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MERCK SHARP & DOHME

27-March-2009

| | |
|---|---|
| **Register No.:** | **P0011-03** |
| **Company Name:** | **Merck Sharp & Dohme (Ireland) Ltd**<br>**Ballydine, Kilsheelan, Clonmel, Co. Tipperary.** |
| **Reporting Period:** | **2008** |
| **Required Submission Date:** | **31 March 2009** |
| **Report Name:** | **Merck Sharp and Dohme**<br>**2008 Annual Environmental Report** |

Dear Ms. Kirwan,

Please find attached the 2008 Annual Environmental Report for the Merck Sharp and Dohme (Ireland) Ltd, Ballydine plant.

The 2008 AER Pollution Release and Transfer Register Data Tables and the full PDF version of the 2008 Annual Environmental Report were uploaded to the EPA website as requested by the Agency.

I confirm that the PDF version is a true copy of the original 2008 Annual Environmental Report.

All data in the report is certified to be accurate and representative.

If you require any additional information or clarification please contact.

Dr. Gervase McAleavey,

Director of Engineering, Safety & Environment

# 2008 ANNUAL ENVIRONMENTAL REPORT

## MERCK SHARP & DOHME (IRELAND) Ltd

Pharmaceutical Manufacturer,
Ballydine, Kilsheelan, Clonmel,
Co. Tipperary.

## REGISTER OF IPPC LICENSE NO.: P0011-03

## License Reissued – 9th August 2007

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# Merck Sharp & Dohme - Licence No. P0011-03
# 2008 Annual Environmental Report

## GRID REFERENCE 2335E 1232N

## 1.0 INTRODUCTION

Merck Sharp & Dohme (Ireland) LTD, (MSD) Ballydine, Kilsheelan, Clonmel, Co. Tipperary is a subsidiary of Merck & Co. Inc., New Jersey, USA. Merck & Co. is a worldwide, research intensive healthcare company that discovers, develops and produces human and animal health products. The Merck Sharp & Dohme (Ireland) LTD, Ballydine plant is a bulk Pharmaceutical Manufacturing Facility. Products are exported to finishing (formulation) plants around the world, where they are formulated into final dosage form and distributed to market outlets.

Merck Sharp & Dohme (Ireland) LTD were granted an Integrated Pollution Control License (P0011-01) by the Environmental Protection Agency, on December 29th, 1995. The agency issued a revised licence (P0011-02) on April 3rd, 1998 to cover all aspects of site operations including both existing and new plant expansion facilities.

An application for an IPPC licence was submitted in September 2006 and a revised licence (P0011-03) was issued on August 10th, 2007.

A consolidated annual report which includes details on all aspects of the site's environmental performance for 2008 has been prepared per the Environmental Protection Agency guidance note and the conditions outlined in IPPC licence No. P0011-03.

The Merck Environmental Policy applies to all Merck operations throughout the world and it unequivocally states the general principles, which must be applied to protect the environment including total regulatory compliance for their worldwide operations, including Merck Sharp & Dohme (Ireland). The Ballydine plant has an ongoing programme of operational change, process change and capital investment to reduce potential environmental effects.

To ensure compliance with the Corporate Environmental Policy and the regulatory requirements, the MSD Ballydine facility has in place, a comprehensive environmental management programme which includes ongoing environmental monitoring and performance reviews, training, internal and external audits.

## 2.0. SITE DESCRIPTION

### 2.1 GENERAL SITE

The production schedule at Ballydine can and does vary considerably from year to year. MSD Ballydine is a bulk pharmaceutical modular manufacturing facility with the flexibility to produce a large number of varying products. The Ballydine facility has been designated as a commercialisation facility by Merck & Co. The future plan for this facility will be to manufacture new API materials for clinical trials and launch campaigns, in addition to manufacture of existing API material for supply. Increasingly, the Ballydine facility is manufacturing new compounds for clinical trials and initial launch to market. A number of new process steps were demonstrated at MSD Ballydine in 2007. Additional new process steps will be introduced in 2009 and subsequent years. A comprehensive submission for each new process introduction will be submitted to the Agency in advance.

The plant is presently in a transition stage and will continue to manufacture a number of long term supply products. Both existing supply products and new clinical trial and launch materials are scheduled on a campaign basis, varying in length, and use a wide range of liquid, solid and gaseous proprietary organic and inorganic chemicals as raw materials. Due to the campaign nature of the facility, throughput of any individual product may range from zero to several thousand kilograms per year. Raw materials required for the manufacture of these products will vary similarly. The maximum quantity is limited only by the length of individual campaigns, which is dependent on market requirements at that time.

Additionally significant Research and Development is on-going within the Company worldwide, to develop new products and improve on existing ones. The site supplies mature bulk active pharmaceutical ingredients to other Merck facilities for subsequent formulation to tablets. As the future product mix is unpredictable, it is not practical to develop the five year timetable with waste reduction targets as per clauses 2.2.2 of the IPPC licence. Nevertheless, Merck Sharp & Dohme is committed to continually assessing and minimising its impact on the environment and evaluating its operations and processes for waste reduction opportunities.

The facility is mature, circa 33 years in operation, and a considerable amount of infrastructure enhancements and process improvement has been completed over the years. In particular in relation to a number of our mature products, significant improvements on yields, minimisation of waste streams and recovery / recycle of solvents have been achieved.

Processing operations commenced in an additional process facility (Fac 03) in May 1999, this represented an additional investment of circa €160 million at the Ballydine site.

An extension to the south of Factory 01 and an upgrade of a PDC laboratory were completed in 2008. Agency approval to utilise these 2 facilities was received.

Construction of a new Research & Development Pharmaceutical roller compaction tableting facility costing circa €120 million is presently in progress and this is planned to be in operation in early 2010. The site has communicated with Agency Licencing, requested that the operation of this new facility be accommodated by means of a technical amendment to the currently IPPC licence.

At the end of 2008, the MSD Ballydine plant had 403 staff directly employed.

## 2.2 SITE ACTIVITIES

The site manufactures bulk pharmaceuticals and intermediates. These synthesis operations are conducted in the two Operating areas – Chem. Ops 1(Fac 01) and Chem. Ops 2 (Fac 03). In addition, the Chem. Ops 1 production area is responsible for the dry powder processing operations, small scale API processing facility, solvent recovery plant (Fac 02), bulk storage tank farm and the atmospheric abatement equipment, scrubber towers, thermal oxidisers and fume incinerator. Chem. Ops 2 operate the latest API facility expansion and in addition are responsible for site utilities and WWTP operations. A range of service functions support the Operating areas; Administration, Process Development & Commercialisation, Project Engineering, Safety & Environmental Services, Quality Assurance, Analytical Developmental Commercialisation, Maintenance, Finance, Automation & IT, Materials Procurement and External Logistics.

The 2 production areas consists of a " Wet" process area for chemical synthesis, purification, isolation and a " Dry" process for drying, milling, blending and packaging operations.

In the "Wet" section of the Operating areas; liquid, solid and gaseous raw materials are mixed and processed in a variety of multi-purpose equipment, to produce batches of product using a variety of unit operations. The production areas are modular, computer controlled and vessels / modules can be inter linked by a central process manifold system.

Utility services including steam, cooling water, glycol refrigeration, compressed air, potable and demineralised water are supplied on a continuous basis to the operating areas.

The solid, liquid and gaseous wastes generated from process operations are treated by a number of abatement systems. Gaseous waste streams are treated by a combination of the following abatement technologies, caustic and water scrubber towers, thermal oxidiser, carbon absorption units and a fume incinerator. The waste solvents generated ex processing are stored in bulk storage tanks. These are subsequently either recovered in the onsite solvent recovery facility or shipped to offsite solvent recovery or incineration facilities. The site has a tertiary waste water treatment facility to treat biodegradable liquid wastes. Waste process solids are drummed for subsequent disposal by offsite incineration. The solids generated by waste treatment and utilities operations are dewatered and dried prior to offsite disposal.

## 2.3 Company Organisation for Environmental Management

Merck & Co. have a Corporate Safety & Environment Group which provides direction and guidance to the individual facilities world-wide.

At the MSD Ballydine plant, the Director of Engineering, Safety & Environment has primary responsibility for ensuring that the plant operates in compliance with all environmental requirements.

The reporting structure in 2008 was that the Director of Engineering, Safety & Environment had overall responsibility for Safety and the Environment. The Safety & Environment Manager had responsibility for a team of 3 chemists and 4 engineers and specialists, who provided plantwide support for safety & environmental control and monitoring activities. The Director for Chem. Ops 2 had operational responsibility for the provision of all plant utilities and waste water treatment operations. The Director for Chem. Ops 1 had operational responsibility for plant abatement control and solvent recovery activities. During 2008, the operational structure was that the Operating areas were run with 4 shift team leaders in each area, who supervised a team of operators.

The shift team leaders direct the personnel of rotating shift crews who are responsible for the safe and efficient operation of all plant utilities, abatement equipment and the waste water treatment plant.

The environmental chemists are responsible for the implementation of technical investigations and recommendations in all areas of plant operations, which have a potential impact to the environment and ensure that all environmental policies, procedures and regulatory requirements are complied with. The environmental section, provide a plant wide environmental control and monitoring service.

The 2 Directors of Chemical Operations are in control of processing operations in the respective plants and are responsible for ensuring, that all operations are conducted in compliance with safety and environmental regulatory requirements. Environmental equipment within the Operating areas includes, wet gas scrubbers, thermal oxidisers, carbon adsorption, fume incinerator, solvent recovery and a waste water treatment plant.

Technical support staff provide documentation, batch sheets and technical direction to the shift team leaders who are responsible for the operation of the environmental abatement equipment and ensure that all operations adhere to the highest standards of safety, environmental control, and good manufacturing practices.

Comprehensive information on the site organisation and responsibilities was provided in the Environmental Impact Statement for the Capacity Expansion Project. The modified organisational structure is available for review by the Agency.

## 3.0 SITE MANAGEMENT SUMMARY DATA

Summary information on the Merck Sharp & Dohme facility, 2008 environmental performance is provided in the following information tables.

**Summary of Report Tables**

| Data Table No. | Description |
|---|---|
| 3.1.1.1A | 2008 Summary of Licensed Effluent Emissions to River Suir |
| 3.1.1.1B | 2008 Summary Monitoring of Surface Water on Site |
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## 3.1.1 SUMMARY EMISSIONS DATA

Previously, quarterly monitoring reports were submitted to the Agency, however from 2nd quarter 2008 onwards, MSD was informed by their EPA Inspector that the quarterly reports were no longer required. All parameters were within licence specifications.

## 3.1.1.1. EMISSIONS TO WATERS / SEWER

**2008 Summary of Licensed Effluent Emissions to River Suir – Ref. No. SW 1**

During 2008 the site monitored the liquid effluent emissions to the River Suir as per the frequency outlined in Schedule C2.2 of the IPPC licence. A summary of the yearly average results is presented.

**EMISSION SUMMARY**
**2008 Average Effluent Concentrations**

| Parameter | Average Emission mg/lt. | Emission Limits mg/lt. | % Compliance 2008 |
|---|---|---|---|
| BOD | 6 | 100 | 100% |
| TOC | 13 | Info | Info |
| Suspended Solids | 16 | 100 | 100% |
| Ammonia | 0.7 | 10 | 100% |
| Total Nitrogen | 5.9 | 35 | 100% |
| Total Phosphorous | 1.1 | 10 | 100% |
| Total Dis. Solids | 1302 | 7500 | 100% |
| Chlorides | 320 | 1500 | 100% |
| Cyanide | <0.01 | 0.2 | 100% |
| Nickel | 0.02 | 2 | 100% |
| Copper | 0.01 | 0.5 | 100% |
| Zinc | 0.05 | 0.5 | 100% |

**Other Effluent Parameters**

| Parameter | Average Emission | Emission Limits | % Compliance 2008 |
|---|---|---|---|
| Effluent Volume | 2314 $M^3$/day | 4,500 $M^3$/day | 100% |
| Effluent Toxicity | <1 T.U. | 10 T.U. | 100% |
| Temperature | 17 C | 35 C | 100% |
| pH | 8.1 | 6 – 9 | 99.9% |

During 2008, the analysis of all licenced parameters was in compliance with the licence emission limit values, with 1 exception. The online effluent PH was above the ELV of 9 during a ca 6 hour period on April 15th. The maximum value recorded was 9.17. The elevation occurred due to diurnal pH shifts in the outfall lagoon. Remedial actions were implemented to prevent a recurrence.

The detailed effluent emission monitoring results are provided in Appendix 6.

# Table 3.1.1.1A Summary Data

# SW 1 – Effluent Emissions

## Licenced Mass Emissions 2005- 2008

| Parameter | Monitoring Frequency | Mass Emissions (Kgs) 2005 | Mass Emissions (Kgs) 2006 | Mass Emissions (Kgs) 2007 | Mass Emissions (Kgs) 2008 | Licensed Mass Emissions (Kgs) |
|---|---|---|---|---|---|---|
| TOC | Daily | 11,813 | 16,774 | 13,239 | 10,797 | Info |
| BOD | 2/week | 6,368 | 12,574 | 8,188 | 5,124 | 164,250 |
| Suspended Solids | Daily | 11,484 | 10,692 | 11,116 | 13,585 | 164,250 |
| Total Ammonia | 1/week | 1,185 | 814 | 831 | 556 | 16,425 |
| Total Nitrogen ($TKN+NO_3+NO_2$) | 1/week | 3,668 | 3,749 | 4,954 | 4,989 | 57,488 |
| Total Phosphorous | 1/week | 942 | 875 | 894 | 903 | 16,425 |
| Chlorides | 1/month | 224,349 | 223,944 | 227,383 | 270,925 | 2,463,750 |
| Total Dissolved Solids | 1/month | 1,041,476 | 1,015,851 | 1,081,487 | 1,102,400 | 12,318,750 |
| Cyanide | 1/month | 8 | 8 | 9 | < 8 | 329 |
| Nickel | 1/month | 24 | 8 | 3 | 17 | 3,285 |
| Copper | 1/month | 49 | 13 | 8 | 10 | 821 |
| Zinc | 1/month | 72 | 29 | 36 | 45 | 821 |
| **Other Effluent Data** | | | | | | |
| Flow/day | Daily | 790,194 $m^3$/yr. | 813,603 $m^3$/yr. | 894,037$m^3$/yr. | 846,860 $m^3$/yr. | 1,642,500 $m^3$/yr. |
| Flow/hour | Daily | Av. 102 $m^3$/hour | Av. 106 $m^3$/hour | Av. 118 $m^3$/hour | Av. 108 $m^3$/hour | 360 $m^3$/hour |
| pH | Daily | 8.3 | 8.2 | 8.2 | 8.1 | 6 - 9 |
| Temperature | Daily | 17 C | 17 C | 18 C | 17 C | Info. |
| Effluent Solvent Av. | 1/Qtr | < 1 ppm | < 1 ppm | < 1 ppm | < 1 ppm | Info. |
| Effluent Toxicity | 2/year | < 1 T.U. | < 1 T.U. | < 1 T.U. | < 1 T.U. | < 10 T.U. |

**Notes**:

1) The reported results for heavy metals, nickel, copper, zinc are calculated on the basis of laboratory levels of detection, the actual results are lower than level of detection. From 2006, the metal analysis method was changed from AA to ICP; the ICP method provides lower levels of detection and the reported metal mass emissions are lower than previous years.
2) All testing of the effluent water is conducted by external laboratories –
   - Microchem, Dungarvan
   - Bord na Mona, Newbridge
   - Enterprise Ireland, Shannon.

## TOXICITY TESTING OF EFFLUENTS

Effluent toxicity testing was conducted on 2 occasions in May and again in September by the Enterprise Ireland Aquatic Toxicology Laboratory in Shannon, Co. Clare. Testing was conducted using 2 species, *Daphnia magna* (crustacean) and Rainbow Trout (fish). Toxicity test results were less than 1 Toxic Unit for both test species for the 2 sampling events.

**Summary 2007 Effluent Toxicity Testing**

| Date | Test Parameter | Test Species | ELV | No. of Toxic Units |
|---|---|---|---|---|
| 12-May-08 | 96 hour $LC_{50}$ | Rainbow Trout | < 10 T.U. | < 1 T.U. |
| | 48 hour $EC_{50}$ | *Daphnia magna* | < 10 T.U. | < 1 T.U. |
| 22-Sept-08 | 96 hour $LC_{50}$ | Rainbow Trout | < 10 T.U. | < 1 T.U. |
| | 48 hour $EC_{50}$ | *Daphnia magna* | < 10 T.U. | < 1 T.U. |

While the IPPC licence requires testing to at least two appropriate aquatic organisms, additional testing to screen against all trophic levels was conducted previously. Testing using *Lemna Minor* (common duckweed) and Micro Tox *Vibrio fishceri* were less then 1 T.U. Results were comparable for all test species and indicate that the effluent is non toxic.

Historically Enterprise Ireland conducted an annual biological invertebrate survey of the River Suir bed at 4 locations, 2 upstream and 2 downstream locations of the effluent discharge. However, due to high river levels in summer 2008, they were unable to conduct the field survey in 2008. It is planned to conduct a survey during the 2009 summer period.

The summary conclusions of previous surveys were that the water quality remains fair / good upstream and downstream of the effluent discharge from MSD and that the effluent has no adverse effect on the biological quality of the River Suir.

As per Condition 6.10.1 of the IPPC Licence, MSD wish to inform the Agency of our intent to utilise the Enterprise Ireland Aquatic Toxicology Laboratory in Shannon, Co. Clare to complete effluent toxicity testing in 2009 using 2 species, *Daphnia magna* (crustacean) and Rainbow Trout (fish).

## 2008 Summary Monitoring of Surface Storm Water on Site – SW3 (discharging to River Suir via SW6)

During 2008 the site monitored the surface / storm water drain SW3 as per the schedule outlined in Schedule C.2.3 of the IPPC licence.

The analysis data is provided for information as there are no specific licence limits for surface water discharge.

The average emission values and daily visual inspections for clarity and odour from this source were indicative that water quality was acceptable and unlikely to adversely effect receiving water.

There were no issues with the daily testing for clarity and odour during 2008.

**TABLE 3.1.1.1B SUMMARY DATA**

**Average Surface / Storm water Analysis 2005 - 2008**

| Parameter | Monitoring Frequency | Average Emissions 2005 | Average Emissions 2006 | Average Emissions 2007 | Average Emissions 2008 |
|---|---|---|---|---|---|
| TOC mgs/lt. | 1/week | 13 | < 10 | < 10 | < 10 |
| pH | 1/week | 8.1 | 8.0 | 8.0 | 8.0 |

## 2008 Reverse Osmosis Effluent Monitoring – Ref. No. SW2A/SW2B

The effluent from the Reverse Osmosis plants was directed to the storm sewer and on-site stream to the River Suir during 2008**.** Testing for licenced parameters was conducted.

### TABLE 3.1.1.1C SUMMARY 2008 DATA

**2008 RO Average Effluent Concentrations**

| Parameter | Average Emission | Emission Limits | % Compliance 2008 |
|---|---|---|---|
| pH | 8.0 | 6-9 | 100% |
| Total Nitrogen | 3.3 mg/lt. | 15 mg/lt. | 100% |
| Phosphorous | 0.3 mg/lt. | 2 mg/lt. | 100% |
| Total Dis. Solids | 255 mg/lt. | 1500 mg/lt. | 100% |
| Av. Daily Flow | 254 $M^3$/day | 360 $M^3$/Day | 100% |
| Av. Max. Hourly Flow | < 12 $M^3$/day | 15 $M^3$/Day | 100% |

**Licensed RO Mass Emissions 2005 – 2008**

| Parameter | Monitoring Frequency | Mass Emission 2005 | Mass Emission 2006 | Mass Emission 2007 | Mass Emission 2008 | Licensed Mass Emission |
|---|---|---|---|---|---|---|
| | | (Kgs) | (Kgs) | (Kgs) | (Kgs) | (Kgs) |
| Total Nitrogen ($TKN+NO_3+NO_2$) | 1/month | 272 | 265 | 246 | 305 | 1,971 |
| Total Phosphorous | 1/month | 24 | 20 | 14 | 23 | 262 |
| Total Dissolved Solids | 1/month | 24,465 | 24,736 | 25,994 | 23,698 | 197,100 |
| Flow | Continuous | 89,426 $m^3$/yr. | 94,261 $m^3$/yr. | 99,371 $m^3$/yr. | 92,771 $m^3$/yr. | 131,400 $m^3$/yr. |
| Average pH | 1/month | 8.1 | 8.1 | 8.5 | 8.0 | 6 - 9 |

## 3.1.1.2 EMISSIONS TO AIR

### 2008 Summary of Thermal Oxidiser Nos. 1&2 Stack Emissions – A2-1

During 2008 the site monitored the exhaust gases from the process scrubbers / thermal oxidiser as per the Schedule B.1. The plant achieved 100% compliance on all monitored parameters versus the emission limit values specified in Schedule.

### A2-1 - Thermal Oxidiser Exhaust Stack Emissions Summary

**Average Emission Concentrations**

| Parameter | Average Emission Kg/hr | Emission Limits | % Compliance 2008 |
|---|---|---|---|
| Class 1 Organics | <0.05 kg/hr | 0.1 kg/hr | 100% |
| Class 2 Organics | 0.07 kg/hr | 2.0 kg/hr | 100% |
| Class 3 Organics | 0.06 kg/hr | 3.0 kg/hr | 100% |
| TOC | < 0.025 kg/hr | Info | |
| | **Average Emission Mg/M$^3$** | | |
| Hydrogen Chloride | < 1 mg/m$^3$ | 30 mg/m$^3$ | 100% |
| Sulphur Oxides | < 2 mg/m$^3$ | 300 mg/m$^3$ | 100% |
| Nitrogen Oxides | 13 mg/m$^3$ | 300 mg/m$^3$ | 100% |
| Ammonia | 2 mg/m$^3$ | 50 mg/m$^3$ | 100% |
| Av. Stack Airflow | 2134 m$^3$/hour | 15,000 m$^3$/hour | 100% |

### Data Table 3.1.1.2A Summary
### Licensed Mass Emissions 2005 -2008

| Parameter | Monitoring | Mass Emissions 2005 | Mass Emissions 2006 | Mass Emissions 2007 | Mass Emissions 2008 | Licensed Mass Emissions |
|---|---|---|---|---|---|---|
| | Frequency | (Kgs) | (Kgs) | (Kgs) | (Kgs) | (Kgs) |
| **Organic Substances** | | | | | | |
| Class 1 Organics | 1/month | Note 1 | Note 1 | Note 1 | Note 1 | 876 |
| Class 2 Organics | 1/month | 408 | 408 | 408 | 612 | 17,520 |
| Class 3 Organics | 1/month | 408 | 408 | 408 | 540 | 26,280 |
| TOC | Continuous | | | | 220 | Info |
| **Inorganic Substances** | | | | | | |
| Hydrogen Chloride | 1/month | 39 | 16 | 15 | 17 | 3,942 |
| Sulphur Oxides | 1/month | 59 | 20 | 15 | 18 | 39,420 |
| Nitrogen Oxides | 1/month | 240 | 88 | 45 | 241 | 39,420 |
| Ammonia | 1/month | 196 | 32 | 29 | 37 | 6,520 |

**Notes:**

1) All monthly results for Class 1 solvents were less than detection limits.

2) Only dilute VOC streams are now routed to the TOU header. This enables the use of only one Thermal Oxidiser unit. The second unit is maintained on hot standby. Uptime on the Thermal Oxidiser system during 2008 was 99.8%. The unit was offline for a total of 20 hours during 360 days of planned operation.

## 2008 Summary of Thermal Oxidiser Nos 1&2, C.E.M. Stack Emissions A2-1

The exhaust stack from the Thermal Oxidisers (A2-1) is monitored continuously by online TOC and HCL monitors. The monthly average emission results were.

**Continuous Emission Monitoring Instrumentation**

| Month | HCL Meter Av. Mgs/$m^3$ | TOC Meter Av. Mgs/$m^3$ | Stack Air Flow Av.$m^3$/ Hr |
|---|---|---|---|
| January | 0.7 | 9 | 2026 |
| February | 0.8 | 11 | 1656 |
| March | 0.7 | 11 | 2155 |
| April | 0.7 | 7 | 1910 |
| May | 1.0 | 15 | 2012 |
| June | 1.2 | 16 | 2065 |
| July | 1.1 | 12 | 2132 |
| August | 1.0 | 17 | 2320 |
| September | 1.0 | 13 | 2391 |
| October | 0.9 | 9 | 2606 |
| November | 0.8 | 9 | 2678 |
| December | 1.0 | 14 | 1656 |
| **Average** | **0.9** | **11.9** | **2134** |

The Agency was notified of a bypass of the Thermal oxidisers 1 & 2 on 17th May 2008. The resultant emission was not environmentally significant. There were no other incidents relating to the operation and monitoring of the Thermal Oxidiser 1 & 2 during 2008. All emission values were within licence limits. The online monitoring of stack emissions for Total Organic Carbon and Hydrochloric Acid are reported in Appendix 6.
The average TOC emission of 1.9mgs/m3 was equivalent to a mass solvent emission of < 0.025 kgs/ hour.

## 2008 Summary of Thermal Oxidiser No. 3 Stack Emissions – Ref No. A2-2

**Thermal Oxidiser No. 3 – Summary of Operations**

The Thermal Oxidiser No 3 / fume incinerator online monitoring of stack emissions for Total Organic Carbon, Carbon Monoxide, Sulphur Oxides, Nitrogen Oxides and Hydrochloric acid, have been consolidated in quarterly reports.
During 2008 the site monitored the exhaust gases from the Thermal Oxidiser No. 3 as per the Schedule B.1. The plant achieved 100% compliance on all monitored parameters versus the emission limit values specified in Schedule B.1.

**2008 Summary of Thermal Oxidiser No. 3 Stack Emissions - A2-2**

Online Continuous Monitoring Emission Data – (during periods when process collection headers were connected to the Fume Incinerator)

**2008 A2-2 – Emission Data**

| Month | HCL mgs/M3 | SOX mgs/M3 | CO mgs/M3 | TOC mgs/M3 | NOX mgs/M3 | Flow nM3/hr |
|---|---|---|---|---|---|---|
| Jan. | 0.4 | 2 | 1 | 0.4 | 72 | 2386 |
| Feb. | 0.4 | 2 | 1 | 0.3 | 95 | 2580 |
| Mar. | 0.3 | 2 | 1 | 0.2 | 96 | 2552 |
| Apr. | 0.3 | 2 | 1 | 0.3 | 88 | 2378 |
| May | 0.3 | 2 | 1 | 0.3 | 87 | 2282 |
| June | 0.3 | 2 | 1 | 0.1 | 87 | 2391 |
| July | 0.5 | 2 | 1 | 0.1 | 92 | 2291 |
| Aug. | 0.3 | 2 | 1 | 0.6 | 166 | 2101 |
| Sept. | 0.3 | 2 | 1 | 0.3 | 111 | 2148 |
| Oct. | 0.3 | 2 | 1 | 0.1 | 76 | 2163 |
| Nov. | 0.3 | 2 | 1 | 0.1 | 78 | 2424 |
| Dec. | 0.3 | 2 | 1 | 0.1 | 88 | 2394 |
| **Average** | **0.33** | **2** | **1** | **0.24** | **95** | **2341** |

**Notes:** Thermal Oxidiser No. 3 was operational for 349 days during 2008 and was not required for process abatement during select periods.

## A2-2 - Average Emission Concentrations

| Parameter | Average Emission mg/M$^3$. | Emission Limits daily average | % Compliance 2008 |
|---|---|---|---|
| VOCs as TOC | 0.24 mg/m$^3$ | 10 mg/m$^3$ | 100% |
| Carbon Monoxide | 1 mg/m$^3$ | 50 mg/m$^3$ | 100% |
| Hydrogen Chloride | 0.33 mg/m$^3$ | 10 mg/m$^3$ | 100% |
| Sulphur Oxides | 2 mg/m$^3$ | 50 mg/m$^3$ | 100% |
| Nitrogen Oxides | 95 mg/m$^3$ | 750 mg/m$^3$ | 100% |
| Hydrogen Fluoride | <0.2 mg/m$^3$ | 1 mg/m$^3$ | 100% |
| Dioxin | 0.008 ng/m$^3$ | 0.1 ng/m$^3$ | 100% |
| Flow | 2341 Nm$^3$/ hr. | 5,000 Nm$^3$/ hr. | 100% |

The thermal oxidiser No. 3 exhaust was monitored quarterly for Hydrogen Fluoride and on 2 occasions for Dioxins. The scheduled sampling was conducted by Wright Environmental Services and the dioxin analytical testing was completed by AES (UK).
In addition, Alcontrol Laboratories under the direction of the EPA monitored the fume incinerator for dioxin emissions on 3 days from July 1st to 3rd July. The abatement equipment uptime during the 349 days of scheduled operation in 2008 was 98.6%. During downtime, off-gas was redirected to either the carbon abatement units or to the Regenerative Thermal Oxidisers Nos. 1 & 2.

## A2-2 – Thermal Oxidiser No. 3 Stack Emissions

### Data Table 3.1.1.2B Summary

### Licensed Mass Emissions 2006 - 2008

| Parameter | Monitoring | Mass Emissions 2006 | Mass Emissions 2007 | Mass Emissions 2008 | Licensed Mass Emissions |
|---|---|---|---|---|---|
| | Frequency | (Kgs) | (Kgs) | (Kgs) | (Kgs) |
| VOCs as TOC | Continuous | 2 | 2 | 5 | 438 |
| Carbon Monoxide | Continuous | 15 | 17 | 20 | 2190 |
| Hydrogen Chloride | Continuous | 3 | 5 | 7 | 438 |
| Sulphur Oxides | Continuous | 29 | 35 | 39 | 2190 |
| Nitrogen Oxides | Continuous | 989 | 1615 | 1856 | 32,850 |
| Hydrogen Fluoride | Quarterly | < 2 | < 2 | < 2 | 43.8 |
| Dioxin | Twice / year | 0.000009 gr. | < 0.000001 gr. | < 0.000001 gr. | 0.0044 grams |
| Flow | Continuous | 14,549,472 $m^3$ | 17,253,362 $m^3$ | 19,606,820 $m^3$ | 43,800,000 $m^3$ |

## 2007 Summary of Particulate Emission Points (A3 Locations)

During 2008 the site monitored the exhausts from 11 particulate emission points (A3 locations) that were operational as per the Schedule B.1.

The monitoring results from all locations were less than 0.1 mgs/m3.

The plant achieved 100% compliance on all monitored parameters versus the emission limit values specified in Schedule B.1.

The licence schedule allows for the monitoring of a number of emission points each year and that all licenced exhaust points are monitored over a 3 year period.

The emission values were significantly less than the licence limits.

| Parameter | Licence Limit | Average Emission | % Compliance |
|---|---|---|---|
| Total Particulate. | 1 $mg/m^3$ | < 0.1 $mg/m^3$ | 100% |
| Pharm. Dust | 0.1 $mg/m^3$ | < 0.1 $mg/m^3$ | 100% |

# 2008 Summary of Steam Boiler Stack Emissions – A1-1

During 2008 the site monitored the exhaust gases from the steam boiler stack as per the Schedule B.1. The plant achieved 100% compliance on all monitored parameters versus the emission limit values specified in Schedule B.1. The boilers were operated using natural gas.

## EMISSION SUMMARY

### Emission Concentrations

| Parameter | Average Emission mg/lt. | Emission Limits | % Compliance 2008 |
|---|---|---|---|
| Sulphur Oxides | < 5 $mg/m^3$ | 35 $mg/m^3$ | 100% |
| Nitrogen Oxides | 198 $mg/m^3$ | 350 $mg/m^3$ | 100% |
| Carbon Monoxide | < 5 $mg/m^3$ | 150 $mg/m^3$ | 100% |

### Data Table 3.1.1.2C Summary

### Licensed Mass Emissions 2005 - 2008
### A1-1- Steam Boiler Stack Emissions

| Parameter<br><br>INORGANIC SUBSTANCES | Monitoring Frequency | Mass Emissions (Kg) Per Year 2005 | Mass Emissions (Kg) Per Year 2006 | Mass Emissions (Kg) Per Year 2007 | Mass Emissions (Kg) Per Year 2008 | Licensed Mass Emissions (Kg) |
|---|---|---|---|---|---|---|
| Sulphur Dioxide | 1/year | 816 | 816 | 816 | 864 | 24,528 |
| Nitrogen Oxides ($NO_2$) (Note 1) | 1/year | 24,480 | 20,074 | 23,990 | 34,214 | 245,280 |
| Carbon Monoxide | 1/year | 816 | 816 | 816 | 864 | 105,120 |

**Notes:**

1) The boilers are fuelled by natural gas.
2) The nitrogen oxides are generated thermally and are not fuel related.
3) The average steam generation was <20,000 lbs / hour during the 360 operational days in 2008.
4) The average boiler emission air flow was estimated to be 20,000 m3/hr versus licence limit of 80,000 m3/hr. There was only a demand requirement to operate with 1 boiler at a time.
5) The licence is based on the concurrent operation of the new boiler and 1 of the old boilers.
6) The sulphur dioxide and carbon monoxide mass emissions are overstated, as monitored values obtained were less than 5 mgs/m3.

## 3.1.1.3 WASTE MANAGEMENT

### Hazardous Waste Recovery / Treatment / Disposal Overview

**PROCESS SOLVENTS**

The primary site waste management strategy is to use the site solvent recovery facility to recover, recycle and reuse process solvents. When this is not technically feasible due to capacity or technology issues, waste streams are assessed for suitability as supplementary food source to the site waste water treatment plant. The next option is to send excess solvent material to commercial recovery facilities in the UK. Streams that are not technically suitable for recovery are sent to commercial incineration facilities with heat recovery.

**WASTE WATER TREATMENT PLANT**

During 2008 circa 1,100 tonnes of biodegradable wastes, were treated by the site wastewater treatment plant. The efficiency of the aerobic activated sludge system was circa 99.5 % with average effluent BOD levels of 6 mg/lt.

Nitrogen and other nutrient containing waste streams are stored in designated tanks and controlled sewered to the waste water treatment plant. A portion of the methanol and ethanol used in processing and equipment train cleaning operations is stored and controlled sewered as supplemental BOD, to match assimilation of nutrient waste streams. Quantities of individual solvents treated during 2008 are presented in Table 3.1.1.3A

**Table 3.1.1.3A -Onsite WWTP Treatment 2008**

| Solvent Treated | Quantity (Tonnes) |
|---|---|
| Methanol | 614.3 |
| Ethanol | 160.6 |
| Acetone | 12.9 |
| Acetonitrile | 25.9 |
| Isopropyl Alcohol | 9.4 |
| Isopropyl Acetate | 0.6 |
| Monochlorobenzene | 1.2 |
| Glycol | 56.1 |
| THF | 87.5 |
| Acetic Acid | 114 |
| Dimethylformamide | 10.6 |
| Toluene | 6.5 |
| Ethyl Acetate | <0.02 |
| Chloroform | 0 |
| Heptanes | 0.4 |
| **Total** | **1,100.2 Tonnes** |

Notes – ethanol overstated due to GLC analysis coelution with glycol substrates

Ethanol and acetic acid are generated from hydrolysis of ethyl acetate waste streams.

Isopropyl alcohol and acetic acid are generated from hydrolysis of isopropyl acetate waste streams.

Historical volumes of solvents treated in the onsite waste water treatment plant.

| Year | Volumes of solvent treated in WWTP (tonnes) |
|---|---|
| 2003 | 1,242 |
| 2004 | 1,279 |
| 2005 | 979 |
| 2006 | 876 |
| 2007 | 1,139 |
| 2008 | 1,100 |

## ONSITE SOLVENT RECOVERY

During 2008 a range of 6 solvents were recovered for reuse in the on-site solvent recovery facility. A cumulative total of 1,507 tonnes of solvents were recovered.

Historical volumes of solvents recovered in the onsite solvent recovery facility.

| Year | Volumes of solvent recovered onsite (tonnes) |
|---|---|
| 2003 | 3,078 |
| 2004 | 3,286 |
| 2005 | 2,729 |
| 2006 | 1,112 |
| 2007 | 997 |
| 2008 | 1,507 |

The total yearly volumes of solvent recovered may vary from year to year and is dependent on the type and duration of process campaigns.

The majority of waste solvent used in processing during 2008 was recovered. Onsite recovery of waste solvents was 1507 tonnes and offsite recovery was 5115 tonnes. During 2008, changes to production schedule and equipment cleaning regime, resulted in less waste solvent generation from cleaning process equipment trains, with consequent reduction in volumes available for onsite recovery.

## OFFSITE WASTE MANAGEMENT SUMMARY

### Offsite Incineration

A total of 157 consignments of hazardous waste totalling 3400 tonnes were shipped for offsite incineration during 2008. All waste streams were shipped under appropriate C1 and TFS documentation. The main types of waste streams sent to incineration facilities were, 3187 tonnes of bulk solvent and aqueous streams and 213 tonnes of solids and packaging waste.

The 213 tonnes of solids and contaminated packaging materials were sent to the AVG incineration facility in Hamburg. The main items were waste process filters, carbon cakes / slurries, molecular sieves. All packaging materials, plastic liners, FIBCs and fibre keg drums, which may have potential residual product contamination are compacted onsite and sent for offsite incineration. Other hazardous materials such as obsolete raw materials, process intermediates, laboratory samples, chemicals and reagents were also sent for incineration.

A total of 3187 tonnes of bulk streams which were not suitable for recovery were sent to incineration facilities. Circa 2238 tonnes was sent to the Indaver, Antwerp facility, 641 tonnes was sent to AVG, Hamburg and 308 tonnes was sent to Kommunekemi, Denmark. The main streams sent for incineration were mother liquor streams containing water, methanol, ethanol, and Isopropyl alcohol

## OFFSITE RECOVERY

### Offsite Waste Solvent Recovery

- During 2008 a total of 221 consignments of mixed solvents (ca. 5115 tonnes in total) were shipped under TFS documentation to the SRM solvent recovery plants in Rye and Sunderland, UK. 4430 tonnes were sent to the Rye facility and 685 tonnes to the Sunderland facility.
- The waste streams were comprised of multi component solvent streams, which were not feasible to recover on-site. The main solvents shipped offsite were toluene, heptane, THF, Acetonitrile.

### Waste Catalyst Recovery

6 shipments totalling 87 tonnes of aqueous waste slurry containing ~ 5 tonnes of nickel catalyst were shipped for recovery to the Nickelhutte facility in Dresden, Germany during 2008.

### EWC Report

Details of all hazardous waste shipments for offsite solvent recovery and incineration facilities are recorded in the EWC report. This report is included in Appendix 3. All hazardous waste streams were shipped offsite under Consignment Note and Transfrontier Shipping Authorisations under the supervision of waste brokers Indaver Environmental Services, Hazardous Waste Transfer Station, Tolka Quay Road, Dublin Docks. This facility operates under waste licence No. W0036-02. A summary of EWC type wastes treated, recycled and incinerated is included in the Pollution Release and Transfer Register Report – Refer Appendix 5.

### Miscellaneous Hazardous Waste Recovery and Disposal

In addition, circa 5.7 tonnes of other hazardous wastes were sent to specialised offsite recovery / disposal or landfill facilities as appropriate. These included:

- Mercury vapour lamps (circa 0.7 tonne) were sent to Irish Lamp Recovery, Athy, Co. Kildare. The mercury is subsequently recovered and recycled.

- A small quantity of batteries was collected; these were stored onsite and will be sent for recycling to Returnbatt, Kill, Co. Kildare.

- Circa 5 tonnes of obsolete electrical and computer equipment was sent for recycle to Rehab, Dublin.

- Circa 0.03 tonnes of laboratory gas cylinders with residual material were sent to the Chemogas facility in Belgium.

**NON HAZARDOUS WASTE DISPOSALS**

**Waste Reduction Initiatives**
Over the past number of years, Merck Sharp & Dohme has developed programs to reduce the volume of waste being sent to landfill. General site refuse and canteen waste disposal has been reduced to circa 76 tonnes per annum. There is an ongoing program in place to continuously increase the level of recycling. In total, 228 tonnes of non hazardous materials were sent to recycling facilities.

**Water Treatment & Biological Sludge Disposal**
Waste sludge generated from the wastewater treatment and potable water treatment plants is dewatered to circa 20% w/w solids using a belt filter press. A sludge drier was installed in 1999 and this has resulted in a circa 4-fold reduction of tonnage sent to landfill. During 2008, a total of 607 tonnes of dried sludge (circa 90% w/w) was generated, all of the dried material was sent to the South Tipperary Co. Council landfill at Donohill (EPA Licence W0074-2). The dried sludge material was tested as per schedule C.4 of the IPPC licence, test results are presented in Appendix 3, Tables 3.1.1.3 G / H / I.

**Canteen Waste**
Waste food preparation material and waste ex catering is macerated and pumped to a digestion unit equipped with a dehydrator. This reduces the volume of solid waste by circa 90%; the effluent is sewered to the site waste water treatment plant. This project diverts circa 100 tonnes of “wet waste” per annum from landfill.

**New Pharmaceutical Roller Compaction Facility**
The waste arisings from the construction of the new Pharmaceutical Facility were managed by Veolia Environmental Services. Materials were separated at source and sent for recycle where feasible.

Summary of waste arisings for recycle

- Cardboard and Plastic Recycling – 11.6 tonnes
- Waste Timber Recycling – 101.3 tonnes
- Waste Metal Recycling – 43.2 tonnes

Summary of waste arisings for disposal
- Mixed Waste Disposal – 264 tonnes

## Waste Recycling Initiatives

**Plastic drums disposal**
During 2008 circa 7 tonnes of plastic drums, pallets and boxes were sent to Retech, Plastic Recycling, Co Cavan, for reprocessing as raw material for plastic injection moulding.

