMPANY POLICIES					
	Valdez Principles	CIA Responsible Care	CIA Prod Stew	CEPIC Principles	ICC Charter Sus Dev	EMAS Scheme	ICI	Du Pont	Monsanto	Glaxo	Solvay Group	✓
Educate General Public		*		*	*							X
Support Local Community					*							✓
Publish Environmental Reports	*		*		*		*	*				✓
Liaise with Local Community												✓
Provide Info in Open Manner						*					*	✓
Cause No Offence to Local Residents												✓
Improve Staff Info & Training	*	*	*	*	*	*	*	*				✓
Ensure Personal Responsibility							*	*				✓
Employ Qualified Personnel	*											✓
Encourage Supplier Performance	*	*	*		*	*		*				✓
Control Raw Material Sourcing												X
Encourage Performance of Contractors	*	*	*		*	*	*	*				✓
Set Equal Standards for Contractors		*	*	*	*							X
Product Stewardship	*	*	*	*	*	*	*	*			*	✓
Meet or Exceed Legal Requirements	*	*			*		*			*		✓
Work with Appropriate Authorities										*		✓
Environmental Management System												✓
Carry Out Environmental Audits										*		✓
Assess, Control & Reduce Impact				*		*		*		*	*	✓

APPENDIX 2.2: SOLVAY INTEROX'S EMS - ENVIRONMENTAL POLICY CHECKLIST

COMMITMENTS	GUIDING POLICIES						COMPANY POLICIES					
	Valdez Principles	CIA Responsible Care	CIA Prod Stew	CEFIC Principles	ICC Charter Sus Dev	EMAS Scheme	ICI	Du Pont	Monsanto	Glaxo	Solvay Group	✓
Use Effective Controls						*						✓
Set and Review Objectives											*	✓
Carry out Monitoring and Targeting							*					✓
Assess & Quantify Progress											*	✓
Integrate Environmental Management				*	*							✓
Accept Cradle to Grave Responsibility												X
Undertake Life-Cycle Analysis	*											X
Promote Products use in Env. Protection							*				*	✓
Adopt Safe Technologies	*								*			✓
Prevention & Mastering risk of Incidents						*		*			*	✓
Contingency Procedures For Incidents						*						✓
Take Effective Action on Incidents	*			*	*	*		*				✓
Energy Conservation	*				*	*		*				✓
Conserve Non-Renewable Resources	*			*	*	*		*				X
Conserve Renewable Resources	*			*		*		*				X
Sustainable Development Commitment	*				*	*		*				X
Continuous Improvement Commitment	*					*	*	*	*		*	✓
Environmental Transport Policy												X
Environmental Investments												X

APPENDIX 2.2: SOLVAY INTEROX'S EMS - ENVIRONMENTAL POLICY CHECKLIST

COMMITMENTS	GUIDING POLICIES						COMPANY POLICIES					
	Valdez Principles	CIA Responsible Care	CIA Prod Stew	CEPIC Principles	ICC Charter Sus Dev	EMAS Scheme	ICI	Du Pont	Monsanto	Glaxo	Solvay Group	✓
Considerations in Decision Making						*		*		*		X
Aim for "Waste Free" Processes								*	*			X
Treat Waste at Source												X
Minimise, Reduce or Reuse Wastes	*		*	*	*	*		*	*			✓
Increase Recycling	*		*		*	*		*			*	✓
Dispose of Waste with Minimal Impact												✓
"Duty of Care" for Waste Disposal	*		*	*	*	*		*			*	✓
Minimise / Reduce Pollution	*			*		*		*	*			✓
Ensure Groundwater Safety									*			✓
Minimise Effects of New Processes				*	*	*						✓
Research Environmentally Sound Processes												X
No Undue to Risks to. Employees									*			✓
No Undue Risks to Community									*			✓
Control & Reduction of Noise						*						✓
Protection of Communities								*		*		✓
Keep Plant Open to Community									*			✓
Commitment to Responsible Care							*	*				✓
Commitment to ICC Charter							*					X
Manage Real Estate to Ben Nature								*	*			X

APPENDIX 2.2: SOLVAY INTEROX'S EMS - ENVIRONMENTAL POLICY CHECKLIST

COMMITMENTS	GUIDING POLICIES						COMPANY POLICIES					
	Valdez Principles	CIA Responsible Care	CIA Prod Stew	CEFIC Principles	ICC Charter Sus Dev	EMAS Scheme	ICI	Du Pont	Monsanto	Glaxo	Solvay Group	✓
Protect Eco-habitats	*			*	*							X
Tackle Conservation Problems	*											X
Company Group Policy												✓

APPENDIX 2.3: SOLVAY INTEROX'S EMS - TRAINING NEEDS ANALYSIS

	General Awareness	Legal Liabilities for Director	Regulatory Background	Legislative Control	Operational Procedures	Waste Minimisation	Environmental Effects	Spillage Response	Local Community Liason	Environmental Auditing	Product Stewardship	Objectives & Targets	Emission Monitoring	BS 7750 / ISO 14001
M.D & Executive Committee	✓	✓	✓	✓	✓	✓	✓		✓			✓		✓
Production & Environmental Services Manager	✓		✓	✓	✓	✓	✓		✓			✓		✓
Operations & Engineering Managers	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
Communications Manager	✓								✓		✓			
Transport Manager	✓													
Purchasing Manager	✓													
Technical Staff	✓		✓	✓	✓	✓	✓	✓				✓	✓	✓
Project Engineering Staff	✓		✓	✓	✓						✓			✓
Commercial Staff	✓				✓						✓			
Team Managers	✓			✓	✓	✓	✓	✓				✓	✓	
Lab Staff	✓			✓	✓	✓	✓	✓				✓	✓	
Process Operators & Maintenance	✓			✓	✓	✓	✓	✓				✓	✓	
Security Officers	✓													
Environmental Coordinators	✓		✓	✓	✓	✓	✓	✓				✓	✓	
Environmental Auditors	✓									✓				
Emergency Response Team	✓			✓				✓						
Office Based Personnel	✓													

APPENDIX 2.3: SOLVAY INTEROX'S EMS - TRAINING NEEDS ANALYSIS

KEY

General Awareness: to include RCLP policy, environmental objectives and key targets, Responsible Care commitment, site environmental issues and effects, benefits of improved environmental performance and consequences of departure from specified operating conditions.

Regulatory Background: to include BATNEEC, BPEO, IPC, EPA 1990 and Duty of Care.

Legislative Control: to include discharge consents, IPC Authorisation Limits etc

Operational Procedures: to include bund emptying, tanker off-loading, waste management, accidental releases etc

APPENDIX 2.4: SOLVAY INTEROX'S EMS - GROSS FACTORS FOR ENVIRONMENTAL EFFECTS ASSESSMENT

GROSS FACTORS

GROSS FACTORS																			
X	SEW	RIV	LANDFILL								TREAT.	INCINERATION				REC REUSE	WASTE CATEG.		GROSS FACTOR
			LIQ	SLD	SLDG	ORG	INORG	CONT	D&D	CLN		HAL	REC	NO-REC	SPEC		NON-SP		
X	3	20	3	1	2	3	1	8	12	3	3	1	3	1	3	0.1	0.1	3	1
Sewer Effluent - H ₂ O ₂	3	3																	9
Sewer Effluent - C.O.D	7	20																	140
Sewer Effluent - SO ₄	0.01	3																	0.03
Sewer Effluent - Oil & Grease	7	3																	21
Sewer Effluent - SS	12	3																	36
Sewer Effluent- Cl ⁻	0.01	3																	0.03
Sewer Effluent - Hg (kg)	100	20																	2000
River Effluent - H ₂ O ₂	3	20																	60
River Effluent - C.O.D	7	20																	140
River Effluent - Cl ⁻	0.01	20																	0.2
River Effluent - SO ₄	0.01	20																	0.2
River Effluent - Hg (kg)	100	20																	2000
River Effluent - Cd (kg)	100	20																	2000
River Effluent -SS	12	20																	240
River Effluent - PO ₄	20	20																	400
River Effluent -H ₂ SO ₄	50	20																	1000
River Effluent - Boron	5	20																	100
Capa Residues			1			3													72
Capa - Solid Polymer Waste			1			3		8										1	24

APPENDIX 2.4: SOLVAY INTEROX'S EMS - GROSS FACTORS FOR ENVIRONMENTAL EFFECTS ASSESSMENT

GROSS FACTORS																	
X	SEW	RIV	LANDFILL						TREAT.	INCINERATION			REC REUSE	WASTE CATEG.		GROSS FACTOR	
			LIQ	SLD	SLDG	ORG	INORG	CONT		D&D	CLN	HAL		REC	NO-REC		SPEC
X	3	20	3	1	2	3	1	8	12	3	1	3	1	0.1	3	1	
Capa - Liquid Polymer Waste										3						1	3
Capa - Caustic Meths Washings										3					3		9
Capa - Reactor Liquid Waste										3					3		9
Capa - Ketone Tank Cleaning Slops											1				3		9
Capa - Process Samples											1		3				9
Capa - Residue Samples (Light Residues)				1		3		8							3		72
Capa - Oily Water Separator Sludge					2	3										1	6
AO - Caustic Tars			3				1	8							3		72
AO - Working Solution												1			3		3
AO - Spent Catalyst													0.1				0.1
AO -Spent Carbons													0.1				0.1
Persalts - Tincal Sludge					2		1		12							1	24
General Waste				1				1	8							1	8
Drums				1										0.1			0.1

Key:

LIQ = Liquid; SLD = Solid; SLDG = Sludge; INORG = Inorganic; CONT = Contained Landfill; D&D = Dilute and Disperse Landfill; CLN = Chlorinated; HAL = Halogenated; NO - REC = No Heat Recovery; REC = Recycled; SPEC = Special Waste; NON-SP = Non-Special

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
AO Crude	Air	VOCs released from carbon absorption beds (sextate and shellsol AB/Solvessa 150)	Associated with ground level ozone formation and some depletion of ozone layer. Prescribed substances for release to air (EPA 1990).	14.1	100	1410	High	Limit in 1998 will be set by EA of 80mg/m ³ . Compliance with this limit is an outstanding issue.
AO Crude	Air	VOCs from process vents, valves, storage and transfer operations (sextate and shellsol AB/Solvessa 150)	Associated with ground level ozone formation and some depletion of ozone layer. Prescribed substances for release to air (EPA 1990). Potential to cause nuisance due to pungent odour.	N/A	N/A	N/A	Low	
AO Crude	Air	Hydrogen peroxide released from various stages of the process e.g. purification, distillation, blending, storage and distribution.	Consequences are not likely to be severe eg a typical transfer of 18m ³ of 35% will only release ~ 5g of vapour.	0.1	1	0.1	Low	
AO Crude	Sewer	COD	Gives rise to odour problems in NW pumping station. Associated with de-oxygenation in receiving water course.	265	140	37,100	High	12 complaints received in 1995 regarding odours from NWW pumping station.
AO Crude	Sewer	Oil and Grease (free phase working solution)	Enhances odour problem in pumping station.	0.1	N/A	N/A	Med/High	
AO Crude	Sewer	Chloride ions	No particular environmental concerns when released into Mersey Estuary.	136	0.03	4.08	Low	
AO Crude	Sewer	Sulphate ions	Not associated with any particular concerns when discharged into an estuary. Effluent analysis indicates levels of 104mg/l which is significantly below discharge consent = 1000mg/l.	8	0.03	0.24	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
AO Crude	Sewer	Quinone & Derivatives	Contributes towards COD loading. Tests by NWW indicate good biodegradability for secondary treatment plant to be installed 1998.	6.73	140	942.2	Low	
AO Crude	Sewer	Di-n-Butylamine		0.47	140	65.8	Low	
AO Crude	Sewer	Suspended solids	Removed from effluent during treatment by NW water. Sludge disposed of at sea.	7.5	36	270	Low	
AO Crude	Sewer	Temperature	Discharge Consent = 43.3°C	< 30°C*	N/A	N/A	Low	
AO Crude	Sewer	Flowrate	Average flow is 7.53 m ³ /hr although levels exceed discharge consent of 18m ³ /hr.	10-30 m ³ /hr	N/A	N/A	Low	In previous years flow exceeded consent - engineering controls now ensure compliance
AO Crude	Sewer	Acidity / Alkalinity	Acidic conditions have a corrosive effect on NWW drainage system and pumping station . Potential to breach discharge consent = 6-10	N/A	N/A	N/A	High	50% failure rate compared with consent conditions.
AO Distillation	River	Hydrogen Peroxide (<10*mg/l)	Effluent analysis indicates levels < 10*mg/l. Contributes towards hydrogen peroxide levels in site effluent (outfall consent = 100mg/l).	17.5	60	1050	Med/High	Uncontrolled release associated with poor containment and occasional high still overhead losses.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
AO Distillation	River	Chemical Oxygen Demand (31* mg/l).	Effluent analysis indicates levels of 31* mg/l - contributes towards COD levels in site effluent (outfall consent = 200mg/l). Associated with de-oxygenation of River Mersey.	32	140	4480	Med	Measurement affected by chlorine ion content
AO Distillation	River	Chloride Ions (2640* mg/l)	No concerns when discharged into an estuary.	4039	0.2	807.8	Low	
AO Distillation	River	Hg (from well water)	Contributes towards heavy metals in site effluent (outfall consent = 10mg/l). Prescribed substances for release to water (EPA 1990), however, quantities released are extremely small.	0.183	2000	366	Low	
AO Distillation	River	Temperature	Contributes towards temperature of site effluent (outfall consent = 30°C)	< 30°C*	N/A	N/A	Low	
AO Distillation	River	Suspended Solids (< 30*mg/l).	Contributes towards suspended solids in site effluent (outfall consent = 100mg/l).	10	240	2400	Low	
AO Distillation	River	Acidity/Alkalinity (pH 8-8.2*).	Contributes towards pH of site effluent (outfall consent = 5-10).	N/A	N/A	N/A	Low	
AO Distillation	River	Flowrate	Contributes towards flowrate of site effluent (outfall consent = 11,000m ³ /hr).	210m ³ /hr	N/A	N/A	Low	
AO New Distillation	Sewer	Effluent from new Distillation Plant containing peroxide and small quantity of COD. To mix with PBS-4 effluent before discharge to sewer.	Contributes towards peroxide and COD loading of site effluent.	N/A	N/A	-	Med/High	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
New DMW	River	Acidity / Alkalinity - normally acidic.	Contributes towards pH of site effluent (outfall consent = 5-10). Consequences not likely to be severe as effluent is neutralised by alkaline PBS effluents before discharge to River.	N/A	N/A	N/A	Low	PCS effluent neutralisation will mean DMW effluent will cause a breach of NRA consents at outfall.
New DMW	River	Mercury (from contaminants in sodium hydroxide and well water)	Prescribed substance for release to water (EPA 1990). Extremely small quantity released.	0.006	2000	12	Low	
New DMW	River	Cadmium (from contaminants in sodium hydroxide and well water)	Prescribed substance for release to water (EPA 1990). Extremely small quantity released.	0.006	2000	12	Low	
New DMW	River	COD resulting from concentration of TOC in towns water.	Contributes towards COD levels in site effluent (outfall consent = 200mg/l). Associated with de-oxygenation of River Mersey.	N/A	N/A	N/A	Low	
New DMW	River	Flowrate	Approximately 35m ³ /hr - contributes towards flow rate of site effluent (outfall consent = 11,000 m ³ /day)	35m ³ /hr	N/A	N/A	Low	
AO Crude	Waste	AO Tars - containing a range of organic compounds e.g. alkyl benzenes, quinones and alkyl benzoates. 80% water.	Currently one stream being disposed to sewer other stream landfilled after neutralisation. Landfill gas management system in operation at landfill site.	158	72	11,376	High	
AO Crude	Waste	Working Solution (organic polar solvents, aromatic hydrocarbons and quinones) - infrequent disposal.	Incineration is usual method of disposal - associated with air pollution.	-	3	N/A	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
AO Crude	Waste	Waste spent palladium catalyst - periodic disposal.		-	0.1	N/A	Low	
AO Crude	Waste	Disposal of waste carbons from carbon beds.	Recycled as a waste kiln fuel.	-	0.1	N/A	Low	
New DMW	Waste	Disposal of brine wash waste from DMW caustic wash of resins - high COD, strong brown colour	Stored in tankers for subsequent off site disposal via treatment.	-	-	N/A	Med /High	Current operation poses risks associated with temporary handling facilities and additional acid/alkaline effluent loading.
AO General	Waste	Leaks of working solution from AO drainage system.	Land contamination with working solution consisting of organic solvents and quinones.	N/A	N/A	N/A	Low	New stainless steel drainage system installed Sept 1995.
AO General	Resource Usage	Acid Sodium Pyrophosphate		15.8	N/A	N/A	Low	
AO General	Resource Usage	New Activated Carbon	Not classified as dangerous (CHIP)	2.2	N/A	N/A	Low	
AO General	Resource Usage	Regenerated Activated Carbon	Not classified as dangerous (CHIP)	830	N/A	N/A	Low	
AO General	Resource Usage	Ammonia		119	N/A	N/A	Low	
AO General	Resource Usage	Caustic Soda Liquor	Alkaline	135	N/A	N/A	Low	
AO General	Resource Usage	Di-n-Butylamine		1.8	N/A	N/A	Low	
AO General	Resource Usage	Dequest 2010		0.8	N/A	N/A	Low	
AO General	Resource Usage	Ethyl - Anthraquinone	Not classified as dangerous (CHIP). No particular environmental concerns.	44	N/A	N/A	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
AO General	Resource Usage	Working Solution		170	N/A	N/A	Low	
AO General	Resource Usage	Hydrogen Gas	Highly flammable (CHIP). Piped directly to site from ICI. No particular environmental concerns.	29,000 km ³	N/A	N/A	Low	
AO General	Resource Usage	Nitric Acid	Corrosive (CHIP)	81	N/A	N/A	Low	
AO General	Resource Usage	Nitrogen	Not classified as dangerous (CHIP)	1593km ³	N/A	N/A	Low	
AO General	Resource Usage	Palladium Catalyst (Bought)	Not classified as dangerous (CHIP)	2	N/A	N/A	Low	
AO General	Resource Usage	Aromatic Solvent (Solvesso 150)	Harmful (CHIP)	203	N/A	N/A	Low	
AO General	Resource Usage	Sextate (purchased)		118	N/A	N/A	Low	
AO General	Resource Usage	Towns water	Depletion of natural resources.	52,813m ³	N/A	N/A	–	See Site General
AO General	Resource Usage	Well water (used to supplement cooling water supplies). Abstracted locally from 5 wells.	Depletion of natural resources.	533,668m ³	N/A	N/A	–	See Site General
AO General	Resource Usage	Low pressure steam (used in crude and distillation stages).	Produced by BP Power House. Associated with air pollution from burning gas.	32,375	N/A	N/A	–	See Site General
AO General	Resource Usage	Mains Electricity	Air pollution from burning fuel, depletion of natural resources. AO Plant uses approximately 50% of site supply.	14,626 MWH	N/A	N/A	–	See Site General
AO General	Resource Usage	Compressed Air		2450km ³	N/A	N/A	–	See Site General

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
AO General	Resource Usage	DMW water (used in extraction and reversion washing; cooling; in-line addition to reactants, products and intermediates; and for domestic supply)	Depletion of natural resources.	97,483m ³	N/A	N/A	–	See Site General
AO General	Nuisance	Noise	Contributes towards general noise from site. However, no specific high noise sources.	N/A	N/A	N/A	Low	No specific complaints received therefore not considered significant.
AO General	Indirect	Use of product by chemical industry - generally high strength to 70%.		N/A	N/A	N/A	Low	Advice and support is provided to customers.
AO General	Indirect	Use of product in textiles - generally high strength to 70%.		N/A	N/A	N/A	Low	Advice and support is provided to customers.
AO General	Indirect	Use of product in pulp & paper industry as bleach - generally high strength to 70%.		N/A	N/A	N/A	Low	Advice and support is provided to customers.
AO General	Indirect	Use of product in cosmetic toiletries - low quantities of low strength material e.g. hair bleach and mouth wash.	Material below 10% does not give rise to significant safety problems.	N/A	N/A	N/A	Low	Advice and support is provided to customers.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
AO General	Indirect	Use of product in effluent and sewerage treatment odour control.		N/A	N/A	N/A	Low	Advice and support is provided to customers.
AO General	Indirect	Use of sodium chlorite - used in water treatment, textile bleaching and electronics industry.		N/A	N/A	N/A	Low	
Capa	Air	Acetic acid form storage tanks and transfer operations. Max release occurs during bulk deliveries.		0.042	100	4.2	Low	Quench tank installed on acetic acid storage tank.
Capa	Air	Cyclohexanone from storage, delivery and transfers. Max release occurs during bulk deliveries.	Cyclohexanone - potential to cause nuisance from Pungent / Sweetish Odour. GLC up to 1.8 mg/m ³ (Max allowable = 2.5 mg/m ³).	0.313	100	31.3	Med/High	Currently on hold with EA agreement pending shut-down of old Capa Plant.
Capa	Air	Hydrogen peroxide from various process vents.	Consequences not likely to be severe due to extremely small quantity released. Not a prescribed substance for release to air.	0.015	1	0.015	Low	
Capa	Air	Arcton HCFC 22 Hydro Fluoro Chloro Gas released from refrigeration units on polymer plant	Associated with stratospheric ozone depletion. Included in scope of Montreal Protocol - manufacture to be phased out.	0.001	1000	1	Med	
Capa	Air	Nitrogen gas	No particular environmental concerns.	381	0.01	3.81	Low	
Capa	Air	Peracetic acid from still dump to happenings pit.	Potential to cause nuisance due to pungent odour. Controlled by Statutory Nuisance Legislation (EPA 1990).	N/A	N/A	N/A	Med	No complaints from the public since previous assessment.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Capa	Air	Vapours of caproic & valeric acid from residue tank vents.	Potential to cause nuisance due to pungent odour . Controlled by Statutory Nuisance Legislation (EPA 1990).	0.02	100	2	Med/High	No complaints from the public since previous assessment.
Capa	Sewer	COD (in process effluent from 400 section scavenging column and small purge on 100 section reactor)	Contributes towards de-oxygenation in River Mersey.	237	140	33180	High	
Capa	Sewer	Flow rate (in process effluent from 400 section scavenging column and small purge on 100 section reactor)	Average flow of 44.6m ³ /hr average Causes breach of discharge of consent of 27m ³ /hr.	NA	N/A	N/A	High	Causes a breach of discharge consent although a temporary higher consent limit is agreed with authorities.
Capa	Sewer	Heavy Metals (in process effluent from 400 section scavenging column and purge on 100 section reactor)	Mercury and Cadmium are classed as prescribed substances for release to water (EPA 1990). However, effluent analysis indicates levels of 1.4mg/l - significantly below discharge consent of 10mg/l.	N.A	N.A	N.A	Low	
Capa	Sewer	Hydrogen Peroxide (in process effluent mainly from 400 section scavenging column and purge on 100 section reactor)		8.69	9	78.21	Low	
Capa	Sewer	Acidity (of process effluent mainly from 400 section scavenging column and purge on 100 section reactor)	Generally within consent range of 6-10. Neutralised on plant by NaOH.	N/A	N/A	N/A	Med/High	Several incidents in 1995 gave rise to alkaline effluent from spillages and neutralisation system faults.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Capa	Air	Vapours of caproic & valeric acid from residue tank vents.	Potential to cause nuisance due to pungent odour . Controlled by Statutory Nuisance Legislation (EPA 1990).	0.02	100	2	Med/High	No complaints from the public since previous assessment.
Capa	Sewer	COD (in process effluent from 400 section scavenging column and small purge on 100 section reactor)	Contributes towards de-oxygenation in River Mersey.	237	140	33180	High	
Capa	Sewer	Flow rate (in process effluent from 400 section scavenging column and small purge on 100 section reactor)	Average flow of 44.6m ³ /hr average Causes breach of discharge of consent of 27m ³ /hr.	NA	N/A	N/A	High	Causes a breach of discharge consent although a temporary higher consent limit is agreed with authorities.
Capa	Sewer	Heavy Metals (in process effluent from 400 section scavenging column and purge on 100 section reactor)	Mercury and Cadmium are classed as prescribed substances for release to water (EPA 1990). However, effluent analysis indicates levels of 1.4mg/l - significantly below discharge consent of 10mg/l.	N.A	N.A	N.A	Low	
Capa	Sewer	Hydrogen Peroxide (in process effluent mainly from 400 section scavenging column and purge on 100 section reactor)		8.69	9	78.21	Low	
Capa	Sewer	Acidity (of process effluent mainly from 400 section scavenging column and purge on 100 section reactor)	Generally within consent range of 6-10. Neutralised on plant by NaOH.	N/A	N/A	N/A	Med/High	Several incidents in 1995 gave rise to alkaline effluent from spillages and neutralisation system faults.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Capa	Sewer	Suspended solids (in process effluent mainly from 400 section scavenging column and purge on 100 section reactor)	Removed during NWW water treatment.	16.4	36	590.4	Low	
Capa	Sewer	Oil & Grease (in process effluent mainly from 400 section scavenging column and purge on 100 section reactor)	Effluent analysis indicates levels of < 1*mg/l ie significantly below discharge consent of 50mg/l.	0.3	21	6.3	Low	
Capa	Sewer	Sulphate ions (in process effluent mainly from 400 section scavenging column and purge on 100 section reactor)	Effluent analysis indicates levels of 154*mg/l which is significantly below discharge consent of 200mg/l. Not associated with any particular environmental concerns.	46	0.03	1.38	Low	
Capa	Sewer	Chloride ions (in process effluent mainly from 400 section scavenging column and purge on 100 section reactor)	Not associated with any particular environmental concerns.	900	0.03	27	Low	
Capa	Sewer	Temperature (in process effluent mainly from 400 section scavenging column and purge on 100 section reactor)	Consent of 43.30C	N/A	N/A	N/A	Med/High	No current regular monitoring to ensure compliance.
Capa	River	Oily Water Separator Overflow	Contents can overflow to River due to inadequacy of existing pump and pipework.	N/A	N/A	N/A	High	
Capa	River	Flow rate of cooling water		150m ³ /hr	N/A	N/A	Low	
Capa	River	COD in cooling water		16	140	2240	Low	
Capa	River	Hg in cooling water		0.166	2000	332	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Capa	River	Chloride ions in cooling water	No environmental concerns when discharged into an Estuary	3000	0.03	90	Low	
Capa	River	Peroxide and PAA added to cooling water as an algacide (concentration of 25ppm or 30 litres a day).		11	60	650	Low	Impact predicted as insignificant.
Capa	Waste	Caprolactone residues from 400 section	"Special Waste", Irritant (CPL Regs). Landfilled - associated with leachate and gas formation.	1056	72	76032	High	
Capa	Waste	Solid polymeric waste	"Non-Special". Landfilled -associated with leachate and gas formation. High molecular weight polymers are particularly biodegradable.	61	24	1464	Low	
Capa	Waste	Caustic Meths Washings (IMS) (from annual cleaning of process equipment)	"Special Waste", Corrosive/Flammable (CPL Regs). Disposed of by treatment.	20	9	180	Low	
Capa	Waste	Monomer washings from reactors on polymer plant	"Special Waste". Currently disposed of as solid polymer waste (solidified by addition of HCl)	15	24	360	Low	
Capa	Waste	Cyclohexanone waste from tank cleaning	"Special Waste". Disposed of by incinerated which is associated with air pollution.	10.92	9	98.28	Low	
Capa	Waste	Process samples (drummed waste - disposed of via incineration)	Classified as "Special Waste" - Control of Pollution (Special Waste Regs 1980). Incineration is associated with air pollution.	36	9	324	Low	
Capa	Waste	Oily Water Separator Sludge - disposed of via landfill.	Considered to be Non-hazardous. Landfill is associated with leachate and gas formation.	1.9	6	11.4	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Capa	Resource Usage	Use of Sulphuric Acid	Corrosive (CPL)	64	N/A	N/A	Low	
Capa	Resource Usage	Use of Glacial Acetic Acid	Produced by BP Chemicals (Grade A). Corrosive/Flammable (CPL).	186	N/A	N/A	Low	
Capa	Resource Usage	Use of Caustic Soda Liquor	Corrosive (CPL)	184	N/A	N/A	Low	
Capa	Resource Usage	Use of Dibutyl Tin Dilaurate (Stanciere TC) - used as a catalyst.		0.015	N/A	N/A	Low	
Capa	Resource Usage	Use of Industrial Spirits (cleaning)		0	N/A	N/A	Low	
Capa	Resource Usage	Use of Nitrogen	Provided by BOC Gases Ltd	423km ³	N/A	N/A	Low	
Capa	Resource Usage	Use of Hydrogen Peroxide	Corrosive/Oxidising (CPL). Produced on site by AO Plant	176	N/A	N/A	Low	
Capa	Resource Usage	Use of Cyclohexanone	Produced by DSM (Grade A). Harmful / Flammable(CPL)	7583	N/A	N/A	Low	
Capa	Resource Usage	Use of Stannous Octoate (Catalyst)	Irritant (CPL).	0.054	N/A	N/A	Low	
Capa	Resource Usage	Use of Santoflex IP		5.14	N/A	N/A	Low	
Capa	Resource Usage	Initiators eg di-ethylene glycol, glycerol, butane 1-4 diol, neopentylglycol, pentaerythritol, Irganox 1010, tri-methylolpropane, topanol, polytetrahydrofuran glycol, cetyl Alcohol		< 600*	N/A	N/A	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Capa	Resource Usage	Additives eg sterically hindered phenol, santoflex IP/anchor powder, IPPD, stanowhite powder, staboxol I anti-hydrolysis agent	Use of Towns (Purchased) Water - for showers, seals and domestic uses.	< 20*	N/A	N/A	Low	
Capa	Resource Usage	Use of Well Water - used for cooling purposes.	Use of a natural resource.	4446m ³	N/A	N/A	-	See Site General
Capa	Resource Usage	Use of Well Water - used for cooling purposes.	Use of natural resources - Abstracted locally from 5 wells (3 located on site). Capa Plant is one of the main users.	1330km ³	N/A	N/A	-	See Site General
Capa	Resource Usage	Use of Demineralised Water	Use of a natural resource. Provided by DMW Plant (see AO Assessment)	66km ³	N/A	N/A	-	See Site General
Capa	Resource Usage	Use of High Pressure Steam	Associated with natural gas usage, acid rain etc Provided by Site Boiler House (see Boiler House Assessment). Capa uses 5% of total for site.	73km ³	N/A	N/A	-	See Site General
Capa	Resource Usage	Use of Mains Electricity - used for fans, lights and pumps etc	Associated with acid rain, green house effects etc. Capa plant uses 8% of site electricity usage.	2, 861 MWh	N/A	N/A	-	See Site General
Capa	Nuisance	Noise	Contributes towards general noise from site. However, no specific high noise sources.	N/A	N/A	N/A	Low	No complaints since last assessment therefore not considered significant.
Capa	Indirect	Use of caprolactone monomer - to form polyesters and resins (paints, inks etc)	No particular concerns - Capa Monomer is classed as an Irritant (CPL)	N/A	N/A	N/A	Low	
Capa	Indirect	Use of low molecular weight polymers - to form hard wearing elastic, adhesives etc.	No particular concerns - capa polymer is non-hazardous.	N/A	N/A	N/A	Low	