**Cardboard / Shrink wrapped plastic**
There are 4 recycling containers onsite; waste cardboard and shrink wrap plastic material is collected weekly for recycling by Veolia, Waterford. Total tonnage collected during 2008 was 35.6 tonnes.

**Scrap metal recycling:**
There is an ongoing program to collect and recycle waste metal. In 2008, circa 74.5 tonnes of metal was recycled; this was comprised of 48.4 tonnes of obsolete metal materials and 26 tonnes of crushed metal drums. The metal was sent to the Cork Scrap Metal Company for reprocessing.

**Wood and Timber pallet recycling:**
In 2008, circa 55 tonnes of pallets and other waste timber arisings onsite were collected and sent offsite for recycle by Veoila, Waterford

**Electrical Timber Cable drum recycling**:
These were collected for recycle by Veoila, Waterford.

**Paper recycling**:
In 2008, circa 48.6 tonnes of office paper, magazines etc was collected for shredding and recycling by Iron Mountain, Summerhill, Co. Meath.

**Toner cartridges**:
Site wide collection of toner cartridges is in operation for return to the vendor for recycling.

**Glass Recycling**
5.8 tonnes of Pyrex and soda glass was collected by Veoila for recycle during 2008.

**Summary**
The implementation of the Ballydine waste recycling management plan in 2008 has been to essentially eliminate any recyclable / packaging material being sent to landfill. Circa 228 tonnes of non hazardous waste was collected and recycled.

# WASTE MANAGEMENT TABLE INDEX

Comprehensive details on the management, quantities, types and analysis of waste streams are provided in the appendix section.

Refer to **Appendix 3 for Waste Management Tables**

## 3.1.1.4. NOISE.

## 2008 Plant Noise Reduction Programme

In 2008 MSD commissioned the PM Group to conduct a sitewide noise study and complete mathematical modelling to evaluate the potential contributions of site activities to off site noise.

The model identified a number of refrigerated storage containers and a charge station exhaust fan, located at the south end of the site as potential contributors to noise at NSL 1.

The charge station fan is run infrequently and for short durations. It was therefore decided to focus on the refrigerated containers which operate continuously.

The vendors of the containers devised attenuation enclosures for three of the 4 installations that were calculated to be the highest potential contributors. The fourth container is located against a building wall and could not be moved to install an enclosure.

Due to fabrication delays the installation of the attenuation enclosures was not completed until late in 2008 and then only on two of the containers that were the closest to the boundary.

The third container that can be attenuated in-situ will require significant modifications to its fire suppression systems to allow installation. This initiative will be further evaluated in 2009.

The annual survey confirmed that the attenuation measures on the two refrigerated container enclosures had contributed to a reduction in boundary and NSL 1 noise of ca 1 dB (A) over those levels measured in 2007.

None of the plant operations give rise to noise at levels outside the terms of the licence.

No further noise reduction opportunities were identified in 2008.

# 2008 IPC Noise Survey Report

## BACKGROUND

Due to delays in installation of attenuation measures mentioned in the previous section and adverse weather conditions late in the year the Annual Noise Survey for 2008 could not be undertaken as scheduled. It was completed as soon a practicable in January 2009.

The study identified an elevated measurement at NSL 1 and boundary location 3 caused by the presence of a localised steam leak in tankfarm 1. The leak had occurred the day of the survey following unseasonal heavy frosts. The leak was repaired but not in time to repeat the noise measurements on the same night.

Measurements at NSL and boundary location 3 were repeated in February 2009.

The surveys were completed in accordance with Agency Guidance documentation.

The survey consisted of the following elements:

- Survey of 23 specific noise sources.
- Night time measurements at 5 boundary locations.
- Day and night time measurements at 2 noise sensitive locations (NSL).
- 1/3$^{rd}$ Octave Band measurements at 2 noise sensitive locations (NSL).

## SUMMARY OF RESULTS

Results of the 2008 noise source survey indicate no deterioration from previous year's performance.

The site noise survey report for 2008 is attached in **Appendix 2.**

BOUNDARY MEASUREMENTS

Night time boundary measurements were conducted at 5 locations as indicated in the report presented in Appendix 2.

Levels at location B1 B2, B4 and B5 were broadly similar to those detected in previous years. Location B3 was reduced from the 2007 levels due to attenuation measures mention in the previous section. The comments section indicates that there was some impact due to traffic and river at some locations.

NOISE SENSITIVE LOCATION MEASUREMENTS

Measurements were made at the 2 noise sensitive locations as submitted in the October 1996 IPC application documentation.

- NSL 1.

  NSL 1 is the nearest residence to the south of the plant. To avoid disturbing the occupants, measurements were taken on the roadway at the entrance gateway to the property.

  Day and night time $L_{Aeq\ 30}$ min readings were 49 and 45 d B (A) respectively at the entrance gateway.

  The $L_{Aeq,\ T}$ levels in the environs of the plant consist of both the noise from the plant and extraneous sources. As indicated in the *Environmental Noise Survey Guidance Document* (page 9) where the noise emissions are relatively steady, as for the Ballydine site, the night-time $L_{A90,\ T}$ is a good indication of the actual noise output from the site.

  The measured night-time $L_{A90,\ 30min}$ at the entrance gate at NSL1 was 44 dB(A).

  With the permission of the residents, a previous noise survey was undertaken at the actual Noise Sensitive Location, the house. This indicated that the noise level here was less than that at the entrance gate to the property.

  It is therefore assured that both the daytime and night-time $L_{Aeq,\ 30mins}$ noise levels at the residence itself achieve the criteria of 55 and 45 dB(A) respectively.

- NSL 2.

  NSL 2 is located to the south west of the plant across the river. Measurements were taken at the field entrance adjacent to the old graveyard.

  Day time $L_{Aeq\ 30\ min}$ readings of 54 dBA were recorded. Significant non MSD related noise sources were present. Requirements were satisfied as the plant was not the source of the noise.

  Night time $LA_{eq\ 30\ min}$ readings of 47 dBA were recorded. As indicated in the *Environmental Noise Survey Guidance Document* (page 9) where the noise emissions are relatively steady, as for the Ballydine site, the night-time $L_{A90,\ T}$ is a good indication of the actual noise output from the site. The measured night-time $L_{A90,\ 30min}$ at NSL2 was 43dB (A), achieving the criterion of 45 dB (A).

  Requirements were satisfied.

OCTAVE BAND ANALYSIS

One third octave band analysis was also performed at each of the 2 NSL's.

There was no clearly audible tonal component or impulsive component in the noise emission from the activity at any of the two noise sensitive locations.

## 2009 IPC Noise Survey Proposal

The Annual Noise Survey for the Merck Sharp & Dohme (Irl.) LTD, Ballydine site, will be undertaken in accordance Agency Guidance.

The survey will be conducted, weather conditions permitting, in the period June - September 2009.

### 3.1.2.1 RESOURCE, ENERGY AND WATER USAGE.

## Energy Consumption Table 3.1.2.A

| Fuel | Units | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Natural Gas | TJ (Nett) | 212 | 194 | 184 | 203 | 204.6 |
| Electricity | MWH | 47,249 | 41,869 | 40,575 | 42,188 | 42,084 |

Notes:

1) Natural gas is used to generate steam and as support fuel in the Fume Incinerator.
1) 2008 included an extra 4 weeks production over previous years. The extra 4 weeks were accommodated while maintaining the overall site energy usage at levels comparable to 2007.

**CO2 Emissions**

| Site CO2 Emissions | Units | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Combustion in boilers and support fuel for fume incinerator. | Tonnes/ Year (nett) | 12106 | 11069 | 10492 | 11551 | 11,629 |

## Water Consumption Table 3.1.2.B

**Summary**

| Water | Units | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Potable Water | $M^3$/Year | 885,901 | 776,176 | 698,933 | 690,988 | 769,450 |

**Notes:**

1) Water is abstracted from the River Suir and treated onsite with lime and ferrous sulphate to produce potable standard water.
2) Potable water usage has been continuously reduced since 2001; this reduced trend was maintained in 2007.
3) Usage increased in 2008, due to higher level of activity including construction of a new Facility.

### 3.1.2.2 RESOURCE, ENERGY AND WATER USAGE INDICIES

A table listing the resource usage of selected environmental parameters, waste, water, gas, electricity and boiler CO2 emissions is presented below.

This enables year to year comparisons of the selected parameters versus tonnage of finished product manufactured.

It is not feasible to generate indices or metrics on a campaign basis, due to multiple concurrent process campaigns. Also production volumes, types of bulk active pharmaceutical ingredients and raw materials / solvents vary on a yearly basis. The different types of process steps vary significantly with the amount of resources required and waste produced.

In 2006 lower production volumes resulted in higher indices.
Plant production volume in 2007 was circa 100% increased from 2006 level. The higher activity levels were maintained during 2008.

**Annual Resources Indices**

**Resource usage versus tonnes of API produced**

| Year | Water Usage Index M3/Tonne | Electricity Usage / Index Mw / Tonne | Natural Gas Usage Index T J / Tonne | Emissions CO2 Index Tonnes / Tonne | Total Waste Arisings Index Tonnes /Tonne |
|---|---|---|---|---|---|
| 2001 | 6,886 | 340 | 1.82 | 104 | 67 |
| 2002 | 6,937 | 344 | 1.78 | 105 | 81 |
| 2003 | 6,515 | 332 | 1.57 | 93 | 60 |
| 2004 | 6,239 | 334 | 1.49 | 85 | 61 |
| 2005 | 9,352 | 504 | 2.34 | 133 | 97 |
| 2006 | 12,262 | 712 | 3.23 | 184 | 130 |
| 2007 | 6,009 | 367 | 1.77 | 100 | 97 |
| 2008 | 7,040 | 385 | 1.85 | 106 | 111 |

### 3.1.2.3 RAW MATERIALS PROCESS EFFICIENCY REVIEW

As per condition 7.4 of the licence, an assessment of the efficiency of raw material usage in all processes was conducted. The plant manufactures circa 25 different process steps, the efficiency factors of raw materials and solvents used in each process versus API manufactured varied widely. The process descriptions and volumes of material used are filed with quality regulatory authorities such as the F&DA. Progress on this initiative is made by yield improvements and recovery of selected solvents ex processing. The majority of process steps manufactured are mature, yield

improvements and recoveries have been implemented. Opportunities for reductions in new process steps will be evaluated.

## 3.1.3 ENVIRONMENTAL INCIDENTS, COMPLAINTS & EPA MONITORING / INSPECTIONS SUMMARY.

### Summary Environmental Complaints 2008

**Data Table 3.1.3A Type and Frequency**

| Month | Noise | Odour | Water | Dust | Procedural | Misc. | Total |
|---|---|---|---|---|---|---|---|
| January | | | | | | | |
| February | | | | | | | |
| March | | | | | | 1 | 1 |
| April | | | | | | | |
| May | | 3 | | | | | 3 |
| June | | 1 | | | | | 1 |
| July | | | | | | | |
| August | | 1 | | | | | 1 |
| September | | | | | | | |
| October | | 1 | | | | | 1 |
| November | | 1 | | | | | 1 |
| December | | 2 | | | | | 2 |
| **Total** | | **9** | | | | **1** | **10** |

### Environmental Complaints Investigation and Corrective Actions

The environmental complaints received by MSD directly or via the EPA during 2008 are listed in the attached Table 3.1.3 B, Environmental Complaints Log.

During 2008, the MSD facility received a total of 10 environmental complaints.

Mr Richard King, Ballydine contacted MSD on 6 occasions during 2008.

- The standard MSD odour investigation was conducted on each occasion, a number of the complaints coincided with agricultural and other odours in the area. Discussions on the MSD investigation were conducted with Mr King and he was satisfied on all occasions that the odours were not from the MSD facility.

Mr John Hanrahan, Ballycurkeen submitted 2 complaints during 2008.

- On the 14th Dec at 3:00 hrs, Mr. Jim Hurley, EPA informed the plant that Mr. John Hanrahan had made an odour complaint. During the subsequent discussion, Mr Hurley also indicated that Mr Hanrahan had contacted him on Dec 7th at 7:30 hrs relating to odours at 1:30hrs, 4:00 hrs and 7:30 hrs. MSD retrospectively investigated all plant and utility operations and the investigation did not indicate any potential cause of the odour complaints. Letter sent to EPA & Mr. Hanrahan on 16th Dec 2008 from the S&E manager outlining MSD's investigation into his complaint, which concluded that MSD was not responsible for the odour complaints made by Mr. Hanrahan.

Mrs Helen O' Brien, Mullagh, Carrick on Suir contacted MSD on June 30th.

- The standard MSD odour investigation was conducted and an agricultural odour was detected in the area. MSD contacted Mrs O'Brien on July 1st; she was satisfied with the MSD investigation and was satisfied that the odour was from an agricultural source.

Mr Tony Dunne, Glen Lower, Kilsheelan contacted MSD on March 26th.

- Mr Dunne queried that mature trees on Western side of the MSD site perimeter were removed during installation of the site security fence in December 2007. He indicated that the trees provided good visual cover of the factory. MSD agreed to replant this area with 7-8 foot root ball trees of existing similar species on the river bank before the end of April. Mr Dunne indicated his satisfaction with MSD's response to this matter.

**Note:**

As per condition 11.4 of the licence, a comprehensive record of environmental complaint investigations is retained onsite and may be inspected during normal business hours

Refer to Table for the 2008 Summary of Environmental Complaints.

| 2008 COMPLAINT Number | NAME | DATE | TIME | NATURE OF COMPLAINT | RECEIVED BY | COMMENTS |
|---|---|---|---|---|---|---|
| 2008-01 | Mr Anthony Dunne, Churchtown | 26/3/08 | 15:45 hrs | Miscellaneous | MSD | Mr. Dunne contacted the plant and indicated that he had an issue with the felling of some mature trees near the river bank which occurred in November 2007. |
| 2008-02 | Mr Richard King, Ballydine | 3/5/08 | 09:37 hrs | Odour | MSD | Mr. King reported that he detected a sweet odour in the vicinity of his house. Subsequent MSD onsite and offsite odour patrols did not detect any odours. |
| 2008-03 | Mr Richard King, Ballydine | 4/5/08 | 00:20 hrs | Odour | MSD | Mr. King reported that he detected a sweet odour in the vicinity of his house. Subsequent MSD offsite odour patrol detected a slurry smell circa 0.5 miles from house. |
| 2008-04 | Mr Richard King, Ballydine | 21/5/08 | 05:25 hrs | Odour | MSD | Mr. King reported that he detected an odour in the vicinity of his house. Subsequent MSD onsite and offsite odour patrols did not detect any odours. |
| 2008-05 | Mrs Helen O'Brien, Mullagh, Carrick on Suir. | 30/6/08 | 21:30 hrs | Odour | MSD | Mrs.O' Brien reported that she detected an odour in the vicinity of her house, at the time of complaint and that morning. Subsequent MSD onsite patrols did not detect any odours. However, an agricultural odour was detected near Mullagh, during the external patrol. |
| 2008-06 | Mr Richard King, Ballydine | 28/8/08 | 22:20 hrs | Odour | MSD | Mr. King reported that he detected an odour in the vicinity of his house. Subsequent MSD offsite odour patrol detected agricultural odours in the vicinity. Agricultural type odours were noticeable in the plant area during the day. |
| 2008-07 | Mr Richard King, Ballydine | 7/10/08 | 19:30 hrs | Odour | MSD | Mr. King reported that he detected a sweet odour in the vicinity of his house. He had previously detected a silage odour. Subsequent MSD offsite odour patrol did not detect any odours. |
| 2008-08 | Mr Richard King, Ballydine | 11/11/08 | 11:55 hrs | Odour | MSD | Mr. King reported that he detected an odour in the vicinity of his house. MSD investigation detected a timber type odour from Clonmel direction. |
| 2008-09 | Mr. J. Hanrahan, Ballycurkeen | 7/12/08 | 1:30 / 4:00 &7:30 hrs | Odour | EPA | On the 14th Dec at 3:00 hrs, Mr Jim Hurley, EPA informed the plant that Mr John Hanrahan had made an odour complaint in the vicinity of his farmhouse. During the subsequent discussion, Mr Hurley also indicated that Mr Hanrahan had contacted him on Dec 7th at 7:30 hrs relating to odours at 1:30hrs, 4:00 hrs and 7:30 hrs. MSD retrospectively investigated all plant and utility operations and the investigation did not indicate any potential cause of the odour complaint. |
| | | | | | | |
| 2008-10 | Mr. J. Hanrahan, Ballycurkeen | 14/12/08 | 03:00 hrs | Odour | EPA | On the 14th Dec at 3:00 hrs, Mr Jim Hurley informed the plant that Mr John Hanrahan had made an odour complaint in the vicinity of his farmhouse. . MSD investigated all plant and utility operations and the investigation did not indicate any potential cause of the odour complaint. |

# Summary of Environmental Protection Agency Monitoring and Enforcement 2008

**Effluent Analysis**
The EPA effluent sampling unit was on-site on 4 occasions and a summary of analysis results obtained by both the EPA laboratory and MSD are presented in Appendix 6.

All results were well within licence emission values.

2008 EPA Effluent SWI Sampling Dates:
29th January, 22nd February, 14th August, 15th December

In addition, the Storm Sewer water SW3, was sampled on 14th August and 15th December

EPA & duplicate MSD results are presented in Appendix 6

## Atmospheric Emission Analysis

Alcontrol laboratories under the direction of the EPA conducted solvent and dioxin emission monitoring from the Thermal Oxidiser No 3 exhaust stack A2-2, for a 3 day period July 1st to 3rd.

The EPA monitoring results are presented in Appendix 6

**Summary 2008 EPA Site Visits / Audits / Inspections**

On June 25th a formal unannounced audit of the MSD facility was conducted by Ms. Maria Lenihan (Inspector OEE – Cork) and Ms. Yvonne Furlong (Inspector OEE - Wexford).

After site introduction and environmental overview presentation, the audit team reviewed the Environmental Management Program. A site tour of WWTP, Tank Farm, Fume abatement equipment, West Pad Fac 01 and Warehouses was completed.

The audit team then focused on a review of documentation, records and procedures pertaining to various plant environmental programs including –

- Waste analysis & waste records
- 2008 environmental complaints
- 2008 incidents / EPA notifications
- Emissions to air analysis and Effluent analysis
- Training systems and records
- Communications program to public
- Sewer line testing program
- Weekly inspection of bunds
- Daily storm water checks

At the close out meeting the auditors indicated that they had not identified any non-compliance with the IPPC licence.

There were 5 minor observations identified that were subsequently addressed by the site.

The site EPA inspector, Ms Niamh O' Donaghue conducted an inspection on October 16th. The main focus of the visit was to review 2008 incident notifications. The inspector was satisfied with root cause analysis and corrective actions. The progress in addressing the minor observations raised in the previous audit was reviewed. A number of submissions for new developments were discussed.

At the close out meeting the auditor indicated that there was no non-compliance with the IPPC licence.

There were 3 minor observation identified that are being addressed by the site.

**2008 Summary Environmental Notifications/Incidents**

In compliance with the Agency Guidance Note of 26th May 2006, "Guidance to Licencee's on the Notification, Management and Communication of Environmental Incidents", MSD notified the Agency of 8 minor incidents during 2008.

There was no damage, injury or significant risk or exposure to the public or general environment as a result of any of the notified incidents.

Summary of Incidents reported to the Agency in 2008.

- Three incidents related to spillage of solvent in contained areas. All material was captured by the containment structures and routed to the on site Waste Water Treatment Plant (WWTP) which is designed to treat any such spillages. There was no environmental impact from the three incidents.

- Two incidents resulted in minor releases to surface water. Due to the low volume and nature of the release's, (WWTP building floor washings in one instance, and dilute lime solution in the other) there was no observed environmental impact on the surface water.

- One incident related to an elevated pH (9.17) on the WWTP outfall to the River Suir. No environmental impact was observed.

- One incident related to the rupture of a pressure relief membrane on a dust handling device. Loss of containment was minimal with no loss of product observed.

- One incident related to an atmospheric release of VOC from a licenced emission point during an abatement equipment bypass. The emission was not environmentally significant.

All incidents were thoroughly investigated to determine root causes and identify corrective actions necessary to prevent recurrence.

## 3.1.4. SPENDING ON ENVIRONMENTAL PROTECTION.

### Section 3.1.4 Environmental Protection Expenditure 2008

### Environmental Capital Expenditure 2008

The MSD Ballydine plant has invested over €72 million in environmental protection facilities during the period 1987 to 2007. In 2008, additional capital investment of circa €0.5 million was spent on improvements to energy management, environmental protection and safety related equipment / facilities in the existing plant. In addition, capital is provided for plant retrofits, to ensure that new process introductions complied with safety and environmental requirements. The Ballydine facility is a mature plant and is equipped with all the appropriate wastewater treatment, emission abatement infrastructure and monitoring equipment.

The main capital expenditure was incurred in the following projects;

- Energy efficiency related projects
- Standby Firewater Retention Basin was relined.

Capital has been approved for to progress a number of safety and environmental related projects in 2009, the main areas for focus are –

- Ongoing implementation of a number of ATEX compliance projects.
- Surface water management.
- Energy efficiency improvement projects.
- Industrial hygiene containment upgrades
- WWTP upgrades of selected units.

### Operational Environmental Expenditure 2008

The cost of providing day to day operational environmental protection was circa €4 million.

The main expenditure was incurred in the following areas;

- Management and operation of the site environmental waste water treatment plant (wages / maintenance / chemicals) and atmospheric abatement equipment.
- Site environmental management, monitoring and analytical testing programs for the waste water treatment plant and atmospheric abatement equipment.
- Offsite waste stream disposals to recovery / incineration facilities.
- Dried sludge disposal to landfill and other non hazardous waste management costs.
- General refuse and recycling costs.
- Environmental laboratory operation
- General environmental programs as required by the IPPC licence, ground water monitoring, noise surveys, RMP.

## 3.2. POLLUTION RELEASE & TRANSFER REGISTER (PRTR)

A proposal was submitted to the Agency identifying the site requirements as per condition 2.4 of the IPC Licence: This has been superseded by condition 6.14 of the revised IPPC licence.

- List I and II substances used on site.
- The list of materials proposed for inclusion in the PRTR.
- The intended methods of material balance / tracking to be used by MSD.

The proposal was accepted by the Agency.

**2008 PRTR**

List I substance Chloroform was not used in processing operations during 2008.

Three List II substances, Toluene, Chlorobenzene and Nickel were used in processing activities.

A material balance (PRTR.) was conducted for the following substances;

Acetonitrile, Ethanol, Methanol, Tetrahydrofuran, Toluene / Heptane combined, Acetone, Isopropyl Acetate / Isopropyl Alcohol combined, Chlorobenzene, Dimethylformamide and Nickel.

The PRTR results for 2008 are presented in this section of the report.

**2009 PRTR Proposal**

In 2009 it is proposed to conduct mass balances for the following substances, which it is projected will be utilised in quantities greater than 10 tonnes:
Acetonitrile, Ethanol, Methanol, Tetrahydrofuran, Toluene/Heptane combined, Acetone, Isopropyl acetate / Isopropyl alcohol combined, Dimethylformamide, Chlorobenzene.

If new process steps or solvents are to be introduced to the plant in 2009, the Agency will be informed by a separate notification and revision of Table 10 of the IPPC application form (list of materials and their properties used onsite) will be submitted. While a number of new process steps are scheduled for 2009, no new bulk solvents will be used onsite. The above list will be revised should any new solvents be introduced to the site in quantities above the threshold.

**Discussion:**

The following list of non-chlorinated solvents, are currently scheduled to be utilised in quantities greater than 10 tonnes in the 2008 period: Volumes of the listed solvent usage may vary depending on the production schedule.
Acetic Acid, Acetone, Acetonitrile, Dimethylformamide, Ethyl Acetate, Ethanol, Ethylene Glycol, Heptane, Isopropyl alcohol, Isopropyl acetate, Methanol, Methane Sulphonic Acid(MSA), Tetrahydrofuran, Toluene, Mono chlorobenzene.

Direct measurement material balances (Measurement methods M and B), are possible in the case of 10 materials.

One material, Heptane, has multiple isomers present and cannot be individually balanced due to interference with Toluene. A combined balance for both Toluene and Heptanes is proposed.

In addition, it is proposed to conduct a combined mass balance for both Isopropyl alcohol and Isopropyl acetate, as a portion of Isopropyl acetate is hydrolysied to Isopropyl alcohol and acetic acid. Both solvents are currently used as once through solvents, there is no onsite recovery processes for these solvents.

There are 4 remaining materials that cannot be accurately balanced:

- Acetic Acid is neutralised to sodium acetate in the treatment process and cannot be directly balanced. Based on odour checks there is no evidence to suggest that fugitive emissions are a significant source of Acetic Acid loss at Ballydine.
  Acetic acid is used "once through" and all processing vessels are provided with abatement. The single bulk solvent storage tank is provided with a vent scrubber to capture emissions during filling operations. A significant change in production schedules in 2005 resulted in reduced usage of acetic acid from circa 300 tonnes to less than 100 tonnes per annum.

- Ethyl acetate is hydrolysed to sodium acetate and ethanol in the treatment process. The acetate portion cannot be accurately balanced. Based on odour checks there is no evidence to suggest that fugitive emissions are a significant source of Ethyl Acetate loss at Ballydine. Ethyl Acetate is used "once through" and all processing vessels are provided with abatement.

- Ethylene Glycol is essentially non volatile. It is utilised as a cooling media for processing vessels. The only credible loss route is to the WWTP equalisation tank where it degrades to a number of substrates under the prevailing pH conditions and is subsequently assimilated in the WWTP aeration system. It cannot be accurately balanced.

- Methane Sulphonic Acid (MSA) is non volatile and cannot be accurately balanced by direct measurement methods. MSA is used "once through" and all processing vessels are provided with abatement.

The above 4 materials do not possess any attributes that make them more likely to display unacceptable fugitives losses that any of the 9 materials proposed for direct material balance. (7 discrete materials and two combinations of 2)

This proposal for 2009 is to continue as per the 2008 program and is submitted for Agency approval.

URS environmental consultants conducted a verification audit on the 2005 MSD solvent mass balance, a report was issued which stated that best practise was utilised in

site infrastructure, monitoring, analysis and data compilation in generating the data. This report is available for inspection by the Agency.

**Balancing Methodology - Summary of Material Tracking System.**

The material balance for each PRTR substance was prepared as per the EPA guidance note. Material flows for each substance were tracked, including raw material purchases, usage in production, onsite recovery, offsite transfers either for reuse / recovery or incineration, onsite abatement and inputs to the waste water treatment plant.

The material flow and material balancing methodologies employed by the MSD plant were as follows.

1) Raw material purchase, inventory and material usage reports were used to track solvent volumes.
2) Solvent inputs to the waste water treatment plant were measured.
3) Shipments of solvents that were sent off-site for reuse, recovery and incineration were recorded and % solvents quantified by laboratory testing.
4) Engineering calculations to account for tank filling and breathing losses were conducted.

Material inputs and outputs from treatment and disposal methodologies were tabulated to enable losses to the environment to be quantified and sources to be determined.

Year to year trends and Eco-productivity index (Index of Net Eco-Efficiency) for each listed substance were generated.

**Methods of Estimation**

1. Solvents transferred to bulk storage tanks from road tankers were recorded on loading batch-sheets. Tanks are equipped with level indicators.
2. The offsite facility weighbridge tonnage data which is recorded in the TFS documentation is used to tabulate and verify the solvent shipment weights. Materials that are sent offsite for recovery or incineration were quantified and characterised to determine assay of each solvent component.
3. Volumes of materials transferred from bulk storage tanks to processing areas were recorded by meters. Tank inventory, and material transfers are tabulated monthly.
4. Transfers from warehouse and usage are reconciled. Material usage is tracked using the JDE inventory management system.
5. Daily GLC analysis was conducted on the waste water treatment influent, to determine quantity of solvents being treated. The daily concentration (ppm) is multiplied by the hydraulic flow ($m^3$/day) to determine the solvent volume (litres/day). The daily inputs are tabulated monthly.
6. There was no onsite incineration of solvent streams in 2008.
7. The main solvents that were recovered onsite for reuse were methanol, THF and an acetonitrile / toluene mixture.
8. Engineering calculations were used to calculate tank filling and breathing losses.
9. The total solvent inputs / outputs to all sources, on the PRTR list were tracked.

Material balances to date at Ballydine have yielded a high level of closure, indicating that fugitive emissions are not a significant source of loss.

This performance is attained through a high level of ongoing investment in site infrastructure at Ballydine and the checks and balances built into the processing operations. These include, but are not limited to the following:

- centralised collection systems, servicing all processing vessels.
- extensive off-gas abatement facilities.
- preventative maintenance programmes on all process and associated equipment.
- pre-campaign “dummy runs” where water and solvent is processed through all equipment and lines.
- pressure tests of each vessel prior to commencement of the batch cycle.
- inspections of vessel transfer lines during each operation.
- weekly line leak checks.
- odour patrols.

# P.E.R. RESULTS

**Summary PER 2005 – 2008**

| Solvent | 2005 INEE (A) | 2005 INEE (B) | 2006 INEE (A) | 2006 INEE (B) | 2007 INEE (A) | 2007 INEE (B) | 2008 INEE (A) | 2008 INEE (B) |
|---|---|---|---|---|---|---|---|---|
| Acetonitrile | 3.1 | 0 | 3.5 | 0.7 | 2.6 | 0 | 3.4 | 0.8 |
| Chloroform | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Ethanol | 62.9 | 0 | 23.9 | 0 | 5.3 | 0 | 23.3 | 0.6 |
| MCB | n/a | n/a | n/a | n/a | 1.3 | 0 | 7.5 | 4.3 |
| Methanol | 15.6 | 0 | 63.1 | 11.0 | 56.4 | 0.1 | 42.6 | 0 |
| Tetrahydrofuran | 8.2 | 1.5 | 5.3 | 0.3 | 4.3 | 0.8 | 5.0 | 0.9 |
| IPA / IPAC | n/a | n/a | 7.0 | 0 | 2.7 | 1.2 | 0 | 0 |
| Isopropyl Acetate | 10.4 | 3.6 | n/a | n/a | n/a | n/a | n/a | n/a |
| Acetone | 64.2 | 1.2 | 68.9 | 0 | 100 | 0 | 30.1 | 0.7 |
| Dimethylformamide | 34.6 | 0.9 | 62.9 | 3.5 | 12.1 | 3.9 | 31.9 | 1.7 |
| Toluene / Heptane | 1.4 | 0.9 | 0.9 | 0 | 0.9 | 0.2 | 2.2 | 1.5 |
| Toluene | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Nickel | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |

**Notes:**

- INNE (A) includes the % of materials sent for both on and offsite recovery.
- 2005 -2008 INEE (B) includes an allowance for the quantity of solvents treated / biodegraded in the onsite waste water treatment plant.
- Chloroform was not used in processing during 2008
- Changes in 2005 were the inclusion of Isopropyl acetate, Acetone, Dimethylformamide and the combined Toluene / Heptane balances.
- Changes in 2006 were combined Isopropyl acetate / Isopropyl alcohol balance.

**Index of Nett Eco-Efficiency (INEE)**

This is defined as the proportion of Nett Process Waste to Gross Usage.
Nett Process Waste is defined as the amount of that material that is generated from the process minus the amount of that material that is recovered on or offsite.

$$\text{INEE} = \frac{\text{Nett Process Waste}}{\text{Gross Usage}} \times 100$$

## Summary of 2008 PER Report

The materials tracked in the 2008 PRTR report indicated a high degree of material accountability; all materials had a low plus or minus % balance.

The major solvent use changes in 2008 were, decrease in onsite recovery of methanol and increased shipment of aqueous methanol / ethanol and isopropyl alcohol streams for incineration.

In total, 8164 tonnes of bulk solvent mixtures were shipped offsite in 2008 to either recovery or incineration facilities, 1461 tonnes of these streams were analysed as water.

The total assayed quantity for each individual solvent and water amounted to 8186 tonnes versus total tonnage shipped of 8164; this is equivalent to 100.3 % accuracy. Offsite shipments contain multi components including Toluene, Heptanes, THF and Acetonitrile, Isopropyl alcohol and isopropyl acetate. The offsite waste shipments were analysed by GC/FID to determine % solvents. The total mass balance for individual solvent indicated a low % gain for some and a low % loss for others.

In summary, the % accuracy of the mass balances is within the accuracy of the analytical testing methodology, metering equipment and inventory levels.

**Example INEE Calculations**

**INEE (A)**

**Acetonitrile**
Gross Usage = 1044.1 Tonnes
Recovered / Recycled Material = 1009 Tonnes

$$\text{INEE (A)} = \frac{\text{(Gross usage - Recovered Material)}}{\text{Gross Usage}} \times 100$$

$$\text{INEE (A)} = \frac{(1044.1 - 1009)}{1044.1} \times 100$$

INEE (A) = 3.4

**INEE (B)**

**Acetonitrile**
Gross Usage = 1044.1 Tonnes
Recovered / Recycled Material = 1009 Tonnes
Biodegraded = 27.2 Tonnes

$$\text{INEE (B)} = \frac{\text{(Gross usage - Recovered Material - Biodegraded)}}{\text{Gross Usage}} \times 100$$

$$\text{INEE (B)} = \frac{(1044.1 - 1009 - 27.2)}{1044.1} \times 100$$

INEE (B) = 0.8

- INEE (B) includes an allowance for the quantity of solvents treated / biodegraded in the onsite waste water treatment plant.

# Summary 2008 PER Performance

## Acetonitrile

Annual throughput [(1)] in 2008 was circa 1044 tonnes.

The majority of acetonitrile used was recovered either on or offsite. Circa 856 tonnes of acetonitrile was sent to offsite solvent recovery or incineration with heat recovery facilities. 153 tonnes were recovered onsite and a further 27 tonnes was treated in the site WWTP. Offsite shipments contain multi component solvents including Toluene, Heptanes, THF, Ethanol and Acetonitrile. Losses from tank storage, filling and aeration system exhaust were minimal at 0.9 tonnes.

The 2008 balance for Acetonitrile indicated a marginal loss of 6 tonnes. The loss reported in 2008 is 0.6 % of the gross usage on-site and is considered within the accuracy of the analytical testing methodology, metering equipment and inventory levels. The review of 3 year balance for the period 2006/7/8 showed a material balance loss of 0.6% in 2006 and a gain of 0.15% in 2007 of the gross annual usage and demonstrates a high degree of material accountability.

| **Acetonitrile - 2008 Data** | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 1044.1 | |
| Onsite Recovery | 152.8 | 14.6 |
| Offsite Rec. & Incin. | 856.2 | 82.0 |
| Treated in WWTP | 27.2 | 2.6 |
| Storage Tank Filling & Breathing losses | 0.45 | 0.04 |
| Aeration Basin Exhaust | 0.3 | 0.03 |
| Abatement Equipment destruction & waste | 1 | 0.1 |
| Mass Balance Loss | 6 | 0.6 |

General Note (1)
Throughput = Beginning inventory + purchases + onsite recovery of solvent - ending inventory.

## Methanol

Annual throughput [(1)] during 2008 was circa 1366 tonnes. Since 2006, production campaigns were rescheduled and equipment cleaning methodology was modified to minimise volumes of methanol used in cleaning operations, with consequent reduction in methanol for recovery. In addition, due to changes in APIs made at Ballydine, significant quantities of methanol streams are sent for incineration.

Methanol is mainly used for cleaning vessel equipment trains between different process campaigns. Methanol is recovered in the solvent recovery facility for subsequent reuse; a total of 332 tonnes was recovered onsite during 2008. Waste methanol is also stored for subsequent controlled sewering to the waste water treatment plant to maintain the activated sludge system and for the assimilation / treatment of nitrogen waste streams. The quantity of methanol biodegraded in the WWTP during 2008 was ca. 586 tonnes. Process wastes containing methanol / water streams, generated circa 452 tonnes of assay methanol, which was sent for offsite incineration.

The balance for methanol resulted in an apparent gain of 8.3 tonnes. This represents 0.6 % of the annual throughput and is considered within the accuracy of metering equipment and inventory levels. There is a potential that methanol inputs to the WWTP are overstated by a low %, due to the co-elution, in the WWTP influent GLC test method of glycol degradation products. Measured and calculated losses from tank storage, filling and aeration system exhaust were 1.1 tonnes.

| Methanol- 2008 Data | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 1366 | |
| Onsite Recovery | 332 | 24.3 |
| Offsite Rec. & Incin. | 452 | 33.1 |
| Treated in WWTP | 586 | 42.9 |
| Storage Tank Filling & Breathing losses | 0.5 | 0.04 |
| Aeration Basin Exhaust | 0.3 | 0.02 |
| Abatement Equipment destruction & Waste | 3.1 | 0.2 |
| Mass Balance Gain | 8.3 | 0.6 |

**Toluene / Heptane**

Annual throughput [(1)] in 2007 was circa 3077.5 tonnes.
The major % of these solvent toluene / heptane mixtures were used as once through solvents and then sent for offsite recovery.

Toluene and Heptane cannot be individually balanced due to heptane isomer interference with Toluene in the GLC analysis method. A combined balance, for both Toluene and Heptanes was generated. The majority of the waste toluene / heptane streams from processing circa 2948 tonnes were sent to offsite solvent recovery facilities. Offsite shipments can contain multi components including Toluene, Heptanes, THF and Acetonitrile. Circa 62.5 tonnes of toluene was recovered onsite. Circa 17.6 tonnes was destroyed in the Thermal Oxidiser / Fume Incinerator abatement facilities and 21 tonnes was treated in the WWTP. Combined emissions from toluene / heptane tank storage, fillage, stack emissions and aeration system exhaust was circa 6.9 tonnes.

The 2008 balance for toluene / heptane indicated that there was an apparent loss of circa 19 tonnes versus a gain of circa 16 tonnes in 2007. The loss is 0.63% of the gross usage on-site and combined with the 2007 data demonstrates a high level of accountability. This is considered within the accuracy of the analytical testing methodology, metering equipment and inventory levels.

| **Toluene / Heptane - 2008 Data** | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 3077.5 | |
| Onsite Recovery | 62.5 | 2.0 |
| Offsite Rec. & Incin. | 2948.5 | 95.8 |
| Treated in WWTP | 20.9 | 0.7 |
| Treated in abatement units TO /FI & waste | 18.9 | 0.6 |
| Storage Tank Filling & Breathing losses | 1.3 | 0.04 |
| Aeration Basin Exhaust | 5.6 | 0.18 |
| Mass Balance Loss | 19 | 0.6 |

## Ethanol

Annual throughput [(1)] in 2008 was circa 626 tonnes.
Circa 480 tonnes of ethanol containing streams were sent for offsite recovery / incineration. The streams sent offsite were mixtures containing a number of solvents and were not suitable for onsite recovery. No ethanol streams were recovered onsite. The remainder circa 142 tonnes is accounted for through the volumes treated in the wastewater treatment plant. Circa 13 tonnes of ethanol was also generated from the hydrolysis of waste ethyl acetate streams; this was taken account of in the balance calculations. Fugitive emissions from tank storage, fillage and aeration system exhaust was minimal at 0.13 tonnes.

The balance for ethanol indicated a generation of circa 5.3 tonnes. There is a potential that ethanol inputs to the WWTP are overstated, due to the co elution in the WWTP influent GLC test method of glycol degradation products. The balance represents 0.85% of the annual throughput and is considered within the accuracy of the analytical testing methodology, metering equipment and inventory accountability.

| Ethanol - 2008 Data | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 626 | |
| Onsite Recovery | 0 | 0 |
| Offsite Rec. & Incin. | 480 | 76.7 |
| Treated in WWTP – | 142.1 | 22.7 |
| Storage Tank Filling & Breathing losses | 0.13 | 0.02 |
| Aeration Basin Exhaust | 0.2 | 0.03 |
| Ethanol in nickel slurry | 8.4 | 1.3 |
| Abatement Equipment destruction & waste | 0.27 | 0.04 |
| Mass Balance Gain | 5.3 | 0.85 |

## Tetrahydrofuran

Annual throughput [(1)] in 2008 was circa 2267.2 tonnes.

Circa 1219 tonnes of material was sent for offsite recovery and 935 tonnes were either concentrated or recovered onsite, a total of 94.6 % of throughput was recovered. Offsite shipments can contain complex mixtures of solvent components including Toluene, Heptanes, THF and Acetonitrile. A further 93.6 tonnes of THF was biodegraded in the WWTP. Fugitive emissions from tank storage, fillage and aeration system exhaust were circa 4.4 tonnes.

The balance for Tetrahydrofuran indicated a loss of 8.7 tonnes, equivalent to 0.4 % of usage. Balance is considered within the accuracy of analytical testing methodology, metering equipment and inventory levels. The review of 3 year balance for the period 2006/7/8 showed a material balance loss of < 0.5% of the gross usage and demonstrates a high degree of material accountability.

| Tetrahydrofuran - 2008 Data | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 2267.2 | |
| Onsite Recovery | 934.9 | 41.2 |
| Offsite Rec. & Incin. | 1219.4 | 53.8 |
| Treated in WWTP | 93.6 | 4.1 |
| Storage Tank Filling & Breathing losses | 2.7 | 0.12 |
| Effluent | 0.15 | <0.01 |
| Aeration Basin Exhaust | 1.5 | 0.07 |
| Abatement Equipment destruction & waste | 6.2 | 0.3 |
| Mass Balance Loss | 8.7 | 0.4 |

**Acetone**

Annual throughput [(1)] in 2008 was circa 43.2 tonnes.

The majority of the acetone used circa 30,200 lts was sent for offsite incineration. Circa 12,700 lts of acetone was sewered to the WWTP plant. Losses from tank storage, filling and aeration system exhaust were minimal at 0.18 tonnes. The 2008 balance for acetone indicated an apparent gain of 0.6 tonnes equivalent to 1.4% of throughput and demonstrates a high degree of material accountability.

| Acetone - 2008 Data | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 43.2 | |
| Onsite Recovery | 0 | 0 |
| Offsite Rec. & Incin. | 30.2 | 69.9 |
| Treated in WWTP | 12.7 | 29.4 |
| Storage Tank Filling & Breathing losses | 0.08 | 0.18 |
| Aeration Basin Exhaust | 0 .1 | 0.23 |
| Abatement Equipment destruction & waste | 0.63 | 1.5 |
| Mass Balance Gain | 0.6 | 1.4 |

**Isopropyl Acetate / Isopropyl Alcohol**

A combined mass balance for both Isopropyl alcohol and Isopropyl acetate was conducted, as a proportion of the Isopropyl acetate can hydrolyse to Isopropyl alcohol and acetic acid. Both solvents are currently used as once through solvents, there is no onsite recovery processes. Annual throughput [(1)] for both these solvents in 2008 was circa 642.8 tonnes. The majority of the isopropyl acetate and isopropyl alcohol circa 643.7 tonnes was sent to offsite solvent recovery and incineration facilities. These streams were usually part of multi component waste streams. A portion of the isopropyl alcohol waste streams had a high water content and % IPA may have been over estimated. A further 9.2 tonnes was treated in the WWTP. Losses from tank storage, filling and aeration system exhaust were minimal at 0.3 tonnes. The 2008 balance indicated a gain of 12.1 tonnes equivalent to 1.9% of throughput, and is considered within the accuracy of analytical testing methodology, metering equipment and inventory levels.

| Isopropyl Acetate / Isopropyl Alcohol - 2008 | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 642.8 | |
| Onsite Recovery | 0 | 0 |
| Offsite Rec. & Incin. | 643.7 | 100.1 |
| Treated in WWTP | 9.2 | 1.4 |
| Storage Tank Filling & Breathing losses | 0.28 | 0.04 |
| Aeration Basin Exhaust | 0 | 0 |
| Abatement Equipment destruction & waste | 1.6 | 0.25 |
| Mass Balance Gain | 2.1 | 1.9 |

**Dimethylformamide**

Annual throughput [(1)] in 2008 was circa 42 tonnes. DMF is used as a once through solvent and there is no onsite recovery of waste streams. Circa 28.6 tonnes of DMF was sent for offsite disposal, these streams also included mixtures of other solvents. Circa 12.7 tonnes was treated in the WWTP.

The 2008 balance for DMF indicated that circa 0.6 tonnes, equivalent to 1.4% was not accounted for and is considered within the accuracy of analytical testing methodology, metering equipment and inventory levels. As the material is non volatile, the losses from tank storage, filling and aeration system exhaust were minimal.

| DMF - 2008 Data | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 42.0 | |
| Onsite Recovery | 0 | 0 |
| Offsite Rec. & Incin. | 28.6 | 68.1 |
| Treated in WWTP | 12.7 | 30.2 |
| Storage Tank Filling & Breathing losses | 0.002 | <0.01 |
| Aeration Basin Exhaust | 0.0 | 0 |
| Abatement Equipment destruction | 0.0 | 0 |
| Mass Balance Loss | 0.6 | 1.4 |

**Chlorobenzene**

Annual throughput [(1)] in 2008 was circa 46.4 tonnes. Circa 42.9 tonnes of chlorobenzene was recovered onsite and 2.2 tonnes was sent offsite to an incineration facility. Circa 1.5 tonnes was treated in the WWTP.

The 2008 balance for chlorobenzene indicated that there was an apparent gain of circa 0.7 tonnes, equivalent to 1.5%. Circa 1.5 tonnes was treated in WWTP influent. Emissions from aeration system, tank storage and filling were 0.4 tonnes. The balance is considered within the accuracy of analytical testing methodology, metering equipment and inventory levels.

| Chlorobenzene - 2008 Data | | |
|---|---|---|
| | Tonnes | % |
| Total Usage | 46.4 | |
| Onsite Recovery | 42.9 | 92.5 |
| Offsite Rec. & Incin. | 2.2 | 4.7 |
| Treated in WWTP | 1.5 | 3.2 |
| Storage Tank Filling & Breathing losses | 0.1 | 0.22 |
| Aeration Basin Exhaust | 0.3 | 0.65 |
| Abatement Equipment destruction | 0.1 | 0.22 |
| Mass Balance Gain | 0.7 | 1.5 |

**Nickel**

Nickel was used in processing during 2008; 4865 kgs of nickel was charged to a process step as a reaction catalyst. All waste streams containing aqueous nickel slurry were drummed off and sent to a recycling vendor, Nickelhutte, Dresden, Germany. The waste water treatment plant effluent analysis results were minimal; the yearly total detected was 17 kgs.

**Chloroform**

There was no Chloroform used onsite during 2008. It is not planned to use Chloroform during 2009.

## Table 3.2A
*USAGE & EMISSIONS SUMMARY*

| **FACILITY IDENTIFICATION** | |
|---|---|
| Facility Name | Merck Sharp & Dohme (Ireland), Ballydine, Kilsheelan, Clonmel, Co. Tipperary. |
| IPC Register No | P0011-03 |
| National Grid Reference | 2335E 1232N |
| Reporting Period (mm-yr to mm-yr) | January 2008 - December 2008 |
| Production units/amount | N/A |
| Employee No. | 403 |

**POLLUTANTS SUMMARY –**

| Pollutant Name | CAS No. | Input Tonnes | Gross Usage Tonnes | Outputs in Tonnes | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Air | MOM | Liquid Effluent | MOM | Waste | MOM | Product | MOM | Recovery / Recycle | MOM | Treated Onsite | MOM | Unaccounted Tonnes | | | |
| Acetonitrile | 75-05-8 | 891.2 | 1044.1 | 0.75 | M / E | 0 | M | 1.0 | M | 0 | M | 856.2 | M / B | 27.2 | M | 6.0 | loss | | |
| Chloroform | 67-66-3 | 0 | 0 | 0 | M / E | 0 | M | 0 | M | 0 | M | 0 | M / B | 0 | M | 0 | | | |
| Ethanol | 64-17-5 | 625.9 | 625.9 | 0.33 | M / E | 0 | M | 8.7 | M | 0 | M | 480 | M / B | 142 | M | -5.3 | Gain | | |
| MCB | 108-90-7 | 3.5 | 46.4 | 0.4 | M / E | 0 | M | 2.3 | M | 0 | M | 42.9 | M / B | 1.5 | M | 0.7 | Gain | | |
| Methanol | 67-56-1 | 1034.1 | 1366 | 0.8 | M / E | 0 | M | 3.1 | M | 0 | M | 784 | M / B | 586 | M | -8.3 | Gain | | |
| Tetrahydrofuran | 109-99-9 | 1332.3 | 2267.2 | 4.4 | M / E | 0.12 | M | 6.2 | M | 0 | M | 2154.3 | M / B | 93.6 | M | 8.7 | loss | | |
| Acetone | 67-64-1 | 43.2 | 43.2 | 0.18 | M / E | 0 | M | 0.6 | M | 0 | M | 30.2 | M / B | 12.7 | M | -1.4 | Gain | | |
| Isopropyl Alcohol / Isopropyl Acetate | 67-63-0 & 108-21-4 | 642.8 | 642.8 | 0.28 | M / E | 0 | M | 1.6 | M | 0 | M | 643.7 | M / B | 9.2 | M | -12.1 | Gain | | |
| Dimethylformamide | 68-12-2 | 42 | 42 | 0.01 | M / E | 0 | M | 0 | M | 0 | M | 28.6 | M / B | 12.7 | M | 0.6 | loss | | |
| Toluene / Heptane | 108-88-3 & 142-82-5 | 3015 | 3077.5 | 6.9 | M / E | 0 | M | 18.9 | M | 0 | M | 3011 | M / B | 20.9 | M | 19.0 | loss | | |
| Nickel | 7440-02-0 | 4.9 | 4.9 | 0 | M / E | 0.017 | M | 0 | M | 0 | E | 4.8 | E / B | 0 | M | 0 | | | |

*MOM - Method of Measurement.*

This refers to the method used in determining losses to Air, Water and Land.
The following codes indicate the method used:

| *Method* | *Code* | *Method* | *Code* |
|---|---|---|---|
| Direct Measurement | M | Material Balance | B |
| Engineering Estimates | E | Other | O |

Inputs – Delivery plus change in inventory – Gross = Inputs plus onsite SRU

In unaccounted column, minus - indicates that there was a generation of material in the overall mass balance.

# 4. Management of the Activity

## 4.1 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS.

The MSD facility is in operation 33 years and is a mature plant which has installed significant environmental infrastructure in the waste water treatment and process abatement areas.

Likewise significant process improvements have been developed and implemented.

The following objectives form part of an evolving long-term strategy and are derived from a review of significant environmental aspects of the MSD operations at Ballydine.

MSD intends working towards the achievement of the stated objectives and goals.

## 4.2 ENVIRONMENTAL MANAGEMENT PROGRAMME 2008 PROGRESS REPORT AND ADDITIONAL TARGETS FOR 2009

The attached environmental management programme identifies appropriate targets to achieve the long-term objectives as presented in Section 4.1.

It outlines the likely means of achieving the targets, those functional areas responsible for their achievement and the general time frame within which it is intended to complete them.

The inclusion of a target in the EMP does not guarantee either its success or completion; however, Merck Sharp & Dohme (Ireland) LTD will make every reasonable effort to achieve anticipated returns from designated targets and to meet proposed completion dates.

The list of targets is an evolving one and may be added to or deleted from. This is dependent on business needs and alterations in the company's future plans. The production processes and volumes may vary significantly from year to year. New process step introductions are advised to the Agency by detailed prior application submissions.

The agency will be consulted on any major additions or deletions to the program and advised of progress annually.

## 4.1 SCHEDULE OF ENVIRONMENTAL OBJECTIVES AND TARGETS – 2008/2009.

| Objectives | Targets |
|---|---|
| 1. PROCESS OPERATIONS, YIELD IMPROVEMENTS, EQUIPMENT CLEANING<br><br>Continually evaluate Ballydine processing to optimise productivity/yield and reduce waste generated. | • Identify process modifications/improvements that improve yield and reduce waste generation.<br>• Ensure maximum recycle/recovery of solvents from processing and cleaning materials.<br>• Minimise usage of non-biodegradable cleaning agents. |
| 2. MATERIAL USAGE, WASTE MINIMISATION MATERIALS PACKAGING INITIATIVES.<br><br>Continually monitor and review material usage and waste generation and evaluate reduction opportunities. | • Evaluate all process steps for waste reduction opportunities.<br>• Improve handling and disposal of packaging wastes.<br>• Eliminate disposal to landfill of recyclable materials.<br>• Optimise material usage. |
| 3. RECOVERY / RECYCLE/ RE-USE<br><br>Promote recovery / re-use initiatives in all aspects of Ballydine operations. | • Maximise recovery/re-use of solvents<br>• Evaluate opportunities for recovery of solvents from new process steps.<br>• Continue to review recovery/recycle opportunities in all site operations. |
| 4. ENERGY MANAGEMENT.<br><br>Continually monitor energy and material use and evaluate reduction opportunities.<br>Conduct energy audit and evaluate energy reduction opportunities | • Ensure that all new process modifications or installations include energy efficiency evaluation.<br>• Identify opportunities for reductions in energy usage.<br>• Conduct site energy audits & implement improvements. |
| 5. ABATEMENT/TREATMENT FACILITIES. MAINTENANCE AND CALIBRATION.<br><br>Through constant review ensure that potential improvements in abatement technologies are evaluated and implemented as necessary to minimise emissions. | • Review atmospheric and effluent emission data and abatement operations to ensure reduction opportunities are addressed.<br>• Ensure that all abatement installations and monitors are adequately maintained and calibrated.<br>• Maximise up time.<br>• Ensure Audit compliance.<br>• Maintain up to date listings of all items requiring maintenance. |

| Objectives | Targets |
|---|---|
| 6. FUGITATIVE EMISSION REDUCTION<br><br>Minimise fugitive emissions from all aspects of Ballydine operations | • Evaluate emissions. Conduct material balances.<br>• Minimise atmospheric emissions.<br>• Maximise abatement up-time.<br>• Identify areas where reductions are possible.<br>• Implement approved modifications. |
| 7. SURFACE AND GROUND WATER PROTECTION. REDUCTION IN N & P<br><br>Ensure that all aspects of MSD's operations are conducted in a manner that protects surface and ground waters.<br><br>Minimise emissions of N & P to the effluent. | • Protect surface and ground water from contamination<br>• Progress our understanding of historical contamination profiles<br>• Eliminate sources of potential and actual contamination.<br>• Evaluate effluent for presence of active ingredients<br>• Optimise nutrient usage.<br>• Manage BOD loads.<br>• Monitor effluent. |
| 8. ENVIRONMENTAL TRAINING | • Provide appropriate environmental training for all Ballydine personnel. |
| 9. EMERGENCY RESPONSE & SAFETY INITIATIVES<br><br>Ensure onsite infrastructure, abatement, equipment, procedures are adequate to deal with potential incidents and emergencies. | • Conduct studies/evaluations of potential impacts.<br><br>• Comply with Seveso II legislation. |
| 10. NOISE REDUCTION<br><br>Ensure that no nuisance arises from Ballydine operations. | • Conduct site noise surveys.<br>• Identify potential sources of nuisance.<br>• Implement any necessary abatement measures. |
| 11. NEW PRODUCT INTRODUCTIONS<br><br>Ensure that safety and environmental aspects of all new products are reviewed. | • Review all new product documentation.<br>• Submit new product introduction proposals to regulatory bodies.<br>• Obtain agency approvals for manufacture of new products. |
| 12. RESIDUALS MANAGEMENT PLAN/ ENVIRONMENTAL LIABILITIES RISK ASSESSMENT | ▪ Develop Residuals Management Plan and conduct an Environmental Liabilities Risk Assessment as per licence requirements. |

## OBJECTIVE: 1. PROCESS MODIFICATIONS -- YIELD IMPROVEMENTS / EQUIPMENT CLEANING

RATIONALE: Process yield improvements will result in reduced use of raw materials and solvents, with consequent reduced volumes for treatment and disposal.

| TARGET NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Mature Process D (Montelukast.)<br><br>Increase yield. Reduce the volume of solvent requirements per kg. Of product. Investigate opportunities for solvent reduction. | This is a mature process, which has been manufactured since 1996; significant yield improvements were achieved and were reported in previous AER's.<br><br>**2006 /2007**<br>This is now a mature 4 step process and the main task is to maintain previously achieved yield gains.<br>• Minor additional yield improvements of ca. 0.5 to 1% were achieved in 2007.<br>• Campaign schedules were optimised to minimise need for equipment cleaning. This resulted in a reduction of 100,000 lts in methanol usage.<br><br>**2008**<br>An alternative synthesis methodology has been developed at laboratory scale, for steps 2 and 3 on this process to realise potential yield improvement of circa 8%. Implementation is dependent on FDA regulatory filing and approval.<br><br>Maintain existing % yields | Chem. Ops 1 Steps 1,2,3<br><br>Chem. Ops 2 Step4<br><br>Chem. Ops 1 & 2<br><br>Chem. Ops 1 /2 & PD&C | Complete<br><br>Complete<br><br>Ongoing<br><br>2009 |

## OBJECTIVE: 1. PROCESS MODIFICATIONS -- YIELD IMPROVEMENTS / EQUIPMENT CLEANING

RATIONALE: Process yield improvements will result in reduced use of raw materials and solvents, with consequent reduced volumes for treatment and disposal.

| TARGET NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 2 | Mature Process B (Rizatriptan)<br><br>Improve yield. Reduce the volume of solvent requirements per kg. Of product. | This is a mature process, in production since 1996; historical achievements are reported in previous AER's.<br><br>**2008**<br>The campaign in 2008, maintained previous improvements. | Process Development & Commercialisation (PDC) | Complete |
| 3 | Mature Process G (Alendronate)<br><br>This process generates a large volume, ca. 10 tonnes / batch, of aqueous phosphorous salt streams for off-site incineration.<br><br>Implement revised manufacturing process.<br><br>Revise Target | This is a mature process, in production since 1994; Achievements are reported in previous AER's.<br>.<br>**2007**<br>An alternative process methodology using different raw materials was developed and demonstrated in 2005. Regulatory (FDA) approval for this process was advised in 2007. Circa 40% of the 2007 production requirement was made using the alternative process. This resulted in a reduction of circa 220 tonnes of waste streams.<br>**2008**<br>The 2008 requirements were made using the revised process, eliminating 280 tonnes of waste.<br>**2009**<br>Vendor advised that raw materials not available for 2009 campaign, plan to use the old process methodology. | Chem. Ops 1 / PDC<br><br>Chem. Ops 1 / PDC | 2007.Ongoing<br><br>Complete.<br><br>2009 Ongoing |

## OBJECTIVE: 1. PROCESS MODIFICATIONS -- YIELD IMPROVEMENTS / EQUIPMENT CLEANING

RATIONALE: Process yield improvements will result in reduced use of raw materials and solvents, with consequent reduced volumes for treatment and disposal.

| TARGET NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 4 | Process Transfer from US Plant *(Omeprazole)* | **2006**<br>Production of a mature process was transferred to Ballydine from a US plant. A number of process improvements were developed. | Chem. Ops 1 / PDC | Complete |
| | Investigate yield improvements | **2007**<br>Centrifuge washes were reduced by 33%, reduction in annual methanol usage by 70,000 lts. Optimised end of campaign equipment cleaning regime to reduce DIW and methanol use. Standard yield was increased by 3%. | " | Complete |
| | | **2008**<br>Process improvements generated an additional 1% yield increase versus 1st. campaign. | Chem. Ops 1 / PDC | Complete. |
| | Investigate waste stream reduction opportunities. | Laboratory WWTP pilot plant treatability studies were conducted and concluded that it was not feasible to sewer waste streams to the WWTP. | Env. Chemists | Complete |
| | | **2009**<br>Further development work has indicated that yields may be increased by 4%; this will be demonstrated in 2009. | Chem. Ops 1 / PDC | 2009 |

## OBJECTIVE: 1. PROCESS MODIFICATIONS -- YIELD IMPROVEMENTS / EQUIPMENT CLEANING

RATIONALE: Process yield improvements will result in reduced use of raw materials and solvents, with consequent reduced volumes for treatment and disposal.

| TARGET NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 5 | New Process Demonstration *(MK518 –Raltegravir Potassium*)<br><br>I | **2006**<br>A new process MK518 was demonstrated in 2006. The initial commercialisation batches were produced in Qtr. 1. Conditions and charge quantities were varied to achieve optimum yields. A number of process improvements were developed and implemented for the second campaign. | Chem. Ops 2 / PDC | Complete |
| | Investigate yield improvements and waste reduction opportunities. | A yield increase from 93 to 96% was obtained. The batch size was increased and solvent usage per kg of API was reduced. | | |
| | | Equipment cleaning regime was reduced. | Chem. Ops 2 | Complete |
| | | **2007**<br>• An additional yield increase of 3% was achieved in the crude step and 1% yield increase was achieved in the pure step. | Chem. Ops 2 / PDC | Complete. |
| | | • The processing distillation regime was optimised, this reduced THF usage per batch by 600 lts. Cumulative reduction for the year was circa 60,000 lts. | | |
| | | • Laboratory work and process change work was completed to allow onsite recovery of THF distillate stream for reuse in this step and other processes. | PDC, ADC, Solvent Recovery. | Complete. |

| | | | | |
|---|---|---|---|---|
| 5 (Continued) | (Continued)<br><br>New Process Demonstration *(MK518 –Raltegravir Potassium*) | **2008**<br>• The onsite recovery of THF distillate streams for reuse was demonstrated in the first Qtr. This reduced purchase of fresh THF and waste disposal shipments by 400 tonnes. | Solvent Recovery | 1st Qtr 2008 & Ongoing |
| | Investigate yield improvements | • Yield improvements and process robustness achieved in 2007 were maintained. | Chem. Ops 2/PDC | Ongoing |
| | Investigate waste stream reduction opportunities | • Laboratory WWTP pilot plant treatability studies to determine the feasibility of on site treatment of selected waste stream to the WWTP were conducted. Study concluded that the aqueous streams were not suitable for sewering to WWTP | Env. Chemists | Complete |
| | Process Transfer | **2009**<br>Last campaign of this process to be manufactured at Ballydine. Planned to transfer manufacture to other facilities. | PDC | Ongoing |

## OBJECTIVE: 1. PROCESS MODIFICATIONS -- YIELD IMPROVEMENTS / EQUIPMENT CLEANING

RATIONALE: The overall strategy is to recover and reuse solvents used in cleaning equipment trains and to reduce actual volumes of water and solvent required.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 6 | Promote the use of water or recoverable materials for equipment cleaning. | Water is used for post campaign flushing of processing equipment. The main solvent used in cleaning is methanol. Wherever possible, all available methanol is recovered for reuse. The WWTP requires a significant quantity of biodegradable substrate to maintain its activity. In the absence of such material being available it is necessary to feed the WWTP with methanol thereby reducing the volume available for recovery. | PD&C. & Chem. Ops. | Ongoing |
| | Recover methanol used in cleaning operations. | **2006.** 471,000 lts of methanol recovered. Equivalent to ca 100% of that used for cleaning.<br><br>**2007.** 148,205 lts of methanol recovered. Equivalent to ca 20% of that used for cleaning. The balance going to feed the WWTP<br><br>**2008.** 419,000 lts of methanol recovered from equipment cleaning. The balance was used to maintain the WWTP biomass. | Chem. Ops | Ongoing |

## OBJECTIVE: 1. PROCESS MODIFICATIONS -- YIELD IMPROVEMENTS / EQUIPMENT CLEANING

RATIONALE: Process yield improvements will result in reduced use of raw materials and solvents, with consequent reduced volumes for treatment and disposal.

| TARGET NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 7 | Reduction in the use of methanol for equipment cleaning. | In 2006, 500,000 lts of methanol was used for cleaning, versus 1,571,000 in 2005. The reduced usage was due to the rescheduling of process campaigns with resultant fewer turnarounds. Implementation of a Lean Six Sigma processing system which reduced the number of process turnarounds<br>In addition cleaning specifications for vessels between campaigns has been modified. This has resulted in reduced methanol and DI water used in equipment cleaning. | Chem. Ops 1 &2. | Complete |
| | | In 2007, ca 792,000 lts of methanol was utilised for cleaning. The increase was due to higher level of processing activity and campaign turnarounds. | Chem. Ops 1 &2. | Complete. |
| | | **2008**<br>A total of ca 556,000 lts of methanol was utilised for cleaning | Chem. Ops 1 & 2. | Complete |
| | | **2009**<br>MSD will continue to implement these initiatives wherever possible thereby reducing the volume of methanol required for cleaning. | Chem. Ops 1&2 | Ongoing. |

| OBJECTIVE: 2. MATERIALS USAGE &, WASTE MINIMISATION INITIATIVES | | | | |
|---|---|---|---|---|
| RATIONALE: To monitor and review material usage , waste generation and evaluate reduction/reuse opportunities | | | | |
| **NUMBER** | **TARGETS** | **PROGRAMME & RESULTS ACHIEVED** | **RESPONSIBILITY** | **TIME FRAME** |
| 1. | Reduce waste at source. | Historical achievements are reported in previous AER's. A high level of both onsite and offsite recovery is employed by MSD for both hazardous and non hazardous materials.<br><br>Recycle programs for various waste types are ongoing and are integrated into the normal manufacturing and service area business processes.<br><br>**2007**<br>240 tonnes of non hazardous materials were sent for direct recycle. The onsite solvent recovery facility recovered 997 tonnes of solvents.<br><br>**2008**<br>221 tonnes of non hazardous materials were sent for direct recycle. The onsite solvent recovery facility recovered 1507 tonnes of various solvents for reuse.<br><br>**2009**<br>These initiatives will continue in 2009. | Env. Chemists<br>Chem. Ops 1&2 | Ongoing |

## OBJECTIVE: 2. MATERIALS USAGE &, WASTE MINIMISATION INITIATIVES

RATIONALE: To monitor and review material usage , waste generation and evaluate reduction opportunities

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 2 | Reduce disposal of non-hazardous materials to landfill. | Achievements are reported in previous AER's. Comprehensive recycling programs are in place to ensure minimal disposals to landfill. | | |
| | | **2006**<br>- Disposals of general waste to landfill were circa 75 tonnes per annum. Mainly comprised of janitorial and canteen waste. Comprehensive recycling program is in place. | Environmental Chemists. | 2006<br>On-going. |
| | Classify WWTP sludges | - Sludge API analysis methods were developed for those products whose waste is currently treated in the on-site WWTP.<br>- A report was submitted to the Agency. | Environmental Chemists. | Complete |
| | | During 2006, permission was obtained to ship dried sludge to the Indaver incineration facility in Belgium. 1 trial load was shipped. | Environmental Chemists. | Complete |
| | Investigate and develop alternative disposal route for dried sludge. | **2007 /2008**<br>An effective system for the transfer of dried sludge to FIBC's was developed. ATEX certification for the equipment was obtained. | Eng. Projects. Chem. Ops 2 & Env. Chemists. | Complete |
| | | This initiative is on hold should the incineration disposal route be required. Alternative disposal methods will be researched. | Chem. Ops 2 | 2nd Q 2009 |

## OBJECTIVE: 2. MATERIALS USAGE &, WASTE MINIMISATION INITIATIVES

RATIONALE: To monitor and review material usage , waste generation and evaluate reduction opportunities

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 3 | Reduce losses of glycol to the WWTP | Achievements are reported in previous AER's.<br><br>**2005**<br>2005 and prior year glycol losses were circa 100,000 lts. Improvements resulted form a proactive program of daily analysis and expediting repairs.<br><br>**2006**<br>In 2006, the methods outlined above were continued and losses to the WWTP were reduced to 45,600 liters versus a target of 60,000 lts.<br><br>**2007**<br>The target for 2007 to curtail losses to 2006 levels was not achieved due to a number of heat exchanger problems. Total losses to WWTP during 2007 were 139,500 lts.<br><br>**2008**<br>During 2008, significant effort was utilised in daily monitoring and remediation, losses were reduced to 50,500 lts.<br><br>**2009**<br>Plan to curtail losses to less than 60,000 lts. | Env. Chemists & Chem. Ops 1<br><br>Env. Chemists & Chem. Ops 1<br><br>Env. Chemists & Chem. Ops 1 | Complete<br><br>Complete<br><br>Ongoing. |

| OBJECTIVE: 2. MATERIALS USAGE &, WASTE MINIMISATION INITIATIVES | | | | |
|---|---|---|---|---|
| RATIONALE: To monitor and review material usage , waste generation and evaluate reduction opportunities | | | | |
| **NUMBER** | **TARGETS** | **PROGRAMME & RESULTS ACHIEVED** | **RESPONSIBILITY** | **TIME FRAME** |
| 4 | Reduce sludge's arising from the generation of potable / process water. | Historical achievements are reported in previous AER's.<br><br>**2005** | | |
| | • Investigate the use of polymer as a substitute for Ferrous Sulphate. | Review of the potable water generation process was conducted. Outline proposals were received and evaluated from two vendors.<br><br>**2006** | Env. Chemists | Complete |
| | • Investigate the use of alternative technologies to produce potable water. | The technical feasibility of the proposals was evaluated in 2006. This project is not currently feasible and on-site trials were not proceeded with. | Env. Chemists | Deferred. |

| OBJECTIVE: 2. MATERIALS USAGE &, WASTE MINIMISATION INITIATIVES | | | | |
|---|---|---|---|---|
| RATIONALE: To monitor and review material usage , waste generation and evaluate reduction opportunities | | | | |
| **NUMBER** | **TARGETS** | **PROGRAMME & RESULTS ACHIEVED** | **RESPONSIBILITY** | **TIME FRAME** |
| 5 | Reduce site-wide water usage.<br><br>Conduct site survey of bunds and pads etc. to minimise rainwater ingress to WWTP.<br><br>Review site wide water usage patterns. | Achievements are reported in previous AER's. Influent hydraulic flows to the WWTP have been progressively reduced over the years. Reduction of 26% achieved between 2001 to 2005.<br>▪ 2540 m3/day in 2001<br>▪ 2270 m3/day in 2002<br>▪ 2170 m3/day in 2003<br>▪ 2127 m3/day in 2004<br>▪ 1866 m3/day in 2005<br>▪ 1908 m3/day in 2006<br>▪ 1966 m3/day in 2007<br><br>**2008**<br>The average hydraulic flow to the WWTP during 2008 was 2107m3/day.<br>An expansion to site facilities is planned in 2008/2009. In order to maintain current WWTP performance and identify any opportunities to reduce water use further, a site survey of water ingress to the WWTP was planned to identify potential areas for reduction in WWTP hydraulic loading such as rainwater ingress and site wide water usage.<br>**2009**<br>This project was deferred to 2009 | Projects, Env. Chemists & Chem. Ops 1&2 | 3rd Q 2009 |

## OBJECTIVE: 3. RECOVERY / REUSE / RECYCLING OF MATERIAL

Identify on-site and off-site solvent recovery / beneficial reuse opportunities. Develop new solvent recovery process steps.

RATIONALE: Through recovery/re-use initiatives waste will be reduced.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Progress Solvent Recovery investigation programme. | Extensive Plant demonstrations have been conducted over the years. The implementation of all feasible recoveries is ongoing. | PDC Manufacturing. | On-going |
| | | **2008** | | |
| | Investigate the technical feasibility of recovery and reuse of waste streams. Continue the ongoing solvent recovery programme. | Ongoing implementation of recovery initiatives. A range of 6 solvents with a total tonnage of 1507 tonnes was recovered onsite. | Chem. Ops 1 | Complete |
| | | **2008** | | |
| | | Ongoing implementation of current recoveries. Maximise beneficial reuse of materials sent off-site. | Chem. Ops 1 & PDC | 2008 ongoing |
| | | **New Initiatives** | | |
| | Demonstrate recovery of acetonitrile streams. | ▪ The recovery of 2 acetonitrile streams has been implemented by an external vendor (UK), material shipped back to plant for reuse. Circa 800 tonnes/ year. | " | 4th Q 2008 & ongoing |
| | Demonstrate recovery of THF stream from MK 518 process. | ▪ The recovery of THF distillate stream from the Raltegravir process was demonstrated in Qtr 1 2008. Estimated offsite shipment reduction of over 400 tonnes. | | 1st Q 2008 and ongoing |
| | | **2009** | | |
| | | Waste streams from new product introductions will be evaluated for recovery | " | 2009 |

## OBJECTIVE: 3. RECOVERY / REUSE / RECYCLING OF MATERIAL

Identify on-site and off-site solvent recovery / beneficial reuse opportunities. Develop new solvent recovery process steps.

RATIONALE: Through recovery/re-use initiatives waste will be reduced.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 2 | Recycling Targets.<br><br>Promote plant wide recycle initiatives. | Achievements are reported in previous AER's<br><br>There is an ongoing site wide recycle program designed to minimise disposals to landfill. The following materials are collected and recycled.<br><br>**2008**<br>During 2008 a total of 221 tonnes of the following materials were recycled. Ref Section 3.1 and Appendix 3 for full details.<br><br>Pallets, waste wood, paper, cardboard, shrink-wrap plastic, plastic drums, cardboard packaging waste, glass, scrap metal, batteries, photocopier and fax consumables. In addition, obsolete electrical equipment was sent to recycling facilities.<br><br>**2009**<br>Ongoing implementation of the existing recycling initiatives to minimise disposals to landfill. The current plant recycling programs will be implemented in the new RC tableting facility. | Environmental chemists.<br>Chem. Ops 1 & 2.<br><br>Environmental Chemists.<br>Chem. Ops 1 & 2. | On-going.<br><br>Ongoing. |

## OBJECTIVE: 4 ENERGY MANAGEMENT

RATIONALE: There is an ongoing program in place to continuously review energy and material usage and evaluate opportunities for reduction.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Reduce plant wide energy usage. | MSD set a goal of a 25% reduction in energy usage by the year 2008, based on 2004 figures.<br><br>2005 Energy usage was 9.8 % lower than 2004 Equivalent to ca. 10824 MW less.<br><br>2006 usage was reduced by a further 3.2% on 2005 level. Equivalent to ca. 4378 MW less.<br><br>**2007**<br>2007 energy usage increased by 7.5 % over 2006 usage. A number of significant factors contributed to increased energy consumption: Significant increase in Production Volumes; Reduction in length of Annual site shutdown; Increased gas usage due to commissioning of new Boiler Automation system.<br><br>**2008**<br>A Lean Six Sigma project has been developed with the objective of reducing site wide energy usage by 10% over the 2007 actual figures. This objective was not achieved due to increased production activity.<br><br>However 2008 included an extra 4 weeks production over previous years. The extra 4 weeks were accommodated while maintaining the overall site energy usage at levels comparable to 2007 | Energy Manager<br><br>"<br><br>"<br><br>Energy manager | Complete<br><br>2008 |

| | | | | |
|---|---|---|---|---|
| | Reduce plant wide energy usage. Cont. | A site energy audit was conducted by external consultants Eirdata.<br><br>A number of focused area reviews (Kaizens) were conducted to achieve sustainable energy reduction.<br><br>Projects completed/evaluated in 2008 were:<br><br>• 3 x VSD's installed on water generation and distribution network.<br>• Upgrade of Factory 01 building HVAC system.<br>• Automation of cyclic operation of process fridges.<br>• Installation of new aeration basin dissolved oxygen system.<br>• Review/evaluation of HTF fluid distribution system.<br><br>**2009**<br><br>A number of projects were identified and capital funding has been approved for completion in 2009.<br>• Factory 01 vacuum system aftercondenser water heat recovery.<br>• Modifications to Warehouse temperature control schemes.<br>• Fac 03 condensate recovery.<br>• Fac 03 HTF cold pump replacement.<br>• VSD's on HTF distribution | Energy Manager, Projects | 2009 |

## OBJECTIVE: 5. TREATMENT AND ABATEMENT SYSTEMS. CALIBRATION AND MAINTENANCE OF CONTROL AND MONITORING EQUIPMENT

RATIONALE: To improve abatement equipment control and minimise emissions to atmosphere.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Ensure a high level of availability and uptime of all abatement technologies | **2008 & ongoing**<br>THERMAL OXIDISERS Nos. 1&2. (A2-1)<br>Only dilute VOC streams are now routed to the TOU header. This enables the use of only one Thermal Oxidiser unit. The second unit is maintained on hot standby. Uptime on the Thermal Oxidiser system during 2008 was 99.77%. The unit was offline for a total of 12 hours during 362 days of planned operation.<br><br>2006 – 99.94% online.<br>2007 – 99.78% online.<br>2008 – 99.77% online.<br><br>TO No. 3 (FUME INCINERATOR).(A2-2)<br>Fume Incinerator uptime during the 349 days of scheduled operation in 2008 was 98.6%. During downtime off-gas was either redirected to carbon abatement or to the Thermal Oxidisers.<br><br>2006 – 99.1% online.<br>2007 – 99.1% online.<br>2008 - 98.6 % on line.<br><br>**2009**<br>Metrics will be tracked to ensure continued high | Chem. Ops 1<br><br>Chem. Ops 1<br><br>Env. Chemists | 2009<br>Ongoing<br><br>2009<br>Ongoing<br><br>2009 ongoing |

| | | | | |
|---|---|---|---|---|
| | | level of operational uptime. | | |

## OBJECTIVE: 5. TREATMENT AND ABATEMENT SYSTEMS. CALIBRATION AND MAINTENANCE OF CONTROL AND MONITORING EQUIPMENT

RATIONALE: Through maintenance and calibration of all abatement, control and monitoring equipment it is ensured that emissions are minimised and system up-time is maximised.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 2 | Maintain maximum up time for exhaust stack CEM systems and upgrade the data collection and evaluation software. | Historical data are reported in previous AER's<br>The TOU TOC analyser are ranged to show better visibility of low levels (<50 mg/m3).<br>The CEM maintenance is administrated via a service contract.<br><br>**2008**<br>CEM system uptime was tracked.<br>A2-1 - Thermal Oxidiser Exhaust. Total of 6 hrs. downtime on the HCL analyser and 3 hours downtime on the TOC analyser, the majority of the offline period was due to routine maintenance. Uptime was > 99.9%.<br>A2-2 -Fume Incinerator. Total downtime of CEMS analysers for routine maintenance was circa 10 hours. Uptime during 2008 was ~ 99.9%.<br>**2009**<br>- Continue to monitor CEMS operation.<br>- Networking of CEM data will be evaluated in | Environmental Chemists.<br><br>Environmental Chemists<br><br>Environmental | Complete<br><br>Complete<br><br>Ongoing. |

| | | | | |
|---|---|---|---|---|
| | | 2009.<br>- A new CEM maintenance contract was developed with an alternative vendor. With the implementation of this contract its administration will be placed on the site PM system | Chemists.<br><br>" | |

## OBJECTIVE: 6. FUGITIVE EMISSION REDUCTION MEASURES

RATIONALE: To reduce the potential for nuisance or fugitive emissions

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Conduct material balances.<br>Evaluate methodologies for improving the accuracies. | Achievements are reported in previous AER's<br><br>**2005 -2008**<br>Material balance closures in period 2005 - 2008 were excellent. All losses/gains were within the accuracy of the balance methodology.<br>An external consultant URS reviewed the solvent balance methodology and determined that best practise was being implemented<br>Significant effort was put into the analysis of off-site shipments of solvents. These are mainly complex mixtures of solvents; analysis of the solvent components is accurate to a percentage point or two.<br>A review of alternative methods of quantifying off-site shipments identified that the use of a macro evaluation, where the total weight of the shipments minus the known water content is determined, would add further assurances to the contention that fugitive emissions are minimal.<br><br>Detailed information is provided in Section 3.2 of this report.<br><br>**2009**<br>It is proposed to continue the current individual component material balances. | Env. Chemists<br><br>Env. Chemists | Complete<br><br>2009 |

## OBJECTIVE: 6. FUGITIVE EMISSION REDUCTION MEASURES

RATIONALE: To reduce the potential for nuisance or fugitive emissions.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 2 | Reduce odours from acetic acid and HTF handling activities. | **ACETIC ACID**<br>**2008**<br>Localised odours have not been an issue in 2008. | Chem. Ops 1 | Complete |
| | | **HEAT TRANSFER FLUID**<br>**2008**<br>No improvement opportunities were identified.<br>Localised odours have not been an issue in 2008. | Chem. Ops 2 | Complete |
| | Minimise fugitive emissions from tank farms. | **TANK FARM EMISSIONS**<br>**2008**<br>The operation of tank farm nitrogen blankets was not problematic in 2008.<br>No improvement opportunities were identified.<br>Fugitive emissions from this area are being reviewed as part of the site wide identification and reduction programme. | Env. Chemists. | 2008 |

## OBJECTIVE: 6. FUGITIVE EMISSION REDUCTION MEASURES

RATIONALE: To reduce the potential for loss of primary containment during solvent and batch transfer activities.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 3 | Reduce the potential for loss of containment from process and solvent handling activities. | **2007**<br>In 2007 the following projects were completed. These were designed to reduce the potential for leaks during solvent and batch transfer activities.<br>• Install spring loaded valves on all permanently located filter housings.<br>• Install new locally operated valves on centrifuge drop lines that require modification.<br>• Installation of LEL detectors in solvent manifold and process manifold area.<br><br>**2008 / 2009**<br>The site will continue to identify any necessary measures to reduce the potential for leaks. | Project Eng.<br><br>Chem. Ops 1&2.<br>Env. Chemists | Complete<br><br>Ongoing. |
| 4 | Prepare a program for the identification and reduction of fugitive emissions. | URS Environmental Consultants were retained to assist in the preparation of a Fugitive Emission identification and reduction programme as per condition 6.7 of the IPPC licence<br><br>A summary of the report is included in the AER. Refer section 5.5.2 | Env. Chemists | Complete |

## OBJECTIVE: 7. PROTECTION OF SURFACE AND GROUNDWATER

RATIONALE:

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Provide appropriate containment for all lines containing materials other than water. | **2007**<br>Progress on this initiative is reported in section 5.4 of this report.<br>The tracking and project management of this program has been transferred to the plant preventative maintenance program Maximo.<br>**2008**<br>Leak testing of all scheduled pipe work was completed in 2008.<br>All necessary repairs identified in 2006/2007 were completed.<br>Minor pad grouting deficiencies identified in 2008 were repaired.<br>**2009**<br>The scheduled leak testing program will be completed. | Projects.<br><br>Projects<br><br>Projects | Complete<br><br>2008<br><br>2009 |
| 2 | Upgrade WWTP outfall TOC monitor. | **2006**<br>A new TOC monitor was installed at the effluent.<br>**2008**<br>A TOC monitor was installed on the storm water drain.<br>**2009**<br>Analyser modifications necessary to improve reliability of data have been identified and will be implemented.<br>Once reliability is assured and sufficient historical data has been gathered a report will be issued to the Agency outlining proposed TOC action limits. | Projects.<br><br>Projects<br><br>Envir. Chemists<br><br>Envir. Chemists | Complete<br><br>Complete<br><br>2nd Q 2009<br><br>4th Q 2009 |

| OBJECTIVE: 7 PROTECTION OF SURFACE AND GROUNDWATER | | | | |
|---|---|---|---|---|
| RATIONALE: | | | | |
| **NUMBER** | **TARGETS** | **PROGRAMME & RESULTS ACHIEVED** | **RESPONSIBILITY** | **TIME FRAME** |
| 3 | Groundwater Monitoring<br><br>Conduct a program of groundwater monitoring. | Historical achievements are reported in previous AER's.<br><br>The ongoing evaluation of results indicates that there is a generally decreasing solvent detection trend in the majority of the borehole locations.<br><br>**2007**<br>An incident was reported to the Agency on the 3rd April, when WWTP influent circa 200 m3 leaked from a standby Equalisation Basin to ground. Subsequent groundwater monitoring at downstream locations did not show any adverse effect on groundwater quality.<br><br>**2008**<br>A report on the 2008 groundwater monitoring and evaluation program is provided in Section 5.2 and Appendix 1 of this report. Summary report was prepared by hydrogeological consultants URS.<br><br>**2009**<br>Groundwater sampling and testing will be conducted as per licence schedule. A summary report by consultants will be prepared. | Env. Chemists | Ongoing |