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AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Capa	Indirect	Use of high molecular weight polymers - e.g in modelling kits, shoes etc	No particular concerns - capa polymer is non-hazardous.	N/A	N/A	N/A	Low	
Capa	Indirect	Final Disposal of Capa Products.	No particular environmental concerns - capa polymer is biodegradable.	N/A	N/A	N/A	Low	
New Capa	Air	VOCs from various process vents and valves.	Associated with low level ozone depletion	0.2	100	20	Low	Awaiting IPC Authorisation
New Capa	Sewer	Flow rate of process effluent	Estimated at ~ 30 m ³ /hr	N/A	N/A	N/A	Low	Awaiting IPC Authorisation
New Capa	Sewer	Chemical oxygen demand of process effluent.	Contributes towards de-oxygenation in River Mersey.	180	140	25200	High	Awaiting IPC Authorisation
New Capa	Sewer	Suspended solids in process effluent.	Effluent simulation indicates levels of 25 mg/l	6.5	36	234	Low	Awaiting IPC Authorisation
New Capa	Sewer	Hydrogen peroxide in process effluent.		2.2	9	19.8	Low	Awaiting IPC Authorisation
New Capa	River	Uncontaminated cooling water	No particular environmental concerns.	340 m ³ /hr	N/A	N/A	Low	Awaiting IPC Authorisation
New Capa	Waste	Capa residues	Landfilled - associated with landfill gas production and leachate.	1949	72	140328	High	Awaiting IPC Authorisation
Persalts	Air	Dust from scrubbing systems	Invisible during normal operating conditions.	4	50	200		Abatement systems in place to reduce amount of airborne particulate matter.
Persalts	Air	CO ₂ from PBS-1 Burners	Associated with global warming	465	0.5	232.5	Low	New boilers installed 1994
Persalts	Air	CO form PBS-1 Burners	Associated with global warming	0.05	5	0.24	Low	New boilers installed 1995
Persalts	Air	NO _x from PBS-1 Burners	Associated with acid rain formation.	0.05	100	4.8	Low	New boilers installed 1996

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Persalts	River	Cooling water - discharged direct to river without treatment.	Uncontaminated cooling water - contributes towards flow rate of site effluent (outfall consent = 11,000 m ³ /day)	30m ³ /hr	N/A	N/A	Low	
Persalts	River	Floor washings and contaminated rain water from the silo buildings and loading bay.	No treatment before discharge to river. Potential to cause high solids at outfall and high peroxide loading.	N/A	N/A	N/A	High	
Persalts	River	COD in PBS process effluent (mainly from overflow of mother liquor tank and L3 wet scrubber - passes through settlement pit before discharge).	Contributes towards COD loading of site effluent (Outfall consent = 200mg/l). Associated with de-oxygenation of River Mersey.	52	140	7280	Med	
Persalts	River	Hydrogen peroxide in PBS process effluent (from mother liquor tank overflow and L3 wet scrubber - passes through settlement pit before discharge).	Contributes towards peroxide loading of site effluent (outfall consent = 100mg/l).	103	60	6180	Med/High	High potential to breach consent. Tighter consent limits will be imposed by the NRA in 1996.
Persalts	River	Suspended solids in PBS process effluent (from mother liquor tank overflow and L3 wet scrubber).	Contributes towards suspended solids in site effluent (outfall consent = 100 mg/l)	6.57	240	1576.8	High	High potential to breach consent. Tighter consent limits will be imposed by the NRA in 1996.
Persalts	River	Phosphate ions in PBS process effluent (mainly from mother liquor tank overflow and L3 wet scrubber).	Associated with eutrophication in receiving water courses.	5.16	400	2064	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Persalts	River	Boron in process effluent from PBS process effluent (mainly from mother liquor tank overflow and L3 wet scrubber).	Not believed to be a significant problem in River Estuary	293	100	29300	High	Significant due to resource wastage.
Persalts	River	Chloride ions in PBS process effluent (mainly from PBS mother liquor tank and L3 wet scrubber)	No environmental concerns when discharged into Mersey Estuary.	598	0.2	119.6	Low	
Persalts	River	Hg in PBS process effluent (mainly from PBS mother liquor tank and L3 wet scrubber). From well water and contaminated NaOH	Toxic - however extremely small quantities (see IPC).	1.77	2000	3540	Low/Med	
Persalts	River	Flowrate PBS process effluent (mainly from PBS mother liquor tank and L3 wet scrubber)	Contributes towards flow rate of site effluent (outfall consent = 11,000 m ³ /day)	20m ³ /hr	N/A	N/A	Med/High	< 15m ³ /hr required to meet internal site consent.
Persalts	River	Sulphate ions (1000-2000 mg/l) in process effluent from PBS effluent (mainly from PBS mother liquor tank and L3 wet scrubber)	No particular concerns regarding discharge to River Estuary.	200	0.2	40	Low	
Persalts	River	Alkalinity of PBS process effluent (mainly from PBS mother liquor tank and L3 wet scrubber)	Contributes towards pH of site effluent (consent = 5-10). Strong buffering effects from perborate at pH 9.	N/A	N/A	N/A	Med	
Persalts	River	pH of PCS process effluent	Contributes towards pH of site effluent (consent = 5-10) - potential to exceed pH 10 at outfall due to uncontrolled releases from PCS.	N/A	N/A	N/A		PCS not presently being produced.

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AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Persalts	River	Suspended solids in PCS process effluent.	PCS effluent mixes with well water in surface drains to produce CaCO ₃ precipitate.	N/A	N/A	N/A		PCS not presently being produced.
Persalts	Land	Tincal sludge	Landfill - Composition (%): Water 49; Soluble borates 5; Silica 10; Alumina 1; Calcium 20; Magnesium 15; and traces of Iron, Copper, Nickel. Duty of Care Regs (EPA 1990)	8219	24	197,256	High	Supplier rating = C (72%)
Persalts	Resource Usage	Caustic Soda Liquor (NaOH - 47%)		13,714	N/A	N/A	Low	
Persalts	Resource Usage	Lapofloc FN200		3, 918	N/A	N/A	Low	
Persalts	Resource Usage	Magnesium Sulphate		286	N/A	N/A	Low	
Persalts	Resource Usage	Magna Flocc		0	N/A	N/A	Low	
Persalts	Resource Usage	Tincal	Opencast mining in Turkey	39,472	N/A	N/A	Low	
Persalts	Resource Usage	Hydrogen Peroxide	Transferred from AO Plant	4731	N/A	N/A	Low	

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AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Persalts	Resource Usage	Towns Water used mainly for the refrigeration plant which uses approximately 10% of site supply.	Associated with the use of natural resources.	1959m ³	N/A	N/A	-	See Site General
Persalts	Resource Usage	Well Water	Used to supplement cooling water supplies. Abstracted from 6 wells (2 on site). Associated with the use of natural resources.	1,433km ³	N/A	N/A	-	See Site General
Persalts	Resource Usage	Steam - Low Pressure (used to heat air for the drying process)	Produced on site by BP Energy	20,309 m ³	N/A	N/A	-	See Site General
Persalts	Resource Usage	Steam - Intermediate Pressure (used to heat air for the drying process.	Produced on site by BP Energy	15,435 m ³	N/A	N/A	-	See Site General
Persalts	Resource Usage	Electricity	Associated with acid rain, greenhouse effect etc.	8,554MW _h	N/A	N/A	-	See Site General
Persalts	Resource Usage	Natural Gas (PBS -1)	Associated with depletion of a natural resource	186,256 therms	N/A	N/A	-	See Site General
Persalts	Nuisance	Noise	Complaints have been received from driers in the past. Potential to breach Statutory Nuisance Regs (EPA 1990)	N/A	N/A	N/A	High	In 1995 4 complaints were received regarding line 4 drier and 3 complaints regarding lines 1-3. Line 1 removed in 1995, line 3 fitted with silencer
Persalts	Indirect	Use of PCS in Laundry Applications (washing powders)	Majority of PCS manufactured is used in washing powders (i.e 99%). Not associated with any particular environmental concerns.	N/A	N/A	N/A	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Persalts	Indirect	Use of PBS in Laundry Applications (washing powders)	Majority of PBS manufactured is used in washing powders (i.e 99%). May be future concern over the release of boron to water courses.	N/A	N/A	N/A	Low	
Persalts	Indirect	Use of PBS/PCS in Household Cleaning Products	No particular environmental concerns.	N/A	N/A	N/A	Low	
Persalts	Indirect	Use of PBS/PCS in Cosmetic Toiletries	No particular environmental concerns.	N/A	N/A	N/A	Low	
Persalts	Indirect	Use of PBS/PCS in Textile Bleaching	No particular environmental concerns.	N/A	N/A	N/A	Low	
Persalts	Indirect	Use of PBS/PCS in Vat Dye Oxidation	No particular environmental concerns.	N/A	N/A	N/A	Low	
Peracetic Acid Plant	Air	VOCs (acetic and peracetic acid) from reactor vents.	Max. GLC can be 1.9 mg/m ³ which is above odour threshold for HAC and both recommended GLCs. Odour complaints possible - potential breach of Statutory Nuisance Regs (EPA 1990)	2.19	100	219	-	Currently no production of PAA.
Peracetic Acid Plant	Air	VOCs (acetic acid) from bulk storage tanks and transfer operations.	Max. release rate occurs during bulk deliveries. GLC of acetic acid at site boundary can = 45mg/m ³ . Level above odour threshold and recommended GLC for acetic acid. Odour complaints possible. Statutory Nuisance (EPA 1990)	N/A	N/A	N/A	-	Currently no production of PAA. Although potential to breach nuisance regulations should production commence.
Peracetic Acid	River	Chemical Oxygen Demand in product heel left from reactor vessel (~ 5kg of product is released per 1t batch).	Effluent analysis indicates levels of 4423 mg/l - contributes towards COD of site effluent (outfall consent = 200mg/l).	5	140	700	-	Currently no production of PAA. Although uncontrolled & not regularly monitored during production.

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AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Peracetic Acid	River	Hydrogen peroxide from product heel left in reactor vessel.	Effluent analysis indicates levels of 14mg/l - contributes towards hydrogen peroxide in site effluent (outfall Consent = 100mg/l).	1.13	60	67.8	-	Currently no production of PAA. Should production commence consents to River are expected to become tighter in the 1996.
Peracetic Acid	River	Suspended solids from product heel left in reactor vessel.	Effluent analysis indicates levels of < 30mg/l - contributes towards suspended solids in site effluent (outfall consent = 100mg/l).	0.089	240	21.36	-	Currently no production of PAA.
Peracetic Acid	River	Acidity/alkalinity from product heel left in reactor vessel.	Contributes towards pH of site effluent (outfall consent = 5-10).	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	River	Chloride ions in product heel left in reactor vessel.	No particular environmental concerns.	60	0.2	12	-	Currently no production of PAA.
Peracetic Acid	River	Cooling water discharge	Cooling water should not be uncontaminated during normal operating conditions.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	River	Reactor dump - contents of reactor released when to leave in the reactor would cause a hazard.	Passed through a dilution pit to meet discharge consents, although an uncontrolled release causing high COD loading and release of PAA (a biocide). Can be associated with fish kills and may attract complaints.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Use of DMW in production of certain grades of peracetic acid.		-16,000 m ³	N/A	N/A	-	Currently no production of PAA.

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AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Peracetic Acid	Resource Usage	Use of Towns water used for: cooling; in-line addition to reactants, products and intermediates; and for domestic supply.	Depletion of a natural resource.	-40,000 m ³	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Use of Well Water - used to supplement cooling water. Abstracted locally from 5 wells (3 of which are located on site).	Depletion of a natural resource.	-233,000 m ³	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Mains electricity	Associated with acid rain, green house effect etc.	-1300	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	P. steam - used to heat water in Hot Water System. Water is maintained at 300C to keep Acetic Acid above freezing point.		-5000*m ³	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Glacial Acetic Acid	Produced by BP Chemicals Ltd (Grade A).	1153	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Hydrogen Peroxide 86%	Produced on site by AO Plant	-500	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Hydrogen Peroxide 35%	Produced on site by AO Plant	-100	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Acetic Anhydride	Distributed by Ellis & Everard (No reply to questionnaire).	-10	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Dequest 2010	Distributed by Ellis & Everard (No reply) or Hays Chemicals (Grade E).	-15	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Sulphuric Acid 97-99%	Distributed by Ellis & Everard (No reply to questionnaire).	-7	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Synperonic 91/8	Distributed by Ellis & Everard (No reply to questionnaire).	-1	N/A	N/A	-	Currently no production of PAA.

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AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Peracetic Acid	Resource Usage	IXPER 75C		-0.5	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Dipicolonic Acid	Produced by BDH Chemicals Ltd (No reply), Raschig UK Ltd (No reply) or Collinda (Grade A).	- 0.2	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Resource Usage	Fragrance LK30524	Produced by Bush Boake Allen Ltd (Grade F)	- 0.1	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Nuisance	Noise	Contributes towards general noise from site. However location of PAA plant not in vicinity of sensitive boundaries. No specific high noise sources.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Indirect	Use of < 5% in Veterinary applications.	Used as a disinfectant - no particular environmental concerns.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Indirect	Use of 5% in J+J medical instrument sterilisation (new application).	Used as a disinfectant - no particular environmental concerns.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Indirect	Use of 5% - "Clean in place", dairy industry, breweries and food packing plants.	Used as a disinfectant - no particular concerns.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Indirect	Use of 5% - Animal health care, disinfecting agent for animal houses.	Used as a disinfectant - no particular concerns.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Indirect	Use of 12% - Oxymaster sewerage disinfectant.	Environmentally Beneficial Applications - used to clean sewerage outfalls.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Indirect	Use of 12 % - Paper industry (new development) and biocide.	Used to remove bugs in paper pulp.	N/A	N/A	N/A	-	Currently no production of PAA.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Peracetic Acid	Indirect	Use of 15% - "Clean in place" Higher strength	Used as a disinfectant - no particular environmental concerns.	N/A	N/A	N/A	-	Currently no production of PAA.
Peracetic Acid	Indirect	Use of 36 - 40% (High strength grades) in pharmaceutical industry and in particular the manufacture of antibiotics (used as an intermediate).		N/A	N/A	N/A	-	Currently no production of PAA.
Boiler House	Air	Visible Smoke	Visible smoke is unlikely as release is well controlled with computer controlled combustion management system. IPC Limit < Ringelmann 2.	N/A	N/A	N/A	Low	
Boiler House	Air	Sulphur Dioxide	Associated with formation of acid rain. Controlled release below IPC limit of 35mg/m ³ (gas) or 850mg/m ³ (oil)	1.2	100	120	Low	
Boiler House	Air	Carbon Dioxide	Associated with global warming and acid rain formation.	41,780	0.5	20,500	High	
Boiler House	Air	Carbon Monoxide	Associated with acid rain formation.	4.7	5	23.5	Low	
Boiler House	Air	Dust	Associated with respiratory problems. IPC particulate limit = 5mg/m ³ (gas), 5.0mg/m ³ (oil)	0.9	50	45	Low	
Boiler House	Air	Nitrogen Dioxide	Associated with acid rain formation. Close to IPC authorisation limit of 240mg/m ³ (gas), 275mg/m ³ (gas oil).	49	100	4900	Med	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Boiler House	River	Temperature of blowdown effluent.	Reduced by mixing with other site effluents - contributes towards temperature of site effluent (outfall consent = 30°C)	2300C	N/A	N/A	Low	
Boiler House	River	Flow rate of blowdown effluent	Contributes towards flow rate of site effluent (outfall consent = 11,000m ³ /day)	2m ³ /hr	N/A	N/A	Low	
Boiler House	River	Mercury in blowdown effluent (from boiler treatment chemicals).	Toxic - however effluent analysis indicates levels of < 0.001mg/l which is significantly below IPC limit of 0.02mg/l.	0.002	2000	4	High	High as monitoring is required by IPC authorisation.
Boiler House	River	Cadmium in blowdown effluent (from boiler treatment chemicals)	Toxic, however effluent analysis indicates of < 0.01mg/l which is significantly below limit of 0.05mg/l	0.002	2000	4	High	High as monitoring is required by IPC authorisation.
Boiler House	River	Alkalinity of blowdown effluent (pH ~11)	Contributes to pH of site effluent (Consent = 5-10). Buffered by site effluent.	No data	N/A	N/A	Med	
Boiler House	River	Suspended solids in blowdown effluent.	Diluted by mixing with other site effluents to within outfall consent of 100mg/l	No data	N/A	N/A	Med	
Boiler House	River	Chloride ions in blowdown effluent.	No particular environmental concerns when discharged to River Estuary.	100	0.2	20	-	
Boiler House	River	Flowrate of cooling water (consisting mainly of towns water) discharged to River via TPS.	Contributes towards flowrate of site effluent (outfall consent = 11,000 m ³ /day).	10 m ³ /day	N/A	N/A	-	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Boiler House	River	Temperature of cooling water.	Approximately 50°C - contributes towards temperature of site effluent (outfall consent = 30°C) although cooled by other site effluents.	N/A	N/A	N/A	Med	
Boiler House	River	Hg in cooling water from well water.	Toxic, however effluent analysis indicates extremely low levels	0.009	2,000	18	Low	
Boiler House	River	Chloride ions in cooling water from well water.	No particular concerns when discharged into an estuary.	199	0.2	39.8	Low	
Boiler House	River	Potential oil release into cooling water (from turbine oil cooling - damage to heat exchange may cause release of oil)	Potential to cause a breach of outfall consent which requires no visible signs of oil or grease.	N/A	N/A	N/A	Med/High	
Old DMW	River	Mercury in DMW effluent to River (from contaminated caustic soda).	Toxic - however effluent analysis indicates levels of 0.001mg/l significantly below IPC limit of 0.02 mg/l.	0.003	2000	6	High	High as monitoring is required by IPC authorisation.
Old DMW	River	Cadmium in DMW effluent to River (from contaminated caustic soda).	Toxic - however effluent analysis indicates levels of < 0.01mg/l which is significantly below IPC limit of 0.05 mg/l.	0.003	2000	6	High	High as monitoring is required by IPC authorisation.
Old DMW	River	Chlorides ions in DMW effluent to River from well water	Approximately 1149 mg/l - not associated with any particular environmental concerns when released to River Estuary.	No data	N/A	N/A	Low	
Old DMW	River	C.O.D of DMW effluent to River.	Effluent analysis indicates levels of 1mg/l - contributes towards COD in site effluent (outfall consent = 200 mg/l). Associated with de-oxygenation of River Mersey.	No data	N/A	N/A	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (t/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Old DMW	River	Suspended solids in DMW effluent to River.	Effluent analysis indicates levels of 10mg/l -contributes towards suspended solids in site effluent (outfall consent = 100mg/l).	1.8	36	240	Low	
Old DMW	River	Flowrate of DMW effluent to River	Approximately 20m ³ /hr - contributes towards flow rate of site effluent (outfall consent = 458m ³ /hr).	20m ³ /hr	N/A	N/A	Low	
Old DMW	River	Alkalinity	Contributes towards pH of site effluent (outfall consent = 5-10)	N/A	N/A	N/A	High	Relies on buffering capacity of tank, restricted outlet, no pH control.
Old DMW	Waste	Occasional disposal of the DMW plant resins.		N/A	N/A	N/A	Low	Previously resins have left plant from new DMW without transfer notes.
Old DMW	Waste	Brine Wash Effluent	Potential to cause high suspended solids at outfall if disposed of incorrectly to surface drains (formation of NaCO ₃)	N/A	N/A	N/A	Med/High	Uncontrolled disposal requiring procedures for correct disposal.
Old DMW	Ground	Potential Leaking Effluent Pit	Potential to leak sulphate & sulphuric acid, caustic to drain.	N/A	N/A	N/A	High	Some improvements to drainage implemented Q2 1996.
Boiler House	Resource Usage	Towns Water Usage (Purchased Water).	Depletion in natural resources.	4,971m ³	N/A	N/A	-	See Site General
Boiler House	Resource Usage	Demineralised Water Usage	Depletion in natural resources.	204,078m ³	N/A	N/A	-	See Site General
Boiler House	Resource Usage	Well Water Usage	Abstraction licence required under the Water Resources Act 1991.	15,162m ³	N/A	N/A	-	See Site General