## OBJECTIVE: 7 PROTECTION OF SURFACE AND GROUNDWATER

RATIONALE:

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 4 | Effluent Screening - Evaluate screening of Effluent for Active Ingredients.<br><br>Conduct technical evaluation of issues involved in conducting screening of effluent stream for the presence of active ingredients.<br><br>Develop and validate analytical methods.<br><br>Evaluate on-site waste disposal options for new products. Conduct treatability studies.<br><br>Implement agreed analytical programme. | **2005**<br>Laboratory methods for the analysis of API were developed and validated for 7 of the 8 API's present on site.<br>**2006**<br>Development work was completed to determine a method for the detection of alendronate in the effluent matrix. Effluent API analysis methods for those products whose waste is currently treated in the on-site WWTP were submitted to the Agency. All wastes from new processes, eg. Omeprazole and Raltegravir will be treated off site, pending method development and completion of treatability studies.<br>**2007**<br>API test methods were developed for newly introduced processes Omeprazole, Taranabant and Raltegravir.<br><br>**2008**<br>WWTP pilot plant treatability studies for waste streams from newly introduced processes, Omeprazole and Raltegravir were completed which concluded that the waste streams were not readily biodegradable. All wastes are treated off-site. | ADC / Env. Chemists.<br><br>Env. Chemists.<br><br>Analytical Development & Commercialisation. (ADC)<br><br>Env. Chemists | Complete<br><br>Complete<br><br>Complete<br><br>Complete |

| | | | | |
|---|---|---|---|---|
| | | Analysis of effluent for API's whose wastes are currently treated on site was completed in 2008.<br><br>However analysis for Alendronate could not be completed. This development was discussed with the Agency during a site inspection in 2008.<br><br>The Merck laboratory at which the original Alendronate method was developed is no longer in operation; therefore analysis was attempted in other laboratories within the Merck network. The method developed in 2007 in the original Merck facility was not reproducible at these alternative facilities.<br><br>Development work is ongoing to identify an alternative method for the detection of Alendronate in effluent.<br><br>**2009**<br><br>Conduct annual screening of the effluent for those products whose wastes are currently treated on site.<br><br>Continue the evaluation/development of analytical methods for the detection of Alendronate in effluent.<br><br>Develop test methodology and conduct treatability studies for new process introductions. | ADC<br><br>ADC<br><br>ADC<br><br>ADC/Env. Chemists | Ongoing<br><br>2nd Q 2009<br><br>4th Q 2009<br><br>4th Q 2009 |

## OBJECTIVE: 7. PROTECTION OF SURFACE AND GROUNDWATER

RATIONALE:

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 5 | Minimise nutrient emissions to effluent. | There is an operational strategy in place to control the total phosphorous and total nitrogen levels in the WWTP influent and effluent emissions. Nutrient nitrogen and phosphorous streams are control sewered. A WWTP analysis program is in place to track nutrient levels as per the licence schedule. In addition there is an online ammonia meter at the secondary clarifier. Residual phosphate and ammonia levels are necessary to maintain aeration system biomass. In summary, best practice control has been implemented to maintain current nutrient effluent emissions at as low a level.<br><br>**2008**<br>The effluent nutrient analysis data was recorded. Phosphorous levels are well controlled versus the licence limits of 10 mg/lt and 9 kgs / day. Likewise total nitrogen results are well within the limits of 35 mgs/lt and 67.5 kgs/ day.<br><br>**Max. (mg/l) Avg. (mg/l) Av Kgs/ Day**<br>Total P 2.3 1.1 2.5<br>Total N 9.7 5.9 13.6<br><br>**2009**<br>MSD will continue to maintain the current WWTP nutrient removal performance. | Env. Chemists | 2008 / Ongoing |

## OBJECTIVE: 8. EMPLOYEE TRAINING

RATIONALE: Through training and general awareness programs each employee will be made aware of the environmental implications and responsibilities of their job.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Identify plant wide environmental training requirements. | Achievements are reported in previous AER's. | | |
| | Provide appropriate training solutions for all MSD employees | **2007**<br>A training profile tracking report was implemented. Training records are tracked to ensure compliance with specified training requirements.<br>- All those in new re-organised roles receive appropriate environmental training<br>- The full plant population of ~350 employees attended a 1 day workshop in "Compliance"; this program had modules in quality, safety and the environmental aspects of the operation. | Training. | Complete. |
| | Present General Awareness and Environmental Issues Training to all employees and contract personnel. Develop specific environmental modules. | **2008**<br>A total of 1740 hrs of specific environmental training was delivered across all levels of employees in the plant. The training included environmental policies, procedures, process specific, environmental modules and induction. | Training / Env Chemists | Complete |
| | | - Modules of specific environmental aspects were conducted with operational areas.<br>- Abatement equipment operation.<br>- Waste management training programs and DGSA transport requirements.<br>- IPPC licence course | Training / Env Chemists | Complete |

| | | | | |
|---|---|---|---|---|
| | | - An external consultant delivered a 1 day WWTP operations course to WWTP operators and team leaders.<br><br>In addition the site extended leadership team (ca. 40 people) attended a 1 day course on Environment and Safety aspects of site operations and compliance.<br><br>**2009**<br>Ongoing training on environmental policies, procedures, process specific and induction will be conducted | | |

## OBJECTIVE: 9. EMERGENCY RESPONSE/SAFETY INITIATIVES

RATIONALE: To provide infrastructure and operating methodology to minimise the potential for environmental incidents and to have plans in place to react promptly in the event of an incident scenario.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Comply with Seveso II requirements.<br><br>Major Accident Planning Teams<br><br>Plant Emergency Response Teams | Achievements are reported in previous AERs.<br><br>-The site developed a "Major Accident Prevention" information booklet<br>- Upgraded Emergency Response capability, c<br>- The Internal Emergency Plan was reviewed and revised and updated<br><br>**2007**<br>Major Emergency Drill was completed with the Local Authority and emergency services in 4Q<br><br>**2008**<br>- Installed dry pipe with Foam Pourer to enable foam suppression of HCL Leak in the tank bund.<br>- Purchased Foam Trailer with 1000 L/min Cannon and 1000 Lt IBC of Arctic Foam.<br><br>**2009**<br>**Projects scheduled include -**<br>Upgrade the Fire Alarm system & graphics.<br>Review site deluge systems and install automatic drain valves to ensure full drain down and avoid potential for frost damage.<br>Tie-in and commission the fire protection installation for the RC Plant to existing plant.<br>Review the Internal & External Emergency Plans in relation to the changing site structure. | Safety.<br><br>Emergency Management Programme Leader<br><br>"<br><br>" | Complete<br><br>Complete<br><br>Complete<br><br>" |

## OBJECTIVE: 10. NOISE EVALUATION AND REDUCTION

RATIONALE: By yearly review of Ballydine operations ensure that timely action is taken to avoid becoming a potential source of off site complaint

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Ensure that no nuisance arises from Ballydine operations. | Historical achievements are reported in previous AER's.<br><br>**2008**<br>An investigative noise survey was completed to identify potential noise sources by external consultants PM. A number of sources were identified and attenuation measures were implemented.<br><br>Annual noise survey was conducted. The survey indicated compliance with licence requirements at noise sensitive locations. No noise related complaints were received by the plant. Refer to section 3.1.1.4 of this report for summary and Appendix 2 for full consultant noise report.<br><br>**2009**<br>The 2009 noise survey will be conducted as per Agency Guidance. | Environmental chemists<br><br>Environmental chemists | On-going.<br><br>3rd Q 2009 |

## OBJECTIVE: 11. NEW PRODUCT INTRODUCTIONS TO MSD BALLYDINE

RATIONALE: The new commercialisation strategy for the plant requires a business system to address safety & environmental issues to facilitate new product introductions to the plant.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Implement a business system to effectively address safety & environmental issues related to new product introductions and to facilitate preparation of submissions to EPA. | Historically the Ballydine site manufactured and supplied mature products for supply to existing markets. In 2006, the site was designated as a commercialisation facility; with increased new processes for clinical trials & launch campaigns.<br><br>The plant developed a new product introduction checklist which addresses all environmental and safety aspects, such as raw materials, waste stream treatment, off gas treatment, material handling and abatement technology.<br><br>**2006**<br>In 2006 the MK518 and Omeprazole processes were introduced to the site.<br><br>**2007**<br>During 2007, the MK364 process was made.<br><br>**2008**<br>A submission was made to the Agency in 2008, to allow the manufacture of a new process step, MK 974 in Q1, 2009.<br><br>**2009**<br>It is planned to introduce new process step MK 633 in Q1, 2010. Submissions will be supplied to the Agency during 2009. | Safety & Environment<br><br>Safety & Environment<br><br>Safety & Environment<br><br>" | Complete<br><br>Complete<br><br>Complete<br><br>Q3, 2009 |

## OBJECTIVE: 12. RESIDUALS MANAGEMENT & ENVIRONMENTAL LIABILITIES RISK ASSESSMENT FOR MSD BALLYDINE

RATIONALE: The IPPC licence requires a business system to address decommissioning and residual management.

| NUMBER | TARGETS | PROGRAMME & RESULTS ACHIEVED | RESPONSIBILITY | TIME FRAME |
|---|---|---|---|---|
| 1 | Conduct all necessary RMP/ELRA studies. | **2008**<br>A Residuals Management Plan (RMP) was prepared by consultant's URS and a report was submitted to the EPA as per condition 10.2 / 10.3 of the licence. | Env. Chemists | 1st Q 2008 |
| | | An Environmental Liabilities Risk Assessment (ELRA) report was submitted to the EPA as per condition 12.2 of the licence. | Env. Chemists | 2nd Q 2008 |
| | | **2009**<br>The annual review of the RMP was completed by URS | Env. Chemists | 1st Q 2009 |
| | | The next full review of the ELRA will be conducted as per the 3 year schedule in 2010. | Env Chemists | 1st Q 2010 |

# 5.0 OTHER REPORTS

## 5.1. 2008 BUND & PAD INSPECTION REPORT.

As per IPPC requirements all site bunded structures are hydraulically leak tested every 3 years.

In 2008 hydraulic testing of 18 bunded structures was completed by an external engineer.

Four locations failed hydraulic testing.

- TA 993/994 Waste Storage Tank bund.
- TA 937/938 Sulphuric Acid Tank bund.
- TA 931/932 HCL Tank bund.
- TA 934/935 Caustic Tank bund.

One location could not be tested due to operational issues. This location will be tested in 2009.

Identified defects will be repaired in 2009.

To comply with licence requirement 6.9, a program was implemented to inspect the site bunds on a weekly basis. The inspection program was included in the site preventative maintenance system Maximo.

During 2008, the site bunds and pads were visually inspected by a combination of external civil engineers and MSD personnel.

All necessary repair works were completed.

A full spreadsheet listing of all structures was developed to assist with future administration of inspections.

The formal inspections of site pads will be administered by the plant preventative maintenance programme on a 3 year cycle.

All such formal inspections will be conducted by an external civil engineering company.

**2009 Proposal**

As per condition 6.9 of the licence, a program of weekly site bund inspection will be completed.

Routine inspection of all external pads/remotely drained containment structures has been placed on the plant preventative maintenance programme.

The inspection covers both the pad and its associated drain.

Base on the risk and frequency of use of the pads they are inspected on either a monthly, six monthly or annual basis.

## 5.2 2008 - GROUNDWATER MONITORING REPORT

Bi-annual sampling of 7 groundwater monitoring boreholes, (no's 4, 8, 10, 11, 12 14 and 23), was conducted as per schedule C.6 of IPPC Licence No. P0011-03.

Event 1. 28 -29th April, 2008. Sampled by URS, Cork and analysed by Chemex. (UK).

Event 2. 15 -16th Sept- 2008. Sampled by URS, Cork and analysed by Chemex. (UK).

As agreed with the Agency, the full suite analysis program was conducted as per schedule 6.C of the licence on samples taken during the first sampling event and a reduced test program for volatile organic compound analysis was conducted during the second sampling round.

In addition to those wells specified in the IPPC licence, a number of other wells have been installed over the years to assist in the overall evaluation of groundwater flow characteristics and to better the understanding of site-wide contamination profiles. The location of all wells is indicated in the supporting documentation presented in Figure 1, of Appendix 1.

The Chemex laboratory reports for each sampling event are available for Agency inspection at the MSD Ballydine site.

Consolidated analysis results for each individual borehole, which were undertaken per the specified IPPC schedule for the sampling events completed in the period 1996 to 2008, are also available for Agency inspection at Ballydine.

As per the requirements of condition 6.12, a comprehensive hydrogeological investigation of the site was conducted by environmental consultants URS. The ground water executive summary report and bore hole contamination graphical trends are presented in Appendix 1.

## 5.3 GROUNDWATER INVESTIGATION PROGRAMME

During 2008, Merck Sharp & Dohme (MSD) continued its investigation of ground water under the site as per Licence No. P0011-03, condition 6.12. Annual interpretative reports detailing assessment of the contaminants and groundwater flow regime below the site have been prepared by the hydrogeological consultants URS each year since 1997.

The Executive Summary of the URS 2008 Groundwater Review has been included in Appendix 1. Solvent contamination trend graphs for each solvent type and location have also been included in Appendix 1, Figs 2 to 26.

As part of the program of works, the external consultants have prepared an assessment, detailing various aspects of the subsurface conditions at the site including ground water sampling, permeability testing, hydrogeological data interpretation, overburden and bedrock geology, ground water migration pathways, flow direction and flow rates. Discussion on distribution of select organic contaminants has also been included.

All of the wells are showing a generally consistent reduced level of contamination and the majority of locations report that the target solvents are less than detection limits.

### Assessment of Groundwater Quality

Key analytes which have been detected during groundwater sampling are monochlorobenzene (MCB), tetrahydrofuran (THF), tertiary butyl alcohol (TBA) and benzene.

- During 2008, the site is used circa 2300 tonnes of THF and circa 90 tonnes was in the influent discharged to the site WWTP, the groundwater sampling results indicates the excellent integrity of the sewer and containment facilities.
    - THF was only detected at B/H 22 B/R at a level of 0.07 mgs/lt and at 11 B/R at 0.04 mgs/lt.
- TBA has not been used on site for over 20 years, TBA was detected at the following borehole locations; the maximum concentrations were.
    - 2.5 mgs/lt at borehole 12 B/R
    - 0.5 mgs/lt at borehole 7
    - 1.1 mgs/lt at borehole 22 B/R.
    - 0.7 mgs/lt at borehole 23 B/R

In August 2003, the EPA issued draft Interim Guideline Values for groundwater evaluation. Both MCB and benzene have been assigned draft IGV's of 0.001 mg/L.

- In 2008, Benzene was detected above the IGV at 2 locations, boreholes 12 B/R at 0.002 mg/lt and borehole 23 bedrock at 0.034 mgs/lt. Annual results have been showing a continuous downward trend. Benzene has nor been used onsite for over 20 years.

- MCB was present in 6 of the borehole locations at concentrations above the IGV guidelines. The maximum concentrations detected were.
  - 0.06 mgs/lt at location 12 B/R
  - 0.02 mgs/lt at location 12 O/B
  - 0.03 mgs/lt at location 11B/R.
  - 0.001 mgs/lt at borehole 22 B/R
  - 0.55 mgs/lt at borehole 23 B/R
  - 0.01 mgs/lt at borehole 14 B/R

The solvents detected are considered to be residual contamination from historical releases and analysis results indicate that there is generally a decreasing contaminant trend.

In addition to the above "Site Specific Parameters" the interim guideline value for a number of "Natural Substances" were also exceeded at a number of IPC specified boreholes. The maximum values obtained during 2008 are presented below and are similar to the values obtained in prior years.

**Guideline Values for groundwater evaluation – 2008 Results**

| Parameter | Interim Guideline | Maximum Result | Location |
|---|---|---|---|
| Conductivity | 1000 uS/cm | 1740 uS/cm | BH 11 B/R |
| Ammonia | 0.15 mg/lt | 2.9 mg/lt | BH 23 BR |
| Chloride | 30 mg/lt | 214 mg/lt | BH 11 B/R |
| Manganese | 0.05 mg/lt | 1.1 mg/lt | BH 12 BR |
| Orthophosphate | 0.03 mg/lt | 0. 09 mg/lt | BH 11 O/B |
| Sodium | 150 mg/lt | 229 mg/lt | BH 11 B/R |
| Sulphate | 200 mg/lt | 210 mg/lt | BH 11 B/R |
| Alkalinity | 150 mg/lt | 344 mg/lt | BH 12 B/R |
| Nitrate | 25 mg/lt | 30 mg/lt | BH 8 BR |
| | | | |

**2008 Microbiological Monitoring**

In response to a request from the Agency, sampling to determine microbial quality was conducted on a number of boreholes down gradient of locations which had suspected leaks from the sewage system. Boreholes 15 OB/BR and 17 OB/BR were sampled in December for total bacteria, total coliforms, Escherichia and faecal coliform colony counts. Total bacteria and coliforms may be naturally present in ground water, whereas, E. coli and faecal coliforms would indicate presence of sewage losses.

The results indicated that there was no impact to groundwater from potential sewage losses.

**Assessment of Groundwater Status**

The "Guideline Value Flowchart - Fig 4.1" was utilised to evaluate the status of the Ballydine groundwater. Though interim guideline values are exceeded for the parameters listed above, the status of the groundwater is determined to be "Good". All wells indicate a consistent reduced level of solvent contamination.

Groundwater is not currently used or planned to be used on the Ballydine site. The local area is serviced by mains water supply. The plant draws water from the river Suir, which is subsequently processed to potable and deionised water standards.

Analytical data was evaluated to confirm that current groundwater contamination profile poses no unacceptable risk to potential receptors.

Evaluation of groundwater patterns confirm that flow is towards the river. The annual river quality invertebrate survey on the river bed was not conducted during 2008, as the consultants Enterprise Ireland, could not schedule the sampling program, due to persisting high river water levels. It is planned to conduct this survey during 2009. Previous surveys of river water and sediments did not indicate the presence of any pollutants or any deterioration in bottom life and species diversity. The reports indicated that the water quality both upstream and downstream remains fair / good and that MSD operations have no adverse effect on biological quality.

All sources of solvent contaminants to groundwater have been removed via the completion of the engineered containment program that was implemented in connection with the in-ground process sewer line system, the in-ground tank storage system, and the primary wastewater treatment system.

**Proposal for 2009**

Analysis results to date indicate that no unacceptable risk to potential receptors exists and that there is a continuing downward trend in contamination levels.

URS have advised that no active remediation is required.

Condition 6.12 of the licence requires that the licensee shall continue to conduct an annual hydrogeological investigation of the site:

- The yearly monitoring and evaluation program will be continued and the need for any remediation will be determined.
- The current twice yearly sampling and evaluation programme will continue during 2009. The information from additional data sets, will further the understanding of the rate of natural attenuation of the localised residual contamination at the Ballydine plant site.

Progress on the on-going initiative with respect to groundwater evaluation will be reported in the next annual update of this plan.

Refer to Appendix 1 for the URS 2008 groundwater assessment report, ground water well locations and year to year solvent concentration trend graphs.

## 5.4 UNDERGROUND SEWER PIPE TESTING AND INSPECTION

### 5.4.1 2008 Sewer Inspection / Remediation Report.

2008 AER Test Programme. Overview

In 2008 a total of 53 sections of underground sewer were hydraulically tested.

- 6 sections failed hydraulic test.
- 2 sections could not be tested.
- 2 sections were determined to be redundant.

2006/2007 AER – Remediation Works Undertaken.

All sections of sewer that failed hydraulic test in either 2006 or 2007 were remediated.

Extensive civil works were undertaken to bring all under building foul sewers above ground in the following areas:

- The employee services building male and female locker room drainage was run above ground to a new double contained external "pipe in pipe" system.
- Technical Operations/PDC foul sewers were run above ground or in new underground lines to an internal manhole, whose connection to the external contained sewer system was confirmed to pass hydraulic testing in 2006.
- Maintenance building foul sewer pipework was routed above ground to external pipework that passes hydraulic testing.

One section from the finished goods warehouse that failed hydraulic test in 2007 was remediated and passed test.

SUMMARY OF 2008 RESULTS

A total of 6 lines failed hydraulic test in 2008.

- Three sections of foul sewer failed test in the Administration Building:
    - WC foul line from disabled toilet to outside manhole.
    - External foul line connecting disabled toilet to main sewer run.
    - WC foul line from ladies toilet to external manhole.
- One section of foul sewer failed test in the raw materials Warehouse.
- One section of drain from a down pipe on the raw materials warehouse canopy failed test. This section of drain contains only rainwater and will be decommissioned.

- One section of foul sewer line connecting the contractor's compound to the waste treatment building failed test.

2 sections could not be tested due to piping configurations/modifications since last tested.

- One section of foul sewer could not be tested in the solvent Recovery building. Civil modifications are scheduled to enable this to be completed in 2009.
- A section of foul sewer in the PDC lab could not be tested. A test stopper could not be inserted due to piping configuration/deterioration. This line passed test in 2006. Modifications will be required to enable future testing.

### 5.4.2. 2009 Sewer Remediation Programme.

During 2009 all sections that failed hydraulic test in 2008 will be remediated.

A total of 6 sections failed hydraulic test in 2008. 5 of these will be remediated and one will be decommissioned.

All sections that could not be tested in 2008 will have all necessary remediations / modifications completed to allow testing to be completed in 2009.

### 5.4.3 2009 Sewer Test Programme.

In 2007 all sewer lines were remapped and designated with individual line numbers to facilitate their entry into the plant Preventative Maintenance (PM) system.

This PM system will administer the scheduling, completion and documentation of all future sewer tests.

In 2009 it is proposed to test all sewers last tested in 2006 and a portion of those tested in 2007. This will enable an even spread of testing to be scheduled going forward.

All remediated sewer sections will be retested.

Funds have been approved and work will commence in the second quarter 2009.

## SECTION 5.5 IPPC LICENCE SURVEYS.

**5.5.1.** Silt Traps & Oil Separator. (Condition 3.8)

**5.5.2.** Fugitive Emission Identification and Reduction Programme. (Condition 6.7.)

**5.5.3.** RMP/ELRA. (Conditions 10 & 12)

### 5.5.1. SILT TRAPS & OIL SEPARATOR.

Condition 3.8

- *"The licensed shall investigate the feasibility of installing silt traps and/or oil separators at the installation to ensure that storm water discharges that discharge directly to surface water outfall from the installation, pass through a silt trap and oil separator in advance, of discharge. Any separators installed shall be a Class 1 full retention separator and the silt traps and separators shall be in accordance with I.S. EN 858-2:2003 (separators system for light liquids)*
- *The licence shall also investigate storm water management at the installation, including the feasibility of installing monitoring and diversion systems such that uncontaminated storm water from bunded and contained area is not discharged to the WWTP.*
- *A report on this study shall be included in the AER to be submitted by 31st March 2008 and any recommendations arising shall be incorporated into the Schedule of Environmental Objectives and Targets with a timeframe to be agreed by the Agency. "*

**2008 AER Progress Report**

Silt Traps and Separators.

In 2007 MSD employed the services of Mott MacDonald Pettit, civil engineering consultants, to investigate the feasibility and necessity for the installation of silt/oil separators on the plant surface water system and to investigate surface water management, as per the above IPPC Licence condition.

In 2008, as part of the 2007 AER, MSD reported that the site had been fully surveyed.

The survey's objective was to identify and list both the source and quantity of rain water and to determine its routing to either the surface water system or the WWTP. In addition the provision of silt and oil separation was examined.

The survey did not identify any immediate or compelling risk of contamination of surface water from either silt or oil emissions.

It provided further insight into the flow pattern and characteristics of site surface water, identified areas where excess surface water was entering the site WWTP influent, identified oil interception facilities, while not of immediate necessity, could under certain circumstances provide a degree of protection over and above that already in place and enabled the site to progress the surface water interception facility project to the stage where it is now approved and scheduled for completion in 2009.

No further progress has been made on this initiative over that advised in 2007.

MSD will endeavour to advance this initiative in the 2009/2010 timeframe.

As reported in 2008, the next step is the completion of a detailed risk assessment and the evaluation of any necessary infrastructural or operational improvements.

All material improvements identified will be communicated to the Agency and incorporated as appropriate into the Schedule of Environmental Objectives with agreed timeframes assigned.

Surface Water Diversion

In 2008 MSD commissioned Jacobs Engineering to develop and install an automated surface water diversion facility.

Funds were approved and construction is scheduled to complete 3rd Quarter 2009.

The facility will provide pumped diversion in the event of contamination of surface water. Backup power is to be provided in the event of power outage.

Action limits for diversion will be determined in 2009 following a review of historical data. TOC data gathering has been delayed due to operability issues with the installed meter. These issues were discussed with the Agency during the February 2009 Site inspection.

### 5.5.2. **FUGITIVE EMISSION IDENTIFICATION AND REDUCTION PROGRAMME**

Condition 6.7

*"The licensee shall prepare a programme, to the satisfaction of the Agency, for the identification and reduction of fugitive emissions. This programme shall be included in the Environmental Management Programme."*

MSD employed the services of URS, environmental consultants, to complete the preparation of the required fugitive emission identification and reduction programme.

URS conclude:

### *CONCLUSIONS AND RECOMMENDATIONS*

*It is the opinion of URS, following an assessment of all information and data, that:*

- *The most significant source of potential fugitive emissions at the site is associated with the use of organic solvents.*
- *MSD have incorporated a range of techniques to reduce and/or eliminate the potential for fugitives emissions from VOC sources. In all cases, the techniques employed would be considered BAT. All measures incorporated are continually monitored and preventive maintenance carried out across the site will ensure that these measures continue to operate effectively and maintain levels of fugitive emissions at an insignificant level.*

- *Despite the range of measures in place at the facility, small quantities of fugitive emissions will still occur albeit at an insignificant level at the facility.*

- *The current quantification and estimation techniques for fugitive emissions is based around the current PER carried out annually at the facility. A review of balance closures achieved over the last 6 years indicates that balance closures are excellent with fugitive emissions within material balance accuracy levels. Typically, MSD achieves PER balance closures in the low percentage points for all solvent materials tracked*

- *As indicated in the Agency Guidance on Annual Environmental Reporting, further assessment and quantification of fugitive emissions would only be required where the unaccounted for value is considered significant. In March 2007, URS undertook a review of MSD PER reporting system. The conclusions of this assessment were the methodology used is adequate and that overall PER uncertainty is low – 1% for 2005. URS did not see the need for changes to the PER methodology at MSD.*

- *It is the opinion of URS that the current systems in place for the identification and reduction of fugitive emissions at the facility are adequate and URS have not identified any further practical measure which could be implemented at the site to further reduce fugitive losses.*

- *It is the opinion of URS that all existing measures currently in place constitute an adequate programme for the identification and reduction of fugitive emissions and meets the requirements of Condition 6.7 of the current IPPC licence.*

### 5.5.3 **RMP**. (Conditions 10 & 12.)

MSD employed the services of URS Environmental Consultants, to complete the required annual review of the RMP for the Ballydine site.

The following URS text summarises the updates made to the original RMP. URS conclude that none of the amendments/updates resulted in a material change to the overall cost of €2.74 million for decommissioning and rendering safe the site.

The amendments noted below are presented to the Agency for agreement,

*"Residual Management Plan (RMP) for the MSD, Ballydine site was updated as required in the site's IPPC license. This Memo presents summary of updates made to the original RMP.*

*The following changes were made:*

- *Updated RMP Comments and Assumptions (Section 1.3)*

  *The specific new assumptions included in this section are:*

  *"The RMP includes costs for buildings to be cleaned and decontaminated, emptied of all materials, non-fixed equipment, and furniture, however, inside walls, false ceilings, fixed process equipment, duct work, HVAC system, and wiring will remain in place. The RMP includes costs for cleaning, decontaminating and decommissioning of emissions abatement systems, (such as WWTP, thermal oxidisers etc.), and utilities (boilers, chillers, water treatment systems etc.), but it assumes that these systems will remain on the site. Potential resale value of emissions abatement systems and utility systems is not considered in this RMP."*

- *In Section 2.1 Site History, the new facility and extension to Factory 01 are mentioned:*

    - *Construction of new formulation research and development facility is scheduled for completion in 2009. The new facility is scheduled to be utilised in early 2010. The new facility is not included in the scope of 2009 RMP Update. It will be included in future revisions when the plant has become operational.*

    - *An extension to the south end of Factory 01 and the upgrade of a research and development laboratory was completed in 2008. The project will be commissioned in 2009 and included in the next revision to the RMP.*

- *Section 2.4, Environmental Incidents, has been revised to include 2008 data.*

- *Addition of Decontamination Testing of Process Equipment (Section 7.1.2)*

  *"Designed on a case by case basis, a testing protocol will be implemented to include sampling of representative areas of the cleaned plant/equipment. The acceptance criteria for the cleaning process and the subsequent classification of equipment as non-hazardous material for reuse/recycling/disposal will be determined on a case by case basis.*
  *Equipment/Plant which does not meet the required criteria will be disposed of off-site in an appropriate manner..."*

- *Revision in waste disposal costs (Section 7.1.4);*

  *Disposal of solid hazardous waste in the original RMP was costed at € 1,500 per tonne; this figure was revised to reflect the more accurate current rate of € 1,000 per tonne. Overall disposal costs have been revised accordingly.*

- *Revision in number of tanks and addition of bunds cleaning (Section 7.1.5);*

  *The number of tanks on site was decreased by two, and the cleaning of 40 bunds costing €500 per bund was included. Overall cleaning costs have been revised accordingly.*

- *Soil and Groundwater Quality update (Section 7.2.1),*

  *"The groundwater-monitoring programme has highlighted a continued reduction in key compound concentrations in the vast majority of wells on site during 2008."*

*None of the above have resulted in a material change to the overall cost of €2.74 million for decommissioning and rendering safe the site.*

# APPENDICES

**MERCK SHARP & DOHME Reg. No. P0011-03**
**2008 ANNUAL ENVIRONMENTAL REPORT**

**APPENDIX 1**
**2008 GROUND WATER MONITORING REPORT AND GRAPHS OF GROUNDWATER TRENDS & RESULTS**

**APPENDIX 2**
**2008 ANNUAL NOISE SURVEY**

**APPENDIX 3**
**2008 WASTE MANAGEMENT TABLES**
**Annual European Waste Catalogue (EWC) Report**
**Hazardous Waste - Offsite Recovery and Disposal Shipments**

**APPENDIX 4**
**2008 Summary EPA Environmental Data**
**Copy of data supplied to EPA (aerreturns@epa.ie)**

**APPENDIX 5**
**2008 Summary EPA Environmental Monitoring**
**(Effluent & Atmospheric Emission Monitoring)**

**APPENDIX 6**
**2008 MSD Monitoring Results**
**(Effluent & Atmospheric Emission Monitoring)**

# APPENDIX 1

## 2008 GROUND WATER MONITORING RESULTS

**Section 5.2**

**Enclosures**

**2008 Groundwater Review – Executive Summary.**
This document was prepared by URS Ireland and includes a summary of the 2008 ground water monitoring program and interpretation of hydrogeological and hydro chemical results. A site map detailing location of site groundwater wells and graphical trends for each borehole for the period 1995 to 2008 is also presented.

The Chemex analytical reports and executive summary reports for the 2 groundwater sampling events conducted in April and September 2008 are available for review at the MSD facility.

# MSD 2008 Groundwater Review

## Executive Summary Report

09 March 2009
Final

Issue No 3
49341664 / CKOT0001

| | |
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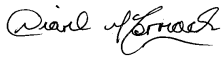
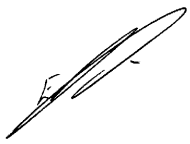
| Prepared by | Niamh McCormack |  | 09 March 2009 | Environmental Scientist |
| Checked by | Edel O'Hannelly |  | 09 March 2009 | Senior Hydrogeologist |
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# CONTENTS

# 1. INTRODUCTION & BACKGROUND

Merck, Sharp & Dohme (MSD) are required under condition 6.12 as per Schedule C6 of their IPPC licence (Licence No. P0011-03, formerly No.208, dated 05/04/98) to maintain the eleven groundwater monitoring wells listed below from which biannual groundwater sampling is required. The required list of analyses and their frequency, as agreed with the Environmental Protection Agency (EPA) in August 1999, are also outlined below.

| Monitoring Well | Biannual Analysis | Annual Analysis |
|---|---|---|
| Bedrock Wells:<br>4BR, 8BR, 10BR, 11BR, 12BR, 14BR and 23BR.<br><br>Overburden Wells:<br>10OB, 11OB, 12OB and 14OB | Volatile Organic Compounds. | Semi-volatile Organic Compounds;<br>Major Ions (including chloride, fluoride and nitrate);<br>Total Ammonia;<br>Heavy Metals. |

By agreement with the EPA in August 1999, wells 4BR and 23BR were included to replace adjacent wells 9 and 13 which were found to have minimal recharge and proved difficult to sample.

The eleven monitoring wells listed were sampled in 2008 according to the above analytical schedule. Samples were taken in April 2008 for biannual and annual analytical parameters.

The second batch of samples was taken in September 2008 for biannual analytical parameters. Samples from an additional twelve monitoring wells across the site were taken in September 2008 for volatile organic compound (VOC) analysis only.

URS performed field sampling for the April and September 2008 monitoring rounds. Chemex Environmental International Ltd., UK, preformed the analysis for both monitoring rounds. The laboratory data summary sheets are included as Appendix A.

Following an incident at the Standby Equalisation Basin in April 2007, URS conducted additional targeted groundwater monitoring rounds in 2007 (wells 7BR, 22OB and 22BR and from the Spring Relief Drain (SRD)) to assess impacts to groundwater down-gradient of the Standby Equalisation Basin and the SRD. The results of the additional targeted groundwater monitoring rounds in 2007 suggested no impact on down-gradient groundwater quality arising from the April 2007 incident and. therefore the additional targeted monitoring was not continued in 2008.

## 1.1 Groundwater Investigation Programme

During 2008 MSD continued its investigation of groundwater under the site as per Condition 6.12 of Schedule C6 of their IPPC licence (Licence No. P0011-03, formerly No.208, dated 05/04/98). The investigative phase of the evaluation is ongoing and the continued groundwater-monitoring programme has highlighted a continued reduction in key compound concentrations in the vast majority of wells on site.

Should continued monitoring and re-evaluation of groundwater status into the future highlight deterioration in groundwater quality and potential adverse affects to off-site groundwater receptors, a proposal for remediation of contaminants shall be developed, if appropriate.

### 1.1.1 Summary of Engineering Upgrades

From the late 1980's to present, several engineered containment programme projects have been successfully completed by MSD to address historical groundwater contamination, as follows:

- In-ground process sewer waste lines placed in containment ducts in 1989.
- Tertiary containment of the three in-ground solvent tank farms was completed in 1996. All subsequent new tank installations are tertiary contained.
- A new primary wastewater treatment system, comprising the equalisation basin, neutralisation basins, primary clarifiers and waste distribution systems, was brought online in 1993.

### 1.1.2 Site Geology & Hydrogeology

In parallel with the secondary containment programme, MSD initiated a survey of site groundwater quality. Boreholes were installed at strategic locations throughout the site to sample groundwater and determine groundwater flow characteristics. The locations of all monitoring wells on site are illustrated in Figure 1.

In 1997 URS Ireland Ltd. (URS) prepared an assessment, detailing various aspects of the subsurface conditions at the site including permeability testing, hydrogeological data interpretation, overburden and bedrock geology, groundwater migration pathways, flow direction and flow rates.

The main findings of the investigation were:

- The clayey overburden thickness ranges from 12 m below the BCEP area to less than 2.0 m in the vicinity of the equalisation tanks. There are three main units:
  - Topsoil and/or clayey gravel made ground.
  - Soft to firm, orange-brown, sandy clay, with occasional gravel lenses. Interpreted as alluvium, and occupying the floodplain of the River Suir.

  - Stiff, brown/grey, gravelly clay, with many cobbles and boulders. Interpreted as glacial till ('boulder clay'), and occupying the higher ground above the floodplain.

- Bedrock at the site consists of pale grey, fine grained, dolomitised limestone in which three different weathering states have been identified as follows:

  - Epikarst – consisting of dense, pale grey, angular, coarse gravel, and interpreted as being broken, weathered bedrock.

  - Competent Bedrock – pale grey, fine grained, dolomitised limestone, present across the site.

  - Fracture Zones – occur within the mass of competent bedrock and contain weathered fracture fill material of dense, yellow/brown, silty, sandy, clayey gravel.

- Very little groundwater was encountered in the clayey overburden, with only minor seepages occurring. In fact, in certain boreholes, the overburden sediments were found to be dry after well installation (i.e. wells 23OB and 21OB). The overburden is considered to act as an aquitard, allowing slow vertical migration of recharge down to the bedrock below.

- The principal groundwater-bearing units below the site are considered to be a combination of the epikarst and deeper limestone fracture zones, which are thought to be hydraulically connected and acting as one hydrogeological unit – the fractured bedrock. The fractured bedrock is considered to be the principal off-site groundwater migration pathway.

- Groundwater flow is generally southwards towards the River Suir in both the overburden and bedrock.

- Vertical groundwater flows through the overburden are generally downward under the higher ground, and generally upward under the floodplain. Horizontal groundwater flows within the overburden are not considered significant in the context of contaminant transport beneath the site.

- Vertical flow components within the fractured bedrock are expected to be downwards below the main plant buildings and upwards below the floodplain and riverbank areas.

- Estimated horizontal flow rates within the bedrock range between 2.0 m/d and 20.0 m/d across the low-lying areas of the site in the vicinity of the aeration lagoon. Estimated flow rates to the east and north of the main plant buildings are in the order of 0.2 m/d to 2.0 m/d.

- Estimated vertical flow rates within the overburden are thought to be in the range of 0.2 mm/d to 10.0 mm/d.

The results of the 2008 water level monitoring do not suggest that the 1997 interpretation of groundwater flow needs be significantly altered. In the bedrock aquifer the horizontal groundwater gradient toward the river was 0.023 in September 2008. The horizontal groundwater gradient in the overburden was 0.024 in September 2008.

It should be noted that groundwater is not currently used, or planned to be used in the future, at the Ballydine site. The local area is serviced by mains water supply. The plant draws water from the River Suir, which is subsequently processed to potable and de-ionised standards.

### 1.1.3 Groundwater Monitoring

During 1996/1997, four groundwater sampling data sets were gathered, as required by Schedule 4(ii) of the site's IPPC licence. Three data sets were collected in 1998 and two data sets each year from 1999 to 2006. Five datasets were collected in 2007 in response to the Standby Equalisation Basin event in April 2007. Two data sets were collected in 2008.

The analytical data evaluation process is on-going in connection with the hydrogeological investigation. Due to consistent analytical results over a number of years, a reduction in the requirement for non-volatile (i.e. metals and major ions) testing was agreed with the EPA in 1999.

Interpretative reports detailing assessment of the groundwater flow regime below the site have been prepared by URS annually since 1997.

These reports have focussed on the presence of four key contaminants of concern that have been identified at the MSD site:

- Monochlorobenzene (MCB);
- Tetrahydrofuran (THF);
- t-Butanol (TBA); and
- Benzene.

The objectives for 2008 monitoring were as follows:

- Collation and interpretation of organic chemical and groundwater level data from sampling rounds undertaken in 2008.

# 2. SUMMARY OF 2008 MONITORING

## 2.1 2008 VOC Monitoring

### 2.1.1 Northern Extent of Plant Installations

This area comprises wells 8BR, 17BR/OB to the north, 18BR to the northeast, and 15BR/OB and 16BR/OB to the northwest of original operational plant areas. Well 8BR was sampled in April and September 2008 according to the site's IPPC groundwater monitoring requirements. In addition, wells 15BR/OB, 16BR/OB, 17OB and 18BR were sampled in September 2008 only.

None of the four compounds of concern were detected above their respective reporting limits in the monitoring rounds during 2008.

Overall concentration trends in the northern extent of plant installations area are as follows:

- MCB was intermittently detected at trace concentrations since monitoring began in April 1996, but has been below reporting limits for the past four years. Trends are illustrated for bedrock wells in Figure 2 and for overburden wells in Figure 3. Overall, MCB concentrations reached a peak of 0.018 mg/L in well 16OB (2000) and have been generally below detection since.

- THF has never been detected above reporting limits in either the bedrock or overburden monitoring wells in the northern plant area.

- Prior to 2004, TBA had only been detected once in this area, well 15OB at 0.06 mg/L in September 1999. In September/October 2004 traces of TBA were detected in three wells (<0.15 mg/L). TBA was below detection throughout the period 2005 to 2008.

- Benzene has occasionally been detected in this area. In September 1998 benzene was detected in well 8BR at 0.001 mg/L, and in September 2000 it was detected in wells 8BR, 16OB and 17OB at 0.001 mg/L in each. Benzene has remained below detection since 2000.

### 2.1.2 South-East Property Boundary

This area comprises wells 11BR/OB on the river boundary; and wells 7BR, 19BR and 20BR on the landward boundary. Wells 11BR/OB and 7BR were sampled in April and September 2008, while wells 19BR and 20BR were sampled in September 2008 only.

Results for MCB are tabulated below, as none of the three other compounds of concern were detected in this area of the site during 2008.

| Monitoring Well | Sample Round | MCB (mg/L) |
|---|---|---|
| **7BR** | September 2008 | - |
| **11OB** | April 2008 | - |
| | September 2008 | - |
| **11BR** | April 2008 | 0.01 |
| | September 2008 | 0.027 |
| **19BR** | September 2008 | - |
| **20BR** | September 2008 | - |

- Indicates result below reporting limit, generally 0.0008 mg/L for MCB.