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Boiler House	Resource Usage	Electricity	Associated with global warming, acid rain formation and depletion in natural resources.	1,491MW h	N/A	N/A	–	See Site General
Boiler House	Resource Usage	Gas - piped directly to site by BP energy.	Depletion of natural resources. Flammable (CHIP) - depletion of a naturally occurring resource.	192,599 therms	N/A	N/A	Med	Combustion efficiency needs high degree of control.
Boiler House	Resource Usage	Gas Oil - tanker delivered (used as a standby fuel).	Flammable (CHIP) - depletion of a naturally occurring resource.		N/A	N/A	Low	
Boiler House	Resource Usage	Betz Preklean 346 - boiler treatment chemical.	Irritant (CHIP)	No data	N/A	N/A	Low	
Boiler House	Resource Usage	Propane - used only as a standby fuel and therefore presumed to be of low quantity.	Flammable (CHIP)	No data	N/A	N/A	Low	
Boiler House	Resource Usage	Boilertek 904 - reacts with the remaining oxygen in the de-aerated water.	Volatile organic oxygen scavenger - irritant to eyes and skin.	4-5	N/A	N/A	Low	
Boiler House	Resource Usage	Boilertek 959 - maintains pH at 8.5 - 9.5.	Non-hazardous	4-5	N/A	N/A	Low	
Boiler House	Resource Usage	Boilertek 970 - Conditioning chemical.	Corrosive to eyes and skin.	4-5	N/A	N/A	Low	
Boiler House	Nuisance	Noise	Plant is located well away from sensitive boundaries and residential properties. General ambient noise levels are considered acceptable. Relief valves have silencers.	N/A	N/A	N/A	Low	No complaints have been received in the past therefore not considered to be significant.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Site General	Air	Air emissions from laboratory fume cupboards.	Release of VOCs, dust, potential odiferous substances.	No data	N/A	N/A	Low	No highly odiferous substances used with potential to cause complaints. Very low level for VOC/dust.
Site General	Air	Air emissions from engineering department and on site workshops.	Dust and welding fumes.	No data	N/A	N/A	Low	
Site General	Air	Use of radiography for detection of cracks etc	Release of radioactivity	N/A	N/A	N/A	Low	Generally accepted use.
Site General	Air	Use & potential release of halons from fire extinguishers.	Strong ozone depletor - manufacture and use to be phased out.	No data	N/A	N/A	Med/High	
Site General	River	Site effluent from cooling water, distillation effluent, persalts effluent, boiler house effluent and surface water drains to River Mersey	COD is associated with de-oxygenation of receiving water courses.	149	140	20860	High	In 1995 one consent breach was identified for pH, three breaches for peroxide.
Site General	Sewer	Domestic effluent released to sewer system eg from toilets, washbasins, kitchens etc.	Requires no discreet discharge consent - NWW charge is based on site head count.	N/A	N/A	N/A	Low	
Site General	River	Laboratory effluent released to River.	Effluent analysis indicates a flow rate of 1m ³ /hr and COD release of 2.5 te/a	2.5	140	350	Low	
Site General	River	Storm water released to surface drainage system.	Potential to affect flow rate at river outfall (site effluent consent = 11,000 l/day).	N/A	N/A	N/A	Low	
Site General	River	Pickling plant effluent					?	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Site General	River	Potential release of contaminated fire- fighting water to surface drains in emergency situations.	Potential to cause river pollution and breaches of discharge consent	N/A	N/A	N/A	High	
Site General	Waste	Disposal of Laboratory waste solvents.	Removed by contractors and incinerated.	2		0	Low	
Site General	Waste	Disposal of general waste skips.	Removed by UK Waste Ltd and landfilled.	200	8	1600	Low	
Site General	Waste	Disposal of drums (metal and plastic)	Reclaimed	N/A	N/A	N/A	Low	
Site General	Waste	Disposal of pallets	Reclaimed	N/A	N/A	N/A	Low	
Site General	Waste	Disposal of waste oils from engineering work.		Unknown	-	-	Low	
Site General	Waste	Disposal of office waste paper - recycled by SCA	Recycled by SCA	10	27	270	Low	
Site General	Waste	Potential incorrect handling and disposal of waste by contractors.	Tightly controlled by Duty of Care Regs. Can cause degradation of local environment if waste escapes.	N/A	N/A	N/A	Med/High	
Site General	Waste	Waste plastic cups from vending machines in main offices.	Landfilled - associated with leachate and landfill gas production.	~4,000/a	N/A	N/A	Med/High	Significant as part of culture change and employee motivation.
Site General	Waste	Printer toner cartridges	Recycled (Action Aid)	12/month	N/A	N/A	Low	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Site General	All Media	Potential releases during incidents and emergency situations due to lack of containment of process and storage areas across site as a whole.	Potential river pollution, breaches of discharge consents and land contamination.	N/A	N/A	N/A	High	
Site General	All Media	Potential spillages during tanker loading / offloading in general areas.	Potential for accidental releases to surface drains and breaches of discharge consents.	N/A	N/A	N/A	High	
Site General	Resource Usage	Electricity usage in main offices for heating / lighting etc.	Associated with global warming, acid rain formation and reduction in natural resources.	-6000MWh	N/A	N/A	Med/High	Significant as part of culture change and employee motivation.
Site General	Resource Usage	Use of purchased water in technical, engineering and garage.	Associated with depletion in natural resources.	-22,000	N/A	N/A	Med/High	Significant as part of culture change and employee motivation.
Site General	Resource Usage	Use of low pressure steam in offices for heating purposes.	Associated with depletion in natural resources.	-1748MG	N/A	N/A	Med/High	Significant as part of culture change and employee motivation.
Site General	Resource Usage	Natural gas used by engineering department and welfare.	Associated with depletion in natural resources.	-72904	N/A	N/A	Med/High	Significant as part of culture change and employee motivation.
Site General	Resource Usage	Paper usage in offices for printing, photocopying etc	Associated with depletion in natural resources.	1340 reams	N/A	N/A	Med/High	Significant as part of culture change and employee motivation.

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Site General	Resource Usage	Site use of electricity	Associated with global warming, acid rain formation and reduction in natural resources.	44,920 MWh	N/A	N/A	Med/High	
Site General	Resource Usage	Site use of purchased water	Associated with depletion in natural resources.	?	N/A	N/A	Med/High	
Site General	Resource Usage	Site use of DMW		?	N/A	N/A	Med/High	
Site General	Resource Usage	Site use of well water		3,854,400 m ³	N/A	N/A	Med/High	
Site General	Resource Usage	Site use of low pressure steam	Associated with gas usage i.e a natural resource.	132,718	N/A	N/A	Med/High	
Site General	Resource Usage	Site use of intermediate pressure steam	Associated with gas usage i.e a natural resource.	22,873	N/A	N/A	Med/High	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Site General	Resource Usage	Site use of high pressure steam	Associated with gas usage i.e a natural resource.	92,982	N/A	N/A	Med/High	
Site General	Resource Usage	Site use of natural gas	Associated with depletion in natural resources.	192,599 therms	N/A	N/A	Med/High	
Site General	Nuisance	Employees transport.	Nuisance to local residents. Contribute towards ground level ozone formation and global warming.	~400/day	N/A	N/A	Med	
Site General	Nuisance	HGV movements	Nuisance to local residents. Complaints have been received in the past.	~500wk	N/A	N/A	High	9 complaints were received regarding HGVs during 1995. (Contributions to annual movements: AO = 25%, Capa = 6%, Boiler House = 1%, Persalts = 50%, Peracetic acid = 1.6%)
Site General	Nuisance	Noise from fire alarm testing.	Nuisance to local residents. Complaints have been received in the past.	N/A	N/A	N/A	Low	No complaints received in the past.
Site General	Nuisance	Visual impact of site especially from high chimney and plume of Boiler House.	Nuisance to local residents, impacts on property prices etc.	N/A	N/A	N/A	Low/Med	
Site General	Indirect	Contractors working on site including BP Energy.	Potential accidental releases during incidents and accidents.	N/A	N/A	N/A	Med/High	

APPENDIX 2.5: SOLVAY INTEROX'S EMS - ENVIRONMENTAL EFFECTS REGISTER

AREA	TYPE	SOURCE	CONSEQUENCE	Quantity (te/a)	Gross Factor	Weighted Effect	RATING	COMMENTS
Site General	Indirect	Suppliers activities during manufacture of raw materials by suppliers.	Effects of producing and processing raw materials eg air releases, discharges to water, waste disposal etc.	N/A	N/A	N/A	-	See Supplier Assessments

APPENDIX 2.6: SOLVAY INTEROX'S EMS - REGISTER OF LEGAL & OTHER REQUIREMENTS

YEAR	TOPIC	ACT / REGULATION	NUMBER	DUTY / PROHIBITION IMPOSED	RELEVANCE TO ACTIVITIES	Copy Location	Expert Resp.	Exec. Resp.
1990	IPC	Environmental Protection Act 1990 - Part 1.		Set up system of IPC. Prescribed processes must apply for authorisation from either EA or LA. Application must include details of how operator will achieve BATNEEC.	Four of the processes on site are prescribed as requiring authorisation from HMIP. Authorisations have been granted for each of these processes.	Env Group	JMcD	RAH
1991	IPC	Environmental Protection (Applications, Appeals and Registers) Regulations 1991	SI 1991/507	Prescribe details to be included in authorisation applications for IPC and information to be kept in EA registers	Relevant for new or modified processes prescribed under IPC.	Env Group	JMcD	RAH
1996	IPC	Environmental Protection (Applications, Appeals and Registers) (Amendment) Regs 1996	SI 1996/667	Amends above Regulations	Relevant for information purposes.	Env Group	JMcD	RAH
1997	IPC	Environmental Protection (Applications, Appeals and Registers) (Amendment No 2) Regs 1996	SI 1996/979	Amends above Regulations	Relevant for information purposes.	Env Group	JMcD	RAH
1991	IPC	Environmental Protection (Authorisation Processes) (Determination Periods) Order 1991(SI 1991/513)	SI 1991/513	This order varies the period available to EA or LAs to consider applications.	This procedure is relevant to those processes requiring IPC authorisations.	Env Group	JMcD	RAH
1991	IPC	Environmental Protection (Prescribed Processes and Substances) Regulations 1991- Schedule 1.	SI 1991/472	Schedule 1 of the Regulations list the processes which require authorisation under the EPA and the timetable for authorisation for all processes.	Chapter 4 section 4.2 specifies that the manufacture of caprolactone, hydrogen peroxide and peracetic acid as Part A processes. Chapter 1 section 1.1 specifies the operation of the boiler house as a Part A process.	Env Group	JMcD	RAH

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YEAR	TOPIC	ACT / REGULATION	NUMBER	DUTY / PROHIBITION IMPOSED	RELEVANCE TO ACTIVITIES	Copy Location	Expert Resp.	Exec. Resp.
1991	IPC	Environmental Protection (Prescribed Processes and Substances) Regulations 1991 - Schedule 2	SI 1991/472	Schedule 2 of the Regulations contains the rules for the interpretation of Schedule 1. The CIA guidance states that to classify as a "single process" one stream must feed directly into the other and there must not be side activities.	AO and PAA can be classed as a single process requiring one authorisation. Whereas Capa and the Boiler House require separate authorisations.	Env Group	JMcD	RAH
1991	IPC	Environmental Protection (Amendment of Regulations) Regulations 1991	SI 1991/836	Amend schedule 3 of the regulations concerned with dates of applications	Relevant for information purposes.	Env Group	JMcD	RAH
1992	IPC	Environmental Protection (Prescribed Processes and Substances) (Amendment) Regulations 1992	SI 1992/614	Amendment of relevance relate to the burning of any fuel in two or more boilers or furnaces.	The amendment prescribes that the two burners on persalts do not have to be included in the IPC application for the Boiler House because they are less than 3MW each.	Env Group	JMcD	RAH
1993	IPC	Environmental Protection (Prescribed Processes and Substances) (Amendment) Regulations 1993	SI 1993/1749	These Regulations amend the 1991 Regs to extend from 31st July 1993 to 31st October 1993 the dates of applications.	Relevant for information purposes.	Env Group	JMcD	RAH
1994	IPC	Environmental Protection (Prescribed Processes and Substances Etc)(Amendment) Regs 1994.	SI 1994/1271	The amendment removes some processes from control under Part 1 of the EPA.	The amendment does not affect the processes on site controlled under Part 1 of the Act.	Env Group	JMcD	RAH
1994	IPC	Environmental Protection (Prescribed Processes and Substances Etc)(Amendment)(No2) Regulations 1994	SI 1994/1329	These Regulations amend the 1994 Regs (SI 1994/1271) to make provision as to the date after which an authorisation is required for those processes which are affected by the 1994 Regs.	The amendment does not directly affect the processes on site.	Env Group (IPC File)	JMcD	RAH

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YEAR	TOPIC	ACT / REGULATION	NUMBER	DUTY / PROHIBITION IMPOSED	RELEVANCE TO ACTIVITIES	Copy Location	Expert Resp.	Exec. Resp.
1995	IPC	Environmental Protection (Prescribed Processes and Substances Etc)(Amendment) Regulations 1995	1995/3247		Relevant for information purposes.	Env Group	JMcD	RAH
1995	IPC	The Environmental Protection (Prescribed Processes and Substances) Regulations - A Consolidated Version (as at 1st December 1994)		This document consolidates the regulations.	Relevant for information purposes.	Env Group	JMcD	RAH
1994	IPC	Authorisation for the Manufacture of PAA and Hydrogen Peroxide	AK 7817	The authorisation specifies authorised release points, sets limits on the mercury content and flow rate of DMW effluent, details returns and notifications to be made to HMIP and contains an improvement programme.	Authorisation specifies discharge limits, reporting requirements and an improvement programme.	Env Group	JMcD	RAH
1994	IPC	Authorisation for the Operation of Gas/Oil Fired Combustion	AL 4872	The authorisation specifies authorised release points, sets limits on release of particulates, sulphur dioxide, oxides of nitrogen and cadmium and mercury to River. The authorisation also contains an improvement programme and specifies returns required.	Authorisation specifies discharge limits, reporting requirements and an improvement programme.	Env Group	JMcD	RAH
1994	IPC	Authorisation for the Manufacture of Caprolactone	AK 7809	The authorisation specifies authorised release points, details returns and notifications to be made to HMIP and contains an improvement programme.	Authorisation specifies discharge limits, reporting requirements and an improvement programme.	Env Group	JMcD	RAH
1958	Air	Dark Smoke (Permitted Periods) Regulations 1958	SI 1958/498	These regulations set out the permitted periods for emissions of dark smoke from a chimney.	Each persalts burner is permitted to emit dark smoke for 10 mins in any period of eight hours. This does not apply to the Boiler House which is controlled under IPC.	Env Group	JMcD	RAH

APPENDIX 2.6: SOLVAY INTEROX'S EMS - REGISTER OF LEGAL & OTHER REQUIREMENTS

YEAR	TOPIC	ACT / REGULATION	NUMBER	DUTY / PROHIBITION IMPOSED	RELEVANCE TO ACTIVITIES	Copy Location	Expert Resp.	Exec. Resp.
1969	Air	Clean Air (Emission of Dark Smoke) (Exemption) Regulations 1969	SI 1969/1263	These Regulations exempt the burning of certain matter from the prohibition of dark smoke emission from industrial premises.	Matter burnt for fire research or for training of fire fighters are exempt from the prohibition of dark smoke emission.	Env Group	JMcD	RAH
1969	Air	Clean Air (Height of Chimneys) (Exemption) Regulations 1969	SI 1969/46	These Regulations exempt certain boilers or plants from having to apply for chimney height approval.	The persalts burners are not exempt and therefore require chimney height approval from the local authority. (Check if we have such approval).	Env Group	JMcD	RAH
1984	Air	Council Directive of 28 June 1984 on the Combating of Air Pollution from Industrial Plants	SI 84/360/EEC		Relevant for information purposes.	Env Group	J.McD	RAH
1987	Air	Control of Asbestos at Work Regulations 1987	SI 1987/2115	These regulations control occupational exposure to asbestos.	These regulations would be applicable during the demolition of certain buildings on site containing asbestos.	Env Group	JMcD	LF
1989	Air	Air Quality Standards Regulations 1989	SI 1989/317	These Regulations implement EEC Directives setting air quality limit values and guide values for SO ₂ and suspended particulates, a limit value for lead in air and air quality standards for NO ₂ .	Relevant for information purposes - needed for dispersion modelling uses etc.	Env Group	J.McD	RAH
1990	Air	Environmental Protection Act 1990		Part III of the EPA makes it an offence to create a statutory nuisance, e.g smoke, fumes, dust, odour or noise - the LA can serve an abatement notice.	Relevant for information purposes.	Env Group	JMcD	RAH
1993	Air	The Clean Air Act 1993 Part 1: Prohibition of Dark Smoke from Chimneys.	N/A	Part 1 of the Act prohibits the emission of dark smoke from chimneys and industrial premises. It does not apply to processes controlled by Part 1 of the Environmental Protection Act 1990.	Not relevant to the Boiler House which is controlled by Part 1 Environmental Protection Act 1990. However the release from the persalts burners and any other emission of dark smoke will come under this Act.	Env Group	J.McD	RAH

APPENDIX 2.6: SOLVAY INTEROX'S EMS - REGISTER OF LEGAL & OTHER REQUIREMENTS

YEAR	TOPIC	ACT / REGULATION	NUMBER	DUTY / PROHIBITION IMPOSED	RELEVANCE TO ACTIVITIES	Copy Location	Expert Resp.	Exec. Resp.
1993	Air	The Clean Air Act 1993 Part 2: Smoke, Grit, Dust and Fumes from furnaces.	N/A	Part 2 of the Act requires that the local authority must be informed before installing a furnace in a building. The furnace must be capable of being operated continuously without emitting smoke when burning the designed fuel.	The persalts burners require approval from the local authority planning department. Not relevant to the Boiler House which is controlled by Part 1 Environmental Protection Act 1990.	Env Group	JMcD	RAH
1976	Water	Control of Pollution (Discharges into Sewers) Regs 1976	SI 1976/958	These regulations relate to appeals to a water authority which cancels a deemed consent. They also allow a consent to be transferred from one drain to another if the water authority closes one drain and provides an alternative.	These regulations would be relevant to the company's activities should NWW cancel a deemed consent or close a drain.	Env Group	JMcD	RAH
1989	Water	The Surface Waters (Dangerous Substances) (Classification) Regulations 1989	SI 1989/2286	These regulations prescribe parameters for classifying waters for setting water quality objectives. The waters are classified according to the concentrations of the prescribed dangerous substances present.	These regulations are relevant for information purposes as the classification of the River Mersey will affect consent limits of effluent.	Env Group	JMcD	RAH
1991	Water	Water Industry Act 1991		This Act covers water services and supply and requires that a consent must be obtained from the relevant water undertaker in order to discharge trade effluent into public sewers.	The AO effluent and Capa effluent to public sewer both require a consent from North West Water plc. These include consent limits for certain parameters (see individual consents).	Env Group	JMcD	RAH
1991	Water	Water Resources Act 1991		This Act covers the protection of water against pollution. It is an offence to discharge trade effluent, other polluting material of solid waste into controlled water unless a discharge consent has been obtained from the NRA.	The site effluent to the River Mersey requires consent from the NRA.	Env Group	JMcD	RAH
1991	Water	Environmental Protection (Prescribed Processes and Substances) Regulations 1991 (SI 1991/472)	SI 1991/472	These regulations prescribe processes subject to IPC and list substances which are prescribed for release to water.	The prescribed substances, mercury and cadmium, are released to controlled water in extremely small quantities from the site.	Env Group	JMcD	RAH

APPENDIX 2.6: SOLVAY INTEROX'S EMS - REGISTER OF LEGAL & OTHER REQUIREMENTS

YEAR	TOPIC	ACT / REGULATION	NUMBER	DUTY / PROHIBITION IMPOSED	RELEVANCE TO ACTIVITIES	Copy Location	Expert Resp.	Exec. Resp.
1992	Water	The Surface Waters (Dangerous Substances) (Classification) Regulations 1992	SI 1992/337	These regulations set criteria for classifying relevant waters to comply with EC Directive 86/280/EEC.	The regulations are relevant for information purposes in that the organisation needs to be aware of the River Mersey's classification.	Env Group	JMcD	RAH
1994	Water	Surface Waters (River Ecosystem) (Classification) Regulations 1994	SI 1994/1057	These regulations set parameters for classification of relevant rivers and watercourses for establishing water quality objectives.	These regulations are relevant for information purposes as water quality objectives may affect consent limits for site effluent.	Env Group	JMcD	RAH
1994	Water	The Urban Waste Water Treatment (England and Wales) Regulations 1994		These regulations implement the EC Directive (91/271/EEC) which lays down minimum requirements for the treatment of municipal waste water and for the disposal of sludge.	These regulations are relevant for information purposes as future consents will be based on these requirements.	Env Group	JMcD	RAH
1995	Water	NWW Consent for Site Discharge to River Mersey (28/2/95)(016990683)	N/A	Consent sets limits for chemical oxygen demand, hydrogen peroxide, suspended solids, pH, temperature, visible oils and grease and volume.	Relevant for information purposes.	Env Group	JMcD	RAH
1996	Water	NRA Notice of Variation of Consent to River (31/7/96)(016990683)	N/A	This consent authorises that the site effluent outfall to the Mersey be located at National Grid Reference SJ 5987 8652 until 31 May 1996.	Relevant for information purposes.	Env Group	JMcD	RAH
1976	Water	NWW Consent for Caprolactone Discharge to Sewer (1/8/76)	N/A	Consent sets limits for pH, separable grease & oil, temperature, sulphates, toxic metals and volume as well as for other specific parameters.	Relevant for information purposes.	Env Group	JMcD	RAH

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1986	Water	NWW Consent for AO Discharge to Sewer (26/3/86)	N/A	Consent sets limits for pH, separable grease & oil, temperature, volume, sulphates and toxic metals	Relevant for information purposes.	Env Group	JMcD	RAH
1974	Waste	Control of Pollution Act 1974	N/A	This Act introduced a site licensing system requiring all controlled waste to be disposed of only at licensed sites.	The majority of provisions relating to waste under this Act has been replaced by the Environmental Protection Act 1990. The registration of vehicles, however, is still under this act.	Env Group	JMcD	RAH
1975	Waste	Council Directive of 15 July 1975 on Waste	75/442/EEC	This framework Directive established general rules for waste management. It is being implemented by Part II of the Environmental Protection Act 1990.	Relevant for information purposes.	Env Group	JMcD	RAH
1988	Waste	Collection and Disposal of Waste Regulations 1988	SI 1988/819	These regulations clarify the definition of controlled waste and the cases for which a licence under COPA '74 is required. Waste which is not "Directive Waste" shall not be treated as controlled waste.	These regulations are being replaced by Part II of the EPA 1990, however "controlled waste" is still a legal term.	Env Group	JMcD	RAH
1989	Waste	Control of Pollution (Amendment) Act 1989	N/A	It is an offence under this Act to transport controlled waste unless the carrier is registered with the waste regulation authority.	All contractors used by the company to transport waste from the site require registration with the waste regulation authority.	Env Group	JMcD	RAH
1990	Waste	Environmental Protection Act 1990. Part II.	N/A	Part II of the Act introduces a Waste Management Licensing Scheme (s.33) and places a Duty of Care on anyone who handles controlled waste (s.34).	The company must a) prevent the illegal disposal, treatment and storage of its waste b) prevent the escape of waste c) transfer waste only to an authorised person d) provide a written description of their waste.	Env Group	JMcD	RAH

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1991	Waste	Controlled (Registration of Carriers and Seizure of Vehicles) Regulations 1991	SI 1991/16	These regulations set out the details for the registration of waste carriers. The regulations list a number of exemptions e.g where the producer transports its own waste to a disposal site (exempt building or demolition waste)	All contractors must have waste carrier registrations.	Env Group	JMcD	RAH
1991	Waste	Council Directive of 18 March 1991 amending Directive 75/442/EEC on Waste		This Directive identifies 16 specific categories of waste. Member states are required to establish competent authorities to be responsible for issuing authorisations and waste management licences.	Many of the Directive's requirements either have, or are being implemented through Part II of the Environmental Protection Act 1990. Waste Regulation Authorities are responsible for waste management licences	Env Group	JMcD	RAH
1991	Waste	Environmental Protection (Duty of Care) Regulations 1991	SI 1991/2839	These regulations set up a system of transfer notes and record keeping under s.34 of the 1990 Act. Both the producer and receiver of waste must complete and sign a transfer note. A written description and the transfer note must be kept for two years.	Transfer notes and a written description of the waste must be kept for at least 2 years.	Env Group	JMcD	RAH
1992	Waste	Controlled Regulations 1992	SI 1992/588	These regulations give a detailed definition of controlled waste, classifying the differences between household, commercial and industrial waste. The definition of controlled waste is amended in the Waste Management Licensing Regulations 1994.	Relevant for information purposes.	Env Group	JMcD	RAH
1993	Waste	Regulation on the Supervision and Control of Shipments of Waste within, into and out of the EC.	EEC 259/93	Establishes a system whereby the competent authority must be notified of despatch, transit and destination of shipments of waste.	Although the company does not ship waste into or out of the EC as a matter of routine. These regulations would be relevant should any waste ever be transported to Brussels or any other EC country.	Env Group	JMcD	RAH