Overall concentration trends in the southeast property boundary area are:

- Historically the highest MCB concentrations in this area have been detected in well 11BR, declining from initial concentrations of >1.0 mg/L in 1996 to 0.027 mg/L in September 2008. MCB was below reporting limits in wells 11OB, 7BR, 19BR and 20BR during the 2008 monitoring rounds. MCB trends are illustrated in Figure 4 for bedrock monitoring wells and in Figure 5 for overburden well 11OB.

- THF has never been detected above reporting limits in wells 7BR, 19BR or 20BR. Low concentrations of THF were intermittently detected in wells 11BR and 11OB between September 2000 and April 2008. Peak THF concentrations for both wells were observed in April 2002 (11OB = 1.6 mg/L and 11BR = 0.4 mg/L). THF concentrations in well 11OB have been below reporting limits since September 2003. THF was detected in well 11BR in April 2008 (0.037 mg/L), having not been detected above reporting limits since April 2004, however THF concentrations were below reporting limits in September 2008. THF concentration trends are illustrated in Figure 6 for bedrock monitoring wells and in Figure 5 for overburden well 11OB.

- The highest TBA concentrations recorded in the bedrock and overburden wells in this area were in well 11BR (3.1 mg/L) and well 11OB (7.3 mg/L) respectively when they were initially sampled in April 1996. TBA concentrations in wells 11OB and 11BR have been below detection limits since September 2004. TBA concentrations in well 7BR reached a peak of 2.1 mg/L in October 2005 and decreased to below detection limits in September 2008. TBA concentrations have been below reporting limits in wells 19BR and 20BR since September 1997, except for one monitoring round in October 2004 where TBA was recorded in well 19BR (0.092 mg/L) and well 20BR (0.050 mg/L). TBA concentration trends are illustrated in Figure 7 for bedrock monitoring wells and in Figure 5 for overburden well 11OB.

- Benzene has never been detected in wells 7BR, 19BR and 20BR, and has been below reporting limits since September 2002 in wells 11BR and 11OB. A peak concentration of 0.029 mg/L was recorded when 11BR was sampled initially in 1996. Benzene has been detected in well 11OB twice, the highest concentration being

0.042 mg/L in 1996. Benzene concentration trends are illustrated in Figure 8 for bedrock monitoring wells and Figure 5 for overburden well 11OB.

### 2.1.3 General Site Area

This area comprises the original operational site area, solvent recovery, tank farms 1 - 4, and wastewater treatment area.

Samples were taken from wells 4BR, 10OB/BR, 12OB/BR, 14OB/BR, 22BR/OB and 23BR during the routine IPPC monitoring rounds in April and September 2008, with the spring relief also sampled. In September 2008 well 21BR was also included. Results for the four key compounds of concern in 2008 are tabulated below.

| Monitoring Well | Sample Round | MCB (mg/L) | THF (mg/L) | TBA (mg/L) | Benzene (mg/L) |
|---|---|---|---|---|---|
| **4BR** | April 2008 | - | - | - | - |
| | September 2008 | - | - | - | - |
| **10OB** | April 2008 | - | - | - | - |
| | September 2008 | - | - | - | - |
| **10BR** | April 2008 | - | - | - | - |
| | September 2008 | - | - | - | - |
| **12OB** | April 2008 | 0.004 | - | 0.51 | - |
| | September 2008 | 0.020 | - | - | - |
| **12BR** | April 2008 | 0.062 | - | 1.7 | 0.002 |
| | September 2008 | 0.21 | - | 2.5 | 0.002 |
| **14OB** | April 2008 | - | - | - | - |
| | September 2008 | - | - | - | - |
| **14BR** | April 2008 | 0.001 | - | - | - |
| | September 2008 | 0.011 | - | - | - |
| **21BR** | September 2008 | - | - | - | - |
| **22OB** | April 2008 | - | - | - | - |
| | September 2008 | 0.001 | - | - | - |
| **22BR** | April 2008 | - | 0.07 | 1.1 | - |
| | September 2008 | - | - | 0.47 | - |
| **23BR** | April 2008 | - | - | 0.41 | - |
| | September 2008 | 0.55 | - | 0.67 | 0.034 |
| **SRD** | April 2008 | - | 0.038 | - | - |
| | September 2008 | - | 0.003 | - | - |

- Indicates result below reporting limit, generally 0.0008 mg/L for benzene and MCB; 0.02 mg/L for THF and 0.25 mg/L for TBA.

Overall MCB concentration trends in the general site area are as follows:

- Prior to 1999, MCB concentrations in up-gradient bedrock monitoring wells (14BR, 21BR and 23BR) were generally below 0.1 mg/L. Between 1999 and 2003 MCB concentrations increased in all three monitoring wells (up to 0.22 mg/L in 14BR, 0.57 mg/L in 21BR and 2.1 mg/L in 23BR). Between 2003 and 2008, MCB concentrations have declined and have generally been below 0.02 mg/L in wells 14BR and 21BR and fluctuated below 0.75 mg/L in well 23BR. MCB concentration trends are illustrated in Figure 9 for up-gradient bedrock wells.

- MCB concentrations in down-gradient bedrock wells 22BR and 12BR have followed a declining, fluctuating trend since 1996. In 2008, MCB concentrations increased slightly in well 12BR (0.21 mg/L) and were below reporting limits in well 22BR. MCB concentrations in groundwater from bedrock wells 4BR and 10BR have been generally below reporting limits. MCB concentration trends are illustrated in Figure 10 for down-gradient bedrock wells.

- MCB concentrations in the down-gradient overburden wells 12OB and 22OB have been consistently higher than in the up-gradient overburden wells 10OB and 14OB. Since 2000, MCB concentrations in wells 12OB have shown a fluctuating, declining trend. MCB concentrations in groundwater from wells 10OB, 14OB and 22OB have been below 0.005 mg/L since 2005. MCB concentration trends are illustrated in Figure 11 for overburden monitoring wells.

- MCB was below detection limits in samples taken from the SRD throughout 2008.

Overall THF concentration trends in the general site area are as follows:

- THF in groundwater from bedrock wells (4BR, 10BR, 12BR, 14BR, 21BR, and 23BR) remained below detection limits in 2008. THF concentration trends are illustrated in Figure 12 for up-gradient bedrock monitoring wells and in Figure 13 for down-gradient bedrock monitoring wells.

- THF concentrations have followed a general declining trend in well 22BR since initial sampling and were below detection in 2005 and 2006. Through 2007 and 2008 THF concentrations have fluctuated between 0.20 mg/L and the detection limit.

- THF concentrations in overburden monitoring wells (10OB, 12OB, 14OB and 22OB) have been below reporting limits since 2001. THF concentration trends are illustrated in Figure 14 for overburden monitoring wells.

- THF was detected in samples taken from the SRD at 0.038 mg/L and 0.003 mg/L in April and September 2008 respectively. These results are within the THF concentration range reported for the SRD in 2007.

Overall TBA concentration trends in the general site area are as follows:

- TBA concentrations in up-gradient bedrock monitoring wells (14BR, 21BR and 23BR) have fluctuated markedly since 2000, though following an overall declining

trend. TBA concentrations in wells 14BR and 21BR were below reporting limits in 2008. TBA was detected well 23BR in April (0.041 mg/L) and September 2008 (0.67 mg/L). TBA concentration trends are illustrated in Figure 15 for up-gradient bedrock monitoring wells.

- TBA has been below reporting limits in down-gradient bedrock wells 4BR and 10BR since 1999. TBA concentrations in groundwater from well 12BR decreased between April 1996 and September 2002. Since September 2002, TBA concentrations in well 12BR have fluctuated, with concentrations of 1.7 mg/L and 2.5 mg/L detected in April and September 2008 respectively. TBA was below detection in well 22BR for the first time in September 2006, and have since fluctuated below 3.0 mg/L. TBA concentration trends are illustrated in Figure 16 for down-gradient bedrock monitoring wells.

- TBA concentrations in overburden monitoring well 12OB showed a general increasing trend after April 2004, which appeared to have stabilised in 2006/2007. In 2008, TBA concentrations decreased to below detection limits in September 2008. TBA has remained below detection in well 10OB since 1996 and in well 22OB since October 2005. TBA concentrations in well 14OB have been detected below current reporting limits (0.25 mg/L) since 1996. TBA concentration trends are illustrated in Figure 17 for overburden monitoring wells.

- TBA was below detection limits in samples taken from the SRD throughout 2008.

Overall benzene concentration trends in the general site area are as follows:

- Benzene concentrations in up-gradient bedrock wells (14BR and 21BR) have been below reporting levels since September 2002 and October 2004 respectively. Benzene concentrations in well 23BR had followed a fluctuating declining trend between 1996 and April 2008, however in September 2008 benzene concentrations increased to 0.034 mg/L. Benzene concentration trends are illustrated in Figure 18 for up-gradient bedrock monitoring wells.

- Benzene concentrations in down-gradient bedrock wells 4BR and 10BR have been below reporting limits since April 1999. Benzene concentrations in wells 12BR and 22BR have followed a general declining trend since initial sampling. Concentrations in well 12BR appear to have stabilised at 0.002 mg/L and benzene concentrations in well 22BR were below reporting limits in 2008. Benzene concentration trends are illustrated in Figure 19 for down-gradient bedrock monitoring wells.

- Benzene concentrations in overburden monitoring wells 10OB and 14OB have been below reporting limits since September 2002. In wells 12OB and 22OB benzene concentrations have remained less than 0.01 mg/L since 1998 and were below reporting limits in 2008. Benzene concentration trends are illustrated in Figure 20 for overburden monitoring wells.

- Benzene was below detection limits in samples taken from the SRD throughout 2008.

### 2.1.4 Comparison of 2008 VOC results with Draft IGVs

In August 2003 the EPA issued draft Interim Guideline Values (IGVs) for the protection of groundwater. Both MCB and benzene were assigned draft IGVs of 0.001 mg/L, no IGV has been defined for either TBA or THF. Generally, the draft IGVs are the lower of either the Drinking Water Standards or the Environmental Quality Standards for the Aquatic Environment. It is intended that concentrations in groundwater in excess of a draft IGV be used to prompt further site investigation, risk assessment and remediation, as appropriate.

The method detection limit for both MCB and benzene is 0.0008 mg/L, marginally below the draft IGV.

In 2008 the majority of benzene results were below the reporting limit.

The only detections of benzene in 2008 were between 0.002 mg/L and 0.034 mg/L in wells 12BR and 23BR, respectively. These results are above the draft IGV. Benzene concentrations in wells 12OB and 22BR have decreased to below both the draft IGV and reporting limits during 2008.

Where MCB was detected above the detection limit it was present at concentrations equal to, or above, the draft IGV.

The highest MCB concentration detected in 2008 was 0.55 mg/L in groundwater from well 23BR in September 2008.

## 2.2 2008 Microbiological Monitoring

In response to a request from the EPA additional sampling was conducted on 16 December 2008, to ensure that the foul sewer leaks awaiting remediation, had not impacted groundwater quality. Sampling was prompted by suspected leaks from the sewerage system on site. Groundwater samples were collected, following purging of between three and five well volumes, from the following wells:

- Wells 17OB/BR, immediately down gradient of affected drains.
- Wells 15OB/BR, further down-gradient of affected drains.

The specific analyses conducted were:

- Total bacteria colony counts;
- Total coliform colony counts;
- Escherichia coliform (E. coli) colony counts; and
- Faecal coliform colony counts.

A summary of results is presented in the table below.

| Monitoring Well | Sample Round | Total Bacteria (cfu/100 mL) | Total Coliforms (cfu/100 mL) | E. Coli. (cfu/100 mL) | Faecal Coliforms (cfu/100 mL) |
|---|---|---|---|---|---|
| **15OB** | December 2008 | 170,000 | 19 | <1 | <1 |
| **15BR** | December 2008 | 4,800 | 5 | 1 | 1 |
| **17OB** | December 2008 | 9,900 | 3 | <1 | <1 |
| **17BR** | December 2008 | 12,000 | 60 | <10 | <10 |

Both E. coli and faecal coliform counts were below detection limits for groundwater samples collected from 17OB/BR and 15OB. A single colony count per 100 mL of sample was detected for 15BR.

Higher detections of total bacteria and total coliform colony counts were reported for all samples. The highest detection of total coliform colonies was 60 cfu/100 mL for the sample from 17BR with the total bacteria colony count being 170,000 cfu/100 mL from 15OB.

Total bacteria and total coliform colony counts include bacteria which may be naturally present in overburden and bedrock in addition to bacteria whose presence may be related to sewage leaks. Whereas, E. coli. and faecal coliform colony counts only include bacteria related to losses from sewage. Therefore, results indicate that there has been no significant impact to groundwater quality in the bedrock aquifer down-gradient of suspected leaks from the foul sewer system.

# 3. UPDATED CONCLUSIONS ON GROUNDWATER INVESTIGATION PROGRAMME

## 3.1 Groundwater Flow

Groundwater flow is to the south-southwest and southwest in both the overburden and bedrock.

Over most of the site water level data indicate that groundwater within the overburden flows vertically downwards as recharge to the bedrock. Close to the site boundary with the River Suir (wells 22OB/BR and 15OB/BR) water level data indicate vertically upward groundwater flow from bedrock to overburden and the river.

## 3.2 Dissolved Solvent Levels and Patterns – 2008

Key analytes, which have been found to recur during this sampling, are monochlorobenzene (MCB), tertiary butyl alcohol (TBA), tetrahydrofuran (THF) and benzene. In the majority of wells across the site, contaminant concentration trends are showing clear declining trends with most results being below detection limits throughout 2008.

- MCB concentrations in wells in the northern extent of plant installations have declined since initial sampling and have generally been below reporting limits for past seven years. MCB concentrations have also declined in all wells along the southeast property boundary. A fluctuating, though declining, trend has been observed for MCB concentrations in wells in the general site area in 2008, with detections of MCB in wells 12BR/OB, 14BR, 22OB and 23BR. MCB was not detected above reporting limits in wells 12OB and 22BR in 2008.

- TBA has been below detection limits in wells in the northern extent of plant installations since 2005. TBA concentrations decreased below detection limits in all wells along the south-eastern property boundary in 2008. A declining, fluctuating trend in TBA concentrations has been observed in most wells in the general site area. Concentrations in wells 4BR, 10BR/OB and 22OB have been below detection limits for a number of years. An increase in TBA concentrations was observed in wells 22BR and 12OB in 2007, however TBA concentrations decreased in these wells in 2008.

- THF has never been detected above reporting limits in either the bedrock or overburden monitoring wells in the northern plant area. Along the south-eastern property boundary, THF has never been detected above reporting limits in wells 7BR, 19BR or 20BR and has been below detection limits in well 11OB since 2004. THF concentrations in well 11BR increased in April 2008 (0.037 mg/L) but returned to below detection limits in September 2008. In the general site area THF concentrations are generally below detection limits. In 2007 THF concentrations in well 22BR increased, but decreased again in 2008.

- In the northern and south-eastern extents of the plant, benzene concentrations have been below detection limits since 2000 and 2002, respectively. In the general site area, benzene levels in the majority of wells have been below detection limits since 2004. Benzene concentrations in groundwater from wells 12OB and 22BR/OB decreased to below reporting limits in 2008. Benzene concentrations in well 12BR appear to have stabilised at approximately 0.002 mg/L, while concentrations in well 23BR increased slightly in September 2008.

THF concentrations have shown an overall decreasing trend across the site since monitoring began, while THF usage in processing operations has increased in recent years to 2100 tonnes per annum and discharge of THF by effluent sewer to the WWTP is circa 70 tonnes per annum, suggesting good integrity of the current containment and sewer systems.

The principal low-level solvent contamination within the main groundwater pathway occurs in the area to the north of the aeration lagoon and the south of the main plant buildings (wells 12OB/BR, 21OB/BR, 22OB/BR and 23BR). Contaminant concentrations decrease in 2008 in samples from wells down gradient and across gradient of this area.

The low-level contamination detected in well installations down-gradient of the wastewater treatment plant is considered to be residual contamination from historical releases. These releases occurred in the vicinity of the old equalisation basin, the tank farm (1 to 4) and the main plant buildings (i.e. the area between wells 14OB/BR and 23BR).

The chemical properties of TBA indicate that it would not be expected to persist in the environment, as it is miscible in water and susceptible to biodegradation under aerobic and anaerobic conditions, however TBA has not been used or stored at the Ballydine site since 1992, nor have any similar solvents that could breakdown to form TBA been used onsite. Therefore, recent losses are not possible and the concentrations detected within the general site area and along the southeast property boundary in 2007 must have been due to slow migration of historical losses. TBA concentrations in these areas decreased in 2008.

## 3.3 Investigation Program Status

- There is indirect evidence to suggest that natural attenuation of solvent contaminants is occurring. There is an on-going groundwater monitoring programme to continue to assess the degree of natural attenuation at the site.

- There are no receptors of contaminated groundwater from beneath the plant to the east, the north, or the west of the plant site. The only potential receptor for contaminated groundwater is the River Suir.

- Migration of solvent contaminated groundwater occurs in a south-southwest direction from beneath the impacted area of the plant toward the river.

- A program of river water sampling in 1998 from approximately ten locations, both up-stream and down-stream of the effluent diffuser, did not detect any of the key solvent analytes.
- Two additional groundwater monitoring rounds were undertaken during 2007 following the April 2007 Standby Equalisation Basin incident. The lack of any detection of additional compounds (toluene, methanol, ethanol and acetonitrile) in any of the down-gradient wells or the SRD in the 2007 and 2008 monitoring rounds, and the decreasing trend in concentrations of THF detected in well 22BR in 2008 suggest no impact on down-gradient groundwater quality arising from the April 2007 Standby Equalisation Basin incident.
- Contaminant concentrations site-wide have declined significantly since monitoring began in 1996/97. Based on this evaluation, there does not appear to be a need for an active remediation programme at the site.
- It is recommended that groundwater monitoring should continue on a biannual basis and that the need for groundwater remediation be reviewed on an annual basis.
- Given the declining concentration trends and the low actual concentrations detected from across the site, the potential to reduce the scope of groundwater monitoring undertaken in 2009 and future years should be considered.

**LIMITATIONS**

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the services. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in using this Report.

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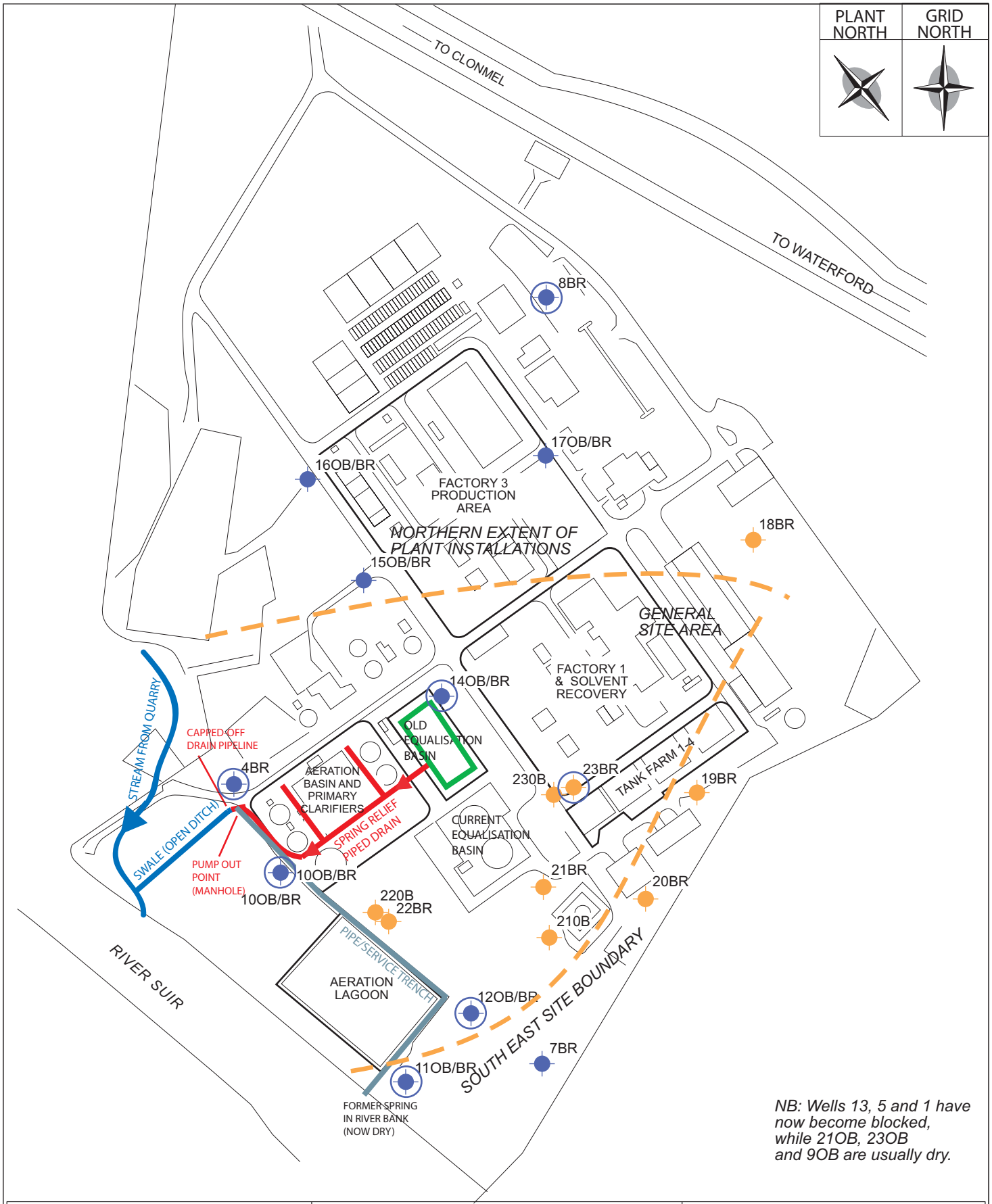
# Figures




*NB: Wells 13, 5 and 1 have now become blocked, while 21OB, 23OB and 9OB are usually dry.*

CLIENT

**MERCK SHARP AND DOHME**

PROJECT LOCATION

**BALLYDINE, CLONMEL, IRELAND**

DRAWING TITLE

**FIGURE 1 - LOCATIONS OF PERMANENT MONITORING WELLS**


ENVIRONMENTAL CONSULTANTS

URS

Iveagh Court, 6–8 Harcourt Road, Dublin2
TEL +353 1 4155100 FAX +353 1 4155101


| DRAWN | TRACED | CHECKED | APPROVED | DATE |
|---|---|---|---|---|
| SML | | NMC | EO'H/COR | 01.12.08 |

| SCALE | Job No. | REV. |
|---|---|---|
| AS SHOWN | 49341664 | A |

NOTES

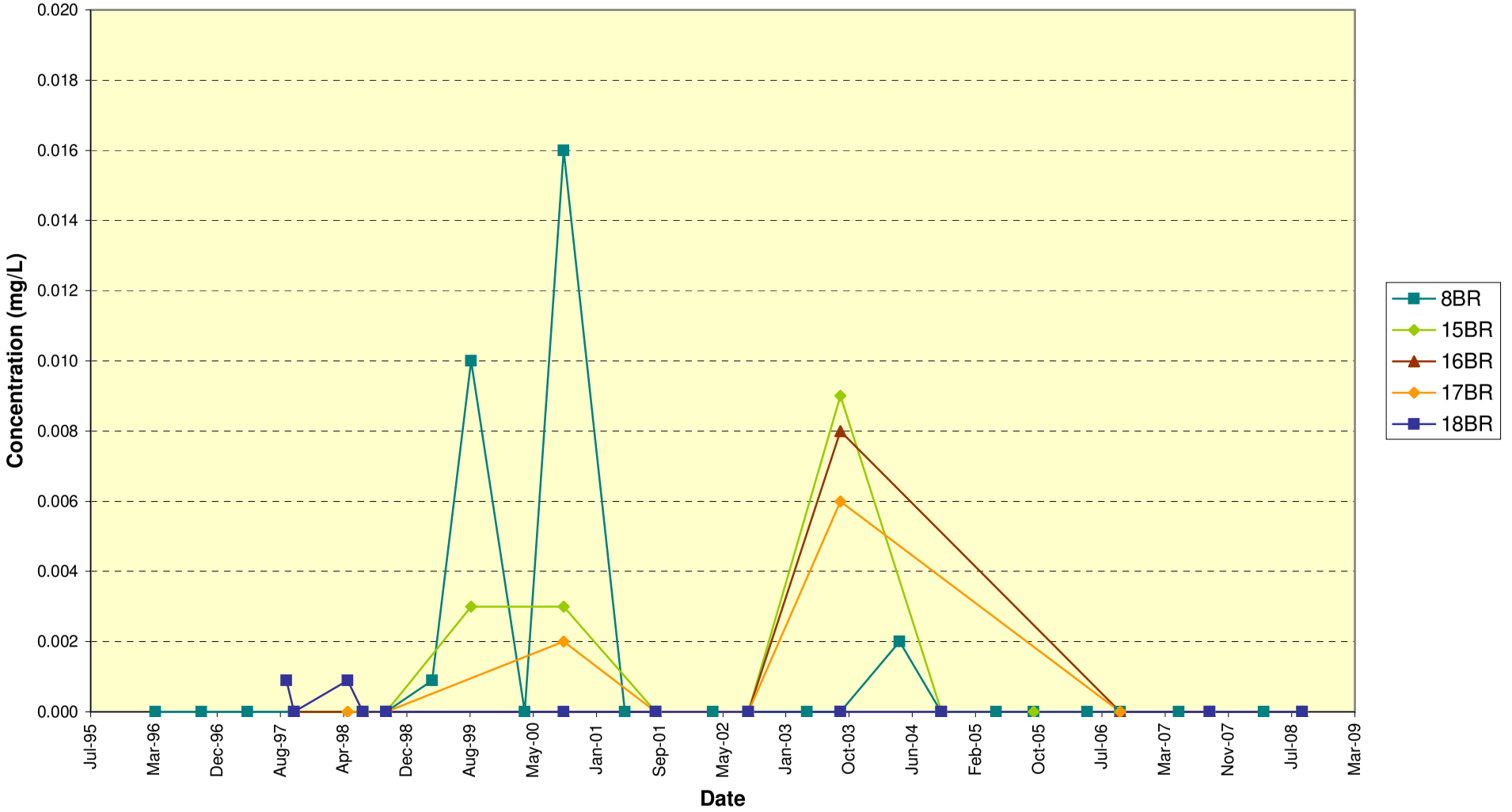
- EXISTING PIEZOMETER LOCATION
- URS PIEZOMETER LOCATION
- INDICATES WELL SAMPLED UNDER IPC LICENCE
- GRAVEL SPRING RELIEF DRAINS (SCHEMATIC)
- PIPED SPRING RELIEF DRAINS (SCHEMATIC)
- SWALE (= SURFACE WATER BODY)
- GRAVEL DRAIN AROUND AERATION BASIN
- DENOTES INTERNAL BOUNDARIES WITHIN THE SITE AS DISCUSSED IN THE TEXT

0 100m

APPROXIMATE SCALE

**Figure 2**

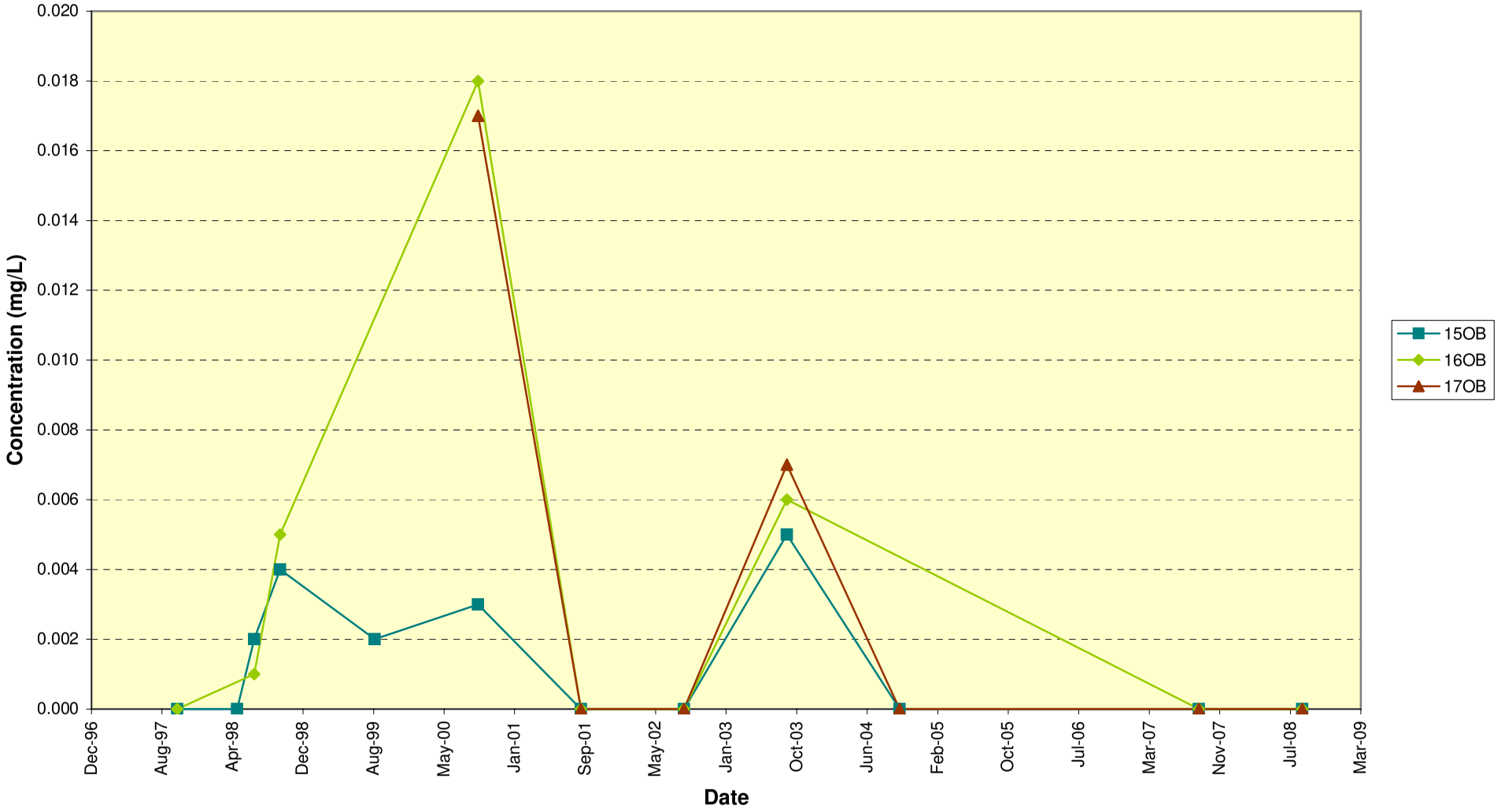
**Northern Extent of Plant Installations - MCB Trends in Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 3**

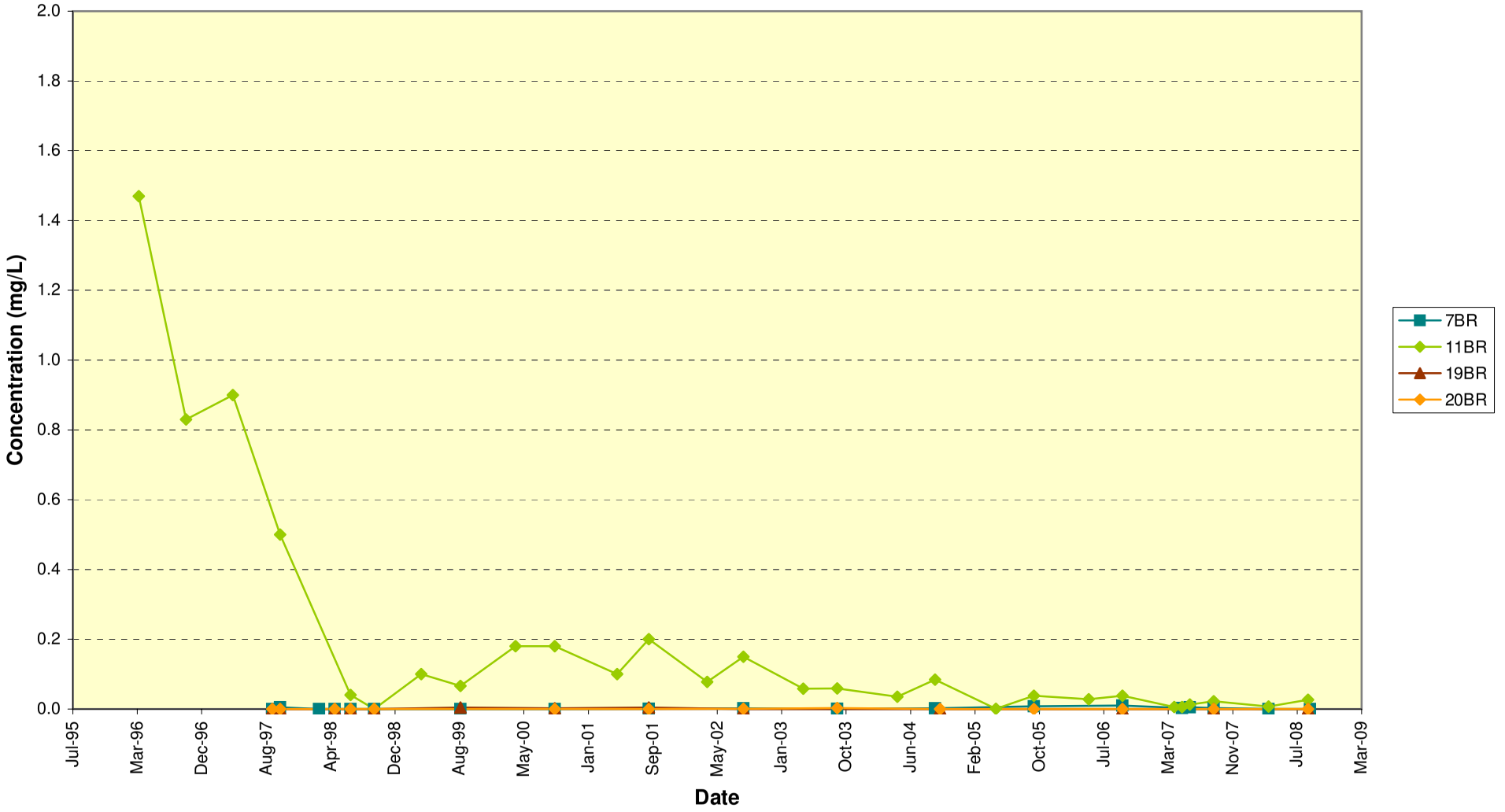
**Northern Extent of Plant Installations - MCB Trends in Overburden Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 4**

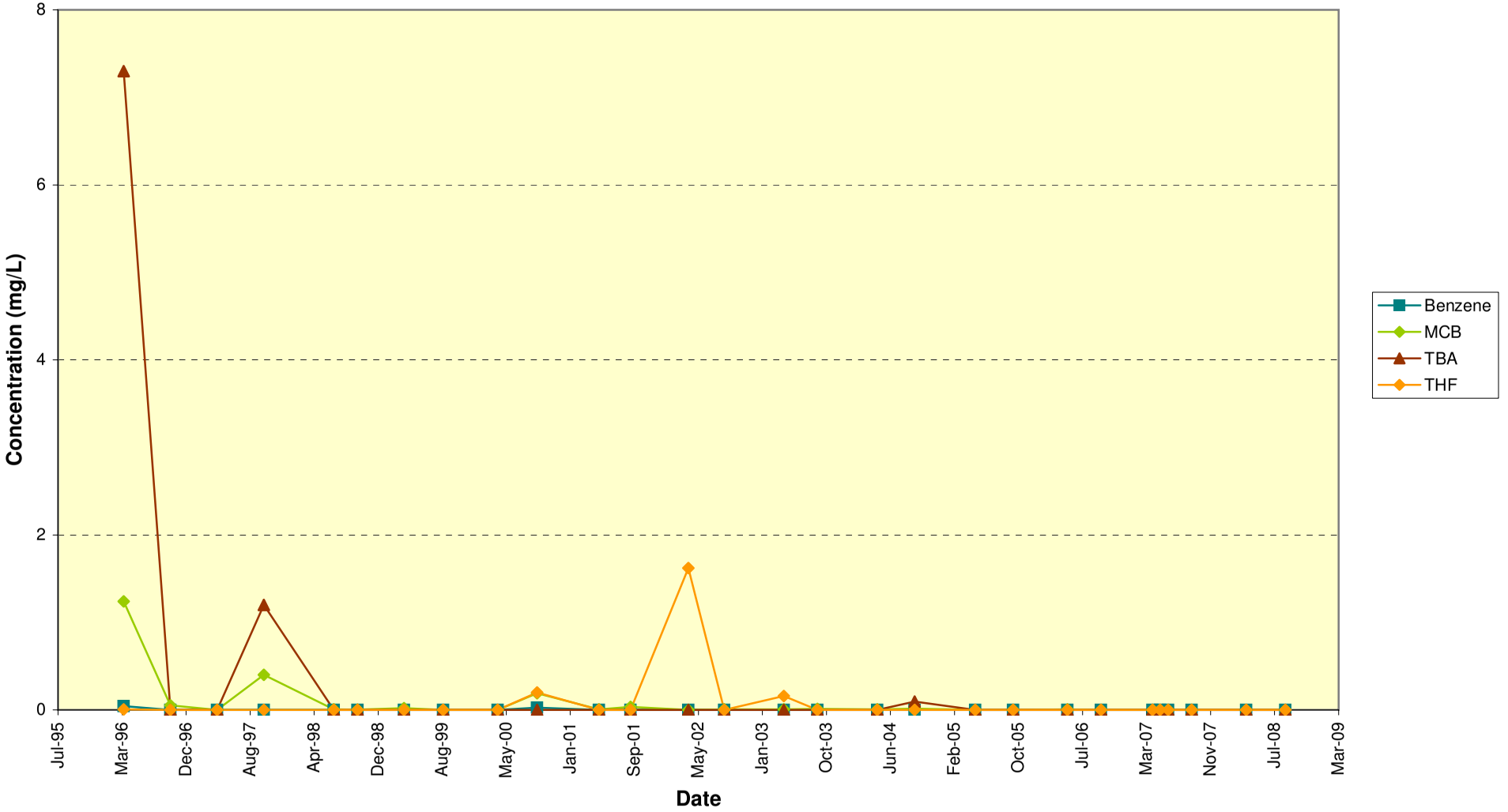
**South East Property Boundary - MCB Trends in Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

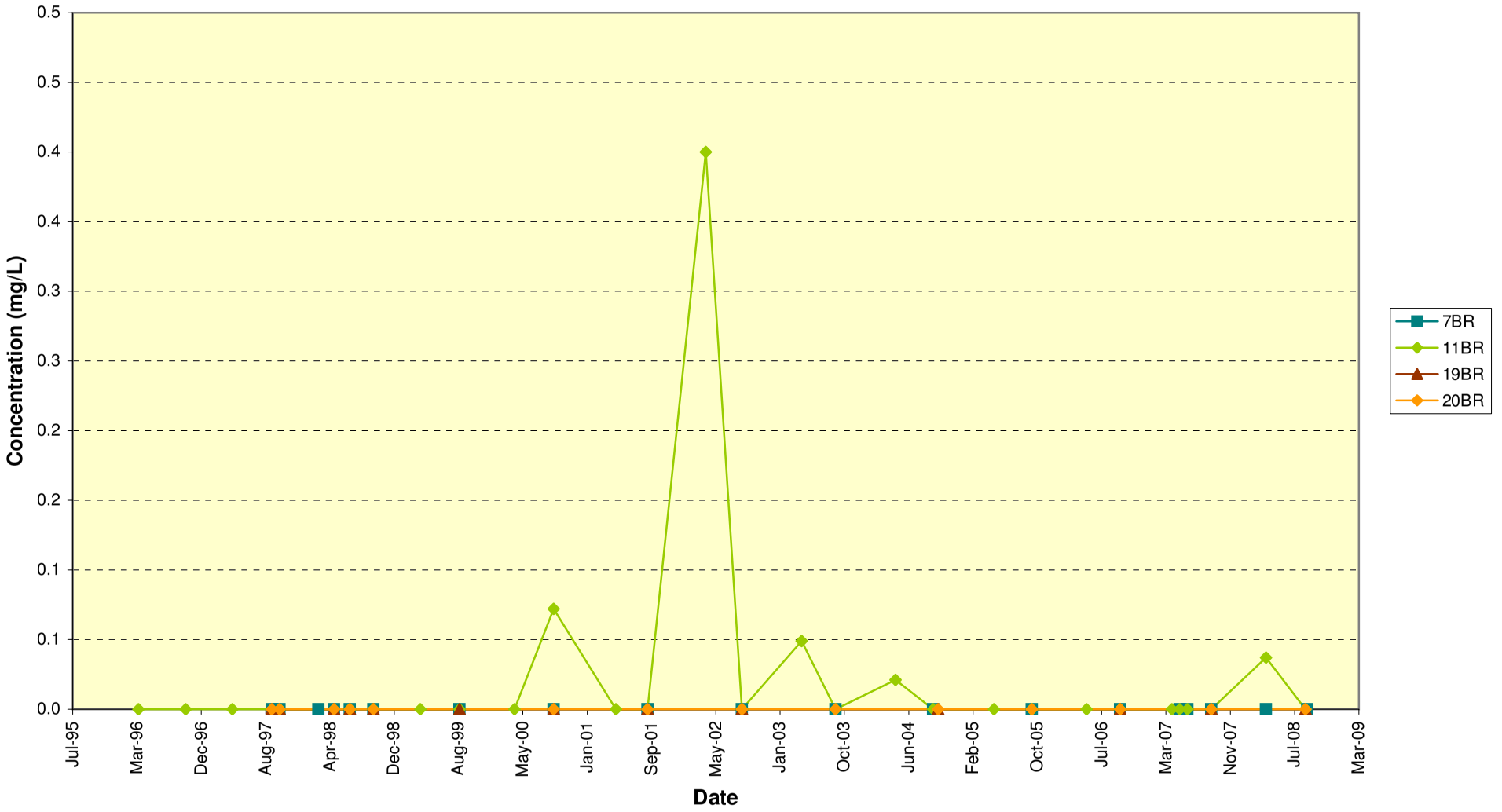
**Figure 5**

**South East Property Boundary - Trends in Overburden Well 11OB**



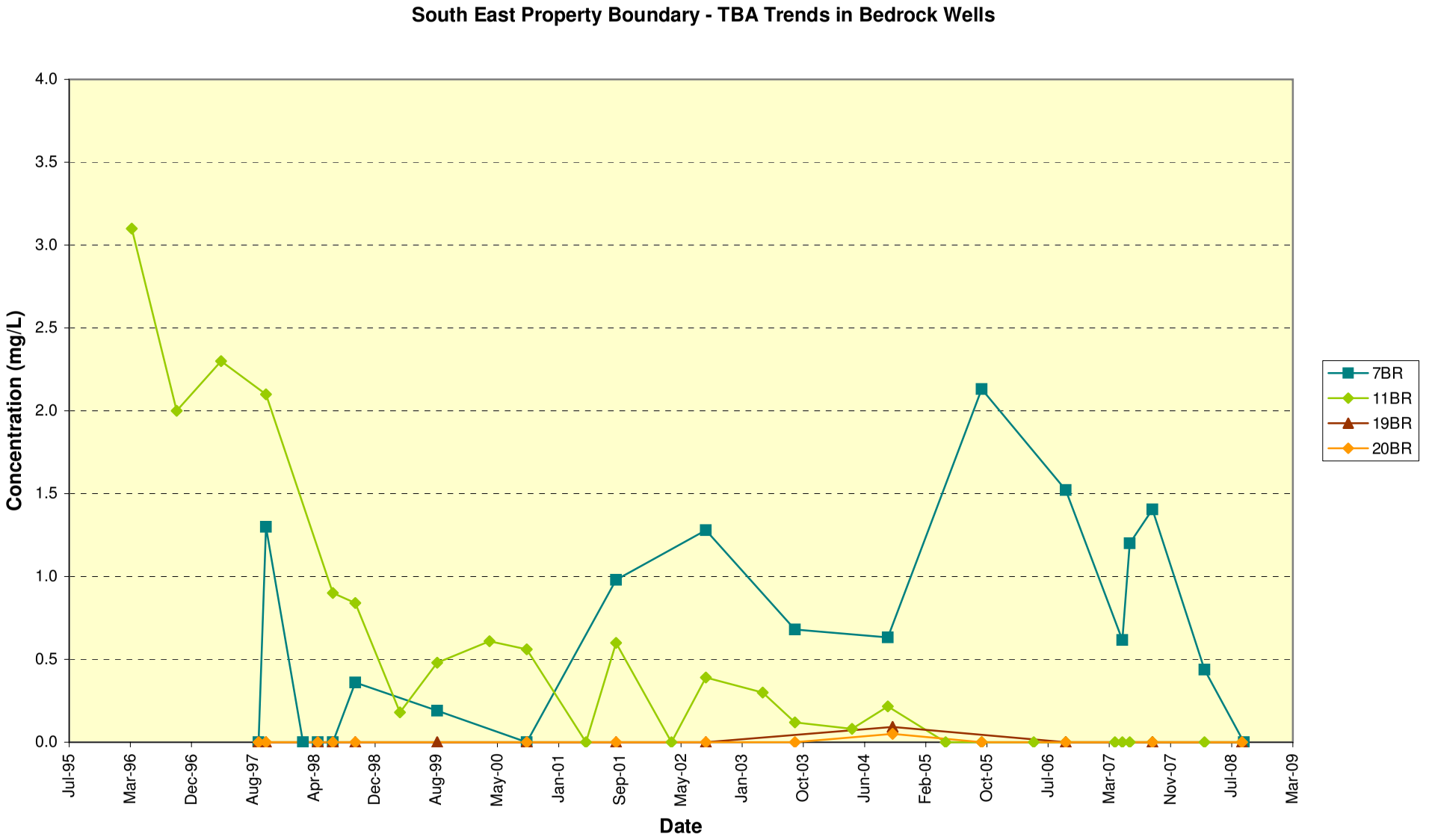

Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 6**




Concentrations below reporting limits have been illustrated as 0 mg/L.