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1994	Waste	Transfrontier Shipment of Waste Regulations 1994	SI 1994/1137	These regulations assist in the implementation of EC Regulation (EC 259/93) on the supervision and control of shipments of waste into, out of and through the EC.	Although the company does not ship waste into or out of the EC as a matter of routine. These regulations would be relevant should any waste ever be transported to Brussels or any other EC country.	Env Group	JMcD	RAH
1994	Waste	Waste Licensing Regulations 1994	SI 1994/1056	These regulations implement the waste management licensing scheme introduced by Part II of the EPA and replace s. 3-11 of COPA '74. It is an offence to dispose of, treat or store controlled waste without a waste management licence.	The Warrington site does not require a waste management licence as the majority of processes require an authorisation under other legislation (other processes produce quantities below the threshold for requiring a licence).	Env Group	JMcD	RAH
1995	Waste	Waste Management Licensing (Amendment etc) Regs 1995	SI 1994/288	The main amendment is the provision of exemptions for scrap metal recovery.	Relevant for information purposes.	Env Group	JMcD	RAH
1995	Waste	Waste Management Licensing (Amendment No 2) Regulations 1995.	SI 1995/1950	These regulations extend the transitional period of waste treatment plants to apply for a licence and, where necessary, a certificate of technical competence.	Relevant for information purposes.	Env Group	JMcD	RAH
1996	Waste	Waste Management Licensing (Amendment) Regulations 1996.	SI 1996/1279	Amends the above regulations	Relevant for information purposes.	Env Group	JMcD	RAH
1996	Waste	The Landfill Tax (Contaminated Land) Order 1996	SI 1996/1529	Set out the provisions for exempting waste from clearing historically contaminated land.	Relevant for contaminated soil removed from site from ground decontamination.	Env Group	JMcD	RAH
1996	Waste	The Landfill Tax (Qualifying Material) Order 1996	SI 1996/1528	Define the categories of waste to which a lower rate of tax will apply.	Specifies which of the site's waste will qualify for the lower tax rate.	Env Group	JMcD	RAH

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1996	Waste	Special Waste Regulations 1996	SI 1996/972	Replace control of Pollution (Special Waste) Regs 1996 on consignment notes for disposal of special waste. Contains a revised definition of special waste and consignment note procedure.	Consignment notes must be pre-notified to the Waste Regulation Authority where the waste is being sent.	Env Group	JMcD	RAH
1996	Waste	Special (Amendment) Regulations 1996	SI 1996/2019	Amend the above regulations	Relevant for information purposes.	Ordered	JMcD	RAH
1996	Waste	The Landfill Tax Regulations 1996	SI 1996/1527	Cover aspects of the implementation of the landfill tax such as: registration procedures; credits; accounting; and the environmental trusts provisions.	Relevant for information purposes.	Env Group	JMcD	RAH
1996	Waste	Waste Management Regulations 1996	SI 1996/634	Make miscellaneous changes to Waste Management Licensing Regulations and the Environmental Protection (Waste Recycling Payments) Regulations.	Relevant for information purposes.	Env Group	JMcD	RAH
1974	Nuisance	Control of Pollution Act 1974	N/A	Several provisions on noise still remain in force including the powers of LA's in designating noise abatement zones, serving noise reduction orders and noise level registers.	The majority of provisions have been replaced by the Environmental Protection Act 1990. However some relevant provisions still remain including some regarding noise from construction sites and from plants and machinery.	Env Group	JMcD	RAH

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1974	Nuisance	Health & Safety at Work, etc Act 1974 s. 2		All employers must ensure, so far as is reasonably practicable, the health, safety and welfare of their employees and other people who are likely to be affected by their work activities.	These requirements include the protection against exposure to excessive noise.	Safety Services Dept.	G. Oliver	RAH
1975	Nuisance	Control of Noise (Appeals) Regulations 1975	SI 1983/1455	These regulations relate to appeals against a noise abatement notice served under the provisions of COPA '74 which remain in force.	These regulations may be relevant should the local authority serve a noise abatement notice under COPA '74.	Env Group	JMcD	RAH
1976	Nuisance	Control of Noise (Measurement and Registers) Regulations 1976	SI 1976/37	These regulations prescribe the methods by which noise levels from classified premises must be measured and the particulars of noise level registers which must be kept be LA's.	Relevant for information purposes.	Env Group	JMcD	RAH
1981	Nuisance	Control of Noise (Code of Practice on Noise from Audible Intruder Alarms) Order 1981 & 1987.	SI 1981/1829	This Order approves the DoE Code of Practice on noise from audible intruder alarms.	The Order may be relevant to the alarms on site.	Env Group	JMcD	RAH
1989	Nuisance	Noise at Work Regulations 1989	SI 1989/1790	Employers must assess, and protect employees against, the risks of noise at work. Action must be taken at or above certain limits. Ear protection zones have to be marked and manufacturers of plant and machinery must provide information on noise levels.	Ear protection zones must be marked on site. Risk assessment must include assessing the risk posed from noise.	Env Group	JMcD	RAH
1990	Nuisance	Environmental Protection Act 1990 s.79		Under s.79 of the Act any noise or vibration at or from any premises which is prejudicial to health or a nuisance, may be a statutory nuisance. If this occurs LA's have the power to serve an abatement notice.	The Local Authority has the power to serve an abatement notice should any noise from the site cause a nuisance. Failure to comply with an abatement notice is an offence.	Env Group	JMcD	RAH

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1990	Nuisance	Environmental Protection Act 1990 s.82		Under s.82 of the Act individuals aggrieved by a statutory nuisance can apply to a magistrates' court.	Local residents are within their rights to apply to the magistrate's court to make an order requiring the company to abate a nuisance.	Env Group	JMcD	RAH
1990	Nuisance	Town and Country Planning Act 1990		Noise from new developments can be controlled by local planning authorities granting planning permission subject to a condition imposing noise controls.	This would be relevant to any new developments.	Env Group	JMcD	RAH
1990	Nuisance	Statutory Nuisance Regulations (Appeals) 1990	SI 1990/2276	These regulations provide for appeals to magistrates' courts against a statutory nuisance abatement notice served under the EPA 1990.	Should an abatement notice be served on the company then these regulations would be relevant as they would describe the grounds for appeals.	Env Group	JMcD	RAH
1990	Nuisance	Statutory Nuisance (Amendment) Regulations 1990	SI 1990/2483	Amend the 1990 Regs (SI 1990/2276)	Relevant for information purposes.	Env Group	JMcD	RAH
1992	Nuisance	Control of Noise (Codes of Practice for Construction and Open Sites) Orders 1984	SI 1984/1992	These orders approve Codes of Practice drawn up by the British Standards Institution on control of noise from construction and open sites.	May be relevant to any construction work carried out on plant.	Env Group	JMcD	RAH
1992	Nuisance	Construction Plant and Equipment (Harmonisation of Noise Emissions Standards) Regulations 1985 and 1988 (Amended 1989 & 1992) . Amended 1989 and 1992		Made under the European Communities Act 1972 to implement an EC Directive on the determination of noise emission of construction plants. They forbid the marketing of construction plant or equipment which does not meet the standards laid down by the EC.	May be relevant to any construction work carried out on plant.	Env Group	JMcD	RAH
1993	Nuisance	Noise and Statutory Nuisance Act 1993		These Act makes provisions for noise in the street, intruder alarms and recovery of expenses incurred by local authorities in abating a statutory nuisance. LA must be notified within 48 hours of installation of an alarm.	The provisions relating to intruder alarms may be relevant to alarms on site.	Env Group	J McD	RAH

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1995	Nuisance	Statutory (Appeals) Nuisance Regulations 1995	SI 1995/2644	Provide for appeals to Magistrates' Courts against a statutory nuisance abatement notice served under EPA 1990.	May be relevant if an abatement notice was served on the Company.	Env Group	J McD	RAH
1974	Hazardous Substances	Health & Safety at Work, etc Act 1974 s.2		Under Section 2 of the Act, all employers must ensure, so far as is reasonably practicable, the health, safety and welfare of their employees and others likely to be affected. This includes protection against exposure to hazardous substances.	Exposure to hazardous substances is carried out as part of the risk assessments. (see Control of Substances Hazardous to Health Regs)	Safety Services of Dept.	G. Oliver	RAH
1986	Hazardous Substances	Radioactive Substances (Substances of Low Activity) Exemption Order 1986	SI 1986/1002	This order exempts the need for a) certain radioactive solids of 0.4 bq or less from the requirement to be registered b) certain waste of low radioactive activity from the requirement to be authorised.	Relevant for information purposes.	Env Group	JMcD	RAH
1990	Hazardous Substances	Environmental Protection Act 1990 s. 140		Section 140 of the Act gives the Secretary of State the power to make regulations to restrict the importation, supply, use or storage of injurious substances and articles.	Relevant for information purposes.	Env Group	JMcD	RAH
1990	Hazardous Substances	Dangerous Substances (Notification and Marking of Sites) Regulations 1990	SI 1990/304	These regulations require that where 25 tonnes or more of dangerous substances are stored on site, the fire authority and the HSE or LA must be notified. Warning signs must be displayed on site in order to warn fire fighters.	Over 25 tonnes of dangerous substances are stored on site. The appropriate authorities have been informed notified and yellow warning signs are displayed on site.	Hazards Group	M. Wass J.McD	RAH
1990	Hazardous Substances	Planning (Hazardous Substances) Act 1990		This Act requires that hazardous substances consent must be obtained from the local authority if certain substances are stored on site in, or above, the specified quantities.	The Planning (Hazardous Substances) Regs 1992 state the types of substances and quantities for which a consent is required.	Hazards Group	M. Wass	RAH

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1991	Hazardous Substances	Council Directive of 18 March 1991 on batteries and accumulators containing certain dangerous substances	91/157/EEC	Specify the correct disposal routes.	Relevant for information purposes.	Env Group	J McD	RAH
1992	Hazardous Substances	Notification of Cooling Towers and Evaporative Condensers Regulations 1992	SI 1992/2225	These regulations require anyone who has control of premises where a wet cooling tower or an evaporative condenser is installed, to notify the local environmental health department.	These regulations apply to the Warrington site and therefore the local environmental health department has been notified.	Env Group	J.McD	RAH
1992	Hazardous Substances	Road Traffic (Carriage of Dangerous Substances in Packages, etc) Regulations 1992	SI 1992/742	These regulations apply to the carriage of dangerous substances by road in the UK. The regulations cover the provision of hazard information to drivers and road operators, the marking of vehicles and roadside provision of information to officers.	These regulations apply to the transport of Solvay Interox's products which are contracted to Tank Freight Ltd.	Commercial Dept.	K. Izzard	RAH
1992	Hazardous Substances	Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992	SI 1992/743	These regulations cover the design, construction, marking and operation of road tankers and tank containers carrying dangerous substances.	These regulations apply to Tank Freight Ltd.	Commercial Dept.	K. Izzard	RAH
1992	Hazardous Substances	Road Traffic (Training of Drivers of Vehicles Carrying Dangerous Goods) Regulations 1992	SI 1992/744	These regulations require drivers of vehicles carrying dangerous substances to hold a certificate of training from an approved course.	These regulations are relevant to the employees of Tank Freight Ltd.	Commercial Dept.	K. Izzard	RAH
1993	Hazardous Substances	Chemical Information (Hazard and Packaging) Regulations 1993	SI 1993/1746	These regulations specify that substances which are dangerous for supply must be classified. Such labels must give relevant risk and safety phrases and safety data sheets which contain specified information must be supplied with the product.	Substances must be labelled correctly before leaving the site and safety data sheets must be provided with products.	Commercial Dept.	K. Izzard	RAH

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1993	Hazardous Substances	Radioactive Substances Act 1993		This Act regulates the keeping and use of radioactive substances and accumulation and disposal of radioactive waste. Anyone intending to keep or use radioactive materials must obtain a certificate of registration.	Relevant for information purposes.	Env Group	JMcD	RAH
1994	Hazardous Substances	Council Regulation (EC) on Control of Ozone Depleting Substances.	3093/94	This regulation implements the Montreal Protocol and sets phase out dates for the manufacture of a number of ozone depleting substances. The regulation also imposes controls on the use of HCFC's.	Arcton HCFC 22 Hydro Fluoro Chloro Gas is used in the refrigeration units on the Caprolactone Plant.	Env Group	J.McD	RAH
1996	Hazardous Substances	The Environmental Protection (Controls on Substances that Deplete the Ozone Layer) Regulations 1996.	SI 1996/506	Specify which substances are to be phased out of manufacture.	Relevant for information purposes and use of refrigerants on site.	Env Group	J. McD	RAH
1994	Hazardous Substances	Control of Industrial Major Accidents Regulations 1984. Amended 1988, 1990 and 1994 (CIMAH)	SI 1984/1746	These apply to installations where certain quantities of specified substances are or where certain activities involving dangerous substances are carried out.	The CIMAH Regulations apply to the Warrington Site. A written report has been submitted to the HSE, an up-to-date on-site & off-site emergency plan is kept and local residents have been provided with the appropriate information.	Hazards Group	M. Wass	RAH
1994	Hazardous Substances	The Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations 1994.	SI 1994/669	Specify the arrangement for classifying, packaging and labelling of dangerous goods for carriage by road and rail.	Relevant for the transport of products and wastes by road.	Env Group	J McD /KI	RAH
1994	Hazardous Substances	Control of Substances Hazardous to Health Regulations 1994 (COSHH)	SI 1988/1657	These regulations require employers to control the exposure of employers, and anyone else likely to be affected, to substances hazardous to health.	Assessments are carried out to prevent, minimise or protect exposure to dangerous substances. See COSHH Procedures & Guidelines.	Env Group	J. McD	RAH

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1988	Planning	Town and Country Planning (Assessment of Environmental Effects) Regulations 1988	SI 1988/1199	These regulations require an environmental assessment to be undertaken in respect of certain new developments. The regulations specify two categories of development where the developer must meet the requirements before planning consent can be granted. These regulations amend the 1988 Regs.	These regulations could be relevant for new developments.	Env Group	J. McD	RAH
1994	Planning	Town and Country Planning (Assessment of Environmental Effects) (Amendment) 1990 (SI 1990/367), 1992 (SI 1992/1494), 1994	(SI 1994/677).		Could be relevant for new developments.	Env Group	JMcD	RAH
1990	Planning	Town and Country Planning Act 1990		This Act was designed to regulate and control the use and development of land.	Relevant for information purposes.	Env Group	JMcD	RAH
1995	Planning	The Town and Country Planning (General Development Procedure) Order 1995	SI 1995/419	This Order specifies the procedures connected with planning applications, appeals to the Secretary of State. It also deals with the maintenance of registers of planning applications.	Could be relevant for new developments.	Env Group	JMcD	RAH
1995	Planning	The Town and Country Planning (Environmental Assessment and Permitted Development) Regs 1995	SI 1995/417	These regulations enable the Secretary of State to be called in to decide whether a development is Schedule 1 or Schedule 2 under the Environmental Assessment Regs.	Could be relevant for new developments.	Env Group	JMcD	RAH
1995	Planning	The Town and Country Planning (General Permitted Development) Order 1995	SI 1995/418	This Order grants planning permission for certain classes of development without any requirement for an application.	Could be relevant for new developments.	Env Group	JMcD	RAH

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1993	General	EC Eco-management and Audit Scheme Regulation	No 1836/93	Sets out the requirements for the voluntary adoption of an environmental management system.	Relevant for information purposes.	Env Group	JMcD	RAH
1992	General	Environmental Information Regulations 1992	SI 1992/3240	These Regulations require public authorities which have responsibility for the environment to make available, on request, any information they hold relating to the environment.	Relevant for information purposes.	Env Group	JMcD	RAH
1988	General	Environment and Safety Information Act 1988		This Act covers maintenance and access to registers kept by public authorities.	Relevant for information purposes.	Env Group	JMcD	RAH
1968	General	Trade Descriptions Act 1968		This Act indirectly applies to the environment in that the environment is commonly used as a marketing tool. The Act makes it an offence for anyone to falsely describe goods.	Relevant to the marketing of the sites products.	Commercial Dept.		RAH
1974	General	Health & Safety at Work Act 1974		Section 2 and 3 of this Act place a general duty on employers to ensure the safety of employees and any others who may be affected by the activities of those at work.	Employers must keep up to date with legislation, best current practice in their industry and effective management techniques.	Safety Services Dept.	G. Oliver	RAH
1992	General	Management of Health and Safety at Work Regulations 1992		These regulations require employers to carry out systematic assessment for all risks to the health and safety of employees and others.	Employers must identify the preventative and protective measures necessary to control the risks.	Env Group	G. Oliver	RAH
1992	General	Workplace (Health, Safety and Welfare) Regulations 1992		These regulations make general requirements about the working environment provided by employers.	Relevant for information purposes.	Env Group	G. Oliver	RAH

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1995	General	Environmental Act 1995		Introduces a national strategy air quality strategy and a national waste strategy.	Relevant for information purposes.	Env Group	JMD	RAH

APPENDIX 2.7: SOLVAY INTEROX'S EMS: ENVIRONMENTAL MEASURES AND TARGETS

Area	Measure	Target	Manager Responsible	Previous Years Results	Actual Results	Achieved Yes/No	Comments
AO	Sewer effluent to sewer pH consent compliance (ex daily spot sample)	90% in 1996 (100% in 97)	J.Massey	77%			
AO	Sewer effluent to sewer flow consent compliance (ex flow records)	99% in 1996 (100 % in 97)	J.Massey				
AO	VOC to air ex carbon beds IPC limit compliance (ex monthly sample)	90% (95% in 97)	J.Massey	76%			
AO	VOC to air ex carbon beds average conc (ex monthly samples)	< 60 mg/l in 1996 < 60 mg/l in 1997	J.Massey	86mg/l			
AO	VOC to air ex carbon beds tonnes released expressed as toluene (ex monthly sample)	< 10 te in 1996 < 10te in 97	J.Massey	14.1			
AO	IPC Notifications to HMIP	<3 in 96 (O in 97)	J.Massey	0			
AO	Environmental complaints related to plant operation	O in 96	J.Massey	0			
AO	Environmental incident severity rating reduction		J.Massey	62% Major			
AO	IPC operator performance rating by HMIP inspections	80% minimum in 96 80% minimum in 97	J.Massey	79%			
AO	Environmental auditing non compliance clear up rate		J.Massey				
AO	Sensitive hour raw material & waste HGV movements	No unjustifiable moves (see specific targets)	J.Massey	No data			
AO	River effluent consent non-compliance attributable to AO	O following 2 nd containment installation.	J.Massey				
AO	Sextate to sewer (kg/te 100% H ₂ O ₂ produced)	To be set in future pending monitoring improvements	J Massey	N/A			

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Area	Measure	Target	Manager Responsible	Previous Years Results	Actual Results	Achieved Yes/No	Comments
AO	COD to sewer (kg/te 100% H ₂ O ₂ produced)	To be set in future pending monitoring improvements	J Massey	N/A			
AO	Waste disposal "Duty of Care" infringements	0	J Massey				
CAPA	Sewer effluent to sewer pH consent compliance (ex NWW samples)	100% in 96	I.McIntyre				
CAPA	Sewer effluent to sewer Flow consent compliance (ex flow records)	100% following re-consent	I.McIntyre				
CAPA	IPC Notifications to HMIP	2 in 96 (0 in 97)	I.McIntyre	1			
CAPA	Environmental complaints related to plant operation	0	I.McIntyre				
CAPA	Environmental incident severity rating reduction		I.McIntyre	14% Major			
CAPA	Environmental incident corrective action completion	95% completion rate	I.McIntyre				
CAPA	IPC Operator Performance rating by HMIP inspections	80% minimum	I.McIntyre				
CAPA	Environmental auditing non compliance clear up rate	N.A in 96 Target for 97	I.McIntyre				
CAPA	Sensitive hour raw material & waste HGV movements	No unjustifiable moves	I.McIntyre				

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Area	Measure	Target	Manager Responsible	Previous Years Results	Actual Results	Achieved Yes/No	Comments
CAPA	River effluent consent non-compliance attributable to Capa	0	I.McIntyre				
CAPA	COD to sewer (Kg/te monomer produced)	To be set in future pending monitoring improvements	I.McIntyre				
CAPA	Residues for disposal (kg/te monomer produced)	To be determined	I.McIntyre				
CAPA	Waste disposal "Duty of Care" infringements	0	I.McIntyre				
PERSALTS	Sewer effluent pH consent compliance (ex NWW samples?)	100% following sewer connection	D.Mitchell				
PERSALTS	Sewer effluent flow consent compliance (ex flow records)	100% following sewer connection	D.Mitchell				
PERSALTS	Environmental complaints related to plant operation	< 4 in 96 (O in 97)	D.Mitchell				
PERSALTS	Environmental incident severity rating reduction		D.Mitchell	67% Major			
PERSALTS	Environmental incident corrective action completion	To be determined	D.Mitchell				
PERSALTS	Environmental auditing non compliance clear up rate	To be determined	D.Mitchell				
PERSALTS	Sensitive hour raw material & waste HGV movements	No unjustifiable moves	D.Mitchell				

APPENDIX 2.7: SOLVAY INTEROX'S EMS: ENVIRONMENTAL MEASURES AND TARGETS

Area	Measure		Target	Manager Responsible	Previous Years Results	Actual Results	Achieved Yes/No	Comments
PERSALTS	River effluent consent attributable	non-compliance		D.Mitchell				
PERSALTS	Tincal sludge skips weight	greater than 13 tonnes	80%	D.Mitchell				
PERSALTS	Tincal sludge water content			D.Mitchell				
PERSALTS	Waste disposal "Duty of Care" infringements		0	D.Mitchell				
PERSALTS	Boron to sewer (kg/te PBS4 produced)		To be set in future pending improved monitoring	D.Mitchell				
PERSALTS	Tincal sludge (kg/te PBS-4 produced)		To be set in future pending improved monitoring	D.Mitchell				
BP ENERGY	Sensitive hour raw material & waste HGV movements		No unjustifiable moves (see specific targets)	L.Curwen				
BP ENERGY	River effluent consent attributable to Boiler House	non-compliance	0	L.Curwen	0			
BP ENERGY	IPC Authorisation Nox conc	limit compliance	100%	L.Curwen				
BP ENERGY	IPC Authorisation particulate conc	limit compliance	100%	L.Curwen				
BP ENERGY	IPC Authorisation opacity conc	limit compliance	100%	L.Curwen				

APPENDIX 2.7: SOLVAY INTEROX'S EMS: ENVIRONMENTAL MEASURES AND TARGETS

Area	Measure	Target	Manager Responsible	Previous Years Results	Actual Results	Achieved Yes/No	Comments
BP ENERGY	Environmental complaints related to plant operation	0	L.Curwen	0			
BP ENERGY	IPC monitoring schedule for NOx complete and results forwarded to environmental group on time.	100%	L.Curwen				
BP ENERGY	I.P.C monitoring schedule for Hg & Cd on DMW & blowdown effluents complete and results forwarded to environmental group on time	100%	L.Curwen				
SITE	River effluent pH consent compliance (ex weekly samples)	100% after Sept 96	R.Haffenden				
SITE	River effluent H ₂ O ₂ consent compliance (ex weekly samples)	100% after Sept 96	R.Haffenden				
SITE	River effluent COD consent compliance (ex weekly samples)	100% in 1996	R.Haffenden				
SITE	River effluent Sups. Solids consent compliance (ex weekly samples)	99%	R.Haffenden				
SITE	River effluent Average H ₂ O ₂ concentration (ex weekly samples)	25mg/l after Sept 96	R.Haffenden				
SITE	River effluent Average COD concentration (ex weekly samples)	<30mg/l	R.Haffenden				
SITE	HGV Sunday moves	To be determined	R.Haffenden				
SITE	HGV Sensitive hour average number of moves per week	To be determined	R.Haffenden				

APPENDIX 2.7: SOLVAY INTEROX'S EMS: ENVIRONMENTAL MEASURES AND TARGETS

Area	Measure	Target	Manager Responsible	Previous Years Results	Actual Results	Achieved Yes/No	Comments
SITE	HGV production related moves limit compliance	100%	R.Haffenden	N/A			
SITE	Waste index	> 30% improvements on base year (1989)	R.Haffenden	41% improvement on base year			
SITE	NRA check monitoring compliance against consent limits	100%	R.Haffenden				
SITE	Total environmental complaints received	< 20	R.Haffenden	29			
ENV GROUP	IPC Returns to EA on time	100%	J.McDonagh	100%			
ENV GROUP	Ground Contamination - w/s removal	To be determined	J.McDonagh				
ENV GROUP	Ground Contamination - TOC reduction	To be determined	J.McDonagh				
ENV GROUP	Ground Contamination - free phase plume surface area	To be determined	J.McDonagh				
ENV GROUP	IPC Notifications within 24 hours	100%	J.McDonagh	100			
ENV GROUP	External environmental complaint initial response time to complainant	Within 24 hours week days	J.McDonagh	100			
CUST. CARE	Sensitive hour product HGV movements	No unjustifiable moves	R.Ireland	N/A			
PROJECTS	Waste disposal "Duty of Care" infringements and site procedure compliance infringements.	0	C. Yeadsley	N/A			

APPENDIX 2.7: SOLVAY INTEROX'S EMS: ENVIRONMENTAL MEASURES AND TARGETS

Area	Measure	Target	Manager Responsible	Previous Years Results	Actual Results	Achieved Yes/No	Comments
PROJECTS	External environmental complaints relating to project activities	0	C.Yeardsley	N/A			
SECURITY	Site Waste Disposal Procedure compliance infringements	0	G Oliver	N/A			

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
C1	Proposals to HMIP for use of drain seals for preventing releases to drain during tanker offloading.	1, 2	EG/ Process	Projects Prog Item 8.1.2	Proposals sent to HMIP 29/4/94. Procedure written by EG and sent to process area Aug 94 for implementation by area coordinators (Capa: A Horsley) by Dec 94. Formal review of implementation due Q1 1996.	Complete
C2	Proposals to HMIP for assessing likely frequency and impact of OWS overflows to river drainage system.	1, 2	EG	Projects Prog Item 8.1.7	Proposals sent to HMIP 29/4/94 dealing approach to be taken and commitment to send report of findings by 31/8/94 (see below)	Complete
C3	Produce a procedure that ensures bund waters are disposed of appropriately.	1, 2	EG/ Process	Projects Prog Item 8.1.8	Procedure sent to HMIP 29/6/94. Procedure sent to process area end June 94 for implementation by area coordinators (Capa: A Horsley) by end July 94. Flyer issued 18/8/94. Implementation review conducted Mar - May 1995 and report issued. Agreed at review	Complete
C4	Produce a procedure for tanker off-loading	1, 2	EG/ Process	IPC Imp Prog	Procedure issued Oct 95.	Complete
C5	Environmental process hazard reviews	1, 2	EG/Tech/Process/Projects	IPC Imp Prog	Report sent to HMIP. HMIP & NRA agreement received.	Complete
C6	Proposals to HMIP for improved monitoring of releases from the process.	2, 4	EG	IPC Imp Prog Item 8.1.3	Proposals sent to HMIP 29/4/94 outlining Co philosophy and current sampling & analysis regimes. Proposal outlined to install monitoring station for River effluent during Q1 1995. Continuous monitoring of effluent to sewer, eg TOC, anticipated installation	See projects prog and mins
C7	Acetic acid vapours to quench tank	1, 2	Tech/Proc	IPC Imp Prog	Installation complete. Performance assessment scheduled.	Complete

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
C8	Cyclohexanone vapour handling	1, 2		IPC Imp Prog	Currently on hold with EA agreement pending shut down of old Capa Plant.	On hold
C9	Report on impact of OWS overflows	1, 4	EG	IPC Imp Prog	Report sent to HMIP. No further action required.	Complete
C10	Waste Minimisation Reviews	4,7	EG/Tech/Proc/Proj	IPC Imp Prog	Reviews complete High priorities identified & agreed. Many items incorporated in new Capa. Priorities set on item listed below. Many items left off IPC imp. programme due to priorities and inappropriateness.	See projects prog and mins
C11	Secondary containment (modification of drainage system and installation of TOC monitors to divert effluent to a containment pit).	1, 2	Projects	Projects Prog (705/08)	Programme priorities set. Monthly review meetings established. Meeting with HMIP scheduled for Oct to agree programme timing.	See projects prog and mins
C12	Storage tank containment (containment pits for PAA, HTP and caustic storage)	1, 2	EG/Projects	Projects Prog (705/09)	On hold pending shutdown of old monomer plant - agreed with HMIP	See projects prog and mins
C13	Tanker off-loading containment	1, 2	EG/Projects	Projects Prog (705/10)	Now part of full secondary containment.	See projects prog and mins
C14	Capa process improvements (small items)	1, 2	EG/Projects	Projects Prog (705/11)	On hold pending shutdown of old monomer plant - agreed with HMIP	See projects prog and mins
C15	Primary column high pressure trip	1, 2	Projects	Projects Prog (705/11)	On hold pending shutdown of old monomer plant - agreed with HMIP	See projects prog and mins

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
C16	Target setting	2,4, 7	Tech/Proc	Waste Minimisation	Performance measures and targets procedure and schedule developed - awaiting agreement with managers before issue.	Q4 1996
C17	Re-use of monomer washings	7	Tech/Proc	Waste Minimisation	Priority 2 initiative within Tech Dept Capa priorities.	Ongoing
C18	New residues tank condenser	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C19	Improve/additional luwa evaporator	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C20	Dumping luwa column on shutdown	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C21	KOH trial	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C22	Change packing in secondary column	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C23	Monitoring equipment	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C24	Stripper extension commissioning	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C25	Filter commissioning	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C26	Cooling capacity	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
C27	Purge stream recovery	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C28	Sample recovery	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C29	Change packing in tertiary column	7	Tech/Proc	Waste Minimisation	Priority 3 initiative within Tech Dept Capa priorities.	Ongoing
C30	Consideration of the use of capa residues as a cem fuel through waste exchange company.	7	EG	Waste Minimisation		Ongoing
C31	Consider high level dispersion venting on residues tank pending.	1, 2	EG	Effects Assessment	On hold pending shut down of old Capa plant.	See projects prog and mins
C32	Investigation of the use of acid as a neutralising agent for alkaline effluent.	2	J McCormick	Effects Assessment		Q1 1996
C33	Investigate the need for temperature checks to be included as part of monitoring schedule.	2	EG	Effects Assessment	A Horsley contacted September 1995 - it is not believed that effluent reaches this temperature as no steam is observed from pit during winter. Checks required ?	Ongoing
A1	Proposals to HMIP for the use of drain seals to prevent releases of controlled waters resulting from tanker loading / off-loading.	1, 2	EG/Proc	IPC Imp Prog (item 8.1.3)	Procedure has been developed by EG for the use of bund seals. Sent to process areas for implementation by area co-ordinators.	Complete
A2	Proposals to HMIP to prevent the overflow of the effluent pit into canal.	1, 2	EG/Proc	IPC Imp Prog (item 8.1.5)	Procedure for penstock valve operation has been incorporated into plant S.O.P.s.	Complete

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
A3	Procedure to ensure that bund waters are tested and disposed of appropriately.	1, 2	EG / Proc	IPC Imp Prog (item 8.1.6)	Incorporated into plant SOPs	Complete
A4	Environmental process hazard reviews	1, 2	EG/Tech/Process/Projects	IPC Imp Prog (item 8.1.1)	Report sent to HMIP. HMIP & NRA agreement received.	Complete
A5	Proposals to HMIP for the continuous monitoring of the releases from the carbon beds.	2, 4	EG/Proc	IPC Imp prog item 8.1.4	Continuous analysers are expected to be fitted in summer / autumn 1996.	Q4 1996
A6	Proposals to HMIP for analysis of the releases to controlled waters from the process, with a view to assessing the effect of these releases on the final discharge to the River Mersey.	2, 4	EG	IPC Imp prog item 8.1.2	Report written by I McLean and submitted to HMIP	Complete
A7	Proposals to HMIP for improved monitoring of releases from the process (including mercury).	2, 4	EG	IPC Imp prog item 8.1.1	Proposals sent to HMIP	Complete
A8	Procedure for waste management	2	EG/Proc	IPC Imp prog item 8.1.7	Site procedure implemented September 1995	Complete
A9	Proposals to HMIP for reducing the release of VOCs from the carbon beds, with the aim of achieving a limit of 80mg/m ³	2	EG / Proc	IPC Imp prog item 8.1.10	Proposals sent to HMIP	Complete
A10	Effluent Control (AO pH etc)	2	EG/Tech/Proc/Proj	Projects Prog (701)	Programme has been reviewed for completion at November 1996 shutdown.	See projects prog and mins

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
A11	Crude cyclones (to handle releases from vents in hydrogenation and oxidiser area)	1, 2	EG/Proc/ Projects	Projects Prog (705/01)	Meeting to be arranged for Oct/Nov 96 between RAH and projects to determine requirements for cyclones and the design basis.	See projects prog and mins
A12	Rundown tanks (modification of drainage arrangements from the bunded area around the tanks).	1, 2	EG/Proc/ Projects	Projects Prog (705/02)	Process scopes issued for engineering department 3/09/96.	See projects prog and mins
A13	Process improvements (small items)	1, 2	EG/Process / Projects	Projects Prog (705/03)	Process scopes issued for engineering department 3/09/96.	See projects prog and mins
A14	Installation of foam level detector	2		Projects Prog (705/03)	Identification of appropriate instrument ongoing.	See projects prog and mins
A15	Tars tank loading (installation of drainage gullies around tanker loading point to drain into bund)	1, 2	EG/Process /Projects	Projects Prog (705/04)	Scope agreed and installation to be phased appropriately.	See projects prog and mins
A16	Tank farm containment (storage tanks, tanker loading/off-loading areas)	1, 2	EG/Process /Projects	Projects Prog (705/05)	Final scope complete	See projects prog and mins
A17	Tank farm containment of IBCs	1, 2	EG/Process /Projects	Projects Prog (705/06)	IBC storage relocated to front of carboys with drainage to AOC dump pit.	See projects prog and mins
A18	Peroxide instrumentation meter (to monitor effluent during washing of IBCs)	1, 2	EG/Process /Projects	Projects Prog (705/07)	Removed from programme as not deemed necessary - agreed with HMIP.	N/A
A19	AO Distillation Secondary Containment	1, 2	EG/Process /Projects	Projects Prog (705/19)	All customer/plant teams' comments incorporated into Process Scope which will be issued for engineering design by SIL engineering groups following discussion at Task Force meeting 3.10.96.	See projects prog and mins

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
A20	AO Distillation Process Improvements (small items)	1, 2	EG/Process /Projects	Projects Prog (705/20)	Review meeting held - scope ready for approval Oct 96	See projects prog and mins
A21	VOC monitoring from carbon beds	2,4		Projects Prog (705/26)	CEP for approval by Oct 96. Scope of work to be revised to enable both wet and dry sampling of A stream absorber vents. Order to be placed with Gladwell once CEP approved.	See projects prog and mins
A22	New storage facilities for raw materials	1, 2		Projects Prog (705/27)	PCAs approved subject to Armco Barrier being added around DMW Storage Tank hardstanding.	See projects prog and mins
A23	DMW effluent treatment (old and new plants) ie pH adjustment systems	2	EG/Tech/Proc/Projects	Projects Prog (705/28)	Bids have been assessed and two companies invited to bid - Haden Freeman have been chosen. Approval from RAH required to proceed.	See projects prog and mins
A24	Conversion of AO Tars to sewer	7	EG / Proc	Waste min	Original PCA approved April 1994. Temporary arrangement has operated for A stream since June 1994	End 96
A25	Use of filter cleaning equipment for cleaning centrifuge plates.	7	Process	Waste min	PCA (1236) submitted 1994, Trials 1995, PCA 1352 for permanent modifications. Report on trials included with PCA.	Ongoing
A26	Continuous addition of dequest to oxidisers (reduces levels of decomposition, influences hydrogen usage).	7	Process	Waste min	Since implementation H ₂ usage has improved with £300k/annum forecast.	Complete
A27	Crude purification improvements (quality of crude, reduced solvent/working solution carryover at start-up / shut down).	7	Process	Waste min	Completed in 1996	Complete

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
A28	Winterisation improvements (to reduce bursts/freeze ups during winter).	7	Process	Waste min		Ongoing
A29	Reduced effluent flow to sewer	7	Process	Waste min	PCA to be submitted for central drainage channel seal water addition system.	Ongoing
A30	Effluent air stripper improvements	7	Process	Waste min	Modifications complete to allow preferential discharge via stripper and on line performance of stripper to be assessed.	Q4 1996
A31	Solvent recovery improvements (drying cycle on C beds)	7	Process	Waste min	Pending installation of VOC monitors and subsequent detailed investigation of bed performances.	1997/8
A32	AO Distillation mass balance (concentrating on overhead losses and loss between product sold and processed).	7	Technical	Waste min	SPC charts from May 1994 onwards. Prior to 1994 ratio was 1.2. From May 94 onwards ratio reduced to 1.4	Complete
A33	AO Crude cooling tower makeup ratio (reduction in well water needed to makeup cooling water).	7	Process	Waste min	Ongoing	Ongoing
A34	Investigation of the use of fixed installations for disposal of brine wash waste.	1, 2	?	Effects Assessment		Ongoing
A35	Reducing VOC releases from carbon beds below 80mg/m ³ future IPC authorisation limit.	2		Effects Assessment	Awaiting VOC monitoring installation and assessment of C bed performance with potential need for drying cycle.	Ongoing

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
PA1	Proposals to HMIP for reducing the releases from the reactor to air and controlled waters.	2	N/A	Projects Prog item 8.1.8	On hold pending close down of PAA	N/A
PA2	Proposals to HMIP for reducing the releases of acetic acid from the bulk storage vessels.	2	N/A	Projects Prog item 8.1.9	On hold pending close down of PAA	N/A
PA3	PAA process improvements (small items)	1, 2	N/A	Projects Prog (705/21)	On hold pending close down of PAA	N/A
PA4	HTP storage tank containment	1, 2	N/A	Projects Prog (705/22)	On hold pending close down of PAA	N/A
PA5	Bulk production (ISO tanker containment pit and drainage for storage areas).	1, 2	N/A	Projects Prog (705/23)	On hold pending close down of PAA	N/A
PA6	Acetic acid tanker off-loading containment	1, 2	N/A	Projects Prog (705/24)	On hold pending close down of PAA	N/A
PA7	Acetic acid storage tank bund upgrade	1, 2	N/A	Projects Prog (705/25)	On hold pending close down of PAA	N/A
PA8	Ventilation system	2	N/A	Projects Prog	On hold pending close down of PAA	N/A
P1	Secondary containment (including flocculent storage tanks, sludge holding tanks, glycol storage area)	1, 2	EG/Tech /Proc/Proj	Projects Prog (705/12)	Process, civil and mechanical engineering scopes completed by Sept 96	See projects prog and mins
P2	Peroxide tank containment	1, 2	EG/Tech /Proc/Proj	Projects Prog (705/13)	Scope to be issued to project engineering disciplines w/c 9.09.96.	See projects prog and mins

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
P3	Tanker off-loading (containment for the offloading facility for caustic and sodium silicate deliveries)	1, 2	EG/Tech /Proc/Proj	Projects Prog (705/14)	Engineering design by SIL developed during August 96	See projects prog and mins
P4	Process improvements (small items)	1, 2	EG/Tech /Proc/Proj	Projects Prog (705/15)	Engineering design by SIL developed during August 96	See projects prog and mins
P5	Diversion of PBS-4 effluent to sewer	1, 2	EG/Tech /Proc/Proj	Projects Prog (705/29)	Connection from PBS sump to new sewer is complete. SIL have completed the in house basic design and have issued an enquiry to contractors for detailed design. Quotations are due 16 October 96.	See projects prog and mins
P6	PCS Effluent Treatment	1, 2	EG/Tech /Proc/Proj	Projects Prog (228)	On hold pending decision on PCS production - PCS Plant will not be able to run without completion of this project.	See projects prog and mins
P7	Waste minimisation reviews	7	EG/Tech /Proc/Proj	Waste Min	Report complete and "high" priorities identified and agreed. Priorities set on items listed on individual plant improvement programmes. Many items left off IPC improvement programme due to priorities and inappropriateness.	See items below
P8	Assess the potential use of tincal sludge using a waste exchange company	7		Waste Min	Report complete - feasibility for rockwool manufacture good, financial viability poor. Meeting to be arranged with Rockwool to view actual processing route.	Ongoing
P9	Conversion of Line 3 scrubber system to MBS	7	Process	Waste Min	Complete	Complete

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
P10	Conversion to flocculents supplied by Allied Colloids which can be made up with process mother liquor instead of water (saving water and reducing effluent to drain).	7	Process	Waste Min	Trials by Allied Colloid taking place Oct 1996.	1997
P11	Washing of classifier screw with mother liquor rather than water (saving of water and reduction of mother liquor to drain).	7	Process	Waste Min	Design underway Oct 1996	1997
P12	Conversion from 47% to 50% peroxide (reducing costs of haulage etc).	7	Process	Waste Min	To be installed Q1 1997	Q1 1997
P13	Investigation into alternative reactor conditions to reduce use of peroxide.	7	Process	Waste Min	Continuous improvements made.	Ongoing
P14	Incorporate boron releases into performance measures and targets once monitoring is established.	7	EG	Effects Assessment	Pending improvements to monitoring	N/A
P15	Investigate improvements to line 4 drier exhaust (eg silencer ?)	5	EG	Effects Assessment		Ongoing
G1	Produce a written report of a full environmental hazard review with proposals for improvements.	1, 2	EG/Tech/Proc/Proj	IPC imp prog item 8.1.6 & 8.1.11(705)	Report agreed by HMIP & NRA.	Complete
G2	Outfall monitoring station	4	EG	Projects Prog (235/03)	Scope has been clarified, letters sent to contractors requesting clarified bids by 11.10.09. CEP to be issued Oct 96, order should be placed early November.	See projects prog and mins

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
G3	DMW chemical off-loading (caustic and sulphuric acid)	1, 2	EG/Tech/Pro c/Proj	Projects Prog (705/16)	Scope agreed and installation to be phased appropriately.	See projects prog and mins
G4	Pickling plant nitric acid off-loading	1, 2	EG/Tech/Pro c/Proj	Projects Prog (705/17)	Process scope to be finalised w/c 9.9.96	See projects prog and mins
G5	Pickling plant effluent treatment and monitoring	1,2,4	EG/Tech/Pro c/Proj	Projects Prog (705/18)	Awaiting development of process scope. A sum of money ie £25 had been set aside.	See projects prog and mins
G6	Waste oil spillage containment	1, 2	Eng	Projects Prog (705/30)	Discrete collection tanks located around site, old system removed Q3 96.	Complete
G7	Cooling water treatment chemicals containment	1, 2	EG/Tech/Pro c/Proj	Projects Prog	Estimate CEP issued to J Massey (5/08/96) for H ₂ SO ₄ storage for cooling water treatment for consideration of justification statement.	See projects prog and mins
G8	DMW H ₂ SO ₄ tank bunding	1, 2	EG/Tech/Pro c/Proj	Project Prog (702)	Intermediate tank fed from Memcor H ₂ SO ₄ tank installed Q1 96. Old tank removed Q3 96.	Complete
G9	Firewater ponds / interceptor pits	1, 2	EG/Tech/Pro c/Projects	Projects Prog	Location feasibility studies actioned. Timescale for implementation has been put back.	See projects prog and mins
G10	Internal overall site monitoring	4	EG/Tech/Pro c/Projects	Projects Prog	Monitoring equipment scoped for inclusion in relevant projects. AO crude flow proportional sampler discrete project. Procedure under development for sewer consent sampling, analysis and cost allocation.	See projects prog and mins
G11	Ground contamination	1, 2	EG	See separate programme	AO hydraulic containment system currently being installed. EA meeting held Sept 96 and remediation programme approved. Full CEP to be sought Q4 96/Q1 97.	1997/1998

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
G12	North West Water pumping station	2	EG/NWW	Projects Prog	Upgrade planned for completion March 97. Legal agreement on costs being progressed.	March 97
G13	New sewer system	2	Projects		New system installed Q3 96. Pump capacity under review - mods needed to reduce potential flow and consent breach.	Ongoing
G14	Investigate potential leaks from old DMW effluent pit	1,2	EG			Ongoing
G15	Waste minimisation reviews	7	EG/Tech /Proc/Proj	IPC imp prog item 8.1.6 & 8.1.11	Report complete and "high" priorities identified and agreed (see individual items above - many items left off IPC improvement programme due to priorities and inappropriateness).	Complete
G16	Office recycling schemes	7	Recycling reps		Office paper recycling centre set up August 1996.	Ongoing
G17	Environmental management system	3	E Goodchild	See separate Programme	Policy, register of regulations, effects assessment, management manual, objectives and targets and improvement programme complete.	Sept 97
G18	Landscaping of derelict land at Junction 5 of Eastford Road and Taylor Street.	5	EG		Mersey Valley Partnership commissioned to carry out works pending referendum by residents on appropriateness of such a scheme. £10 budget agreed shared between Solvay Interox Ltd, Vinamul and Crossfield	Ongoing
G19	Support local community project to develop Walton Lock area of the River Mersey.	5	Communic. Manager		£20k donation offered. Awaiting progress by Water Watch.	Ongoing

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
G20	Involvement in the implementation of Agenda 21 via roundtable groups.	5, 6	EG		Ongoing	Ongoing
G21	Publish publicly available environmental reports every two years.	5, 6	EG		Report published in 1993-1994. Second report for 1994-1995 in draft form.	Ongoing
G22	Ongoing programme of regular resident liaison meetings.	5	EG		Ongoing	Ongoing
G23	HGV Monitoring & Targeting	5	EG	See specific HGV targets	HGV logging and targeting procedures issued August 1996. Targets established to be agreed with Operations Managers.	Q4 96
G24	Reduction in HGV Movements	5	EG		Group Project set up with Salford University to investigate alternative transport. Report to be complete Dec 96.	Ongoing
G25	Monitoring and targeting of electricity usage by site utilities management.	7	Eng	Effects Assessment	Electrical distribution is now being monitored.	Ongoing
G26	Monitoring and targeting of water usage by site utilities.	7	Eng	Effects Assessment	Metres now installed on two incoming sources of towns water (although can't measure individual site usage). Savings of £80,000 a year through conversion of powerhouse compressors from towns water to well water.	Ongoing
G27	Monitoring and targeting of steam usage by site utilities.	7	Eng	Effects Assessment	Fairly good existing monitoring although some minor uses can not presently be individually measured.	Ongoing
G28	Monitoring and targeting of gas usage by site utilities.		Eng	Effects Assessment	Therm gas (Persalts burners) and interruptable gas (boiler house) being monitored. Therm gas usage has decreased as less mono is produced.	Ongoing

APPENDIX 2.8: SOLVAY INTEROX'S EMS - ENVIRONMENTAL MANAGEMENT PROGRAMME

No	Target	Objective No	Progressed By	Reference	Comments / Status	Anticipated Completion Date
G29	Monitoring and targeting of compressed air usage by site utilities.		Eng	Effects Assessment	Diagramme prepared of requirements of monitoring prepared.	Ongoing
G26	Review use and legal obligation of halon use across the site (refrigerant and fire extinguishers).	1	EG	Effects Assessment		Q4 1996

KEY: Proc = Process, EG = Env Group, Tech = Technologists, Proj = Projects, C= Capa A = AO Plant, PA = Peracetic Acid Plant, P = Persalts Plant, G = General

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- 3 Organisation Structures**
- 4 Responsible Care & Loss Prevention Document Levels**
- 5 Index to Procedures / Manuals**
- 6 Cross References including BS 7750, ISRS etc.**
- 7 Amendment History**
- 8 Current HSE Objectives**
- 9 Suggestions for Improvement Form**
- 10 Current Policy Statement**

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APPENDIX 2.10: SOLVAY INTEROX'S EMS - SUPPLIER ASSESSMENT QUESTIONNAIRE

SUPPLIER ENVIRONMENTAL QUESTIONNAIRE			
SECTION A: GENERAL INFORMATION			
Name of organisation			
Address of organisation		Telephone Number	
		Facsimile Number	
		Number of employees	
Names and titles of those responsible for environmental matters.		Products supplied to Solvay Interox	
Are any of these director/board level appointments?			Y/N
Please supply the name of a contact person for verification purposes.			
Is your company certified to the Quality Standard BS 5750?			Y/N
Is your company affiliated to a Trade Association?			Y/N
If, yes which one?			
SECTION B: ENVIRONMENTAL MANAGEMENT			
1.	Do you have an Environmental Policy? If "Yes", please supply a copy.		Y/N
2.	Does your organisation have an Environmental Management System? Is this custom designed by your organisation or based on BS 7750, EMAS, ISO 14000 series, CIA's: "Integrated Health, Safety and Environment Management Systems" guidance?		Y/N
3.	Are you intending to achieve certification to any environmental management standard within the next 5 years? If "Yes", please state which standard e.g. BS 7750 and EMAS in the U.K.		Y/N
4 a.	Do you have registers of the environmental effects of your activities? If "Yes" do these include inventories of:		Y/N
	- emissions to air?		Y/N
	- discharges to water?		Y/N
	- waste?		Y/N
	- resource usage?		Y/N
	- nuisance effects?		Y/N
	- indirect effects?		Y/N
4 b.	Do you have formal procedures to assess these effects / risks?		Y/N
4 c.	Do you have comprehensive formal waste management procedures?		Y/N

APPENDIX 2.10: SOLVAY INTEROX'S EMS - SUPPLIER ASSESSMENT QUESTIONNAIRE

4 d.	Do you have formal procedures in place for responding to emergency situations? Y/N
5.	Do you have formal procedures for keeping a register of relevant regulatory, legislative and policy requirements? Y/N
6.	Do you undertake regular environmental training of your personnel? Y/N If "Yes", can you provide details of the nature and frequency of this training.
7.	Do you have an environmental management programme for the site? Y/N If "Yes", does your environmental management programme include: <div style="margin-left: 40px;"> - waste minimisation initiatives ? Y/N - the consideration of the recycling and reuse of waste ? Y/N - energy efficiency initiatives ? Y/N - improved monitoring ? Y/N - improved containment ? Y/N - effluent treatment ? Y/N - any others? </div> Please indicate with a ✓ which of these are being driven by legislation e.g. through an Integrated PollutionControl Improvement Programme.
8.	Have you conducted a Baseline Review/Audit within the last 5 years? Y/N
9.	Do you undertake regular environmental audits? Y/N If "yes", do these environmental audits include: - site audits? Y/N <div style="margin-left: 40px;"> - supplier assessment? Y/N - waste contractor assessment? Y/N - any others? </div>
10.	Has your organisation been prosecuted for an environment related offence within the last 5 years? Y/N If "Yes", please supply details.