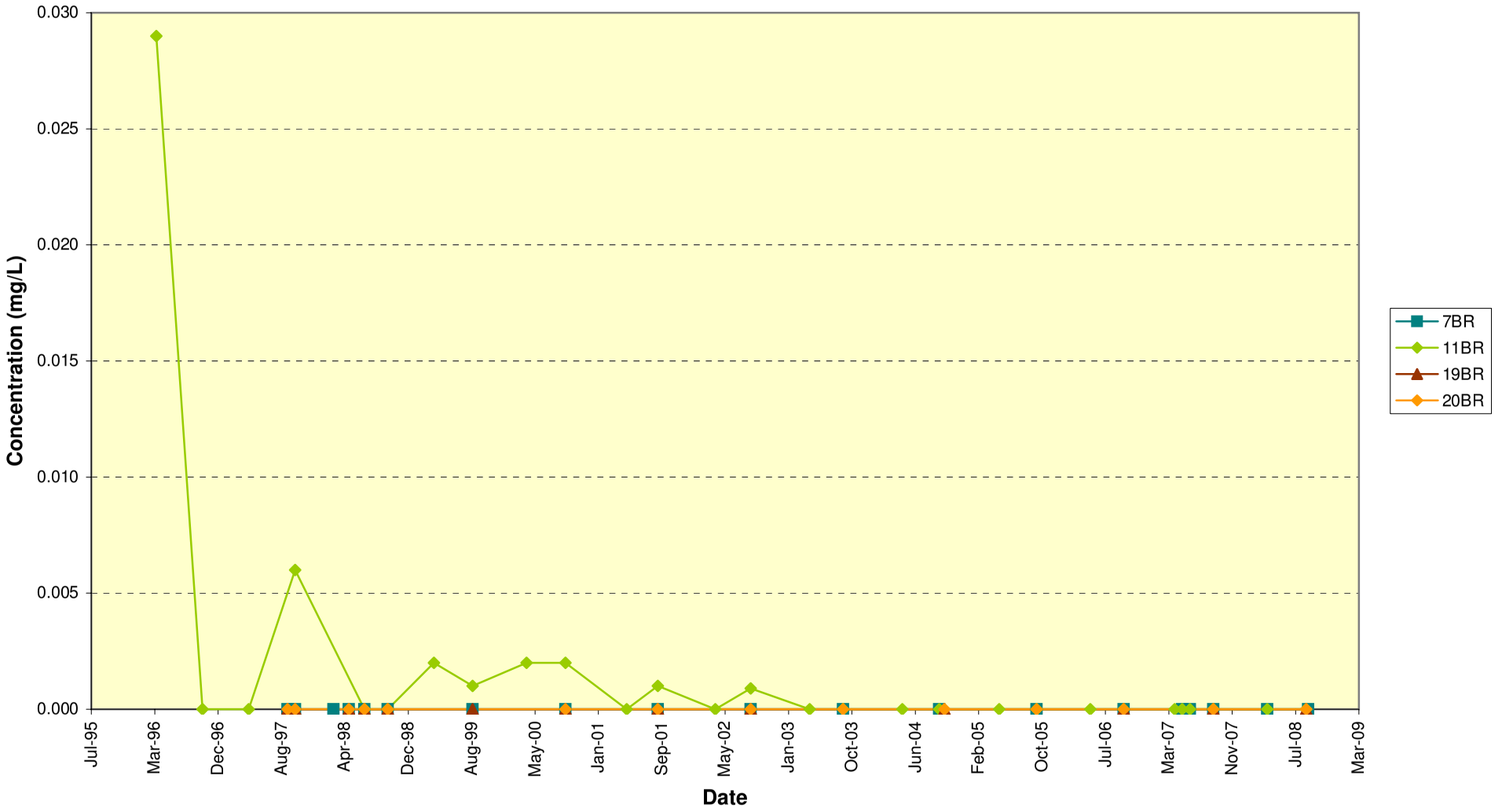
**Figure 7**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 8**

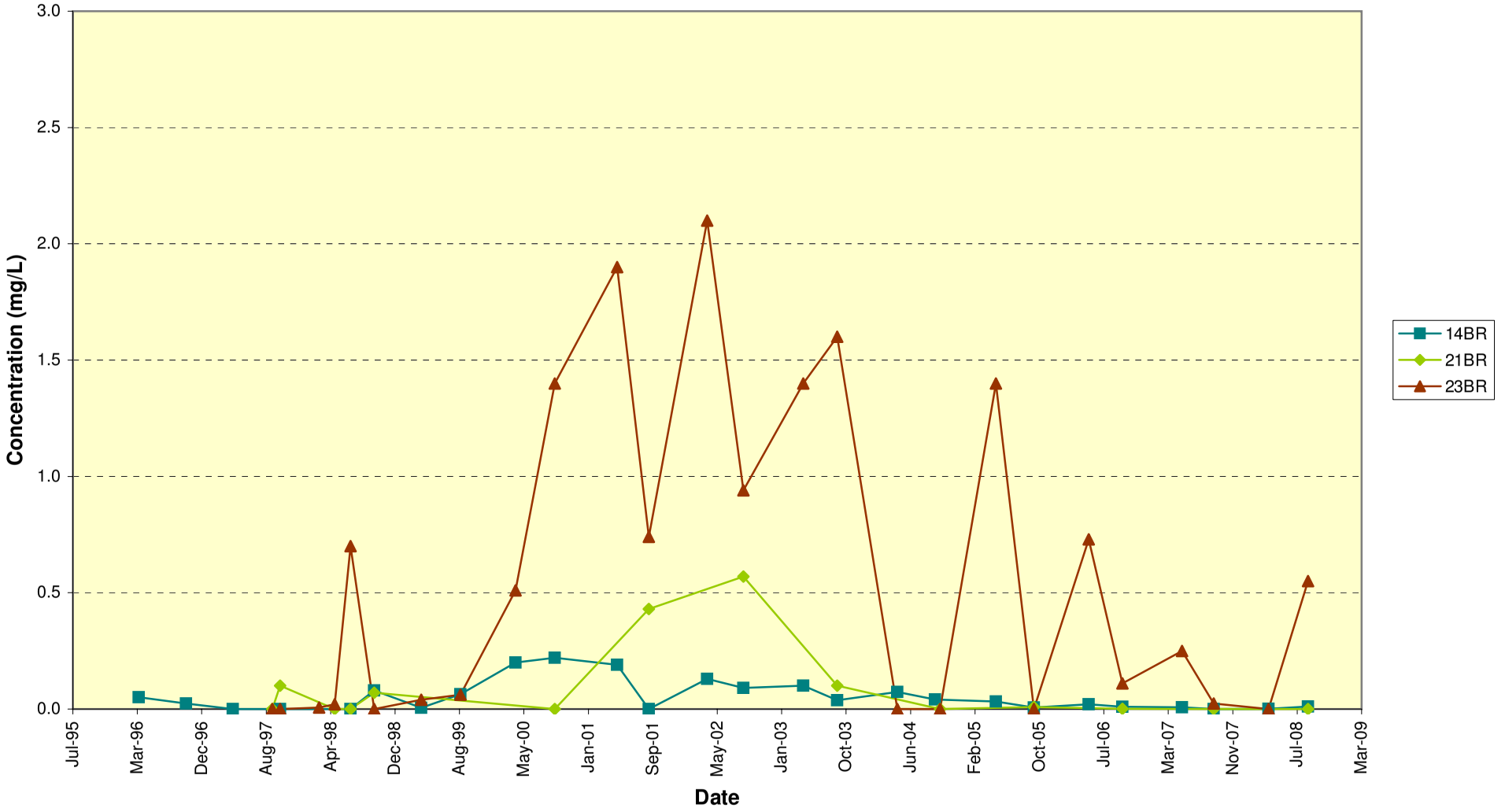
**South East Property Boundary - Benzene Trends in Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 9**

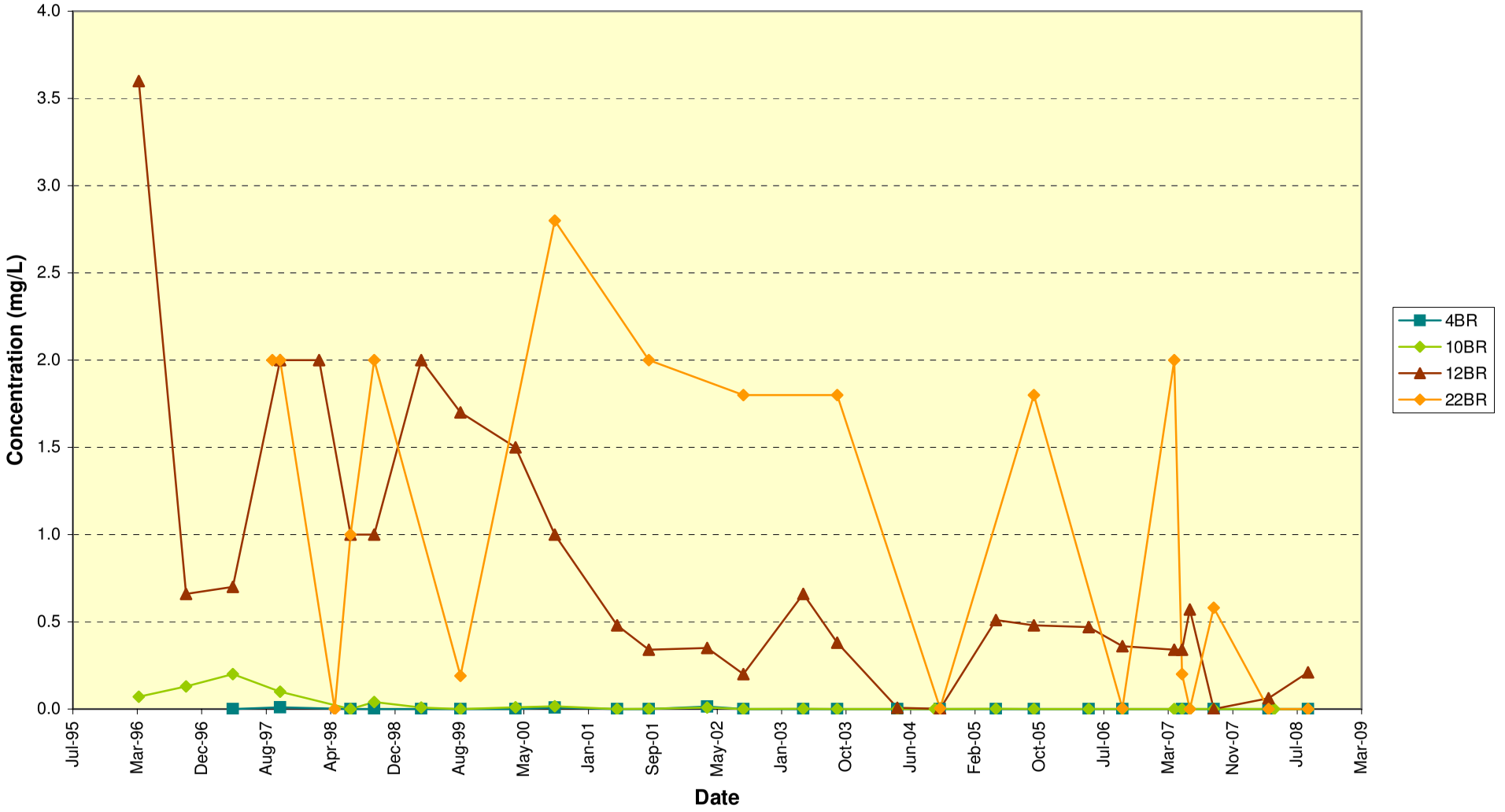
**General Plant Area - MCB Trends in Up-gradient Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 10**

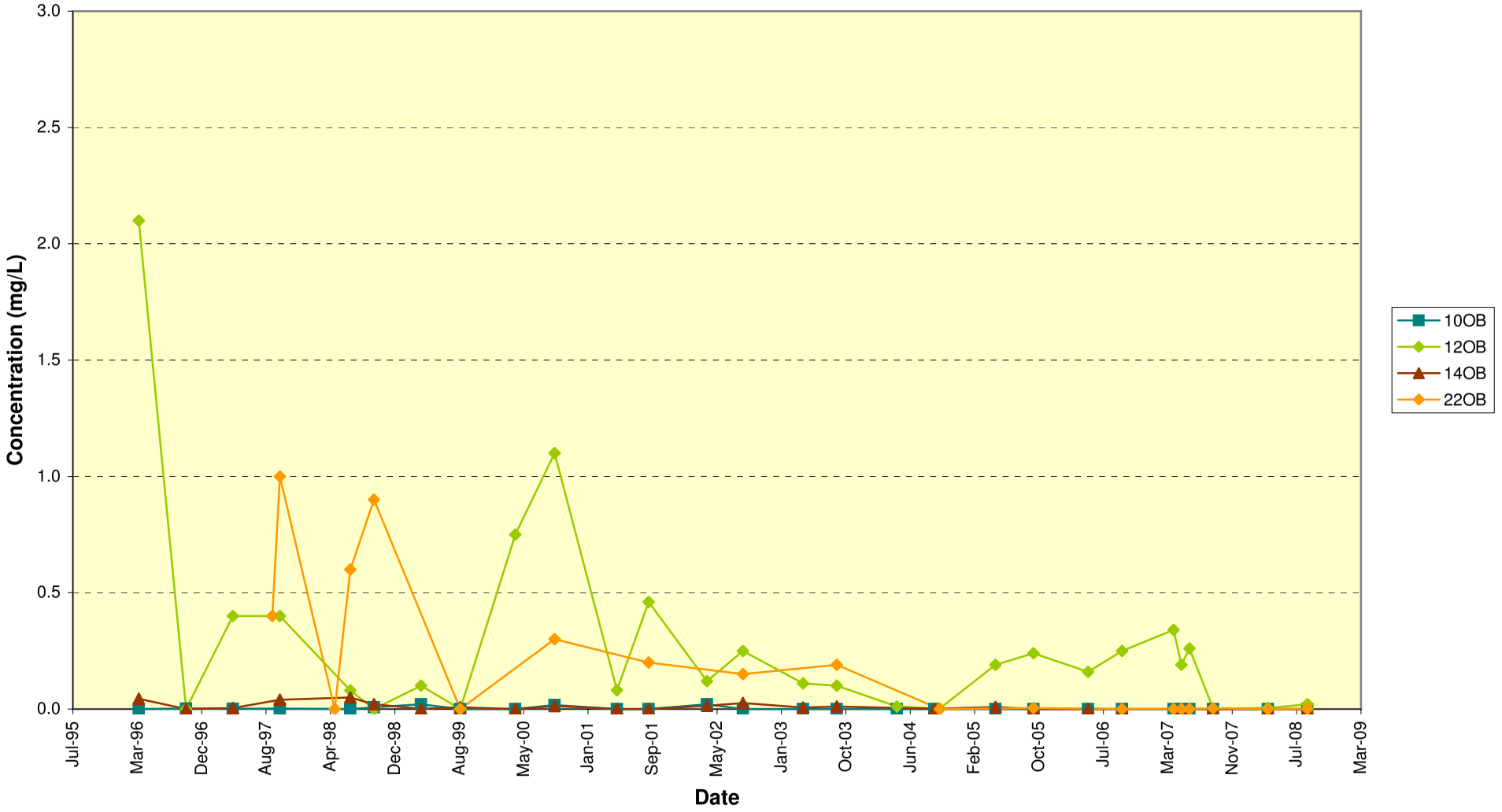
**General Plant Area - MCB Trends in Down-gradient Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 11**

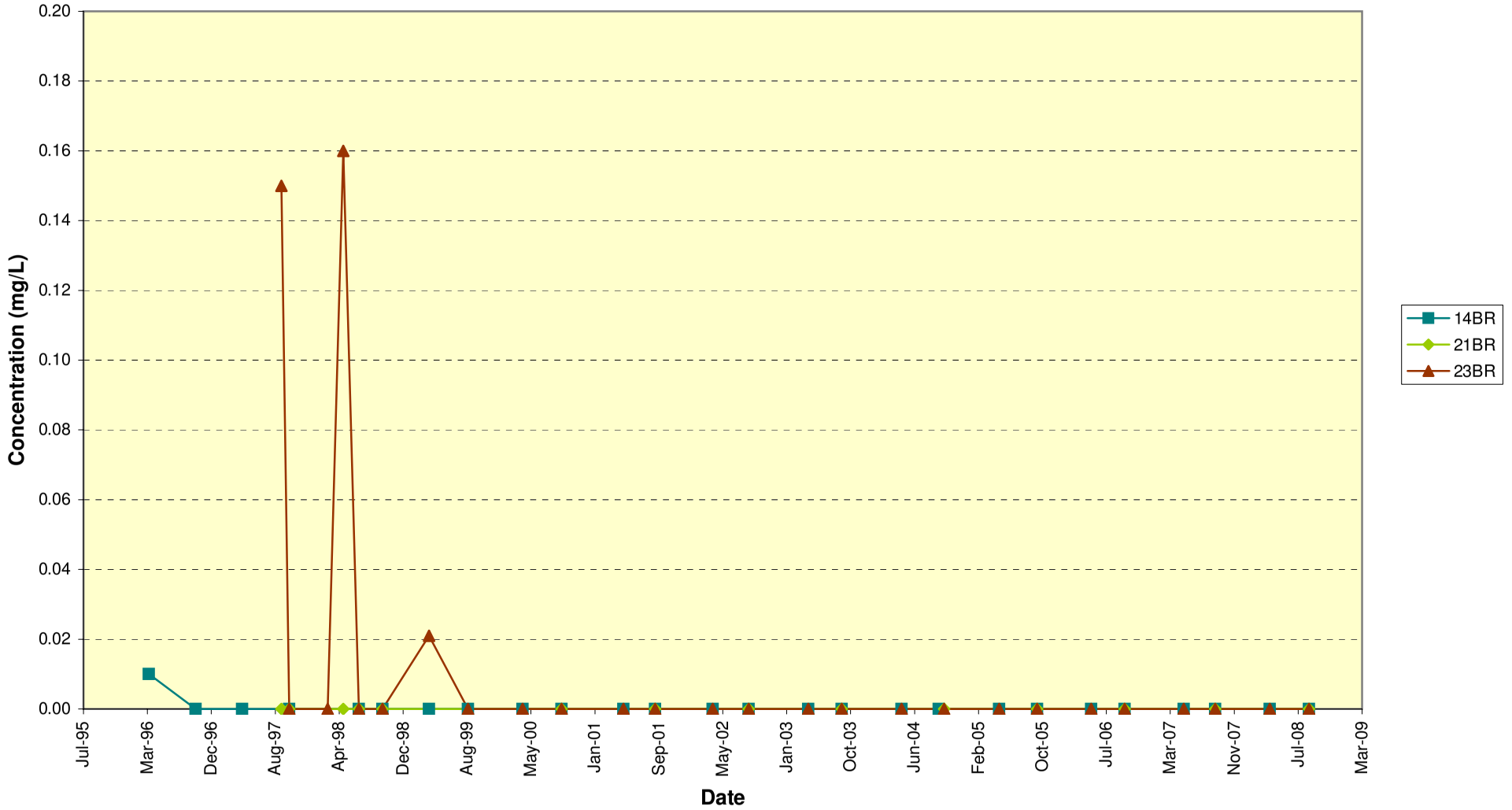
**General Plant Area - MCB Trends in Overburden Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 12**

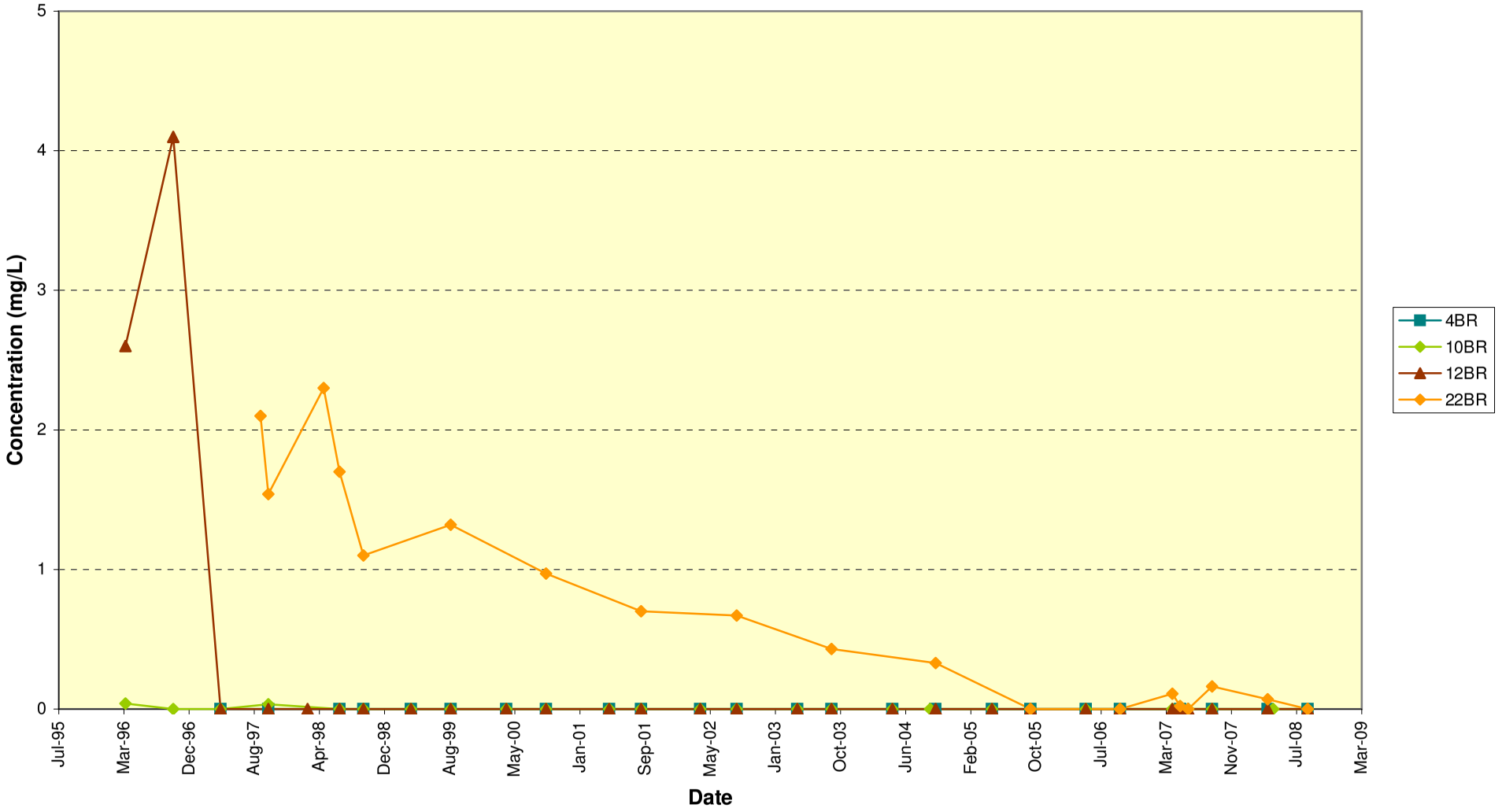
**General Plant Area - THF Trends in Up-gradient Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 13**

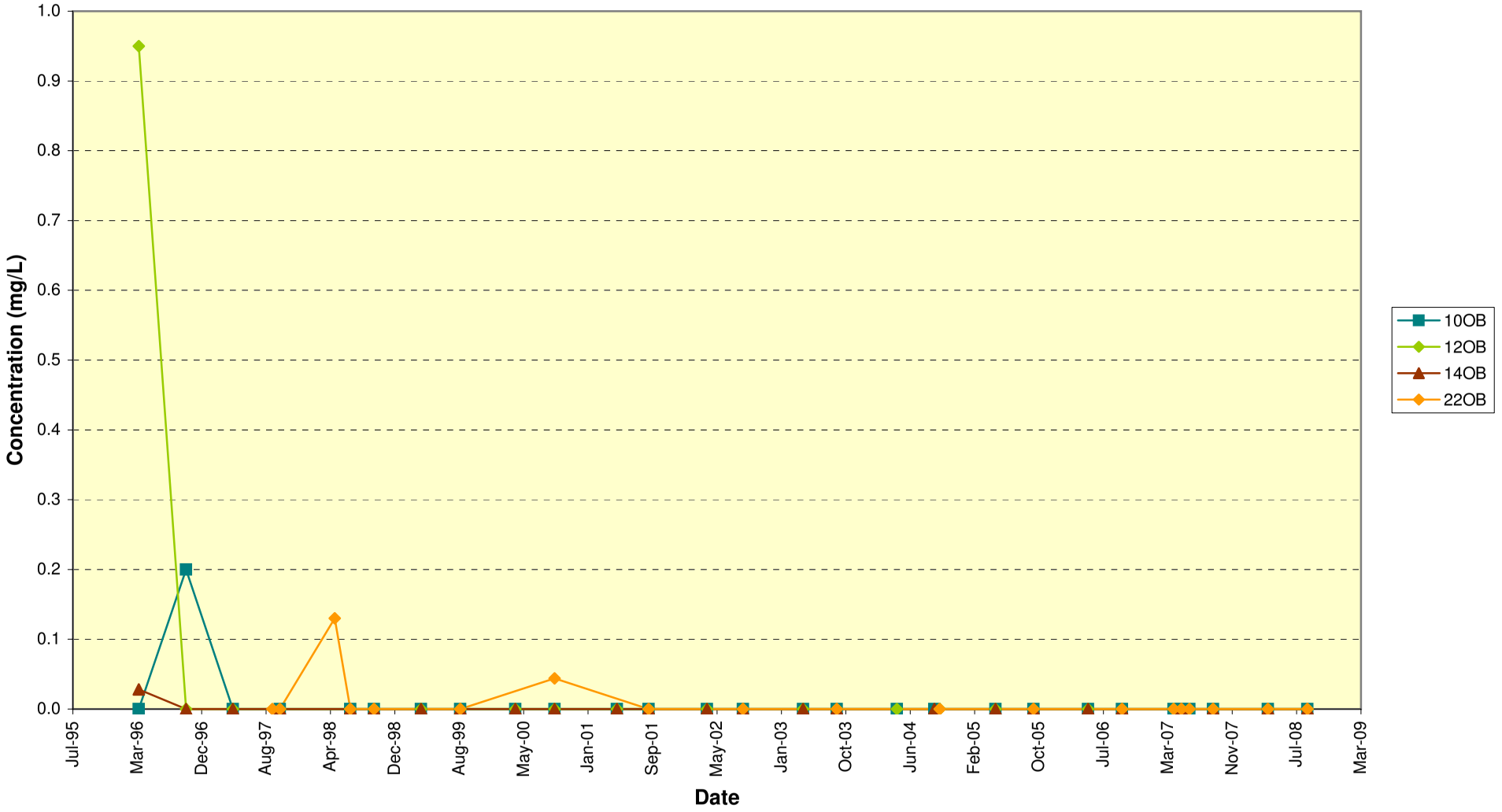
**General Plant Area - THF Trends in Down-gradient Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 14**

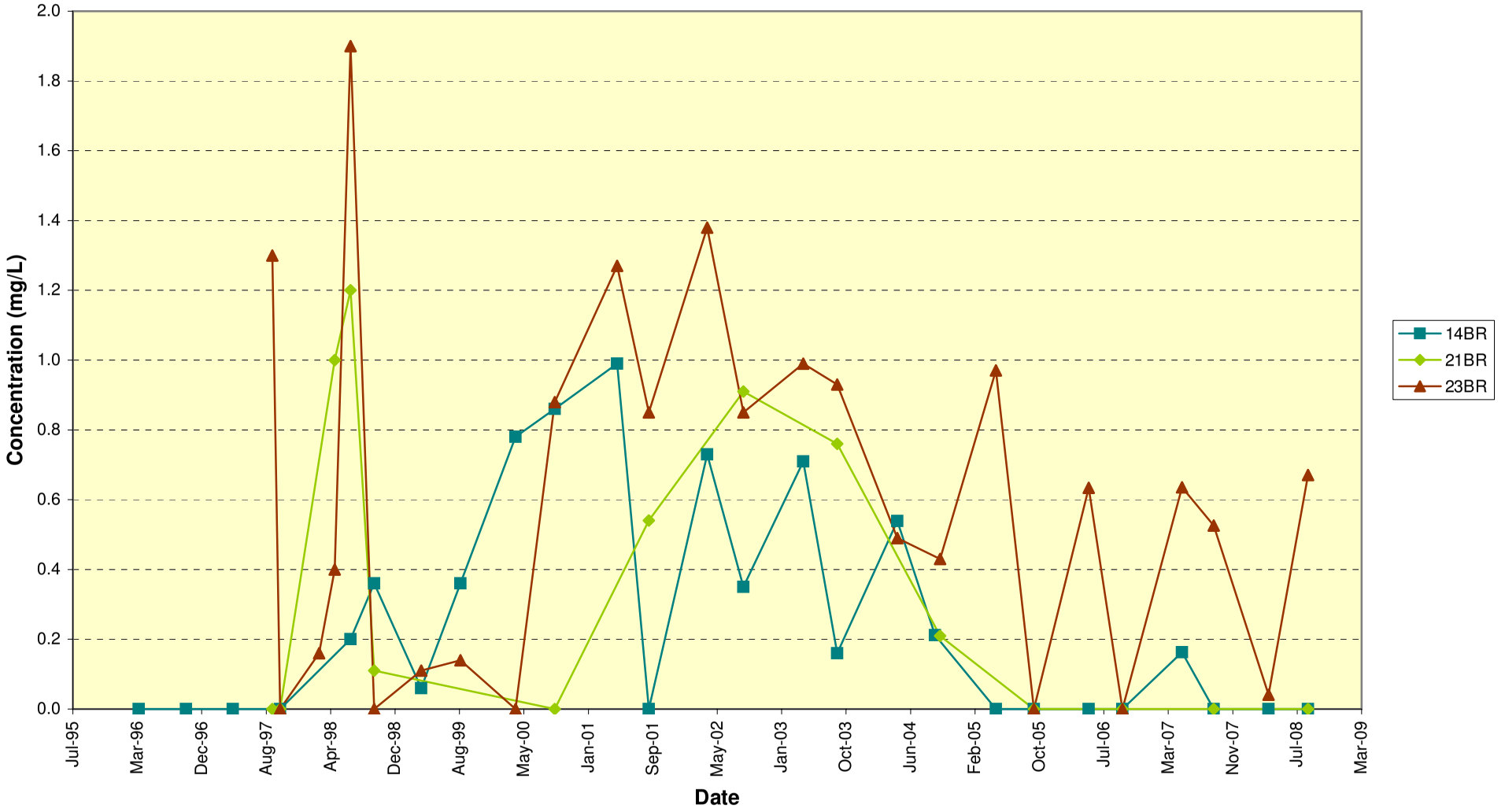
**General Plant Area - THF Trends in Overburden Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 15**

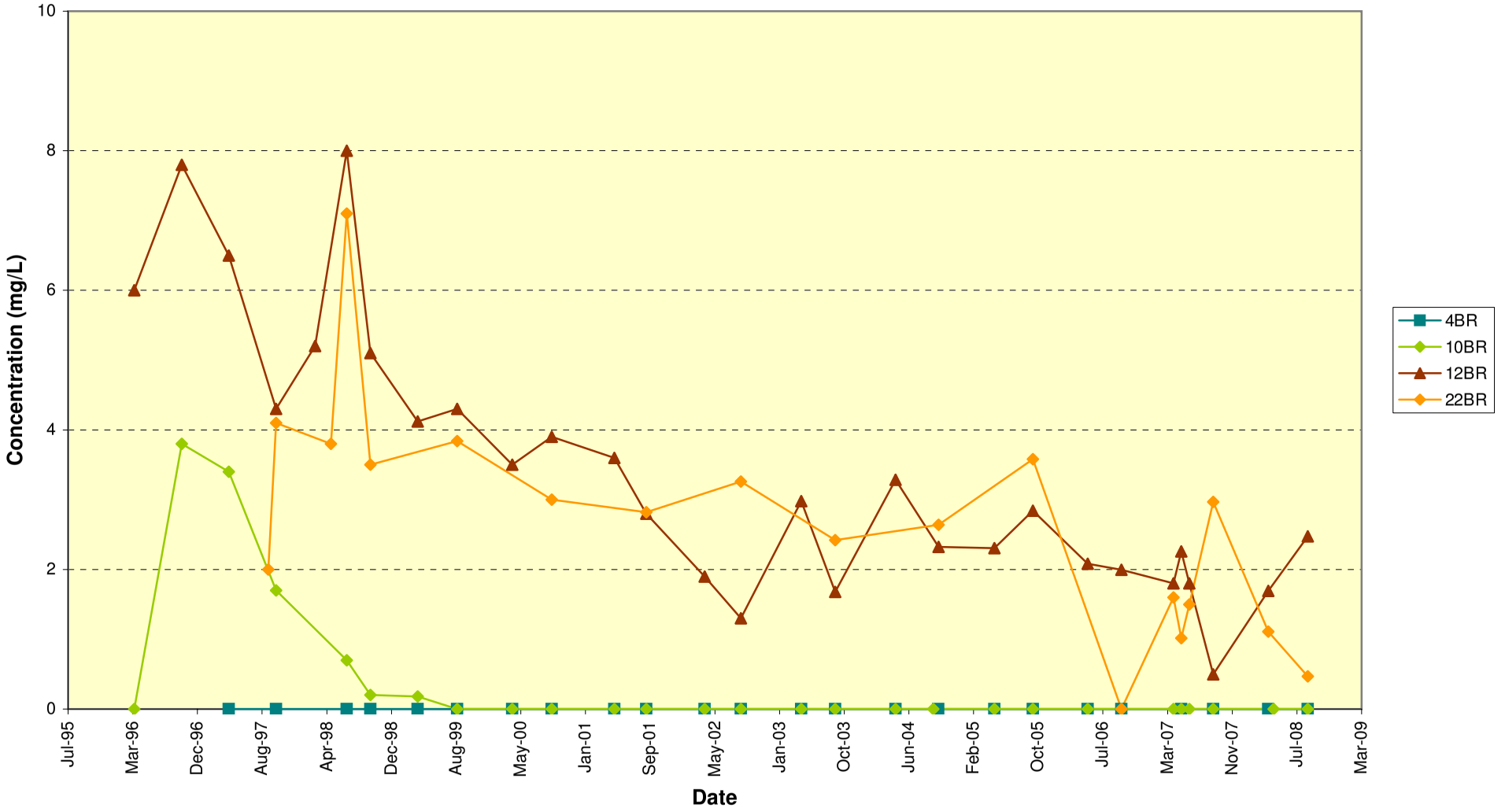
**General Plant Area - TBA Trends in Up-gradient Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 16**

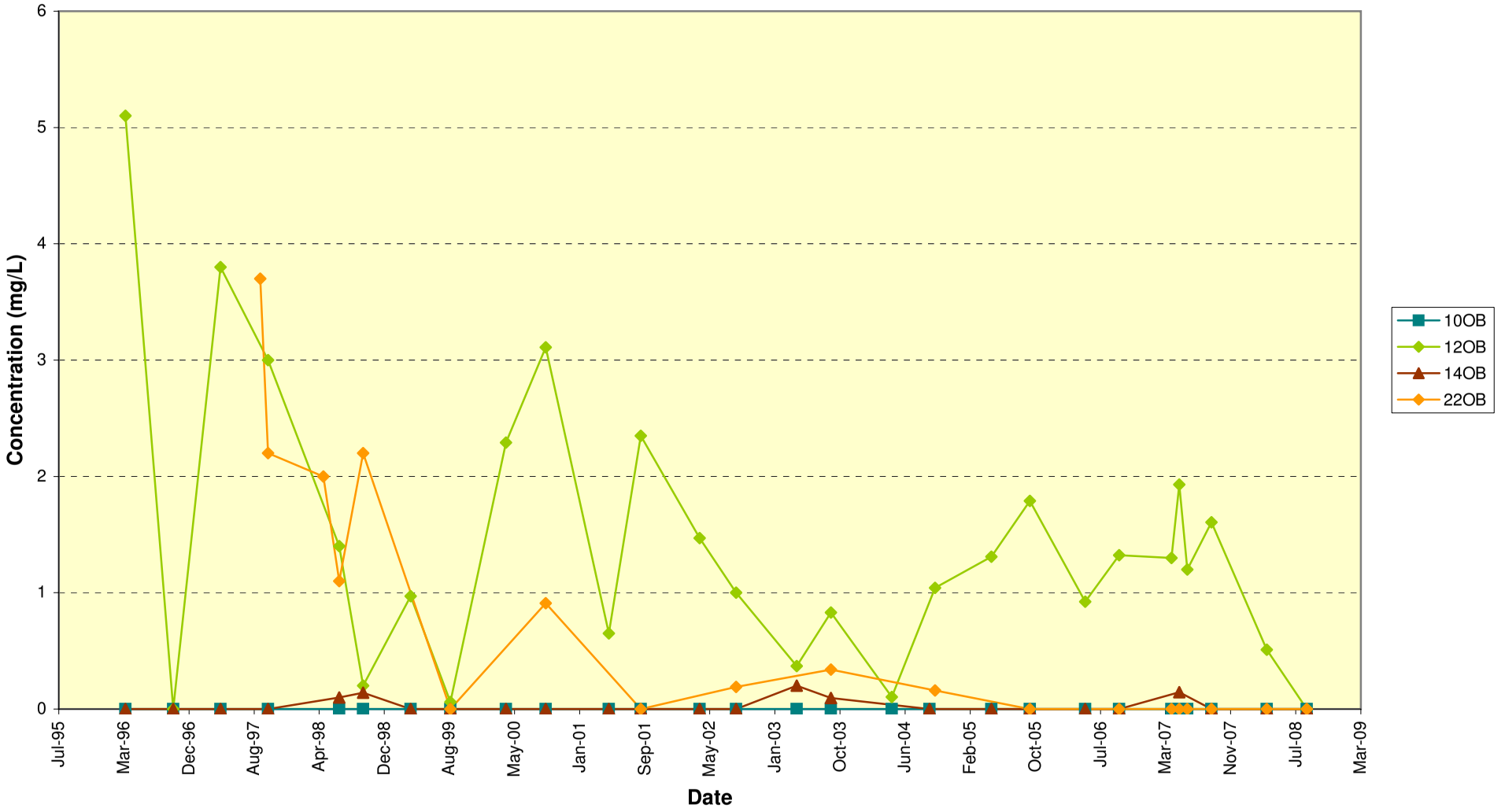
**General Plant Area - TBA Trends in Down-gradient Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 17**