APPENDIX 2.10: SOLVAY INTEROX'S EMS - SUPPLIER ASSESSMENT QUESTIONNAIRE

SECTION C: PRODUCTION PROCESS	
<p>If you supply more than one product to Solvay Interox, please photocopy this page and complete accordingly for each product.</p> <p>Product Name _____</p>	
1.	<p>Please briefly describe the process by which you manufacture the named product you supply to Solvay Interox.</p>
2.	<p>Is this process subject to control by enforcing authorities e.g. HMIP's Integrated Pollution Control in the U.K.? Y/N</p>
3.	<p>Please describe the main environmental releases from your process e.g. COD, VOCs, special and non special wastes. An indication of the order of magnitude compared to production would be helpful.</p>
4.	<p>Please describe the environmental protection installed to mitigate the effects of the manufacturing process.</p>
5.	<p>Please specify any intended technical environmental improvements for the manufacturing process.</p>

APPENDIX 2.10: SOLVAY INTEROX'S EMS - SUPPLIER ASSESSMENT QUESTIONNAIRE

For validation purposes, would it be possible for us to verify the responses to this questionnaire by such methods as requesting further information and/or site visits and meetings?	Y/N
Name of person who completed questionnaire	
Position	
<p>Thank you for your time and co-operation.</p> <p>Please return the questionnaire, your environmental policy (if applicable) and any comments to:</p> <p>MS E. GOODCHILD P.O. BOX 7 SOLVAY INTEROX LTD WARRINGTON CHESHIRE WA4 6HB</p>	

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

Supplier	Contact Name & Address	Product(s) Supplied	Plant	Date Sent	Date Rec	Score	Grade	Comments
Acrol Ltd	Everite Road, Widnes, Cheshire WA8 8PT	Tinstab BL277	CAPA	4.8.95 + reminder 1.9.95	23.10.95		N/A	Acrol Ltd act as an agent for Akros Chemicals UK Ltd.
Akros Chemicals UK Ltd	Meresa Bate, P.O. Box 1, Silk Street, Eccles, Manchester M30 0BR	Tinstab BL277	CAPA					
Air Products Ltd	Gareth Crowther, Chemical Division, Clayton Lane, Clayton, Manchester M11 4SR.	Dabco T9	CAPA	4.8.95 + reminder 1.9.95				Telephone Call - 12/10/95. Questionnaire promised.
Akzo Nobel Surface Chemistry	A Pearson, 23 Grosvenor Rd, St Albans, Herts AL1 3AW	Glycerine	CAPA	4.8.95 + 1.9.95 + 8.10.95				Reports provided - no questionnaire.
Albright And Wilson Ltd	Phosphates Division, P.O. Box 3, Hagley Road, West Oldbury, Warley, West Midlands.B68 0NN	Albright C1XN, Sodium Acid Pyrophosphate, Sodium Hexametaphosphate.	AO, AO, Persalts	4.8.95		70%	B	Questionnaire completed by the Head Quarters.
Alcohols Ltd	Charringtons House, The Causeway, Bishops Stortford, Hertfordshire. CM23 2EW	Di - Ethylene Glycol; Neopentyl Glycol; IMS	CAPA	17.8.95	17.8.95	NA	N/A	Alcohols Limited are the distributors and passed the questionnaire to BP Chemicals and Hoechst UK Ltd.

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

<i>Supplier</i>	<i>Contact Name & Address</i>	<i>Product(s) Supplied</i>	<i>Plant</i>	<i>Date Sent</i>	<i>Date Rec</i>	<i>Score</i>	<i>Grade</i>	<i>Comments</i>
Allied Colloids	P.O. Box 38, Clecheaton Road, Low Moor, Bradford, Yorkshire BD12 0JZ	Magnafloc E24	PERSALTS	17.7.95	27.7.95	60%	C	
BASF U.K. Ltd	P.O. Box4, Earl Road, Cheadle Hulme, Cheadle Cheshire. SK9 6Q9	Ethyl Anthraquinone Neopentyl Glycol Sodium Polyacrylate	AO, Capa, Persalts	17.7.95	26.7.95	79%	B	Completed by Head Office as manufacture of products often occurs on different sites.
Bayer U.K. Ltd	Dr Speck, Bayer House, Strawberry Hill, Newbury, Berkshire. RG13 1JA	1,2,3 Benzotriazole (only used in one-off development project) Stabaxol 1 + Stabaxol P	AO CAPA	4.8.95	28.7.95	68%	C	
BDH Chemicals Ltd	Poole, Dorset. BH12 4NN	Dipiclonic Acid Methyl Red	AO, PAA AO	4.8.95 + reminder 1.9.95				
Berk Ltd	Berk House, P.O. Box 56, Basing View, Basingstoke, Hants. HR21 2EG	Magnesium Sulphate	PERSALTS				N/A	Products manufactured by Kali & Salz (part of the Berk Group)

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

Supplier	Contact Name & Address	Product(s) Supplied	Plant	Date Sent	Date Rec	Score	Grade	Comments
Borax Consolidated Ltd	Gorsey Lane, Widnes, Cheshire. WA8 0RP	Pentahydrate Borax	PERSALTS	17.7.95	9.8.95 - letter			Questionnaire promised.
BP Chemicals Ltd	Poplar House, Chertsey Road, Sunbury, Surrey.+ Hull Research and Tech. Centre, Salt End, Hull HU12 8DS	Acetic Acid; IMS (via Alcohols Ltd)	CAPA,PAA	17.7.95	17.8.95	91%	A	
Brunner Mond + Co Ltd	P.O. Box 4, Mond House, Northwich, Cheshire CW8 4DT	Sodium Carbonate	PERSALTS	4.8.95 + reminder 1.9.95	12.9.95	81%	A	Audits just started.
Bush Boake Allen Ltd	Fragrances Division, Blackhorse Lane, London. E17 5QP	Perfume LK30524	PAA	17.7.95	28.7.95	33%	F	Little at present - although a commitment to BS 7750. Progress to be monitored.
Carbon Link	Sterling House, 2 Park Street, Wigan. WN3 5HE	Activated Carbon	AO	17.7.95	28.7.95	25%	F	Stated that the process does not result in releases to the environment. The company only has 10 employees.
Ciba Geigy Plc	Hulley Road, Macclesfield, Cheshire. SK10 2NX	Irganox 1010	CAPA	4.8.95 + reminder 1.9.95	3.11.95	89%	A	

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

Supplier	Contact Name & Address	Product(s) Supplied	Plant	Date Sent	Date Rec	Score	Grade	Comments
Collinda Ltd	25 Ottways Lane, Ashtead, Surrey KT21 2PZ	Dipiclonic Acid	AO, PAA	17.7.95 + reminder 23.8.95		90%	A	
Condea Chemie GmbH		Cetyl Alcohol	CAPA	8.10.95				Information provided - no questionnaire.
Courtaulds Chemicals Ltd	Leek Works, Macclesfield Road, Leek, Staffordshire. ST13 8UZ	Orthosextate	AO	17.7.95 + reminder 23.8.95	13.10.95	82%	A	
Crosfields Chemicals	P.O. Box 26, Warrington, Cheshire, WA5 1AB	Sodium Silicate	PERSALTS	17.7.95	28.7.95	72%	B	
Crosmill Flocculants Ltd	85E Main Road, Goostrey, Cheshire. CW4 4DT	Milfloc D34	PERSALTS	17.7.95	28.7.95	27%	F	The questionnaire was completed by SNF SA in France. No policy although claims of improvements - has been prosecuted.
Croxton & Garry Ltd	Smith, Curtis Road, Dorking, Surrey RH14 1XA	Santoflex IP; Santowhite Powder	CAPA	17.7.95 + 23.8.95 + 8.10.95	Letter 3.11.95			Distributors of Flexsys products until Nov 1995. Requested a delay in completing the questionnaire due to product changes.

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

<i>Supplier</i>	<i>Contact Name & Address</i>	<i>Product(s) Supplied</i>	<i>Plant</i>	<i>Date Sent</i>	<i>Date Rec</i>	<i>Score</i>	<i>Grade</i>	<i>Comments</i>
DSM (U.K.) Ltd	Kingfisher House, Kingfisher Walk, Redditch, Worcestershire. B97 4EZ	Cyclohexanone	CAPA	17.7.95	17.8.95	98%	A	Achieved Certification to BS 7750 through ISO 9000 (BVQI) in April 1994.
Du Pont U.K. Ltd	Wedgewood Way, Stevenage, Hertfordshire. SG1 4QN	Polytetrahydrofuran Glycol	CAPA	4.8.95 + reminder 1.9.95	17.8.95		N/A	See Du Pont de Nemours (Nederland) BV.
Du Pont de Nemours (Nederland) BV	G J Klijn, PO Box 145, NL- 3300 AC Dordrecht, The Netherlands	PTMEG (Terathane)	CAPA		13.9.95	81%	A	The company has been prosecuted but not concerning the manufacture of Terathane.
Efkay Chemicals Ltd (Distributor)	158 Kilburn Arch Road, London. NW6	Cetyl Alcohol	CAPA	4.8.95 + reminder 1.9.95			N/A	Cetyl Alcohol is supplied to Efkay from RWE-DEA.
Elf Atochem SA	Ms Leburgue de Oliveira, 4 Cours Michelet, Cedex 42, 92091 Paris La Defense, France.	Sodium Chlorite		4.8.95	15.08.95	88%	A	

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

Supplier	Contact Name & Address	Product(s) Supplied	Plant	Date Sent	Date Rec	Score	Grade	Comments
Ellis & Everard Chemicals Ltd	Pickerings Road, Hale Road Industrial Estate, Ditton, Widnes, Cheshire. WA8 8XW	Acetic Anhydride Dequest 2010 Sulphuric Acid Synperonic 91/B Ammonia Benzoic Acid Orthophosphonic Acid	PAA PAA, AO PAA PAA AO AO AO, PERSALTS	4.8.95 + reminder 1.9.95				
Enichem U.K. Ltd	Enichem House, 111 Upper Richmond Road, Putney, London. SW15 2TJ	Cyclohexanone - have not supplied for 2 years.	CAPA	4.8.95 + reminder 1.9.95			N/A	
Exxon Chemicals Ltd	Dr A Holton, P.O. Box 122, 4600 Parkway, Fareham, Hampshire. PO15 7AP	Aromatic Hydrocarbon	AO	4.8.95 + reminder 1.9.95	14.9.95	89%	A	
Fisons Ltd	Bishops Meadow Road, Loughborough, Leicestershire. LE11 0RG	Ammonia	AO	4.8.95 + 1.9.95 + 8.10.95				Information provided - no questionnaire.
Hays Chemicals Ltd	Westinghouse Road, Trafford Park, Manchester. M17 1QB	Ammonia Dequest 2010 Nitric Acid	AO PAA, AO AO	17.7.95		42%	E	All their products are only stored and repackaged on this site.

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

Supplier	Contact Name & Address	Product(s) Supplied	Plant	Date Sent	Date Rec	Score	Grade	Comments
Heraeus Silica + Metals Ltd	Unit A, Cinder Hill Industrial Estate, Weston Coyney Road, Longton, Stoke-on-Trent.ST3 5LB	Palladium on Silicalit 2%	AO	4.8.95 + reminder 1.9.95	18.8.95			Phone call 3.11.95 will fax questionnaire.
Hoechst U.K. Ltd	Chemicals Division, Hoechst House, Salisbury Road, Hounslow, Middlesex TW4 6JH	Neopentyl Glycol; Diethylene Glycol	CAPA	4.8.95		92%	A	
ICI Chance and Hunt (Distributors)	D Bruce, Alexander House, Crown Gate, Runcorn, Cheshire. WA7 2UP	Topanol	CAPA	4.8.95 + reminder 1.9.95	4.8.95	85%	A	The Group has been prosecuted but not Chance & Hunt.
ICI Chemicals & Polymers (passed from Alcohols Ltd)	Distribution Department, P.O. Box 14, The Heath, Runcorn.WA7 4QC	Nitric Acid; Di - n - Butylamine; Sulphuric Acid; Caustic Soda;	AO AO AO PAA, AO, PERSALTS, CAPA	4.8.95	11.9.95	76%	B	
Ingetra AG	Steingraben 28, 4051, Basel, Switzerland	Sodium Chloride Tincal	AO Persalts	4.8.95 + reminder 1.9.95	Letter 24.8.95 -	72%	C	
ISP (G.B.) Co. Ltd	Tilson Road, Wythenshawe, Manchester. M23 9PH	1,4 Butanediol	CAPA	17.7.95 + 23.8.95 + 8.10.95				

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<i>Supplier</i>	<i>Contact Name & Address</i>	<i>Product(s) Supplied</i>	<i>Plant</i>	<i>Date Sent</i>	<i>Date Rec</i>	<i>Score</i>	<i>Grade</i>	<i>Comments</i>
Johnson Matthey Plc	AC Evans, Materials Technology Division, Orchard Road, Royston, Hertfordshire. SG8 5HE	Palladium Chloride	AO	17.7.95 + reminder 23.8.95		82%	A	
K + K Greef Chemicals Ltd	Argyle House, Stanley Green Industrial Estate, Handforth, Wilmslow. SK9 3RN	Di - n - Butylamine	AO	4.8.95	29.8.95	46%	E	Distributors
Kali und Salz GmbH	Mr Landsrath, Postfach 10 20 29, D-34111 Kassel.	Magnesium Sulphate	PERSALTS	17.7.95 + reminder 23.8.95	5.9.95 - letter+ 8.10.95			Information Provided - No time to complete the questionnaire
L'Air Liquide	Department Chimique, 75 Quay D'Orsay, 75321 Paris. Cedex 07 France	Silicalit	AO	4.8.95 + reminder 1.9.95				
Laporte Absorbents Ltd (do not manufacture)	B Massey, P.O. Box 2, Moorfield Road, Widnes, Cheshire WA 8 0JU	Sulphuric Acid	AO	4.8.95 + 1.9.95 + 8.10.95		56%		Sulphuric Acid is not manufactured on their Site - requested questionnaire is passed to manufacturer.
Merck Ltd	W G Blakey, Merck House, Sheldon Road, Poole.	Methyl Red			1.11.95	71%	B	Prosecuted in 1990 for disposal of hazardous waste to unlicensed tip. Products manufactured in Germany.
Mitsui + Co. U.K. Plc	20 Old Bailey, London.EC4M 7QQ	Ethyl Anthraquinone	AO	4.8.95		65%	C	

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<i>Supplier</i>	<i>Contact Name & Address</i>	<i>Product(s) Supplied</i>	<i>Plant</i>	<i>Date Sent</i>	<i>Date Rec</i>	<i>Score</i>	<i>Grade</i>	<i>Comments</i>
MG Gas Products Ltd	P Gallimore, Station Road, Coleshill, Birmingham, B46 1JY	Nitrogen				32%	F	Although the company has a policy there appears to be no follow up action or improvements planned.
Perstorp Ferguson Ltd	Roland Derkow, Aycliffe Industrial Estate, Newton, Aycliffe, County Durham. DL5 6EF	Pentaerithnitrol Tri methylolpropane	CAPA	4.8.95 + reminder 1.9.95	23.10.95	67%	C	
Peter Whiting (Chemicals) Ltd	5 Lord Napier Place, Upper Mall, London. W6 9UB	Sodium Acid Pyrophosphate; Sodium Hexametaphosphate	AO, Persalts	17.7.95		32%	F	The company has no policy although states they have an improvement programme - only 15 people are employed.
PGP Industries	European Sales Office, Bishops Court, 17A The Broadway, Old Hatfield, Hertfordshire. SG8 5HE	Palladium Chloride	AO	4.8.95 + reminder 1.9.95	20.7.95			
Prolabo	Liverpool Road, Eccles, Manchester. M30 7RT	Ammonium Nitrate; Acetic Acid; Sulphuric Acid	AO	4.8.95 + 8.10.95		10%	F	Plans to implement BS 7750 by 1996. (Requested that questionnaire sent to Prolabo France the manufacturers).

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

<i>Supplier</i>	<i>Contact Name & Address</i>	<i>Product(s) Supplied</i>	<i>Plant</i>	<i>Date Sent</i>	<i>Date Rec</i>	<i>Score</i>	<i>Grade</i>	<i>Comments</i>
Raschig U.K. Ltd	Dock Office, Trafford Road, Salford Quays, Salford. M5 2XB	Dipiclonic Acid	PAA	4.8.95 + reminder 1.9.95	21.8.95			
Raschig AG	Dr Loscher Mundenheimer Str. 100 D-67061 Ludwigshafen	Topanol / BHT	CAPA		11.12.95	60%	C	Manufacturers of Topanol which is distributed by ICI Chance & Hunt.
Rhone Poulenc U.K. Ltd - now known as Prolabo.	See Prolabo Details.			17.7.95			N/A	See Prolabo
RWE-DEA Aktiengesellschaft	Dr. Thomas Rappert, Überseering 40, 22297 Hamburg.	Cetyl Alcohol	CAPA	9.10.95	23.10.95	92%	A	Committed to EMAS.
Salt Union Ltd	Kay Monaghan; Mersey View Road, Weston Point, Runcorn, Cheshire. WA7 4HB	Sodium Chloride (PDV & Thawrox"	PERSALTS	4.8.95 + reminder 1.9.95	21.8.95.	45%	D	
Shell Chemicals U.K. Ltd	Nancy McKee, Heronbridge House, Chester Business Park, Chester.CH4 9QA	Aromatic Hydrocarbon Di Ethylene Glycol	AO CAPA	4.8.95 + reminder 1.9.95	1.11.95	75%	B	

APPENDIX 2.11: SOLVAY INTEROX'S EMS - RESULTS OF SUPPLIER ASSESSMENTS

Supplier	Contact Name & Address	Product(s) Supplied	Plant	Date Sent	Date Rec	Score	Grade	Comments
Sutcliffe Speakman	Guest Street, Leigh, Lancashire.WN 7 2HE	Activated Carbon	AO	4.8.95 + reminder 1.9.95				
Tennants Ltd (Distributors)	C McKenzie, Hazelbottom Road, Cheatham, Manchester. M8 7GR	Ammonia; Industrial Methylated Spirits; Acetic Anhydride;	AO CAPA PAA	17.7.95 + reminder letter 23.8.95	25.08.95	42%	E	
Union Carbide		Diethylene Glycol ?					?	
William Blythe + Co Ltd	Holland Bank Works, Church, Accrington, Lancashire. BB5 4PD	Sodium Stannate Magnesium Sulphate	AO Persalts	4.8.95		57%	D	

Total Sent = 51

APPENDIX 2.12: SOLVAY INTEROX'S EMS - EMISSION INVENTORY CHECKLIST

YEAR _____

EMISSION INVENTORY CHECKLIST			
Information Required	Procedure	Resp.	✓
EFFLUENTS			
River Mersey:			
Average C.O.D (mg/l)	8.1 EI 2		
Average H ₂ O ₂ (mg/l)	8.1 EI 2		
Average B ₂ O ₃ (mg/l)	8.1 EI 2		
Average Boron (t/a)	8.1 EI 2		
Tonnes C.O.D (t/a)	8.1 EI 2		
Tonnes H ₂ O ₂ (t/a)	8.1 EI 2		
Tonnes Boron (t/a)	8.1 EI 2		
Consent Fails (%)	8.1 EI 2		
Breakdown of C.O.D ex Well Water (te/a)	8.1 EI 2		
Caprolactone to Sewer:			
Total Flow (m ³ /a)	8.1 EI 2		
Average C.O.D (mg/l)	8.1 EI 2		
Tonnes C.O.D (t/a)	8.1 EI 2		
Tonnes Suspended Solids (t/a)	8.1 EI 2		
Consent Fails (%)	8.1 EI 2		
Effluent Charges (£/a)	8.1 EI 2		
AO to Sewer:			
Total Flow (m ³ /a)	8.1 EI 2		
Average C.O.D (mg/l)	8.1 EI 2		
Average Suspended Solids (mg/l)	8.1 EI 2		
Tonnes of C.O.D (t/a)	8.1 EI 2		
Tonnes of Suspended Solids (t/a)	8.1 EI 2		
Consent Fails (%)	8.1 EI 2		
Effluent Charges (£/a)	8.1 EI 2		
Tonnes Quinone & Derivatives (t/a)	8.1 EI 2		
Tonnes Di-n-Butylamine	8.1 EI 2		
Persalts to River			
Tonnes of COD ex PBS-4	8.1 EI 2		
Tonnes of COD ex PCS	8.1 EI 2		
Mercury & Cadmium Releases			

APPENDIX 2.12: SOLVAY INTEROX'S EMS - EMISSION INVENTORY CHECKLIST

EMISSION INVENTORY CHECKLIST			
Information Required	Procedure	Resp.	✓
Persalts NaOH usage	8.1 E1 4		
AO Plant NaOH usage	8.1 E1 4		
Boiler House Effluent Av Hg & Cd (mg/l)	8.1 EI 2		
Boiler House Effluent Flows (m ³ /a)	8.1 EI 2		
New DMW Plant NaOH usage	8.1 E1 4		
New DMW Effluent Average Hg (mg/m ³)	8.1 EI 2		
New DMW Effluent Flow (m ³ /a)	8.1 EI 2		
Average Hg & Cd in well water	8.1 EI 2		
Average Hg in NaOH	8.1 EI 2		
Hg ex Old DMW Plant (g/a)	8.1 EI 2		
Cd ex Old DMW Plant (g/a)	8.1 EI 2		
Hg ex Boiler House (g/a)	8.1 EI 2		
Cd ex Boiler House (g/a)	8.1 EI 2		
Hg ex New DMW Plant (g/a)	8.1 EI 2		
Hg to River ex Perborate (g/a)	8.1 EI 2		
Hg to River ex Well Water (g/a)	8.1 EI 2		
Total Hg to River (g/a)	8.1 EI 2		
Breakdown of COD Releases	8.1 EI 2		
Site COD Release	8.1 EI 2		
Chloride Ions (te/a)	8.1 EI 2		
NRA & HMIP Charges	8.1 EI 2		
WASTE			
Tincal Sludge (t/a)	8.1 EI 3		
Tincal Sludge Disposal Costs (£/a)	8.1 EI 3		
Tincal Slurry (t/a)	8.1 EI 3		
Tincal Slurry Disposal Costs (£/a)	8.1 EI 3		
Capa Residues (t/a)	8.1 EI 3		
Capa Residues Disposal Costs (£/a)	8.1 EI 3		
Capa IMS/Caustic	8.1 EI 3		
Capa IMS/Caustic Disposal Costs (£/a)	8.1 EI 3		
AO Tars (t/a)	8.1 EI 3		
AO Tars Disposal Costs	8.1 EI 3		
Lab Waste Solvents (t/a)	8.1 EI 3		
Lab Waste Solvents Disposal Costs	8.1 EI 3		
Misc. Special Wastes (t/a)	8.1 EI 3		

APPENDIX 2.12: SOLVAY INTEROX'S EMS - EMISSION INVENTORY CHECKLIST

EMISSION INVENTORY CHECKLIST			
Information Required	Procedure	Resp.	✓
Misc. Special Wastes Disposal Costs (£/a)	8.1 EI 3		
Misc. Non-Special (t/a)	8.1 EI 3		
Misc. Non-Special Disposal Costs (£/a)	8.1 EI 3		
Capa Polymeric Waste (t/a)	8.1 EI 3		
Special Incinerated Waste (t/a)	8.1 EI 3		
Physico-chemical Treatment (t/a)	8.1 EI 3		
Special Waste Landfilled (t/a)	8.1 EI 3		
Municipal Waste Landfilled (t/a)	8.1 EI 3		
Boilers:			
Gas Consumed	8.1 EI 4		
Oil Consumed	8.1 EI 4		
Tonnes Steam Produced	8.1 EI 4		
Average NO _x mg/Nm ³	8.1 EI 1		
Average SO ₂ mg/Nm ³ (Gas Oil Only)	8.1 EI 1		
Average Dust mg/Nm ³	8.1 EI 1		
Average CO mg/Nm ³	8.1 EI 1		
Average CO ₂ mg/Nm ³	8.1 EI 1		
NO _x Factor (g/te steam)	8.1 EI 1		
SO ₂ Factor (g/te steam - oil only)	8.1 EI 1		
Dust Factor (g/te steam)	8.1 EI 1		
CO Factor (g/te steam)	8.1 EI 1		
CO ₂ Factor (g/te steam)	8.1 EI 1		
Tonnes SO ₂	8.1 EI 1		
Tonnes NO _x	8.1 EI 1		
Tonnes Dust	8.1 EI 1		
Tonnes CO	8.1 EI 1		
Tonnes CO ₂	8.1 EI 1		
Gas Energy	8.1 EI 1		
Oil Energy	8.1 EI 1		
AO Off-Gas			
Average VOC as Toluene (mg/Nm ³)	8.1 EI 1		
Total Flow through Beds (Nm ³ /a)	8.1 EI 1		
Tonnes VOC as Toluene	8.1 EI 1		
Tonnes VOC as Carbon	8.1 EI 1		

APPENDIX 2.12: SOLVAY INTEROX'S EMS - EMISSION INVENTORY CHECKLIST

EMISSION INVENTORY CHECKLIST			
Information Required	Procedure	Resp.	✓
Tonnes Hydrocarbon	8.1 EI 1		
PAA Plant:			
Tonnes PAA Produced ex Reactor	8.1 EI 4		
Tonnes HAC used (Reactor & Bulk)	8.1 EI 4		
HAC released ex storage (g/te HAC used)	8.1 EI 1		
Tonnes of HAC released ex storage (te/a)	8.1 EI 1		
HAC released ex reactor (kg/te batch)	8.1 EI 1		
Tonnes of HAC released ex reactor (te/a)	8.1 EI 1		
Tonnes of VOC ex reactor as toluene (te/a)	8.1 EI 1		
Total Tonnes of HAC released	8.1 EI 1		
Total Tonnes VOC expressed as Carbon	8.1 EI 1		
Capa Plant:			
Tonnes of HAC Used (te/a)	8.1 EI 4		
Tonnes of Cyclohexanone Used (te/a)	8.1 EI 4		
Cyclohexanone Released (g/te used)	8.1 EI 1		
Tonnes of Cyclohexanone Released (te/a)	8.1 EI 1		
Tonnes of ketone as toluene (te/a)	8.1 EI 1		
HAC Released (g/te used pre quench tanks)	8.1 EI 1		
HAC Released (g/te used post quench tanks)	8.1 EI 1		
Tonnes of HAC released (te/a)	8.1 EI 1		
Tonnes of HAC released as toluene	8.1 EI 1		
Persalts:			
Tonnes of PBS-4 Produced	8.1 EI 4		
Tonnes of PBS-1 Produced	8.1 EI 4		
Tonnes of PCS Produced	8.1 EI 4		
Tonnes of Dust ex PBS-4	8.1 EI 1		
Tonnes of Dust ex PBS-1	8.1 EI 1		
Tonnes of Dust ex PCS	8.1 EI 1		
Tonnes of CO ₂ ex PBS-1 Burners	8.1 EI 1		
Tonnes of CO ex PBS-1 Burners	8.1 EI 1		
Tonnes of NO _x ex PBS-1 Burners	8.1 EI 1		
	8.1 EI 1		
CIA RETURNS			

APPENDIX 2.12: SOLVAY INTEROX'S EMS - EMISSION INVENTORY CHECKLIST

EMISSION INVENTORY CHECKLIST			
Information Required	Procedure	Resp.	✓
Data on Environmental Spending	8.1 EI 5		
Safety Information - Lost Time Accidents	8.1 EI 5		
Environmental Information	8.1 EI 5		
Distribution Information	8.1 EI 5		
Energy Consumption Information	8.1 EI 5		
Communication	8.1 EI 5		
Occupational Health Information	8.1 EI 5		
Management Systems	8.1 EI 5		
Product Stewardship	8.1 EI 5		
AO (H ₂ O ₂ @ 100%)	8.1 EI 5		
Capa (Monomer Production)	8.1 EI 4		
PAA	8.1 EI 4		
PBS -1	8.1 EI 4		
PBS - 4	8.1 EI 4		
PCS	8.1 EI 4		
Steam Produced	8.1 EI 4		
Total te/a of Product Produced	8.1 EI 4		

APPENDIX 2.13: SOLVAY INTEROX'S EMS - INTERNAL AUDIT SCHEDULE

ACTIVITY	Clause*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Environmental Policy	4.1	G											
Environmental Effects	4.2.1		G										
Legal & Other Requirements	4.2.2			G									
Objectives & Targets	4.2.3				G								
Environmental Programme(s)	4.2.4					G							
Structure & Responsibility	4.3.1						G						
Training, Awareness & Competence	4.3.2							G					
Communication	4.3.3								G				
EMS Documentation	4.3.4									G			
Document Control	4.3.5										G		
Operational Control	4.3.6	P	C	A	L	P	C	A	L	P	C	A	L
Emergency Preparedness & Response	4.3.7	L	P	C	A	L	P	C	A	L	P	C	A
Monitoring & Measurement	4.4.1		L	P	C	A	L	P	C	A	L	P	C
Bund Emptying	4.3.6	A	L	P	C	A	L	P	C	A	L	P	C
Waste Management	4.3.6		A	L	P	C	A	L	P	C	A	L	P
Tanker Offloading	4.3.6		A	L	P	C	A	L	P	C	A	L	P
Corrective and Preventative Action	4.4.2	G											
Records	4.4.3			G									
EMS Audit	4.4.4			G									
Management Review	4.5				G								

* Based on BS EN ISO 14001 1996

P = Persalts, C = Capa, A = AO, L = Labs, B = Peracetic Acid Plant, G = Environment Group

APPENDIX 2.14: SOLVAY INTEROX'S EMS - ONGOING MAINTENANCE REQUIREMENTS

ENVIRONMENTAL MANAGEMENT SYSTEM SCHEDULE															
	Frequency	Time	Resp	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Update Emission Inventories	1 year	4 weeks	EG												
Update Effects Assessment	1 year	2 weeks	EG												
Waste Minimisation Reviews	1 year	2 weeks	EG												
Update Objectives & Targets	1 year	2 weeks	EG												
Update Improvement Programme	1 year	2 weeks	EG												
Update Register of Regs	1 year	1 week	EG												
Develop Audit Schedule	1 year	0.5 day	EG												
Environmental Audits	2 weeks	0.5 day	Auditors												
Environmental Training	1 year	2 weeks	EG												
Management Review Meetings	6 months	0.5 day	EG			*						*			
Enviro-Hazop Reviews	5 years	4 weeks	Harards												
Review Manual & Procedures	2 years	2 weeks	EG												
Review S.O.Ps & Task Instructions	2 years	2 weeks	Plants												
Supplier Assessments	2 years	1 week	EG												

REFERENCES

ACBE (1993): *"Business Case for the Environment"*, Environmental Management Working Group, Advisory Committee on Business and the Environment, 1993.

ACBE (1997): *"Seventh Progress Report to and Response from the President of the Board of Trade and the Secretary of State for the Environment"*, Department of the Environment, March 1997.

Alleid Colloids Ltd and HMIP (1995): *"3Es Project Concluding Report"*, Her Majesty's Inspectorate of Pollution, 1995.

Aspects International, March Consulting Group & WS Atkins (1994): *"Project Catalyst - Report to the Project Completion Event at Manchester Airport, 27 June 1994."*

Akzo Nobel Chemicals Ltd (1996): *"Site Gillingham, Environmental Report 1996"*, 1996.

Auken, S. (1996): *"The Danish Experience"*, *Environment Strategy Europe*, Campden Publishing Ltd, 1997.

Autosmart (1997): *"Environmental Statement"*, Issue 2, Autosmart Ltd, July 1997.

Autosmart (1997a): *"Environmental Policy"*, Autosmart Ltd, April 1997.

Barthel, M. (1996): *"Business and Environment Programme Techniques and Solutions"*, Environment Council, p 5, November 1996.

Barwise, J. (Ed) (1996): *"Policy & Procedures"*, Croners Publications Ltd, 1996.

Baumast, A. (1998): *"How Does the Implementation of Environmental Management Systems Effect the Focus of Corporate Environmental Management ? Results of an Empirical Study"*, *Eco-Management and Auditing Conference Proceedings*, University of Sheffield, July 2nd and 3rd, 1998.

Baxter International, (1996): *"Baxter's Environmental Financial Statement"*, *Environmental Accounting in Industry - a practical review*, Appendix A, British Telecommunications plc, 1996.

Baxter, M. (1997): *"Resource Implications of Implementing an Externally Certified EMS"*, *Environmental Assessment*, Volume 5, Issue 2, June 1997.

Bedford, S. (1991): *"Cleaning up with Quality"*, *Total Quality Management*, p. 309-310, October 1991.

Bell, C. (1997): *"The ISO 14001 Environmental Management Systems Standard: One American's View"*, *ISO 14001 and Beyond*, Greenleaf Publishing, 1997.

Benchmark Environmental Consulting (1996): "ISO 14001 An Uncommon Perspective - Five Public Policy Questions For Proponents of the ISO 14000 Series", *Free Trade and Environment: Cooperation between NGOs of EU and Third Countries, An International Workshop*, Brussels, 26-28 October 1995.

Bennett, M. (1996): "Environment-related Management Accounting in North America", *Environmental Accounting in Industry - a practical review*, British Telecommunications plc, 1996.

BICC Cables (1995): "*Environmental Instruction - Environmental Effects and Evaluation*", BICC Cables Ltd, September 1995.

BICC Cables (1996): "*Environmental Management Programme Index*", BICC Cables Ltd, July 1996.

BICC Cables (1996a): "*BICC Cables Limited Environmental Policy*", BICC Cables Ltd, November 1996.

BICC Cables (1996b): "*BICC Cables Limited, Telecommunication Cable Systems Blackley Environmental Policy*", BICC Cables Ltd, November 1996.

Blaza, A. & Chambers, N. (1997): "Environmental Management Standards: Who Cares ?", *ISO 14001 and Beyond*, Greenleaf Publishing, 1997.

Brady, J. (1996): "Acting on new challenges", *Environmental Excellence*, p.51-56, March 1996.

Brady, J. and Sadler, B. (1997): "Sustainable Development & Environmental Management, Natural Steps Towards Progress and a New Professionalism", *Environmental Assessment*, Volume 5, Issue 2, June 1997.

Brockway, R. (1995): "The Development of the Accreditation Arrangements", *Conference Proceedings on Environmental Management Conference - BS 7750- Advising for Certification*, IBC Technical Services Ltd, March 1995.

Brown, K. (1997): "Environmental Reporting: Trends and Progress", *Environmental Assessment*, Volume 5, Issue 2, June 1997.

British Standards Institution (1992): "*BS 7850: 1992 Total quality management, Part 1 - guide to management principles*", British Standards Institution, 1992.

British Standards Institution (1994): "*BS EN ISO 9000-1: 1994 Quality management and quality assurance standards, Part 1 Guidelines for selection and use*", British Standards Institution, 1994.

British Standards Institution (1994a): "*BS 7750: 1994 Specification for Environmental management systems*", British Standards Institution, 1994.

British Standards Institution (1995a) : "Clean Living", *BSI News*, p.19 - 21, May 1995.

British Standards Institution (1996a): *"BS EN ISO 14001: Environmental Management Systems - Specification with guidance for use"*, British Standards Institution, September 1996.

British Standards Institution (1996b): *"ISO/CD 14011/1:Guidelines for Environmental Auditing - Audit Procedures - Part 1: Auditing of Environmental Management Systems"*, British Standards Institution, 1996.

British Standards Institution (1996c): *"ISO/CD 14010:Guidelines for Environmental Auditing - General Principles of Environmental Auditing"*, British Standards Institution, 1996.

British Standards Institution (1996d): *"BS EN ISO 14004: Environmental Management Systems - General Guidelines on principles, systems and supporting techniques"*, British Standards Institution, 1996.

British Standards Institution (1996e): *"The Transition from BS 7750 to BS EN ISO 14001 - Your questions answered...."*, British Standards Institution, 1996.

British Standards Institution (1996f): *"BS 8800:1996: Guide to Occupational health and safety management systems"*, British Standards Institution, 1996.

British Telecom (1996): *"A Report on BTs Environmental Performance 1995/6"*, British Telecommunications, 1996.

BRECSU (1995): *"Financial Aspects of Energy Management in Buildings"*, Building Research Establishment, 1995.

Brockway, R. (1995): *"Addition of ISO DIS 14001 Certificates to Accredited BS 7750 Certificates"*, United Kingdom Accreditation Service, December 1995.

Brown, K. (1997): *"Environmental Reporting - Trends and Progress"*, *Environmental Assessment*, Volume 5, Issue 2, June 1997.

Burdett, N. (1994): Cited in ENDS Report 231 (1994).

Burke, T (Ed) (1997): *"Environment Strategy 1997"*, Campden Publishing Ltd, 1996.

Business in the Environment (1993): *"Buying into the environment - guidelines for integrating the environment into purchasing and supply"*, Business in the Environment, 1993.

Business in the Environment (1996): *"The Index of Corporate Environmental Engagement, A Survey of the FTSE 100 Companies"*, Business in the Environment, 1996.

Business in the Environment (1997): *"ISO 14001 Update"*, Business in the Environment, February 1997.

Business in the Environment (1997a): *"Finance Sector and Environment"*, *Business in the Environment News*, Issue 10, Autumn 1997

- Business in the Environment (1997b):** "Insurance Companies Launch New Body", *Business in the Environment News*, Issue 10, Autumn 1997
- Business in the Environment (1998):** "Prescott Praises FTSE Progress", *Business in the Environment News*, Issue 11, Spring 1998.
- Butterworth, H. (1995):** Cited in British Standards Institution (1995a).
- Callens, I. and Wolters, L. (1998):** "Factors of Unsustainability: Identification, Links and Hierarchy", *Business Strategy and the Environment*, Volume 7, Number 1, February, 1998.
- Central Statistical Office (1992):** "*Standard Industrial Classification, of Economic Activities - SIC (92)*", HMSO, London, 1992.
- Chemistry in Britain (1995):** "First EMAS registrations through", *Chemistry in Britain*, p.767, October 1995.
- Chemical Industries Association (1995):** "*Responsible Care Management Systems for Health, Safety and Environment*", Chemical Industries Association, 1995.
- Chemical Industries Association (1996):** "*The UK Indicators of Performance 1990-95*", Chemical Industries Association, 1996
- Ciba Clayton (1996):** "*Environmental Report 1995*", 1996
- Clark, T. (1995):** "Consultancy for Smaller Firms", *Conference Proceedings on Environmental Management - BS 7750 - Advising for Certification*, IBC Ltd, Birmingham Metropole Hotel, 22nd March, 1995.
- Contract Chemicals (1997):** "*Contract Chemicals (Knowsley) Ltd Environmental Statement*", Contract Chemicals Ltd, 1997.
- Counsell, S. Maher, D. & Robinson, D. (1995):** "Accreditation and certification for an EMS", *Environmental Policy and Procedures - Special Report*, Issue No 3, June 1995.
- Clough, R. & Bowtell, P. (1995):** "Environmental management systems: problems and solutions", *Environmental Policy and Procedures - Special Report*, Issue No 8, December 1995.
- Coulson, A. and Monks, V. (1998):** "Corporate Environmental Performance Considerations Within Bank Leading Decisions", *Eco-Management and Auditing Conference Proceedings*, Sheffield University, July 2nd and 3rd, 1998.
- Crabtree, B. & Miller, W. (1992):** "*Doing Qualitative Research*", Sage Publications, 1992.
- Crognale, G. (1997):** "Training: Preparations for Maintaining Effective Environmental Management Systems", *ISO 14001 and Beyond*, Greenleaf Publishing, 1997.
- Crosbie, L. & Knight, K. (1995):** "*Strategy for Sustainable Business: Environmental Opportunity and Strategic Choice*", McGraw-Hill Publishing, November, 1995.

Dale, B. & Plunkett, J. (1995): *"Quality Costing"*, Second Edition, Chapman & Hall Publishing, 1995.

Darker (1996): "Environmental Management", *Seminar presented to Teaching Company Associates of Salford University*, 1996.

Davies, P. (1993): "Help or Hazard", *Total Quality Management*, p.35-38, April 1993.

Deloitte Touche Tohmatsu and the International Institute for Sustainable Development & Sustainability (1994): *"Coming Clean, Corporate Environmental Reporting, Opening Up for Sustainable Development"*, 1994.

Department of the Environment (1990): *"This Common Inheritance: Britain's Environmental Strategy"*, Department of the Environment, 1990.

Department of the Environment (1994): *"Sustainable Development: The UK Strategy"*, Department of the Environment, 1994.

Department of the Environment (1996a): *"Indicators for Sustainable Development for the UK"*, 1996.

Department of the Environment (1996b): *"EMAS - A Catalyst for Change"*, May 1996.

Department of the Environment (1996c): *"EMAS News"*, *The Newsletter for the Eco-management and Audit Scheme*, Issue 3, p.1, October 1996.

Department of the Environment (1996d): *"EMAS Case-Studies"*, December 1996.

DETR (1998): *"Opportunities for change, Consultation paper on a revised UK strategy for sustainable development"*, Department of the Environment, Transport and the Regions, 1998.

DETR (1998a): *"Revamped Package Launched to Help Green Small Firms, News Release"*, Department of the Environment, Transport and the Regions, July 1998.

DETR (1998b): *"Sustainable business: Consultation paper on sustainable development and business in the UK"*, Department of the Environment, Transport and the Regions, July 1998

Dermody, J. (1994): *"Guidelines for Developing Environmentally Responsible New Products"*, *PhD Thesis, University of the West of England*, December 1994.

DNV (1994): *"The International Safety Rating System"*, DNV Industry Ltd, 1994.

Doran, E. (1995): *"Research Methodology and Design"*, *Teaching Company Seminar on Research Methodology and Design, Salford University*, 1995.

Du Pont Ltd (1994): *"The Du Pont Commitment to Safety, Health and the Environment"*, Du Pont Ltd, 1994.

Duncan, A. (1996): "The Interfaces Between Regulation and Voluntary Environmental Management Systems", *Conference Proceedings on Environmental Management Systems for the Chemical Industry*, Nabarro Nathanson Ltd, 22nd February, 1996

EAG Environ (1998): "ISO 14001 Uptake", *Environment Times*, Volume 5, Issue 1, Autumn 1998.

ENDS Report 206 (1992): "ICI: Reporting on progress towards its environmental targets", *ENDS Report*, Issue 206, p. 15-18, March 1992.

ENDS Report 216a (1993): "Many companies slow to commit resources to BS 7750", *ENDS Report*, Issue 216, January 1993.

ENDS Report 216b (1993): "Eco-audit proposal overhauled", *ENDS Report*, Issue 216, January 1993.

ENDS Report 217 (1993): "United Engineering Steels: Benefitting from BS 7750", *ENDS Report*, Issue 217, February 1993.

ENDS Report 231 (1994): "BS 7750 - the selling of a standard", *ENDS Report*, Issue 231, p. 22-25, April 1994.

ENDS Report 237 (1994): "BS 7750 moves towards recognition under EC eco-audit regulation", *ENDS Report*, Issue 237, p. 38 - 39, October 1994.

ENDS Report 240a (1995): "Stakeholders in environmental standards", *ENDS Report*, Issue 240, p.2, Jan 1995.

ENDS Report 240b (1995): "Weak ISO draft threatens Europe's environmental management standards", *ENDS Report*, Issue 240, p.25 -27, Jan 1995.

ENDS Report 242 (1995): "D2D: Integrating quality and environment", *ENDS Report*, Issue 242, p. 20-22, March 1995.

ENDS Report 247 (1995): "Benefits and shortcomings of EMAS revealed as first five sites win registration", *ENDS Report*, Issue 247, p. 18-21, August 1995.

ENDS Report 252a (1996): "Interest in BS 7750 picks up", *ENDS Report*, Issue 252, p. 5, January 1996.

ENDS Report 252b (1996): "Top companies play waiting game on environmental standards", *ENDS Report*, Issue 252, p.6, January 1996.

ENDS Report 252c (1996): "EC steps nearer to bridging gap between EMAS and ISO 14001", *ENDS Report*, Issue 252, p.41, January 1996.

ENDS Report 254a (1996): "Chemical firms use EMAS, ISO 14001 in push for deregulation", *ENDS Report*, Issue 254, pp 5-6, March 1996.

ENDS Report 254b (1996): "Upbeat message from environmental managers", *ENDS Report*, Issue 254, pp 6-7, March 1996.

ENDS Report 255a (1996): "Big savings at Allied Colloids confirm "3Es" success", *ENDS Report*, Issue 255, p.7, April 1996.

ENDS Report 258a (1996): "BS 7750 reaches century mark - but interest slow down", *ENDS Report*, Issue 258, p7, July 1996.

ENDS Report 258b (1996): "European guidelines for ISO 14001 certification", *ENDS Report*, Issue 258, p 41 - 42, July 1996.

ENDS Report 260 (1996): "ISO under fire over environmental standards", *ENDS Report*, Issue 260, p 3-4, September 1996.

ENDS Report 261 (1996): "ISO 14001 arrives - but EMAS uptake stays at low level", *ENDS Report*, Issue 261, p7, October 1996.

ENDS Report 263 (1996): "Metal powder producer reaps benefits from BS 7750", *ENDS Report*, Issue 263, p6-7, December 1996.

ENDS Report 264a (1997): "Firms rush to ISO 14001 - but Magnox drops out", *ENDS Report*, Issue 264, p6-7, January 1997.

ENDS Report 264b (1997): "Birds Eye Wall's: Making ice cream with a new environmental flavour", *ENDS Report*, Issue 264, p18-20, January 1997.

ENDS Report 265a (1997): "Move to reduce inspections for IPC sites with ISO 14001 and EMAS", *ENDS Report*, Issue 265, p.5-6, February 1997.

ENDS Report 265b (1997): "Rover becomes first BS 7750 holder to be fined for pollution", *ENDS Report*, Issue 265, p.43-44, February 1997.

ENDS Report 267a (1997): "ISO 14001-certified businesses pass the 200 mark", *ENDS Report*, Issue 267, April 1997.

ENDS Report 267b (1997): "Akzo becomes second BS 7750 firm to be fined for pollution", *ENDS Report*, Issue 267, p.44, February 1997.

ENDS Report 272 (1997): "UK slides down EMAS League", *ENDS Report*, Issue 273, p.4, October 1993.

ENDS Report 273 (1997): "Global uptake of ISO 14001 shows uneven picture", *ENDS Report*, Issue 273, October 1997.

ENDS Report 275 (1997): "Major companies sign up for ISO 14001 and EMAS", *ENDS Report*, Issue 275, December 1997.

ENDS Report 278 (1998): "BP opts for EMAS at all European sites", *ENDS Report*, Issue 278, pp. 5, March 1998.

ENDS Report 280 (1998): "Global uptake of ISO 14001 doubles in six months", *ENDS Report*, Issue 280, pp. 5, May 1998.

ENDS Report 286 (1998): "ISO 14001 certification tops 700 as EMAS trials behind", *ENDS Report*, Issue 286, pp. 8, November 1998.

ENDS Report 287 (1998): "ISO 14001 takes off worldwide", *ENDS Report*, Issue 287, pp. 13, December 1998.

ENDS Report 288 (1999): "Record Fine for port authority over Sea Empress disaster", *ENDS Report*, Issue 288, pp. 50, January 1999.

ENDS Report 289 (1999): "Setting the agenda for the revision of ISO 14001", *ENDS Report*, Issue 289, pp. 12, February 1999.

Energy Efficiency Office Best Practice Programme (1993): "*Investment Appraisal - Workshop Manual*", Workshop Literature, September 1993.

Environment Agency (1997): "*Waste Minimisation and Waste Management Good Practice Guide*", March 1997

Environment Business (1996): "Environmental standards for world class talent", *Environment Business Magazine*, p.13, March 1996.

Environment Business (1996a): "EMSs are 'highly cost effective'", *Environment Business Magazine*, October 1996.

Environment Business (1996b): "EMS across Europe: the Bottom Line", *Environment Business Magazine*, p. 14-15, October 1996

Environment Business (1996c): "The future for EMS Standardisation", *Environment Business Magazine*, p. 27-31, October 1996.

Environment Business (1996d): "EMAS: Eighteen months on", *Environment Business Magazine*, p. 33, October 1996.

Environment Business (1996e): "EMS Implementation: the global picture", *Environment Business Magazine*, p.34, October 1996.

Environment Business (1997): "EMS system cuts fine by £70,000", *Environment Business Magazine*, pp6, 6 November 1997.

Environment Business (1997a): "Environmental Salaries and Benefits - May 1997 Survey", *Environment Business Supplement*, May 1997.

Environment Business (1999): "Budget delivers environmental blast", *Environmental Business Magazine*, April 1999.

Environment Information Bulletin (1998a): "Kyoto - only time will tell", *Environment Information Bulletin*, Issue 75, January 1998.

Environment Information Bulletin (1998b): "Round-up 1997", *Environment Information Bulletin*, Issue 75, January 1998.

- Environment Information Bulletin (1998c):** "The environmental agenda for 1998", *Environment Information Bulletin*, Issue 75, January 1998.
- Environment Information Bulletin (1998d):** "BSI Survey", *Environment Information Bulletin*, Issue 84, November 1998.
- Environment Information Bulletin (1998e):** "EMAS Revision", *Environment Information Bulletin*, Issue 84, November 1998.
- Environment Information Bulletin (1998f):** "Insurers tighten up on pollution liability cover", *Environment Information Bulletin*, Issue 84, November 1998.
- Environmental Excellence (1995):** "D2D's 7750 First", *Environmental Excellence*, p.7, April 1995.
- ETBPP (1996a):** "Attitudes and Barriers to Improved Environmental Performance: Cross-Sectoral Analysis", ET57, Environmental Technology Best Practice Programme, September 1996.
- ETBPP (1996b):** "Environmental Management System Improves Performance - A good practice case study at Wolstenholme International Ltd", Environmental Technology Best Practice Programme, October 1996.
- ETBPP (1998):** "Speciality Chemicals Manufacture: Staying Competitive Through EMS", Environmental Technology Best Practice Programme, April 1998.
- ETBPP (1999):** "Attitudes and Barriers to Improved Environmental Performance 1998", Environmental Technology Best Practice Programme, January 1999.
- European Accreditation of Certification (1996):** "Guidelines For Accreditation of Certification Bodies for Environmental Management Systems (EAC/G5)", European Accreditation of Certification, June 1996.
- European Commission (1993a):** "Council Regulation No 1836/93 of 29 June allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme", *Official Journal of the European Communities*, No L 168, July 1993.
- European Commission (1993b):** "Towards Sustainability: Fifth Action Programme on the Environment", European Commission, 1993.
- European Environment Agency (1995):** "The Dobbris Assessment: The European Environment Agency's State of the Environment Report", 1995.
- Evans, R. (1998):** "Practical Ethical Management and Sustainability", *Environmental Assessment*, Volume 6, Issue 1, March 1998.
- Excel Partnership (1996a):** "EMS Handbook (ISO 14001, BS 7750 and other guides and standards", Excel Partnership Environmental Management Services, 1996.
- Excel Partnership (1996b):** "Notebook for the EARA-approved Advanced EMS Auditing Course", Advanced EMS auditor training course (UK) for environmental and

quality personnel - EMS Auditing to 3rd-party requirements, Excel Partnership Environmental Management Services, 25-29th March 1996.