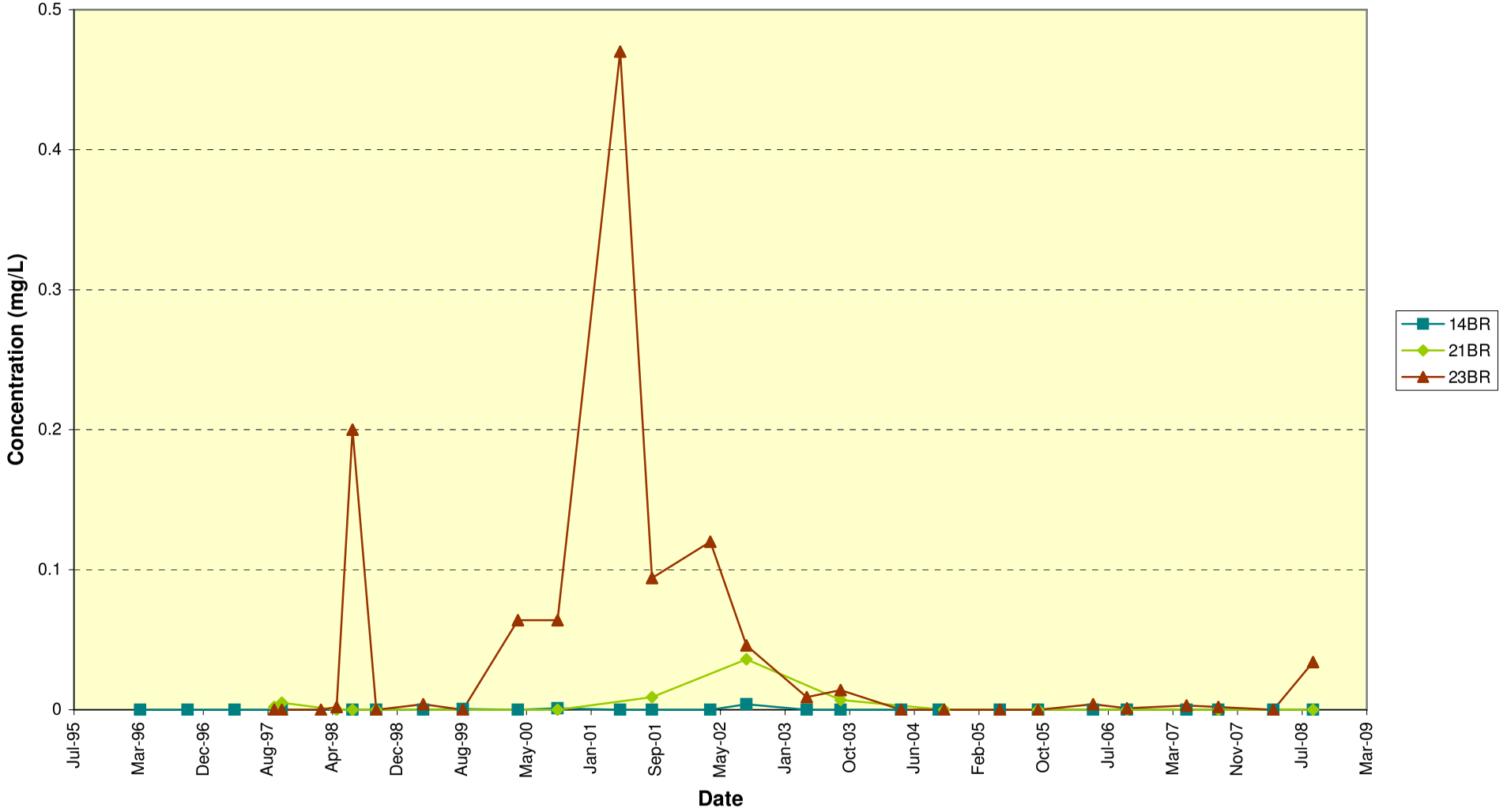
**General Plant Area - TBA Trends in Overburden Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 18**

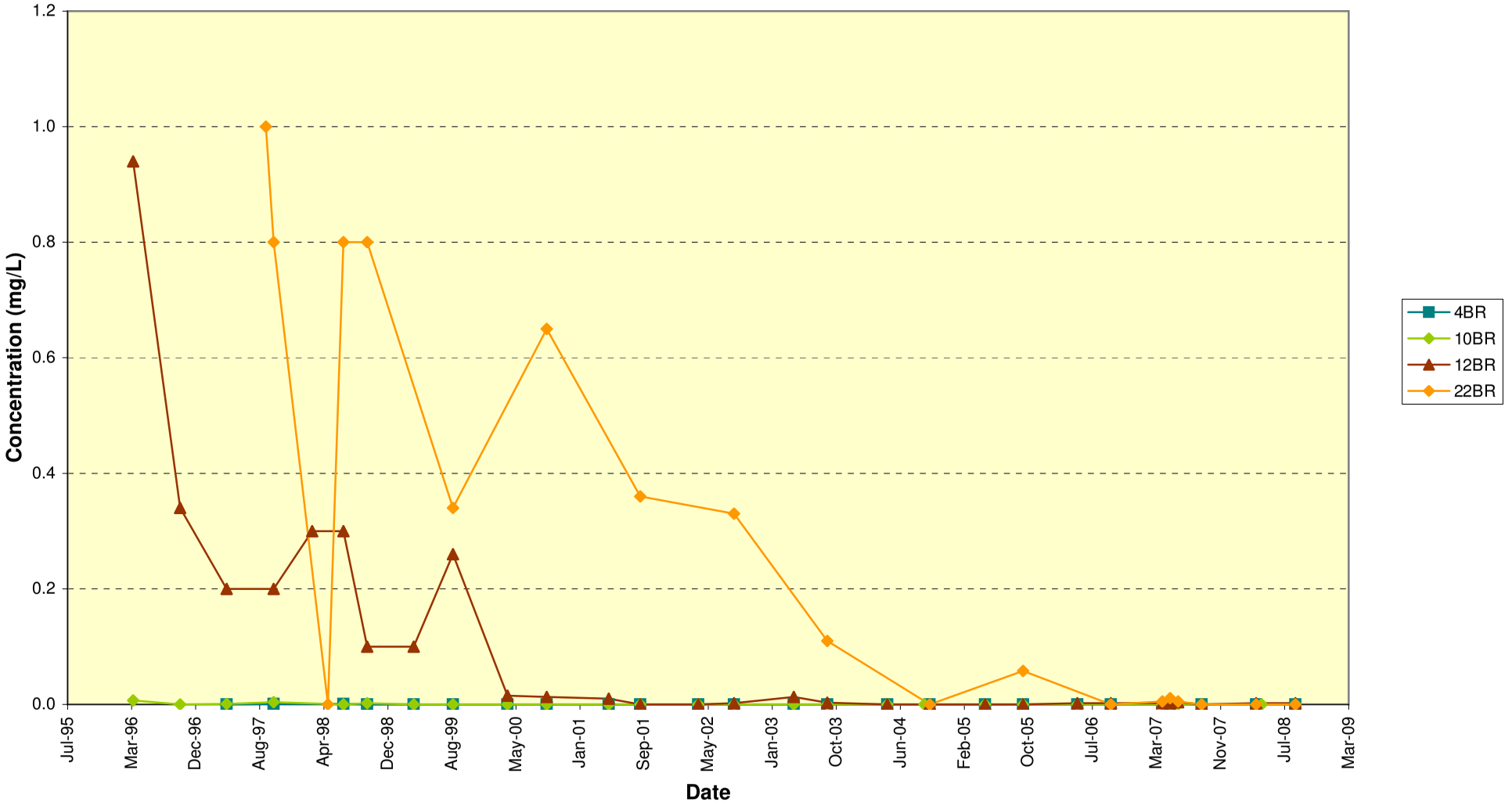
**General Plant Area - Benzene Trends in Up-gradient Bedrock Wells**




Cocentrations below reporting limits have been illustrated as 0 mg/L.

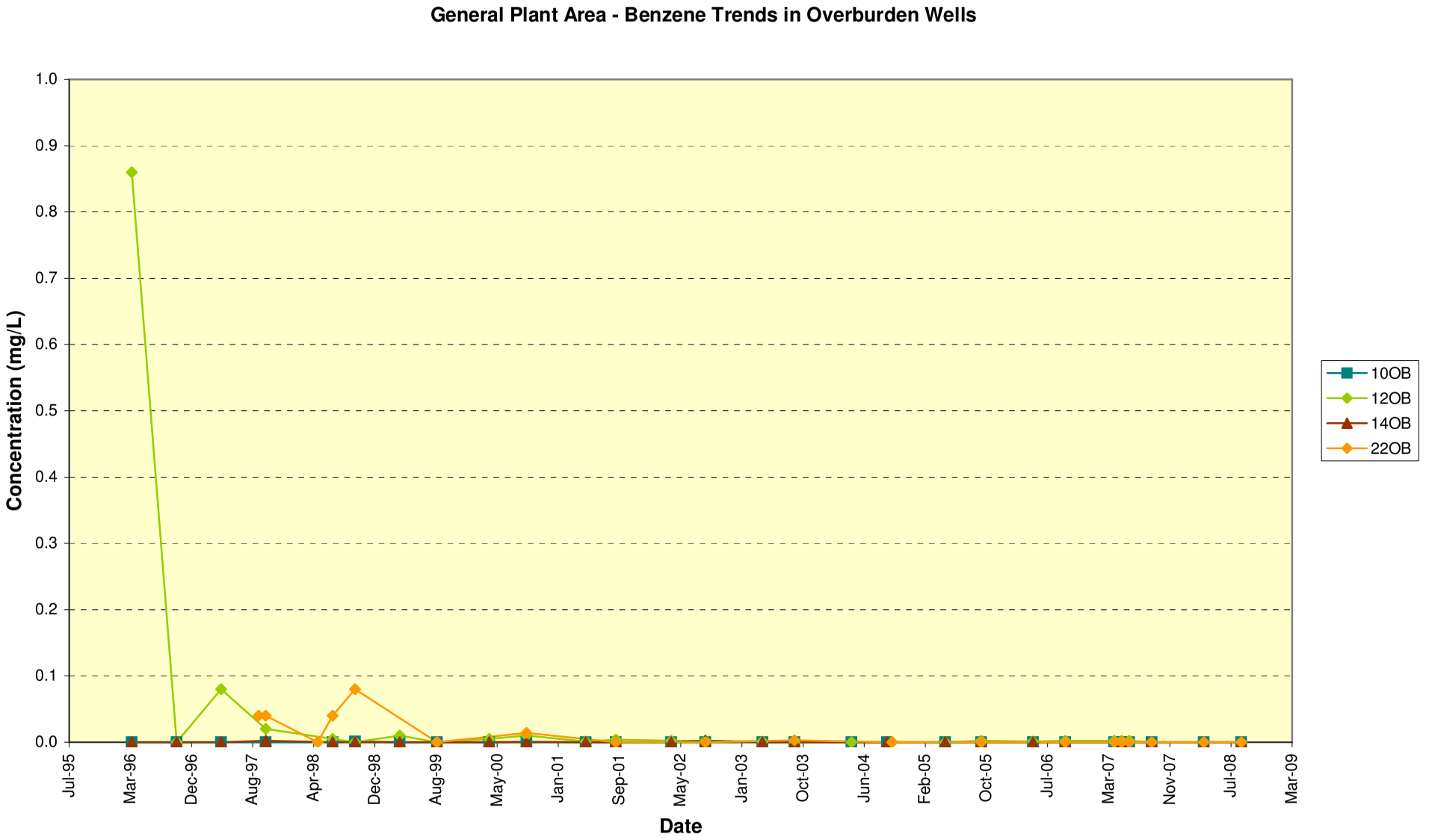
**Figure 19**

**General Plant Area - Benzene Trends in Down-gradient Bedrock Wells**




Concentrations below reporting limits have been illustrated as 0 mg/L.

**Figure 20**




Concentrations below reporting limits have been illustrated as 0 mg/L.

# APPENDIX 2

## 2008 ANNUAL NOISE SURVEY

## Report by Project Management, Consultants

# Merck Sharp & Dohme (Ireland) Ltd
# Noise Monitoring

## Project No.: 101779

# Environmental Noise Monitoring Report

## Annual Noise Survey

**File No. 101779.22.140** **Document No: 101779-22-RP-0001**

| CURRENT ISSUE | | | | | |
|---|---|---|---|---|---|
| Issue No: A | Date: 24/03/2009 | Reason for Issue: For Issue | | | Customer Approval (if required) |
| Sign-Off | Originator | Checker | Reviewer | Approver | |
| Print Name | Tim O'Shea | Darren Hilton | | Darren Hilton | |
| Signature | | | | | |
| Date | 24/3/09 | 24th March 2009 | | 24th March 2009 | |

| PREVIOUS ISSUES (Type Names) | | | | | | | |
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# CONTENTS

# 1. INTRODUCTION

This report was undertaken at the request of Mr. Robert Boyle of Merck, Sharp & Dohme (Ireland) Ltd (MSD), Ballydine, Kilsheelan, Co. Tipperary. The object of this report is to present the results of noise measurements carried out in accordance with the requirements of the IPPC License Number P0011-03.

The survey was carried out in accordance with the EPA guidance document on environmental noise surveys dated 2003.

The Ballydine facility operates on a 24 hour continual basis; therefore it is considered that compliance with the EPA night-time noise criteria inevitably demonstrates compliance with the specified and higher level daytime noise criteria. For the purposes of the survey, equipment noise measurements were carried out during the daytime hours, and the boundary measurements were made during the night-time. The measurements carried out at the two nearest noise sensitive locations (NSL) were made during both the daytime and night-time hours.

The survey was carried out on the 7th January 2009 and the 10th February 2009 with dry and cold weather conditions and with no significant wind effects on both dates.

# 2. NOISE SOURCES

Noise measurements were carried out at the locations and at the distances as specified in Table 2.1 overleaf and as shown on the site plan in Figure 1, Appendix A.

The instrumentation used during the survey was a Brüel and Kjær 2250 Sound Level Meter c/w Bruel and Kjær type 4189 Microphone and a Brüel and Kjær type 4231 Calibrator. Measurements were made 1.5 metres above ground level unless otherwise specified and the results of these measurements are set out in Table 2.1.

**Table 2.1:** ***Measurements from noise sources from 7th January 2009***

| Source | | SPL dB(A) | Distance (metres) | Notes |
|---|---|---|---|---|
| 1 | Surface aerator | - | - | Not operating |
| 2 | River water pump | 67 | 1 | |
| 3 | Aerator compressors | 71 | 5 | |
| 4 | Nitrogen PSA plant | 73 | 5 | |
| 5 | Old Incinerator plant | 60 | 10 | |
| 6 | Cooling Towers | 75 | 5 | |
| 7 | Cooling water pump | 79 | 1 | |
| 8 | Process/Fire pump house | 68 | 5 | |
| 9 | Boiler House | 65 | 15 | |
| 10 | FAC01 Plant East Pad | 64 | 15 | |
| 11 | South side of Process Building | 61 | 25 | |
| 12 | Solvent Recovery plant | 63 | 15 | |
| 13 | Scrubber pad | 69 | 5 | |
| **Process Building Roof (FAC01)** | | | | |
| 14 | Specific Vent Fan (08, EP4.14) | 82 | 1 | |
| 15 | Specific Vent Fan (07) | 79 | 1 | |
| 16 | Rotoclone Penthouse Fans | 79 | 1 | |
| | | | | |
| 17 | Water pump pad (FAC 01) | 71 | 5 | |
| 18 | Fume Incinerator (Front) | 73 | 5 | |
| 19 | Fume Incinerator (Rear) | 72 | 5 | |
| 20 | Indirect glycol recirculation pumps | 76 | 5 | |
| 21 | Deionised water pump pad (FAC03) | 76 | 5 | |
| 22 | Cooling tower pump (FAC03) | 83 | 2 | |
| 23 | Nitrogen PSA Plant (FAC03) | 93 | 1 | |

# 3. BOUNDARY MEASUREMENTS

The night-time noise levels were measured at the boundary locations identified as B1 to B5 as shown in Figure 1, Appendix B. The instrumentation used on site consisted of a Brüel and Kjær 2250 Sound Level Meter c/w Bruel and Kjær type 4189 Microphone and a Brüel and Kjær type 4231 Calibrator. Measurements were again made at a height of1.5 metres above ground level.

Measurements were made for ten-minute periods and the $L_{Aeq,T}$, $L_{A90,T}$, $L_{A10,T}$ and $L_{A01,T}$ the recorded values are shown in Table 3.1 below

**Table 3.1:** ***Boundary Noise Monitoring Night Time Results***

| Measurement Identification | Date | Description | $L_{Aeq}$ dB(A) | $L_{A90}$ dB(A) | $L_{A10}$ dB(A) | $L_{A01}$ dB(A) | Audible Sounds during Measurement Period |
|---|---|---|---|---|---|---|---|
| B1 | 7th Jan 09 | Site boundary to north, adjacent to N24 | 55 | 52 | 57 | 58 | Predominant and noticeable noise from road traffic on the N24.<br>No clearly audible noise from MSD facility except for occasional car movement in car park. |
| B2 | 7th Jan 09 | Site boundary to north-east: adjacent to the N24 road and entrance roadway | 47 | 45 | 48 | 55 | Traffic noise clearly audible from N24. No clearly audible noise from the MSD facility. |
| B3 | 10th Feb 09 | Site boundary to east | 51 | 50 | 52 | 53 | Some road traffic noise audible from N24. |
| B4 | 7th Jan 09 | Site boundary to south-east | 52 | 51 | 52 | 51 | Operational noise from facility. |
| B5 | 7th Jan 09 | Site boundary to south | 48 | 47 | 50 | 50 | Operational noise from facility. |

# 4. NSL MEASUREMENTS

Daytime and night-time measurements were made at the two nearest noise sensitive locations as shown in Figure 2, Appendix B. Location NSL1 was at the entrance to the nearest residence east of the plant. Location NSL2 was south of the plant on the far side of the river at the field entrance adjacent to the old graveyard. There was line of sight between the measurement locations and the plant with the intervening ground principally grassland with some trees. The measurement period was T = 30 minutes both during the night time and the daytime. The recorded $L_{Aeq,T}$, $L_{A90,T}$, $L_{A10,T}$, $L_{A01,T}$ and 1/3$^{rd}$ Octave Band spectra are shown in the following Tables 4.1, 4.2 and 4.3.

**Table 4.1:** ***Noise Sensitive Locations Noise Monitoring Day Time Results***

| Measurement Identification | Date | Description | $L_{Aeq}$ dB(A) | $L_{A90}$ dB(A) | $L_{A10}$ dB(A) | $L_{A1}$ dB(A) | Audible Sounds during Measurement Period |
|---|---|---|---|---|---|---|---|
| NSL1 | 7th Jan 09 | Off-site noise sensitive location – private dwelling to east of site | 49 | 46 | 50 | 58 | Operational noise from facility. Intermittent noise from distant passing traffic. |
| NSL2 | 7th Jan 09 | Off-site noise sensitive location – to south of site, graveyard | 54 | 44 | 50 | 66 | Operational noise from facility. Intermittent noise from passing traffic. River noise. |

**Table 4.2:** ***Noise Sensitive Locations Noise Monitoring Night Time Results***

| Measurement Identification | Date | Description | $L_{Aeq}$ dB(A) | $L_{A90}$ dB(A) | $L_{A10}$ dB(A) | $L_{A1}$ dB(A) | Audible Sounds during Measurement Period |
|---|---|---|---|---|---|---|---|
| NSL1 | 10th Feb 09 | Off-site noise sensitive location – private dwelling to east of site | 45 | 44 | 46 | 47 | Operational noise from facility. |
| NSL2 | 7th Jan 09 | Off-site noise sensitive location – to south of site, graveyard | 47 | 43 | 47 | 48 | Operational noise from facility. Intermittent noise from distant passing traffic. Noticeable river noise. |

**Table 4.3:** ***1/3 Octave Band Spectra at Noise Sensitive Locations***

| Frequency Hz | NSL 1<br>Night time 10th Feb 2009 | NSL 2<br>Night time 7th Jan 2009 |
|---|---|---|
| **16** | 1 | 1 |
| **20** | 1 | 3 |
| **25** | 7 | 8 |
| **31.5** | 12 | 12 |
| **40** | 17 | 17 |
| **50** | 23 | 22 |
| **63** | 21 | 21 |
| **80** | 24 | 25 |
| **100** | 29 | 30 |
| **125** | 32 | 33 |
| **160** | 33 | 34 |
| **200** | 29 | 30 |
| **250** | 24 | 33 |
| **315** | 28 | 34 |
| **400** | 34 | 38 |
| **500** | 36 | 38 |
| **630** | 37 | 39 |
| **800** | 38 | 39 |
| **1000** | 35 | 37 |
| **1250** | 34 | 37 |
| **1600** | 33 | 34 |
| **2000** | 30 | 33 |
| **2500** | 28 | 30 |
| **3150** | 26 | 26 |
| **4000** | 19 | 22 |
| **5000** | 14 | 17 |
| **6300** | 9 | 12 |
| **8000** | 7 | 8 |
| **10000** | 5 | 5 |
| **12500** | 3 | 3 |
| **16000** | - | - |
| **20000** | - | - |
| **A-Weighted** | 45 | 47 |

# 5. INTERPRETATION OF THE RESULTS

The plant operates on a continuous basis with deliveries and maintenance activities undertaken during the daytime hours.

There are security patrols around the site on a 24 hour basis.

The main extraneous source of noise during the critical night time hours is from road traffic on the N24 which forms one boundary to the manufacturing site.

The $L_{Aeq,T}$ levels in the environs of the plant consists of both the noise from the plant and extraneous sources i.e. road traffic.

The $L_{Aeq,30min}$ noise levels are below the night and day time criteria at noise sensitive location 1.

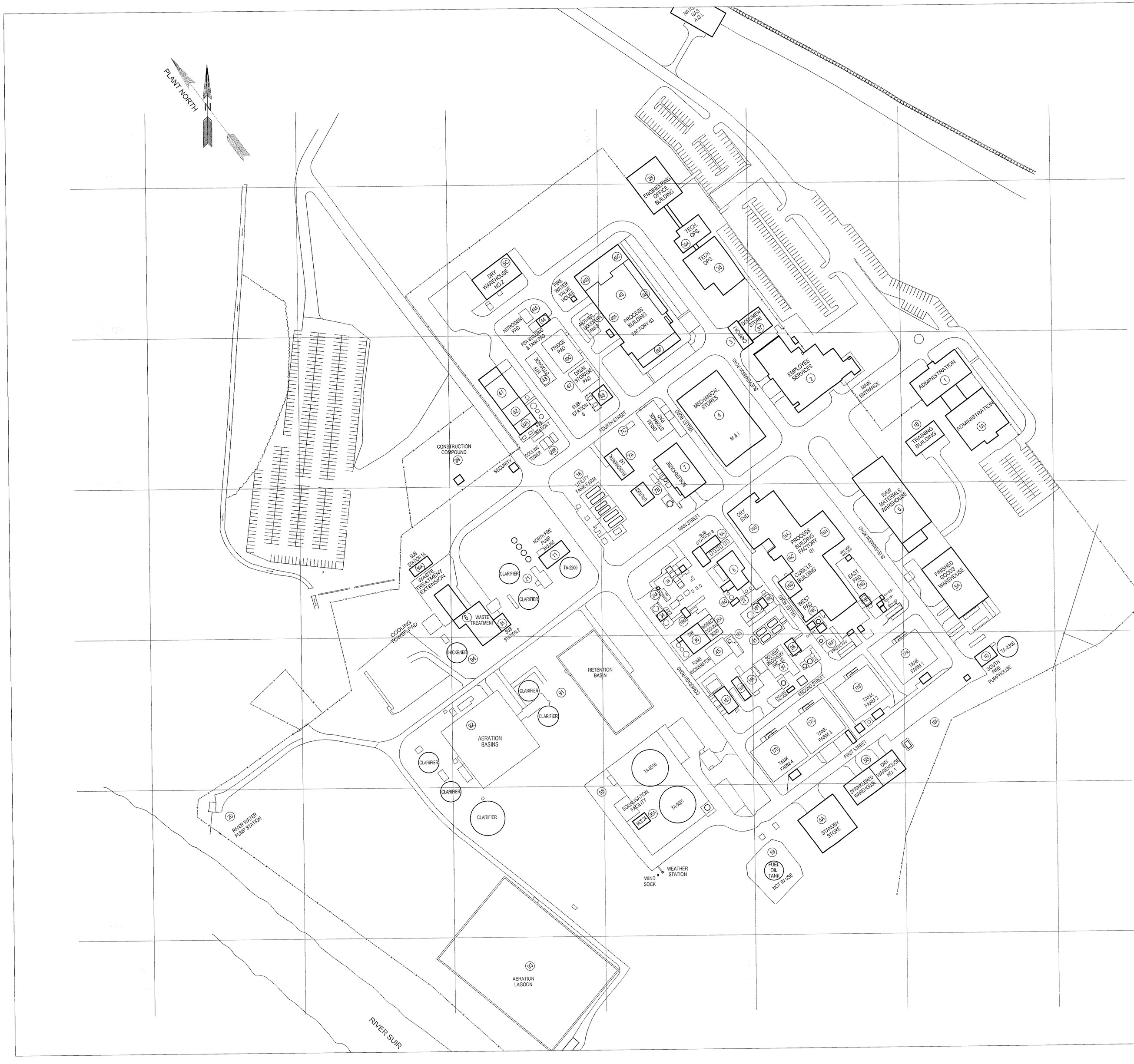
With regard to Noise sensitive location 2, the $L_{Aeq,30min}$ noise levels are below the relevant criteria applicable to the day time but slightly exceed the required night time limit. Noise from the adjacent river Suir was a contributing factor at this location. However, as indicated in the EPA *Environmental Noise Survey Guidance Document 2003* (page 9) where the noise emissions are relatively steady as is the case for the Ballydine facility, the night-time $L_{A90,T}$ is a good indication of the actual noise output from the site. The measured night-time $L_{A90,30min}$ at NSL2 was recorded as 43 and so achieves the criterion of 45 dB(A).

There was no clearly audible tonal component or impulsive component in the noise emission from the activity at any of the two noise sensitive locations.

# APPENDIX A

## SITE PLAN

**Figure 1:** Site Plan




LEGEND:-

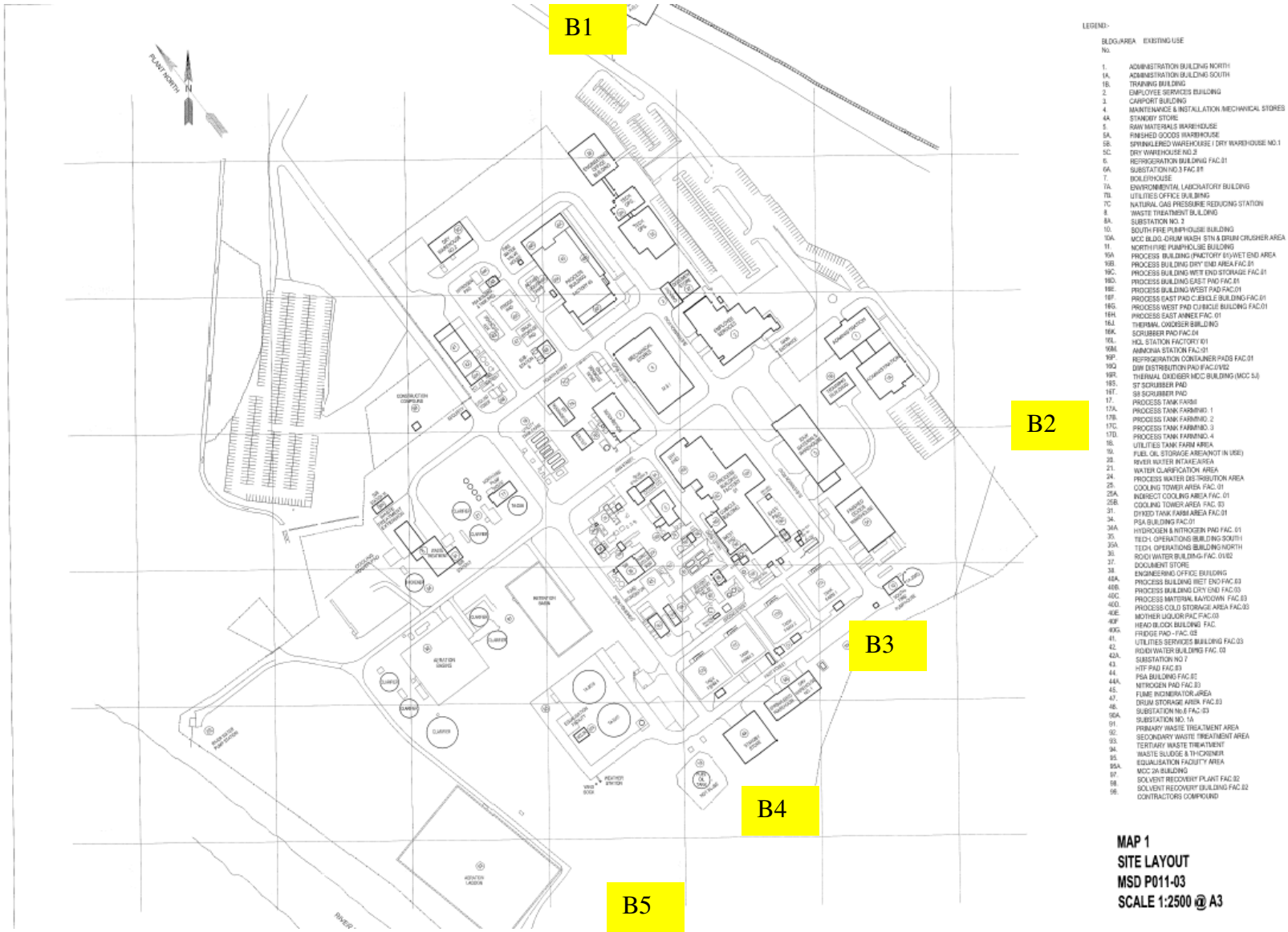
| BLDG./AREA No. | EXISTING USE |
|---|---|
| 1. | ADMINISTRATION BUILDING NORTH |
| 1A. | ADMINISTRATION BUILDING SOUTH |
| 1B. | TRAINING BUILDING |
| 2. | EMPLOYEE SERVICES BUILDING |
| 3. | CARPORT BUILDING |
| 4. | MAINTENANCE & INSTALLATION /MECHANICAL STORES |
| 4A | STANDBY STORE |
| 5. | RAW MATERIALS WAREHOUSE |
| 5A. | FINISHED GOODS WAREHOUSE |
| 5B. | SPRINKLERED WAREHOUSE / DRY WAREHOUSE NO.1 |
| 5C. | DRY WAREHOUSE NO.2 |
| 6. | REFRIGERATION BUILDING FAC.01 |
| 6A. | SUBSTATION NO.3 FAC.01 |
| 7. | BOILERHOUSE |
| 7A. | ENVIRONMENTAL LABORATORY BUILDING |
| 7B. | UTILITIES OFFICE BUILDING |
| 7C | NATURAL GAS PRESSURE REDUCING STATION |
| 8. | WASTE TREATMENT BUILDING |
| 8A. | SUBSTATION NO. 2 |
| 10. | SOUTH FIRE PUMPHOUSE BUILDING |
| 10A. | MCC BLDG.-DRUM WASH STN & DRUM CRUSHER AREA |
| 11. | NORTH FIRE PUMPHOUSE BUILDING |
| 16A | PROCESS BUILDING (FACTORY 01)-WET END AREA |
| 16B. | PROCESS BUILDING DRY END AREA FAC.01 |
| 16C. | PROCESS BUILDING WET END STORAGE FAC.01 |
| 16D. | PROCESS BUILDING EAST PAD FAC.01 |
| 16E. | PROCESS BUILDING WEST PAD FAC.01 |
| 16F. | PROCESS EAST PAD CUBICLE BUILDING FAC.01 |
| 16G. | PROCESS WEST PAD CUBICLE BUILDING FAC.01 |
| 16H. | PROCESS EAST ANNEX FAC. 01 |
| 16J. | THERMAL OXIDISER BUILDING |
| 16K. | SCRUBBER PAD FAC.01 |
| 16L. | HCL STATION FACTORY 01 |
| 16M. | AMMONIA STATION FAC.01 |
| 16P. | REFRIGERATION CONTAINER PADS FAC.01 |
| 16Q | DIW DISTRIBUTION PAD FAC.01/02 |
| 16R. | THERMAL OXIDISER MCC BUILDING (MCC 5J) |
| 16S. | S7 SCRUBBER PAD |
| 16T. | S8 SCRUBBER PAD |
| 17. | PROCESS TANK FARM |
| 17A. | PROCESS TANK FARM NO. 1 |
| 17B. | PROCESS TANK FARM NO. 2 |
| 17C. | PROCESS TANK FARM NO. 3 |
| 17D. | PROCESS TANK FARM NO. 4 |
| 18. | UTILITIES TANK FARM AREA |
| 19. | FUEL OIL STORAGE AREA(NOT IN USE) |
| 20. | RIVER WATER INTAKE AREA |
| 21. | WATER CLARIFICATION AREA |
| 24. | PROCESS WATER DISTRIBUTION AREA |
| 25. | COOLING TOWER AREA FAC. 01 |
| 25A. | INDIRECT COOLING AREA FAC. 01 |
| 25B. | COOLING TOWER AREA FAC. 03 |
| 31. | DYKED TANK FARM AREA FAC.01 |
| 34. | PSA BUILDING FAC.01 |
| 34A. | HYDROGEN & NITROGEN PAD FAC. 01 |
| 35. | TECH. OPERATIONS BUILDING SOUTH |
| 35A. | TECH. OPERATIONS BUILDING NORTH |
| 36. | RO/DI WATER BUILDING FAC. 01/02 |
| 37. | DOCUMENT STORE |
| 38. | ENGINEERING OFFICE BUILDING |
| 40A. | PROCESS BUILDING WET END FAC.03 |
| 40B. | PROCESS BUILDING DRY END FAC.03 |
| 40C. | PROCESS MATERIAL LAYDOWN FAC.03 |
| 40D. | PROCESS COLD STORAGE AREA FAC.03 |
| 40E. | MOTHER LIQUOR PAD FAC.03 |
| 40F | HEAD BLOCK BUILDING FAC. |
| 40G. | FRIDGE PAD - FAC. 03 |
| 41. | UTILITIES SERVICES BUILDING FAC.03 |
| 42. | RO/DI WATER BUILDING FAC. 03 |
| 42A. | SUBSTATION NO 7 |
| 43. | HTF PAD FAC.03 |
| 44. | PSA BUILDING FAC.03 |
| 44A. | NITROGEN PAD FAC.03 |
| 45. | FUME INCINERATOR AREA |
| 47. | DRUM STORAGE AREA FAC.03 |
| 48. | SUBSTATION No.6 FAC.03 |
| 90A. | SUBSTATION NO. 1A |
| 91. | PRIMARY WASTE TREATMENT AREA |
| 92. | SECONDARY WASTE TREATMENT AREA |
| 93. | TERTIARY WASTE TREATMENT |
| 94. | WASTE SLUDGE & THICKENER |
| 95. | EQUALISATION FACILITY AREA |
| 95A. | MCC 2A BUILDING |
| 97. | SOLVENT RECOVERY PLANT FAC.02 |
| 98. | SOLVENT RECOVERY BUILDING FAC.02 |
| 99. | CONTRACTORS COMPOUND |

**MAP 1**
**SITE LAYOUT**
**MSD P011-03**
**SCALE 1:2500 @ A3**

# APPENDIX B

## ADDITIONAL NOISE SURVEY INFORMATION

**Figure 2:** Boundary (B1-B5) and Noise Sensitive Locations (NSL1, NSL2) Locations


B1
B2
B3
B4
B5
PLANT NORTH
N
LEGEND:-
BLDG./AREA No.
EXISTING USE
1. ADMINISTRATION BUILDING NORTH
1A. ADMINISTRATION BUILDING SOUTH
1B. TRAINING BUILDING
2. EMPLOYEE SERVICES BUILDING
3. CARPORT BUILDING
4. MAINTENANCE & INSTALLATION (MECHANICAL STORES
4A STANDBY STORE
5. RAW MATERIALS WAREHOUSE
5A. FINISHED GOODS WAREHOUSE
5B. SPRINKLERED WAREHOUSE I DRY WAREHOUSE NO.1
5C. DRY WAREHOUSE NO.2
6. REFRIGERATION BUILDING FAC.01
6A. SUBSTATION NO.3 FAC.01
7. BOILERHOUSE
7A. ENVIRONMENTAL LABORATORY BUILDING
7B. UTILITIES OFFICE BUILDING
7C NATURAL GAS PRESSURE REDUCING STATION
8 WASTE TREATMENT BUILDING
8A. SUBSTATION NO. 2
10. SOUTH FIRE PUMPHOUSE BUILDING
10A. MCC BLDG.-DRUM WASH STN & DRUM CRUSHER AREA
11 NORTH FIRE PUMPHOLSE BUILDING
16A PROCESS BUILDING (FACTORY 01)-WET END AREA
16B. PROCESS BUILDING DRY END AREA FAC.01
16C. PROCESS BUILDING WET END STORAGE FAC.01
16D. PROCESS BUILDING EAST PAD FAC.01
16E. PROCESS BUILDING WSST PAD FAC.01
16F. PROCESS EAST PAD CUBICLE BUILDING FAC.01
16G. PROCESS WEST PAD CUBICLE BUILDING FAC.01
16H. PROCESS EAST ANNEX FAC. 01
16J THERMAL OXIDISER BUILDING
16K. SCRUBBER PAD FAC.04
16L. HCL STATION FACTORY 101
16M. AMMONIA STATION FAC.101
16P REFRIGERATION CONTAINER PADS FAC.01
16Q DIW DISTRIBUTION PAD FAC.01/02
16R. THERMAL OXIDISER MCC BUILDING (MCC 5J)
16S. S7 SCRUBBER PAD
16T. S8 SCRUBBER PAD
17. PROCESS TANK FARM
17A. PROCESS TANK FARM NO. 1
17B. PROCESS TANK FARM NO. 2
17C. PROCESS TANK FARM NO. 3
17D. PROCESS TANK FARM NO. 4
18. UTILITIES TANK FARM AREA
19. FUEL OIL STORAGE AREA(NOT IN USE)
20. RIVER WATER INTAKE AREA
21. WATER CLARIFICATION AREA
24. PROCESS WATER DISTRIBUTION AREA
25. COOLING TOWER AREA FAC. 01
25A. INDIRECT COOLING AREA FAC. 01
25B. COOLING TOWER AREA FAC. 03
31. DYKED TANK FARM AREA FAC.01
34. PSA BUILDING FAC.01
34A HYDROGEN & NITROGEN PAD FAC. 01
35. TED-1 OPERATIONS BUILDING SOUTH
35A TED1 OPERATIONS BUILDING NORTH
36 RO/DI WATER BUILDING-FAC. 01/02
37. DOCUMENT STORE
38 ENGINEERING OFFICE BUILDING
48A. PROCESS BUILDING WET END FAC.03
48B. PROCESS BUILDING DRY END FAC.03
48C PROCESS MATERIAL BAYDOWN FAC.03
48D. PROCESS COLD STORAGE AREA FAC.03
48E. MOTHER LIQUOR PAC.FAC.03
48F HEAD BLOCK BUILDING FAC.
48G. FRIDGE PAD - FAC. 03
41. UTILITIES SERVICES BUILDING FAC.03
42. RO/DI WATER BUILDING FAC. 03
42A. SUBSTATION NO 7
43. HTF PAD FAC.03
44. PSA BUILDING FAC.02
44A. NITROGEN PAD FAC.03
45. FUME INCINERATOR AREA
47. DRUM STORAGE AREA FAC.03
48. SUBSTATION No.6 FAC.03
50A. SUBSTATION NO. 1A
91. PRIMARY WASTE TREATMENT AREA
92. SECONDARY WASTE TREATMENT AREA
93. TERTIARY WASTE TREATMENT
94. WASTE SLUDGE & THICKENER
95. EQUALISATION FACILITY AREA
95A. MCC 2A BUILDING
97. SOLVENT RECOVERY PLANT FAC.02
98 SOLVENT RECOVERY BUILDING FAC.02
99. CONTRACTORS COMPOUND
MAP 1
SITE LAYOUT
MSD P011-03
SCALE 1:2500 @ A3

# APPENDIX 3

## 2008 WASTE MANAGEMENT TABLES

## Annual European Waste Catalogue (EWC) Report
## Hazardous Waste - Offsite Recovery and Disposal Shipments

# APPENDIX 3

## WASTE MANAGEMENT TABLES INDEX

TABLE. 3.1.1.3A
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TABLE 3.1.1.3D NATIONAL WASTE DATABASE.
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TABLE 3.1.1.3G WASTE TREATMENT PLANT SLUDGE
2008 SLUDGE ANALYSIS INORGANIC SUBSTANCES.