Faragher, J (1996): "Who needs an Environmental Management System?", *Conference proceedings on Environmental Management Systems for the Chemical Industry*, Nabarro Nathanson Ltd, February 1996.

Fawcett, P. and Nobbs, J. (1995): "Developing a System to Meet BS 7750 at a Manufacturing Site", *Conference proceedings on Environmental Management Systems, Institute of Chemical Engineers*, April 1995.

Financial Times (1995): "Attention seekers in the financial market", *The Financial Times*, November 1, 1995.

Financial Times (1991): "Sharks in the Water", *The Financial Times*, p.16, 27 November 1991.

Fishwick, L. and Bamber, L. (1996): "Practical Ways of Integrating the Environment into Your Health and Safety Programme", *Environmental Policy and Practice*, Volume 5, No 4, 1996.

Fuller, K. (1998): "Implementing IPPC", *Environmental Assessment*, Volume 6, Issue 1, March 1998.

Garrett, J. (1997): "EMS Delivers Cost Savings & Environmental Benefits", *Environmental Assessment*, Volume 5, Issue 2, June 1997

Garrett, J (1998a): "Global EMS Uptake: A Picture in the Speciality Chemicals Sector", *Eco-Management and Auditing Conference Proceedings*, University of Sheffield, July 2nd and 3rd, 1998.

Garrett, J (1998b): "EMS Delivers Cost Savings and Environmental Benefits - A Case Study from Wolstenholme International", *Eco-Management and Auditing Conference Proceedings*, University of Sheffield, July 2nd and 3rd, 1998.

Ghobadian, A., Viney, H., Liu, J. and James, P. (1998): "Extending Linear Approaches to Mapping Corporate Environmental Behaviour", *Business Strategy and the Environment*, Volume 7, Number 1, February 1998.

Gibbon, J. & Holland, L (1994): "Implementing an environmental policy in small and medium enterprises: some considerations", *Integrated Environmental Management*, p. 21-23, 1994.

Gill, G & Johnson, P (1991): "*Research Methods for Managers*", Paul Chapman Publishers, 1991.

Gleckman, H. & Krut, R (1997): "Neither International nor Standard: The Limits of ISO 14001 as an Instrument of Global Corporate Environmental Management", *ISO 14001 and Beyond*, Greenleaf Publishing, 1997.

Goodchild, E (1994): "The Implementation of Environmental Management Systems within Industry", *M.Sc. Thesis*, Salford University, 1994.

Gray, R., Bebbington, K. & Walters, D. (1993): *"Accounting for the Environment - the greening of accountancy, part II"*, Chartered Association of Certified Accountants / Paul Chapman Publishing, March 1993.

Gray, R. (1997): "Accounting for the Environment ?", *Environment Strategy Europe 1997*, Campden Publishing Ltd, 1997.

Green, K., Morton, B. and New, S. (1996): "Purchasing and environmental management: interactions, policies and opportunities", *Business Strategy and the Environment*, Volume 5, Issue 3, 1996.

Griffiths, J. (1995): "The green preservationists", *Environmental Excellence*, p17, June 1995.

Groundwork Trust (1995): *"Small Firms and the Environment"*, 1995

Gummerson, E. (1991): Cited in Dermody, 1994.

Hall, R (1995): Cited in Griffiths, 1995.

Hamilton, P (1995): Cited in ENDS Report 242, 1995

Hamilton, P. (1997): "Total Quality and Environmental Quality Management", *Environmental Assessment*, Volume 5, Issue 2, June 1997.

Hammersely, M. (1989): *"The Dilemma of Qualitative Method"*, Routledge Publishers, 1989.

Haavisto, P. (1996): "Who Needs Environmental Taxation ?", *Environment Strategy Europe 1997*, Campden Publishing Ltd, 1996.

Healy, V. (1995): "The Vauxhall Motors Ellesmere Port Experience", *EMAS Verification and BS 7750 Certification Conference Proceedings*, Network of Environmental Managers and Auditors, May 1995.

Henry Leigh & Slater Ltd (1997): *"Environmental Management Manual"*, 1997.

Henry Leigh & Slater Ltd (1997a): *"Environmental Effects Register"*, 1997.

Hill (1992): *"Towards Good Environmental Practice - a book of case-studies"*, Institute of Business Ethics and Green Alliance, 1992.

Hill, J. (1994): "The Implementation of EMAS and BS 7750", *Integrated Environmental Management*, p 7-9, 1994.

Hill, J., Marshall, I. & Priddey, C. (1994): *"Benefitting Business and the Environment: Case Studies of Cost Savings and New Opportunities from Environmental Initiatives"*, Insititute of Business Ethics, 1994.

Hill, K. (1994): "The Strategic Response of Manufacturing Industry to Environmental Issues: Experience from firms in Yorkshire and Humberside", *Ph.D. Theses, University of Leeds*, 1994.

Hill, J., James, P. & Kenyon, B. (1995): "Environmental Management: Costs and Benefits", *Environmental Policy and Procedures - Special Report*, Croner Publications Ltd, Issue No 2, May 1995.

Hillary, R. (1993): "Eco-management and audit scheme - update", *Integrated Environmental Management*, Issue 21, August 1993.

Hillary, R. (1994): "*The Eco-Management and Audit Scheme - A Practical Guide*", Technical Communications (Publishing) Ltd, Business in the Environment - Practitioner Series, 1994.

Hillary, R. (1995): "The Route to Environmental Accreditation", *Quality World*, p.480-481, July 1995.

Hillary, R. (1996): "Practical Guidance: EMAS", *Environmental Audit*, Intelix Press Ltd, Chapter 8, September 1996.

HMIP (1996): "*Operator and Pollution Risk Appraisal (OPRA)*", Her Majesties Inspectorate of Pollution, 1996.

Hocking, R. (1993): "Can the principles of Total Quality Management be Applied to the Environment ?", *M.Sc. Thesis, Salford University*, 1993.

Hodge, J. (1995): "Why Having an EMS should please your insurer", *Network for Environmental Managers and Auditors Seminar on Insurance, Industry and EMS*, 20th September 1995.

Hodgson, J. (1995): "Small firm steps towards Total Quality Management", *Integrated Environmental Management*, p 12-13, March 1995.

Holland, L (1997): "The Integration of Accounting and the Environment: A Small Company View", *Environmental Policy and Practice*, Volume 6, No 4, 1997.

Hooper, D. and Gibbs, D (1995): "*Profiting from Environmental Protection: A Manchester Business Survey*", Project sponsored by The Co-operative Bank, November 1996.

Horrocks, R. (1995a): "BS 7750 Environmental Management Systems", *Presentation to BICC Cables Group*, 1995.

Horrocks, R. (1995b): "Life After Certification", *Presentation to BICC Cables Group*, 1995.

Houldin, M. (1995a): "Audits: what certifiers want to see", *Environmental Excellence*, p.26-27, 1995.

Houldin, M. (1995b): "What Accredited Certification is Looking For in Environmental Management Systems", *Conference Proceedings on Environmental Management Conference - BS 7750- Advising for Certification*, IBC Technical Services Ltd, March 1995.

Howlett, L. (1994): "Setting the standard for Environmental Management", *Process Engineering Environmental Protection*, p. 13-14, 1994.

Hunt, D. and Johnson, C. (1993): "Environmental effects evaluation in an environmental management system", *Integrated Environmental Management*, Issue 18, p.7-13, April 1993

Hutchinson, A (1995): "*Devon and Cornwall's Small and Medium Sized Enterprise Sector*", Green Survey Results, Plymouth Business School, 1995

Institute of Environmental Assessment (1998): "Environmental Minister Designates the Institute of Environmental Assessment as the Competent Body for EMAS", *Press Release Issued by the Institute of Environmental Assessment*, 10 March 1998.

Institute of Environmental Management (1995): "The Internal Audit - Making it work for your organisation", *Journal of the Institute of Environmental Management*, Volume 3, Issue 1, December 1995.

Institute of Environmental Management (1995a): "Eco-management and audit scheme: Enhancing the Impact of Environmental Management?", *Journal of the Institute of Environmental Management*, Volume 3, Issue 3, December 1995.

Institute of Environmental Management (1995b): "EMAS, BS 7750 and ISO 14001 - how do they all relate ?", *Journal of the Institute of Environmental Management*, Vol 3 Issue 3, p.6-16, December 1995.

Institute of Environmental Management (1995c): "Members Annual Survey 1995", *Journal of the Institute of Environmental Management*, Volume 2, Issue 4.

Institute of Environmental Management (1996a): "Survey of Membership 1996 - Annual Report", *Journal of the Institue of Environmental Management*, Vol 3 Issue 4, March 1996.

Institute of Environmental Management (1996b): "Being Strategic: Building skills to manage for the future", *Journal of the Institute of Environmental Management*, Vol 4 Issue 1, July 1996.

Institute of Environmental Management (1996c): "ISO 14001: Looking beyond bureaucracy", *Journal of the Institute of Environmental Management*, Vol 4, Issue 2, December 1996.

Institute of Environmental Management (1997): "Update on EMS in Business". *Journal of the Institute of Environmental Management*, Vol 4, Issue 4, July 1997.

Institute of Environmental Management (1998): "Eco-Efficiency: Towards more sustainable business practice, Part 1: Key Concepts", *Journal of the Institute of Environmental Management*, Vol 5, Issue 2, March 1998.

Institute of Environmental Management (1998a): "ISO 14001 and EMAS Sites World-Wide", *Journal of the Institute of Environmental Management*, Vol 5, Issue 4, October 1998.

Intelix Press (1994a): "*Register of Environmental Effects Workbook*", Intelix Press Ltd, 1994.

International Chamber of Commerce (1992): "*Business Charter for Sustainable Development*", International Chamber of Commerce, 1992.

J & J Makin Converting (1995-1997): "*Environmental Programmes*", 1995 -1997

J & J Makin Converting (1997): "*Environmental Procedures Manual*", 1997.

Jones (Ed) (1997): "*Environmental Standards Certification Kit*", GEE Publishing, 1995.

Jordan, K. (1996): "Akzo's Route to Registration", *Environmental Excellence*, p.53-56, July 1996.

Joslin, (1995): "EMS for the Chemical Industry - A Case Study", Conference Proceedings on Environmental Management Systems for the Chemical Industry, Naborro Nathanson Ltd, 22nd February, 1996.

King, S (1995): "BS 7750 Cases and Guidelines", *Environmental Excellence*, p24-25, June 1995.

King, S. (1995b): "Dunlop's 7750 task force", *Environmental Excellence*, p.26, June 1995,

Kinley, P. (1996): "Implementation of BS 7750 at Contract Chemicals", *Presentation to Warrington C.I.A Responsible Care Cell*, October 1996.

Kirk, C. (1996): "Pollution Risk Insurers", *Environmental Excellence*, p.33-35, June 1996.

Klaver, J. and Jonker, J. (1998): "The Significance of Recent EMS Standards as an Impetus for Improvement", *Eco-Management and Auditing*, Volume 5, Number 1, March 1998.

Knight, A. (1995): "B&Q's supplier grading system", *Integrated Environmental Management*, p.19-20, March 1995.

Knight, A. (1996): "B&Q's quest for excellence", *Environmental Excellence*, p.7-10, June 1996.

Kuhner, G. (1998): "First experience in German Industry with ISO 14001", *Eco-Management and Auditing Conference Proceedings*, University of Sheffield, 2nd and 3rd July, 1998.

KPMG (1997): "*The Environmental Challenge and SMEs in Europe*", KPMG Environment Consulting, 1997.

Lane, G. (1996): "Developing a comprehensive framework for corporate environmental accounting", *Environmental Accounting in Industry - a practical review*, British Telecommunications plc, 1996.

Lange, P. (1996): Cited in ENDS Report 254a, 1996.

Lee, R. (Ed). (1998): "Environmental Law Monthly", Volume 7, Issue 12, December, 1998.

Leinster, P. (1996): "Which Environmental Management System to Adopt, If Any ?", *Environmental Management Systems for the Chemical Industry Conference Proceedings*, Nabarro Nathanson, February 1996.

Lewis, M. (1995): "A Review of Economic Instruments in Environmental Control", *Environmental Policy and Practice*, Volume 5, No 2, 1995.

Little, B., Pearson, B. and Brierley, M. (1992): "*Using Environmental Management Systems to Improve Profits*", Graham & Trotman Publishers, 1992.

McKenna, et al., (1996): "*Environmental Auditing : A Management Guide*", Intellex Press Ltd, Chapter 18, 1996.

Margerum, R. (1995): "Integrated Environmental Management: Moving From Theory to Practice", *Journal of Environmental Planning and Management*, Volume 38, No 3, 1995.

Mayhook-Walker, A. (1995): "Lean, Keen and Green", *The Chemical Engineer*, p19-20, February 1995.

Moffat Associates Partnership (1997): "*The 1997 UK Business & The Environment Trends Survey*", Research undertaken by the Moffat Associates Partnership nad sponsored by Entec in association with the Green Alliance, 1997.

Morris, M. (1995): "Implementing EMSs in New Zealand", *Environmental Policy and Practice*, Volume 4, No 4, 1995.

Musgrove, C. & Fox, J. (1991): "*Quality Costs - Their Impact on Company Strategy and Profitability*", TQM Practitioner Series, Stanley Thomas Publishing, 1991.

NACCB (1994a): "*Environmental Accreditation Criteria*", National Accreditation Council for Certificaion Bodies, 1994.

NACCB (1994b): "Environmental Accreditation Development of NACCB's Proposals", *Press Information, NACCB*, May 1994.

NACCB (1995): "Environmental Management Systems - The Launch of Accredited Certification", *Conference on Environmental Management Systems - BS 7750 - Advising for Certification*", IBC Ltd, 22nd March 1995.

Newson, M. (1994): "Developing Environmental Principles", TQM Magazine 1994.

O'Regan, B. and Moles, R. (1997): "Applying a Systems Perspective to Environmental Policy": *Journal of Environmental Planning and Management*, Volume 40, No 4, July 1997.

Page, S (1995): "Making Environmental Management Work", *Conference on Environmental Management Systems*, Institute of Chemical Engineers, April 1995.

Parker, G (1995): "Achieving Cost Efficient Quality", Parsec Consultants Group, Gower Publishing, 1995.

Parkman Environment (1995): "The Environmental Effects Assessment", Workshop of Environmental Effects, Environmental Resources Unit, Salford University, 24th February 1995.

Patton, D. and Baron, P. (1995): "Factors influencing companies' response to environmental responsibility", *Eco-Management and Auditing*, 2, pp. 41-46.

Patton, M (1980): "Qualitative Evaluation Methods", Sage Publications, 1980.

Pearce, D: "Packaging Waste and the Polluter Pays Principle: A Taxation Solution", *Journal of Environmental Planning and Management*, Volume 35, No 1, 1992.

Peckham, A. (1995): "Certification to BS 7750 - What is Business Looking For ?", *Environmental Management Conference - BS 7750- Advising for Certification*, IBC Technical Services Ltd, March 1995.

Powley, D. (1994): "Practical Guidance: The BS 7750 Effects Evaluation and Register", *Environmental Auditing : A Management Guide*, Intalex Press Ltd, Chapter 17, pp.18-28, 1994.

Powley, D. (1995): "BS 7750 - The Performance Standard", *Environmental Management Conference - BS 7750- Advising for Certification*, IBC Technical Services Ltd, March 1995.

Powley, D. (1996): "BS 7750 - the myths and reality", *Quality World*, January 1996.

Reimann, C. and Sharratt, P. (1995): "Survey of Industrial Experience with Environmental Management", *Conference on Environmental Management Systems*, Institute of Chemical Engineers, April 1995.

Reynolds, N. (1995): "Now Here's a Site to be Seen", *Live Wire - The Newspaper for BICC Cables Blackley Site Employees*, BICC Cables, December 1995.

Richardson, F. (1995): "Environmental Management in a Small Company", *The Role of the Environmental Manager*, Hillary, R (Ed), Stanley Thornes (Publishers) Ltd, Chapter 6, 1995.

Rickman, A. (1996): "An Overview of Risk Assessment in Environmental Management", *Proceedings of Risk Assessment Workshop*, Institute of Environmental Management, 6th March 1997.

- Ridgeway, B. (1997):** "The Australian Experience of the Implementation of ISO 14001", *Environmental Assessment*, Volume 5, Issue 2, June 1997.
- Ringer, J. (1995):** "What We Have Learned From Providing Consultancy", *Proceedings of Conference on Environmental Management - BS 7750- Advising for Certification*, IBC Technical Services Ltd, March 1995.
- Robinson, D. (1996):** "Investing in environmental improvement", *Environment Briefing*, Croner Publications Ltd, March 1996.
- Robinson, D. and Clegg, A. (1998):** "Environmental Leadership and Competitive Advantage Through Environmental Management System Standards", *Eco-Management and Auditing*, Volume 5, Number 1, March 1998.
- Rover Group Ltd (1994):** "BS 7750 / EMAS - Environmental Management Standard - A Practical Guide for Smaller Companies", Rover Group Ltd, 1994.
- Rowan, S. (1994):** "Initial Environmental Performance Review and Preparation of a Register of Significant Environmental Effects", *Paper presented at Merseyside Environmental Business Club - EMS Working Group Meeting*, July 1994.
- Rowland, J. (1995):** "Environmental Effects Assessment", *M.Sc. Thesis*, Salford University, 1995.
- Sadler (1998):** "Aide Memoir to Sustainability Analysis", *Environmental Assessment*, Volume 6, Issue 1, March 1998.
- Sayre, D. (1996):** "Inside ISO 14001: The Competitive Advantage of Environmental Management", St Lucie Press Ltd, 1996.
- Shields Special Metals Ltd (1996):** "Environmental Statement", 1996.
- Sekaran, U. (1992):** "Research Methods for Business" John Willey & Sons Inc, 1992.
- Selltiz, C., Wrightsman, L. & Cook, S. (1976):** "Research Methods in Social Relations", 3rd ed, Holt, Rinehart and Winston Publishers, 1976.
- SGS Yarsley (1996):** "Environmental Management Standards - Accelerator or Brake for Business ? - A pan European report conducted by the Institut Superior de Commerce International a Dunkerque (ISCID)", 1996.
- Sheldon, C. (1995a):** "Applying BS 7750", *Environmental Excellence*, p 22-24, June 1995.
- Sheldon, C. (1995b):** "BS 7750 and Certification - A Developmental History", *Conference on Environmental Management Systems*, Institute of Chemical Engineers, April 1995.
- Sheldon, C. (1996):** "First Steps on the Thousand Mile Journey: A Brief Overview of the ISO 14000 Series of Standards", *Environmental Policy and Practice*, Volume 6, No 3, 1996.

Shillito, D. (Ed) (1994): *"Implementing Environmental Management"*, Institute of Chemical Engineers, 1994.

Shillito, D. (1995a): "Grand Unification Theory of Should Safety, Health, Environment and Quality be Managed Together or Separately ?", *Journal of the Institute of Chemical Engineers*, Vol 73, Part B, August 1995, p.194-202.

Shillito, D. (1995b): "Re-designing management processes - EMS certification and integrated management", *The Environmental Protection Bulletin*, Issue 039, p.2, 1995.

Smith, M. (1995): "Methodologies for assessing environmental effects", *Environmental Protection Bulletin*, Issue 041, pp.12-22, 1995.

Smith, G. (1994): Cited in ENDS Report 231, 1994.

Smith, D. (1995): "The International Scene", *Network of Environmental Managers and Auditors Conference on EMAS verification and BS 7750 certification*, May 1995.

Solvay Interlox Ltd (1993a): *"Application for an Authorisation under IPC the Environmental Protection Act 1990, Part 1, Manufacture of Peracetic Acid"*, Solvay Interlox Ltd, October 1993.

Solvay Interlox Ltd (1993b): *"Application for an Authorisation under IPC the Environmental Protection Act 1990, Part 1, Manufacture of Caprolactone"*, Solvay Interlox Ltd, October 1993.

Solvay Interlox Ltd (1993c): *"Technical Department Procedures - Guidelines for Environmental Process Hazard Reviews"*, Solvay Interlox Ltd, 1993.

Solvay Interlox Ltd (1993d): *"Technical Department Procedures - Guidelines for Waste Minimisation Reviews"*, Solvay Interlox Ltd, 1993.

Solvay Interlox Ltd (1993e): *"Responsible Care & Loss Prevention System - Environmental Hazards Manual"*, Solvay Interlox Ltd, 1993.

Solvay Interlox Ltd (1994a): *"Application for an Authorisation under IPC the Environmental Protection Act 1990, Part 1, Combustion Process"*, Solvay Interlox Ltd, January 1994.

Solvay Interlox Ltd (1994b): *"Solvay Interlox Ltd and the environment - Environmental Report 1993-4"*, 1994.

Solvay Interlox Ltd (1995): *"Solvay Interlox Ltd, Authorisation Reference No. AK7809 & AK7817, Improvement Programme Implementation"*, May 1995.

Solvay Interlox Ltd (1996): *"Solvay Interlox Ltd and the environment - Environmental Report 1994-6"*, 1996.

Solvay Interlox Ltd (1996a): *"Responsible Care & Loss Prevention System for Health, Safety and the Environment - Management Manual"*, 1996.

Solvay Interlox Ltd (1996b): *"Responsible Care & Loss Prevention System for Health, Safety and the Environment - Environment Group Procedures"*, 1996.

Spencer-Cooke, A. (1997): "From EMAS to SMAS: Charting the Course from Environmental Management to Sustainability", *ISO 14001 and Beyond*, Greenleaf Publishing, 1997.

Stanwick, S., and Stanwick, P. (1998): "A Descriptive Analysis of Environmental Disclosures: A Study of the US Chemical Industry", *Eco-Management & Auditing*, Volume 5, Number 1, March 1998.

Sunderland, T. (1997): "Environmental Management Standards and Certification: Do They Add Value ?", *ISO 14001 and Beyond*, Greenleaf Publishing, 1997.

Sutton, P. (1997): "Targeting Sustainability: The Positive Application of ISO 14001", *ISO 14001 and Beyond*, Greenleaf Publishing, 1997.

Tarling, J. (Ed) (1996): "First in the East for DNVQA", *Environmental Assessment*, Volume 4, Issue 3, p.94, September 1996.

Thomas Swan & Co (1993): *"Internal Review Questionnaire"*, Thomas Swan & Co Ltd, 1993.

Thomas Swan & Co (1994): *"Environmental Evaluation and Significance Guidelines"*, Thomas Swan & Co Ltd, Amendment No 1, September 1996.

Thomas Swan & Co (1994a): *"Environmental Evaluation Form - Evaluation of all environmental effects to determine significance"*, Thomas Swan & Co Ltd, Amendment No 2, September 1994.

Thomas Swan & Co (1994b): *"Example of an Environmental Improvement / Objective Form"*, Thomas Swan & Co Ltd, Amendment No 3, November 1994.

Thomas Swan & Co (1996): *"The Thomas Swan & Co Ltd Combined Policies on The Environment, Quality, Health & Safety"*, Thomas Swan & Co Ltd, Issue 2, June 1996.

Thomas Swan (1996a): *"Thomas Swan - Public Environmental Statement"*, Thomas Swan & Co Ltd, December 1996.

Thomas Swan (1997): *"Interim Environmental Public Statement 1997"*, Thomas Swan & Co Ltd, November 1997.

Tothill (1993): *"Environmental Management Systems: BS 7750 and the European Community Environmental Management and Audit Scheme (EMAS)"*, NNC Ltd, 1993.

Tull (1978): Cited in Dermody, 1994.

UKAS (1996): *"UKAS List of 18 Differences Between ISO 14001 and BS 7750"*, United Kingdom Accreditation Service, 1996.

UKAS (1998): *"List of ISO 14001 Accredited Bodies"*, United Kingdom Accreditation Service, 1998.

UNEP (1992): “*Statement by Banks on the Environment and Sustainable Development*”, United Nations Environment Programme, 1992.

Vogt (1996): “BS 7750 and SMEs”, *Environmental Excellence*, 1996.

Warris, A. and Evans, D. (1995): “How does verification work ?”, *Environmental Excellence*, p.30 - 32, June 1995.

Welford, R. (1998): “Corporate Environmental Management, Technology and Sustainable Development: Postmodern Perspectives and the Need for a Critical Research Agenda”, *Business Strategy and the Environment*, Volume 7, Number 1, February 1998.

Welford, R., Young, W. and Ytterhus, B. (1998a): “Towards Sustainable Production and Consumption: A Literature Review and Conceptual Framework for the Service Sector”, *Eco-Management and Auditing*, Volume 5, Number 1, March 1998.

Wells, A. (1997): “Training and Environmental Management Systems”, *ISO 14001 and Beyond*, Greenlead Publishing, 1997.

Whitaker, B. (1993): “*Experience of SMEs in European Countries*”, School of the Environment, University of Sunderland, 1993.

Williams, M. (1993): “Attaining New Levels”, *Total Quality Management*, April 1993

Willis Corroon Ltd (1998): “Environmental Risk Rating Assessment”, *Institute of Environmental Management Seminar*, 29 January, 1998.

World Commission on Environment and Development (1987): “*Our Common Future (The Brundtland Report)*”, World Commission on Environment and Development, Oxford University Press, 1987.

PERSONAL COMMUNICATIONS

Booth, M (1996): Senior Quality Engineer, Epson Telford Ltd, Telford, Shropshire.

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