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2008 LEACHATE ANALYSIS. INORGANIC SUBSTANCES.

TABLE 3.1.1.3I. WASTE TREATMENT PLANT SLUDGE.
2008 LEACHATE ANALYSIS. ORGANIC COMPOUNDS.

## TABLE 3.1.1.3A
## Annual Waste Arisings - Hazardous Waste Summary 2008 IPPC LICENCE NO. P0011-03 - MSD

| Waste Material | EWC Code | Source | Tonnes Gross Usage | On-site Treatment Tonnes | Waste Management Option | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Onsite Recovery | | Offsite Recovery | | Onsite Treatment / Disposal | | Offsite Disposal / Heat Rec | |
| | | | | | Method | Tonnes | Method Note 2,3, | Tonnes | Method | Tonnes | Method Note 4 | Tonnes |
| **Organic Non Halogenated Solvents** | **070504*** | Processing | | | | | | | | | | |
| Methanol | | ,, | 1366 | 946 | Distillation | 332 | Sol. Rec. | 21 | WWTP | 614 | Incin. Note 4 | 431 |
| Ethanol ( note 1) | | ,, | 626 | 161 | Distillation | 0 | ,, | 207 | WWTP | 161 | WWTP Note 1 | 273 |
| Acetone | | ,, | 43 | 13 | N/A | 0 | ,, | 0 | WWTP | 13 | Incin. Note 4 | 30 |
| Acetonitrile | | ,, | 1044 | 179 | Distillation | 153 | ,, | 629 | WWTP | 26 | Incin. Note 4 | 227 |
| Glycol | | ,, | 101 | 101 | Distillation | 45 | ,, | 0 | WWTP | 56 | N/A | 0 |
| THF | | ,, | 2247 | 972 | Distillation | 884 | ,, | 851 | WWTP | 88 | Incin. Note 4 | 368 |
| Acetic Acid | | ,, | 114 | 114 | N/A | 0 | ,, | 0 | WWTP | 114 | WWTP Note 1 | 0 |
| Dimethylformamide | | ,, | 42 | 11 | N/A | 0 | ,, | 0 | WWTP | 11 | N/A | 29 |
| Toluene / Heptane | | ,, | 3078 | 69 | Distillation | 63 | ,, | 2939 | WWTP | 7 | Incin. Note 4 | 4 |
| Ethyl Acetate | | ,, | 20 | 20 | N/A | 0 | ,, | 0 | WWTP (1) | 20 | N/A | 0 |
| Isopropyl Acetate /IPA | | ,, | 643 | 10 | N/A | 0 | ,, | 361 | WWTP (1) | 10 | Incin. Note 4 | 283 |
| **Total** | **070504*** | | **9324** | **2596** | | **1477** | | **5008** | | **1120** | | **1645** |
| | | | | | | | | | | | | |
| **Organic halogenated solvents** | **070503*** | Processing | | | | | | | | | | |
| Chloroform | | ,, | 0 | 0 | Distillation | 0 | N/A | 0 | WWTP | 0 | Incin. Note 4 | 0 |
| Monochlorobenzene | | ,, | 46 | 44 | Distillation | 43 | N/A | 0 | WWTP | 1 | N/A | 2 |
| **Total** | **070503*** | | **46** | **44** | | **43** | | **0** | | **1** | | **2** |

Gross usage = Onsite Recovery + Inputs (Deliveries + change in inventory)

**Notes:**

1. Waste ethyl acetate streams and isopropyl acetate are hydrolysed with sodium hydroxide to acetic acid and ethanol / IPA.
2. Waste Streams for offsite recovery were recovered for direct reuse and for subsequent reuse in the paint, plastics or fuel blending industrial sectors.
3. Solvent components and compositions varied with different processing steps.
4. High calorific value waste streams unsuitable for direct recovery were incinerated offsite in facilities with energy recovery.
5. A full comprehensive offsite shipping report (9 pages), detailing all hazardous waste shipments in 2008 to external facilities is provided.
6. All disposals of hazardous materials were conducted by Waste Management Broker – Indaver Environmental Services, Tolka Quay Rd, Dublin
7. Disposals to external solvent recovery and incineration with heat recovery facilities and other specialist facilities totalled 8609 tonnes in 2008.

**TABLE**
**3.1.1.3C**

**Merck Sharp & Dohme (Ireland) EWC Report** **IPC Licence No: - P0011-03** **NACE Code :**
**Waste Management Company:** **2.1.2**
**Indaver Ireland Limited**
**Waste Collection Items with a Pick Up Date between 01/01/2008 - 31/12/2008**

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75584 | B429623 | 311096 | 25.00 | 23.00 | Isopropyl Acetate 60-80% , Tetrahydrofuran 5-20% , Isopropanol 0-20%, Water 0-5%, ROE 0-0.5%. | 04-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75456 | B429626 | 311120 | 59.00 | 25.55 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 09-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75585 | B429625 | 311096 | 26.00 | 26.50 | MK 518 Coupling Distillate No. 1 (B-518-1) Tetrahydrofuran 99.3%, Water 0.7% | 09-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 2056 | 3 | 070504* | R2 |
| 75671 | B | 311351 | 1.00 | 26.52 | B-156-1 Aceonitrile 65-85%, Toluene 15-30%, Tetrahydrofuran 0-5% and water <3% | 10-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75693 | | 311351 | 2.00 | 25.14 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 11-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75457 | B429627 | 311120 | 60.00 | 27.10 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 14-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75748 | | 311351 | 3.00 | 27.60 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 14-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75550 | B429628 | 311120 | 61.00 | 27.40 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 15-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75750 | | 311351 | 4.00 | 22.86 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 15-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75580 | B429629 | 311120 | 62.00 | 27.04 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 16-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75842 | | 311351 | 5.00 | 22.14 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 16-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75581 | B429631 | 311120 | 63.00 | 25.62 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 17-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75587 | B429630 | 311096 | 27.00 | 27.20 | MK 518 Coupling Distillate No. 1 (B-518-1) Tetrahydrofuran 99.3%, Water 0.7% | 17-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 2056 | 3 | 070504* | R2 |
| 75635 | B429624 | 311441 | 4.00 | 2.50 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 17-Jan-2008 | Pallet Box | LS | AVG | n/a | n/a | 070513* | D10 |
| 75635 | B429624 | 311441 | 4.00 | 0.20 | Fibreboard drums - empty unused MW-2 | 17-Jan-2008 | Fibre Keg | LS | AVG | n/a | n/a | 150110* | D10 |
| 75635 | B429624 | 311441 | 4.00 | 0.33 | MW-95-5 Unused Filter Aid Heels / bags | 17-Jan-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 150202* | D10 |
| 75635 | B429624 | 311441 | 4.00 | 0.10 | Waste Filters Consumerables (MW-166-4) | 17-Jan-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 75635 | B429624 | 311441 | 4.00 | 0.30 | Ferroquest (MW-29) | 17-Jan-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 160508* | D10 |
| 75635 | B429624 | 311441 | 4.00 | 0.05 | UTIL-9 Empty plastic bags with residual ferrous sulphate & water | 17-Jan-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 150110* | D10 |
| 75846 | | 311351 | 6.00 | 24.48 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 18-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75847 | | 311351 | 7.00 | 23.26 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 18-Jan-2008 | Bulk Tank | UTT | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75582 | B429632 | 311120 | 64.00 | 27.10 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 21-Jan-2008 | Bulk Tank | UTT | AVG | 1993 | 3 | 070504* | D10 |
| 74492 | B429633 | 311096 | 24.00 | 25.62 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 22-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75843 | B429634 | 311096 | 28.00 | 25.58 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 22-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75583 | B429636 | 311120 | 65.00 | 25.16 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 23-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75953 | B429635 | 311096 | 29.00 | 23.96 | MK 518 Coupling Distillate No. 1 (B-518-1) Tetrahydrofuran 99.3%, Water 0.7% | 23-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 2056 | 3 | 070504* | R2 |
| 75849 | | 311351 | 8.00 | 25.22 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 24-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75931 | | 311351 | 9.00 | 21.74 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 24-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76109 | B429637 | 311120 | 67.00 | 26.88 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 24-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75932 | | 311351 | 10.00 | 9.24 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 25-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75932 | | 311351 | 10.00 | 9.70 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 25-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76158 | B429638 | 311120 | 70.00 | 27.00 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 28-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 76161 | B429639 | 311120 | 71.00 | 25.10 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 28-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75933 | | 311351 | 11.00 | 25.66 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 29-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75954 | B429641 | 311096 | 30.00 | 25.86 | MK 518 Coupling Distillate No. 1 (B-518-1) Tetrahydrofuran 99.3%, Water 0.7% | 30-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 2056 | 3 | 070504* | R2 |
| 76246 | B429640 | 311120 | 73.00 | 26.86 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 30-Jan-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 75934 | | 311351 | 12.00 | 21.77 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 31-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 75935 | | 311351 | 13.00 | 23.82 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 31-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76206 | | 311351 | 14.00 | 25.48 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 31-Jan-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76252 | B429642 | 311120 | 74.00 | 24.26 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 01-Feb-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 76208 | | 311351 | 15.00 | 21.90 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 04-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76389 | B429643 | 311320 | 3.00 | 26.94 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 04-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76209 | | 311351 | 16.00 | 24.52 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 05-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76411 | B429647 | 311096 | 31.00 | 25.78 | MK 518 Coupling Distillate No. 1 (B-518-1) Tetrahydrofuran 99.3%, Water 0.7% | 05-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 2056 | 3 | 070504* | R2 |
| 76172 | B429650 | 311441 | 24.00 | 3.00 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 06-Feb-2008 | Pallet Box | LS | AVG | n/a | n/a | 070513* | D10 |
| 76172 | B429650 | 311441 | 24.00 | 0.28 | MW-88-1 Waste sodium methoxide heels & bags, waste raw material | 06-Feb-2008 | 200L Steel Combi | LS | AVG | 1431 | 4.2 | 070513* | D10 |
| 76210 | | 311351 | 17.00 | 26.62 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 06-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76455 | B429649 | 311320 | 5.00 | 26.96 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 06-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76253 | B429648 | 311120 | 75.00 | 24.04 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 07-Feb-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 76211 | | 311351 | 18.00 | 21.76 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 08-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76212 | | 311351 | 19.00 | 25.32 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 11-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76564 | B429646 | 311320 | 6.00 | 26.98 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 11-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76569 | B429645 | 311120 | 79.00 | 25.28 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 11-Feb-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 76595 | B429644 | 311320 | 7.00 | 26.94 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 12-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76514 | | 311351 | 20.00 | 23.18 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 13-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76516 | | 311351 | 21.00 | 25.54 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 13-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76676 | B455862 | 311096 | 32.00 | 25.72 | MK 518 Coupling Distillate No. 1 (B-518-1) Tetrahydrofuran 99.3%, Water 0.7% | 14-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 2056 | 3 | 070504* | R2 |
| 76517 | | 311351 | 22.00 | 25.30 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 15-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76720 | B455863 | 311320 | 8.00 | 26.98 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 15-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76518 | | 311351 | 23.00 | 24.08 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 18-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76519 | | 311351 | 24.00 | 22.06 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 18-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76710 | B455864 | 311096 | 33.00 | 25.06 | B-156-3 87% Tetrahydrofuran, 4.5% Ethanol, 1% Toluene, 6% Water , 1.5% Acetonitrile | 18-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76711 | B455865 | 311096 | 34.00 | 25.04 | B-156-3 87% Tetrahydrofuran, 4.5% Ethanol, 1% Toluene, 6% Water , 1.5% Acetonitrile | 18-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76771 | B455867 | 311320 | 9.00 | 26.66 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 19-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76772 | B455866 | 311120 | 82.00 | 24.00 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 19-Feb-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 76647 | | 311351 | 25.00 | 25.30 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 20-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76648 | | 311351 | 26.00 | 23.94 | B-156-1 Aceonitrile 65-85%, Toluene 15-30%, Tetrahydrofuran 0-5% and water <3% | 20-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76649 | | 311351 | 27.00 | 8.98 | POT A - [B-154-3] Mesylate Mother bottoms-Tetrahydrofuran 10-40% and Heptane 60-90%, solids <2% and water <1% | 21-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76649 | | 311351 | 27.00 | 9.50 | POT B - [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 21-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76650 | | 311351 | 28.00 | 22.90 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 21-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76753 | B455876 | 311441 | 36.00 | 3.15 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 21-Feb-2008 | Pallet Box | LS | AVG | n/a | n/a | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.80 | Waste Molecular Sieves ex THF drying (contaminated with Tetrahydrofuran) (MW-156-3) | 21-Feb-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.24 | MW 191-3 Waste Omeprazole Magnesium Salt / Methanol API | 21-Feb-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.56 | MW-95-7 Waste Cloths/filters/trace nickel/water | 21-Feb-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 150202* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.12 | MW-95-13 Waste Monochlorobenzene 95%, Water 5% | 21-Feb-2008 | 200L T/H Steel | LS | AVG | 1134 | 3 | 070503* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.08 | MW-205-3 Waste Pharmaceutical Intermediate (Benzoate pure scrapings) | 21-Feb-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.08 | Waste Syltherm Oil (Dimethylpolysiloxane) (MW-126-5) | 21-Feb-2008 | 200L T/H Steel | LS | AVG | 1993 | 3 | 070504* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.08 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 21-Feb-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.08 | (MW-88-2) Waste Guanidine heels & empty bags | 21-Feb-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.16 | Waste Filter elements/media ex Benzoate crude (trace Isopropyl Acetate(IPAC)) (MW-204-4) | 21-Feb-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.56 | [MW-4] Carbon or lagging contaminated with dowtherm | 21-Feb-2008 | OD 322L Steel | LS | AVG | 3175 | 4.1 | 070510* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.32 | MW-10 Waste drums of water / dowtherm ex PSV tank | 21-Feb-2008 | 200L T/H Steel | LS | AVG | 2049 | 3 | 070504* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.75 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 21-Feb-2008 | 120L O/T Plastic | LS | AVG | 2811 | 6.1 | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 1.28 | UTIL-1Waste paint tins / cloths / etc | 21-Feb-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.56 | UTIL-9 Empty plastic bags with residual ferrous sulphate & water | 21-Feb-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 150110* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.08 | UTIL-4 Waste Sludge / Grease / Cloths ex sludge dryer | 21-Feb-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.08 | MW 191-4 Waste Omeprazole Salt API | 21-Feb-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 76753 | B455876 | 311441 | 36.00 | 0.52 | MW 95-1 MCB distillation bottoms/tars | 21-Feb-2008 | 25L T/H Steel | LS | AVG | n/a | n/a | 070508* | D10 |
| 76874 | B455877 | 311320 | 10.00 | 26.96 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 22-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76875 | B455878 | 311120 | 85.00 | 23.08 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 22-Feb-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 76651 | | 311351 | 29.00 | 24.44 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 25-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76949 | B455879 | 311320 | 16.00 | 26.96 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 26-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76951 | B455880 | 311120 | 86.00 | 25.06 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 26-Feb-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 76905 | | 311351 | 30.00 | 23.54 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 27-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76823 | B375747 | 311441 | 71.00 | 0.03 | Top-02(a) Lab Smalls cotaining 24% Potassium Ethoxide in Ethanol [BASIC] | 28-Feb-2008 | 120L O/T Plastic | LS | AVG | 2924 | 3 | 160508* | D10 |
| 76823 | B375747 | 311442 | 34.00 | 0.01 | Top-02(a) Lab smalls containing Waste N Methyl Morpholine [BASIC] | 28-Feb-2008 | 30L O/T Plastic | QYL | AVG | 2924 | 3 | 160508* | D10 |
| 76823 | B375747 | 311452 | 177.00 | 0.16 | MW-204-3 Waste Dimethyl Amine 40% in water [BASIC] | 28-Feb-2008 | 200L T/H Plastic | QYL | AVG | 1154 | 3 | 070504* | D10 |
| 76823 | B375747 | 311441 | 79.00 | 0.03 | UTIL-19 Piping, Lagging and other building materials contaminated with Sulphuric Acid [ACIDIC] | 28-Feb-2008 | 200L T/H Plastic | LS | AVG | 3244 | 8 | 070513* | D10 |
| 76823 | B375747 | 311442 | 40.00 | 0.04 | MW-88-1 Waste sodium methoxide heels & bags, waste raw material | 28-Feb-2008 | 200L Steel Combi | QYL | AVG | 1431 | 4.2 | 070513* | D10 |
| 76823 | B375747 | 311441 | 71.00 | 0.04 | Top-02(a) Octyl Alcohol packed as lab smalls | 28-Feb-2008 | 120L O/T Plastic | LS | AVG | n/a | n/a | 160508* | D10 |
| 76823 | B375747 | 311441 | 71.00 | 0.02 | Top-02(a) 99% dimethylacetamide packed as lab smalls | 28-Feb-2008 | 120L O/T Plastic | LS | AVG | n/a | n/a | 160508* | D10 |
| 76823 | B375747 | 311448 | 21.00 | 0.01 | TOP - 05 Halogenated Solvents - Lab Smalls contaning Chloroform | 28-Feb-2008 | 30L O/T Plastic | LS | AVG | 2810 | 6.1 | 160508* | D10 |
| 76823 | B375747 | | | 0.01 | Top-07, Containing Ammonia cylinders OVERPACK | 28-Feb-2008 | 32L O/T Plastic | IND | Chemogas | 1005 | 2.3 | 160504* | |
| 76825 | B375748 | | | 0.44 | Mixed WEEE | 28-Feb-2008 | Metal Cage | IND | Rehab Rec | n/a | n/a | 200135* | |
| 76906 | | 311351 | 31.00 | 24.38 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 28-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77028 | B455881 | 311320 | 17.00 | 26.94 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 28-Feb-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76907 | | 311351 | 32.00 | 21.20 | B-156-1 Aceonitrile 65-85%, Toluene 15-30%, Tetrahydrofuran 0-5% and water <3% | 29-Feb-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 76908 | | 311351 | 33.00 | 27.06 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 03-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77029 | B455882 | 311320 | 18.00 | 22.90 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 03-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 76909 | | 311351 | 34.00 | 21.86 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 04-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77030 | B455883 | 311320 | 19.00 | 25.86 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 04-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 1.50 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 05-Mar-2008 | Pallet Box | LS | AVG | n/a | n/a | 070513* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 2.10 | MW-95-13 Waste Monochlorobenzene 95%, Water 5% | 05-Mar-2008 | 200L T/H Steel | LS | AVG | 1134 | 3 | 070503* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.18 | Waste pharmaceutical intermediate - Lisinopril pure (Lot NTA 148S 1kg) MW-114-4 | 05-Mar-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.54 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 05-Mar-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 1.62 | Waste Molecular Sieves ex THF drying (contaminated with Tetrahydrofuran) (MW-156-3) | 05-Mar-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 1.26 | Waste carbon / filter aid ex sparkler (acetone) MW-89-1 | 05-Mar-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 070510* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.18 | Unused Filter Aid heels/bags (MW-95-5) | 05-Mar-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 150202* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.36 | Waste Filters ex Benzoate pure (trace Ethanol) (MW-205-1) | 05-Mar-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.90 | MW-165-2 Waste cloths / Trace tirofiban API | 05-Mar-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 150202* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.77 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 05-Mar-2008 | 120L O/T Plastic | LS | AVG | 2811 | 6.1 | 070513* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.18 | UTIL-4 Waste Sludge / Grease / Cloths ex sludge dryer | 05-Mar-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.11 | Waste Lab Smalls (Pyridine, Methanol) (QOP-02) | 05-Mar-2008 | 120L O/T Plastic | LS | AVG | 1992 | 3 | 070504* | D10 |
| 77022 | B455884 | 311441 | 43.00 | 0.18 | TOP-02(a) Waste Solvent samples ex Lab, Lab smalls containing Toluene, Tetrahydrofuran, Heptane | 05-Mar-2008 | 120L O/T Plastic | LS | AVG | 1993 | 3 | 160508* | D10 |
| 77162 | B455885 | 311120 | 89.00 | 22.62 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 05-Mar-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 77086 | | 311351 | 35.00 | 23.84 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 06-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77087 | | 311351 | 36.00 | 25.36 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 06-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77088 | | 311351 | 37.00 | 23.78 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 06-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77225 | B455886 | 311320 | 22.00 | 26.92 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 07-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77228 | B455887 | 311320 | 24.00 | 23.72 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 07-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77089 | | 311351 | 38.00 | 21.98 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 10-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77263 | B455888 | 311320 | 23.00 | 24.44 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 10-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77090 | | 311351 | 39.00 | 25.36 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 11-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77092 | | 311351 | 40.00 | 26.46 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 11-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77372 | B455889 | 311320 | 26.00 | 22.98 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 12-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77378 | B455890 | 311320 | 27.00 | 26.96 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 12-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77285 | | 311351 | 41.00 | 26.74 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 13-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77393 | B455891 | 311096 | 35.00 | 26.88 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 13-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77394 | B455892 | 311096 | 36.00 | 26.06 | B-156-3 87% Tetrahydrofuran, 4.5% Ethanol, 1% Toluene, 6% Water , 1.5% Acetonitrile | 13-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77287 | | 311351 | 42.00 | 22.44 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 14-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77429 | B455893 | 311320 | 30.00 | 22.10 | B 89-1 Amiloride 89 Mother Liquors, Acetone (~67%), Water (~32%), Solids (~1%) | 14-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1090 | 3 | 070504* | D10 |
| 77459 | B455894 | 311320 | 28.00 | 26.62 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 18-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77462 | B455895 | 311320 | 29.00 | 24.94 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 18-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77288 | | 311351 | 43.00 | 26.36 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 19-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77516 | B455897 | 311320 | 31.00 | 25.72 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 19-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77519 | B455896 | 311320 | 32.00 | 23.72 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 19-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77547 | B455898 | 311320 | 37.00 | 24.28 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 20-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77289 | | 311351 | 44.00 | 21.20 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 21-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77590 | B455899 | 311320 | 33.00 | 26.80 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 25-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77606 | B455900 | 311320 | 25.00 | 26.76 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 25-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77290 | | 311351 | 45.00 | 24.14 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 26-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77616 | B455868 | 311320 | 34.00 | 22.62 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 26-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77291 | | 311351 | 46.00 | 27.58 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 27-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77652 | B455869 | 311320 | 38.00 | 25.14 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 27-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77501 | | 311351 | 47.00 | 22.08 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 28-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77673 | B455870 | 311320 | 40.00 | 26.88 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 28-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77502 | | 311351 | 48.00 | 21.38 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 31-Mar-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77675 | B455872 | 311320 | 41.00 | 23.44 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 31-Mar-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77503 | | 311351 | 49.00 | 23.58 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 01-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77674 | B455873 | 311320 | 42.00 | 26.94 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 01-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77505 | | 311351 | 51.00 | 22.76 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 02-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77677 | B455874 | 311320 | 44.00 | 20.00 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 02-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77715 | B455871 | 311441 | 72.00 | 3.68 | Fibreboard drums - empty unused MW-2 | 02-Apr-2008 | Pallet Box | LS | AVG | n/a | n/a | 150110* | D10 |
| 77814 | | 311351 | 52.00 | 24.30 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 03-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77815 | | 311351 | 53.00 | 23.82 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 03-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77473 | B455875 | 311317 | 7.00 | 27.36 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 04-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 77504 | | 311351 | 50.00 | 17.60 | (B-155-2) Heptanes ~75% , Tetrahyrofuran ~20% , Toluene ~5% , Water <0.5% , Residue on Evapouration <0.1%. | 04-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77676 | B455951 | 311320 | 43.00 | 25.88 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 04-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 76938 | B455952 | 311320 | 15.00 | 25.82 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 07-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77933 | B455954 | 311352 | 19.00 | 24.24 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , THF 0.03% , Ethanol 0.6% | 07-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070503* | R2 |
| 77876 | | 311351 | 54.00 | 23.68 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 08-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77878 | B455955 | 311320 | 46.00 | 26.32 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 08-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77925 | B455953 | 311320 | 47.00 | 24.00 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 08-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78000 | B455956 | 311317 | 24.00 | 26.40 | Omeprazole Crude M/Ls (B-190-2) , 5 % (w/w) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 09-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 78010 | B455957 | 311320 | 50.00 | 26.88 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 10-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 77877 | | 311351 | 55.00 | 23.86 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 11-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78011 | B455958 | 311320 | 51.00 | 23.46 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 11-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78080 | B455959 | 311320 | 52.00 | 26.40 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 11-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 77908 | | 311351 | 56.00 | 23.46 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 14-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78081 | B455960 | 311320 | 53.00 | 26.96 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 14-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78128 | B455961 | 311317 | 27.00 | 27.52 | Omeprazole Crude M/Ls (B-190-2)~ 5 % (w/w) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 14-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 77909 | | 311351 | 57.00 | 24.24 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 15-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77910 | | 311351 | 58.00 | 16.10 | B-364-1 Organic waste stream - 60 % Isopropyl Acetate (IPAC)40 % n-Heptane0.5 % THF0.3 % IPA | 15-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78082 | B455926 | 311320 | 54.00 | 25.28 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 15-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78083 | B455927 | 311320 | 55.00 | 26.94 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 16-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78188 | B375298 | 311339 | 3.00 | 21.00 | B-156-3 87% Tetrahydrofuran, 4.5% Ethanol, 1% Toluene, 6% Water , 1.5% Acetonitrile | 16-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78189 | B375299 | 311339 | 4.00 | 25.64 | B-156-3 87% Tetrahydrofuran, 4.5% Ethanol, 1% Toluene, 6% Water , 1.5% Acetonitrile | 16-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 77989 | B455929 | 311448 | 33.00 | 3.00 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 17-Apr-2008 | Pallet Box | LS | AVG | n/a | n/a | 070513* | D10 |
| 77989 | B455929 | 311448 | 33.00 | 0.72 | Waste carbon / filter aid ex sparkler (acetone) MW-89-1 | 17-Apr-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 070510* | D10 |
| 77989 | B455929 | 311448 | 33.00 | 0.54 | MW-204-1 Waste carbon (IPAC - isopropyl acetate) ex Benzoate Crude | 17-Apr-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 070510* | D10 |
| 77989 | B455929 | 311439 | 33.00 | 1.24 | Waste Molecular Sieves ex THF drying (contaminated with Tetrahydrofuran) (MW-156-3) | 17-Apr-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 77989 | B455929 | 311439 | 33.00 | 0.98 | Waste molecular sieves ex Acetonitrile drying ( MW-156-2) | 17-Apr-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 77989 | B455929 | 311439 | 33.00 | 1.88 | MW-156-4 Molecular sieves – ex Acetonitrile/Toluene drying | 17-Apr-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 150202* | D10 |
| 77989 | B455929 | 311448 | 33.00 | 1.96 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 17-Apr-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 070513* | D10 |
| 77989 | B455929 | 311448 | 33.00 | 0.18 | MW-162-6 Waste Pharmaceutical Intermediate -Tyrosine Sulphonate | 17-Apr-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 070513* | D10 |
| 77989 | B455929 | 311439 | 33.00 | 0.90 | MW- 364-2 Waste PPE / Cloths / Sample Jars Contaminated With Chiral Amide | 17-Apr-2008 | 200L Steel Combi | LS | AVG | n/a | n/a | 150202* | D10 |
| 77989 | B455929 | 311448 | 33.00 | 1.40 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 17-Apr-2008 | 120L O/T Plastic | LS | AVG | 2811 | 6.1 | 070513* | D10 |
| 77989 | B455929 | 311448 | 33.00 | 1.36 | UTIL-1Waste paint tins / cloths / etc | 17-Apr-2008 | 200L Steel Combi | LS | AVG | 3175 | 4.1 | 070513* | D10 |
| 78084 | B455930 | 311320 | 56.00 | 23.34 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 17-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78170 | | 311351 | 59.00 | 23.30 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 17-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78241 | B455928 | 311353 | 1.00 | 25.16 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene ,Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 17-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070503* | R2 |
| 77112 | B455857 | 311441 | 48.00 | 3.16 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 18-Apr-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 78085 | B455931 | 311320 | 57.00 | 26.92 | MK518 Coupling Mother Liquors & Washes (B-518-3) Water ~ 70%, IPA ~ 27% , Acetonitrile ~ 2% , THF ~ 1% | 18-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78275 | B455932 | 311320 | 59.00 | 22.52 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 18-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 78276 | B455933 | 311317 | 28.00 | 24.62 | Omeprazole Crude M/Ls (B-190-2) Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 18-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 78172 | | 311351 | 61.00 | 23.70 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 21-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78173 | | 311351 | 62.00 | 23.74 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 21-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78174 | | 311351 | 63.00 | 24.24 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 21-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78296 | B455934 | 311320 | 60.00 | 24.20 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 21-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78171 | | 311351 | 60.00 | 26.50 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 22-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78317 | B455936 | 311317 | 29.00 | 20.00 | Omeprazole Crude M/Ls (B-190-2) Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 22-Apr-2008 | Bulk Tank | UTT | Indaver NV | 1986 | 3 | 070503* | D10 |
| 78317 | B455936 | 311320 | 61.00 | 7.00 | MK 364-2 - Aqueous Waste Stream (B-364-2) Water ~95%, IPAC 2.6%, Dimethylformamide 2.1%, IPA 0.3% | 22-Apr-2008 | Bulk Tank | UTT | Indaver NV | 1993 | 3 | 070501* | D10 |
| 78318 | B455935 | 311320 | 62.00 | 26.94 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 22-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78384 | B455937 | 311320 | 65.00 | 26.40 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 23-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78397 | B455938 | 311320 | 66.00 | 24.80 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 24-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 78175 | | 311351 | 64.00 | 26.74 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 25-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78435 | B455941 | 311353 | 4.00 | 27.14 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 25-Apr-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070503* | R2 |
| 77782 | B455942 | 311317 | 13.00 | 20.00 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 29-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 78398 | B455939 | 311320 | 67.00 | 23.38 | MK 518 Pure Mother Liquors & Washes (B-518-4) Water 5%, Acetonitrile 17%, Ethanol 77% , Toluene 1 %. | 30-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78399 | B455940 | 311320 | 68.00 | 25.50 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 30-Apr-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78400 | B455943 | 311320 | 69.00 | 25.52 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 01-May-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 78401 | B455945 | 311320 | 70.00 | 26.88 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 01-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78504 | B455943 | 311439 | 43.00 | 1.70 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 01-May-2008 | Pallet Box | TPI | AVG | n/a | n/a | 070513* | D10 |
| 78504 | B455943 | 311439 | 43.00 | 0.80 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 01-May-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 150202* | D10 |
| 78504 | B455943 | 311126 | 132.00 | 1.60 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 01-May-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 070513* | D10 |
| 78504 | B455943 | 311439 | 43.00 | 0.18 | Waste filters ex Alendronate (water) MW-128-1 | 01-May-2008 | 200L Steel Combi | TPI | AVG | n/a. | n/a | 150202* | D10 |
| 78504 | B455943 | 311439 | 43.00 | 0.86 | Waste line Filters ex Sodium Salt (trace Acetonitrile, Toluene) (MW-156-5) | 01-May-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 150202* | D10 |
| 78504 | B455943 | 311442 | 33.00 | 0.32 | MW-26 Spor Klenz - 2.5lt -(Peroxide 0.8% peroxyacetic acid 0.06%) | 01-May-2008 | 200L Steel Combi | TPI | AVG | n/a | n/a | 070501* | D10 |
| 78504 | B455943 | 311444 | 14.00 | 0.30 | Waste Lab Smalls (Pyridine, Methanol) (QOP-02) | 01-May-2008 | 120L O/T Plastic | TPI | AVG | 1992 | 3 | 070504* | D10 |
| 78504 | B455943 | 311444 | 14.00 | 0.18 | TOP-02(a) Waste Solvent samples ex Lab, Lab smalls containing Toluene, Tetrahydrofuran, Heptane | 01-May-2008 | 120L O/T Plastic | TPI | AVG | 1993 | 3 | 160508* | D10 |
| 78504 | B455943 | 311442 | 33.00 | 1.98 | MW-518-3 Waste Oxadiazole K salt | 01-May-2008 | 200L Steel Combi | TPI | AVG | n/a | n/a | 070513* | D10 |
| 78504 | B455943 | 311439 | 43.00 | 0.36 | [MW-13] Waste Ecosorb ex Process | 01-May-2008 | 200L Steel Combi | TPI | AVG | n/a | n/a | 070513* | D10 |
| 78504 | B455943 | 311442 | 33.00 | 1.60 | [MW-13] Waste Ecosorb raw materials | 01-May-2008 | 200L Steel Combi | TPI | AVG | n/a | n/a | 070513* | D10 |
| 78176 | | 311351 | 65.00 | 22.78 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 02-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78177 | | 311351 | 66.00 | 23.22 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 02-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78178 | | 311351 | 67.00 | 25.06 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 06-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78280 | B456143 | | | 0.01 | Containing Hydrogen Chloride cylinder OVERPACK | 06-May-2008 | 120L O/T Plastic | IND | Chemogas | 1050 | 2.3 | 160504* | |
| 78280 | B456143 | 311439 | 83.00 | 0.04 | MW-364-4 Waste PPE / Cloths / Sample Jars Contaminated With Cyanuric Chloride [ACIDIC] | 06-May-2008 | 120L O/T Plastic | QYL | AVG | 2670 | 8 | 150202* | D10 |
| 78280 | B456143 | 311452 | 65.00 | 0.04 | MW 364-5 Cyanuric Chloride ~ 33kgs [ACIDIC] | 06-May-2008 | 200L O/T Steel | QYL | AVG | 2670 | 8 | 070513* | D10 |
| 78280 | B456143 | 311452 | 45.00 | 0.01 | Top-05 Lab Smalls containing Ethylene Trichloride | 06-May-2008 | 30L O/T Plastic | QYL | AVG | 2810 | 6.1 | 160508* | D10 |
| 78280 | B456143 | 311452 | 34.00 | 0.05 | Top-02(a) containing Thioacetamide | 06-May-2008 | 30L O/T Plastic | QYL | AVG | n/a | n/a | 160508* | D10 |
| 78280 | B456143 | 311126 | 169.00 | 0.26 | MW- 190-1 Waste Thionyl Chloride ~ 46kgs [[ACIDIC] | 06-May-2008 | 200L T/H Steel | QYL | AVG | 1836 | 8 | 160507* | D10 |
| 78281 | B456144 | | | 2.32 | M&I-1, Waste general WEEE PCs, Monitor etc | 06-May-2008 | Metal Cage | IND | Rehab Rec | n/a | n/a | 200135* | |
| 78281 | B456144 | | | 0.77 | M&I-1: Computer Servers | 06-May-2008 | Pallet | IND | Rehab Rec | n/a | n/a | 200135* | |
| 78658 | B455947 | 311320 | 75.00 | 25.44 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 06-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78659 | B455948 | 311353 | 5.00 | 24.44 | Omeprazole Crude Organic Extract layer (B-190-1), 78659 - 37% methanol, 60% toluene, 2.5% ethanol, <0.1% solids & 0.4% water. | 06-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1992 | 3 | 070504* | R2 |
| 78627 | B455946 | 311123 | 7.00 | 19.64 | (B-MW-1) Waste Oil - Top Oil Layer (~30%) Bottom Solvent-Water Layer (~70%) 90%(v.v.) Acetonitrile 50%,THF 30%,Toluene 20% | 07-May-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 78661 | B455949 | 311320 | 76.00 | 26.94 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 07-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78662 | B455901 | 311317 | 30.00 | 24.52 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 07-May-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 78665 | B455950 | 311320 | 77.00 | 22.06 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 07-May-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 78179 | | 311351 | 68.00 | 26.40 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 08-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78632 | | 311351 | 69.00 | 23.04 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 09-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78773 | B455902 | 311320 | 78.00 | 20.00 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 09-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78633 | | 311351 | 70.00 | 7.80 | [B-154-3] Mesylate Mother bottoms-Tetrahydrofuran 10-40% and Heptane 60-90%, solids <2% and water <1% | 10-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78633 | | 311351 | 70.00 | 9.92 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 10-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78634 | | 311351 | 71.00 | 23.26 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 12-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78774 | B455903 | 311320 | 79.00 | 26.64 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 12-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78635 | | 311351 | 72.00 | 21.60 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 14-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78636 | | 311351 | 73.00 | 22.64 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 15-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78816 | B455904 | 311439 | 51.00 | 2.62 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 15-May-2008 | Pallet Box | TPI | AVG | n/a | n/a | 070513* | D10 |
| 78816 | B455904 | 311443 | 59.00 | 0.48 | MW-190-3 m-CPBA (3-Chloroperoxybenzoic acid) 25L drum with residue (<100g/drum) | 15-May-2008 | 25L O/T Plastic | TPI | AVG | 3106 | 5.2 | 150110* | D10 |
| 78816 | B455904 | 311443 | 59.00 | 0.18 | MW-190-6 m CPBA (chloroperoxybenzoic acid) residuals contaminated cloths | 15-May-2008 | 200L Steel Combi | TPI | AVG | 3106 | 5.2 | 150202* | D10 |
| 78346 | B456145 | | | 0.52 | Mercury Lamps, used (UTIL-20) | 16-May-2008 | Coffin | IND | Irish Lamp | n/a | n/a | 060404* | |
| 78775 | B455905 | 311320 | 80.00 | 24.26 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 16-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78802 | | 311351 | 74.00 | 22.88 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 19-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78776 | B455906 | 311320 | 81.00 | 26.96 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 20-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78777 | B455907 | 311320 | 83.00 | 26.92 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 20-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 79055 | B455908 | 311339 | 5.00 | 22.92 | [B-156-3] THF 70-90%Toluene 1-3%Ethanol 5-20%Acetonitrile 1-3%Water 4-8% | 20-May-2008 | Bulk Tank | JPR | SRM Ltd. (: | 1993 | 3 | 070504* | R2 |
| 79056 | B455909 | 311339 | 6.00 | 23.12 | [B-156-3] THF 70-90%Toluene 1-3%Ethanol 5-20%Acetonitrile 1-3%Water 4-8% | 20-May-2008 | Bulk Tank | JPR | SRM Ltd. (: | 1993 | 3 | 070504* | R2 |
| 78903 | | 311351 | 75.00 | 27.16 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 21-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78904 | | 311351 | 76.00 | 23.80 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 21-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78778 | B455910 | 311320 | 84.00 | 25.50 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 22-May-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 78905 | | 311351 | 77.00 | 26.25 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 22-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78779 | B455911 | 311320 | 86.00 | 26.96 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 26-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 78906 | | 311351 | 78.00 | 26.84 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 26-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |

**TABLE**
**3.1.1.3C**

**Merck Sharp & Dohme (Ireland) EWC Report** **IPC Licence No: - P0011-03** **NACE Code :**
**Waste Management Company:** **2.1.2**
**Indaver Ireland Limited**
**Waste Collection Items with a Pick Up Date between 01/01/2008 - 31/12/2008**

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78907 | | 311351 | 79.00 | 22.02 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 26-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79132 | | 311351 | 80.00 | 26.56 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 27-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79216 | B455912 | 311320 | 87.00 | 25.32 | `MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 27-May-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 79133 | | 311351 | 81.00 | 22.58 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 28-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79134 | | 311351 | 82.00 | 22.64 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 29-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79183 | B455913 | 311452 | 2.00 | 2.74 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 29-May-2008 | Pallet Box | TPI | AVG | n/a | n/a | 070513* | D10 |
| 79183 | B455913 | 311452 | 2.00 | 0.80 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 29-May-2008 | 120L O/T Plastic | TPI | AVG | 2811 | 6.1 | 070513* | D10 |
| 79183 | B455913 | 311452 | 2.00 | 0.08 | TOP-02(a) Waste Solvent samples ex Lab, Lab smalls containing Toluene, Tetrahydrofuran, Heptane | 29-May-2008 | 120L O/T Plastic | TPI | AVG | 1993 | 3 | 160508* | D10 |
| 79183 | B455913 | 311452 | 2.00 | 0.16 | TOP-03Waste lab pharmaceutical powders (Simvastatin, Montelukast) | 29-May-2008 | 120L O/T Plastic | TPI | AVG | 3077 | 9 | 070513* | D10 |
| 79183 | B455913 | 311452 | 2.00 | 0.20 | UTIL-9 Empty plastic bags with residual ferrous sulphate & water | 29-May-2008 | 200L Steel Combi | TPI | AVG | n/a | n/a | 150110* | D10 |
| 79295 | B455914 | 311320 | 89.00 | 27.36 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 29-May-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 79135 | | 311351 | 83.00 | 22.54 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 30-May-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79136 | | 311351 | 84.00 | 23.54 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 03-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79286 | | 311351 | 85.00 | 24.38 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 03-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78780 | B455916 | 311320 | 90.00 | 26.82 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 04-Jun-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 79297 | | 311351 | 86.00 | 22.66 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 04-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79091 | B455915 | 311452 | 10.00 | 4.68 | UTIL-4 Waste Sludge / Grease / Cloths ex sludge dryer | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | n/a | n/a | 070513* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 2.07 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 05-Jun-2008 | Pallet Box | TPI | AVG | n/a | n/a | 070513* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 0.96 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 150202* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 0.48 | Waste line Filters ex Sodium Salt (trace Acetonitrile, Toluene) (MW-156-5) | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 150202* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 6.05 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 070513* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 1.92 | Waste Molecular Sieves ex THF drying (contaminated with Tetrahydrofuran) (MW-156-3) | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 150202* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 0.24 | MW-190-8 Waste Methyl Formate (40kgs) | 05-Jun-2008 | 200L T/H Steel | TPI | AVG | 1243 | 3 | 070504* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 0.12 | MW 191-3 Waste Omeprazole Magnesium Salt / Methanol API | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 070513* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 0.36 | MW-190-4 Waste Residual Solids omeprazole / Methanol (Empty) | 05-Jun-2008 | 200L T/H Steel | TPI | AVG | 1230 | 3 | 150110* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 0.12 | MW-20 Waste ecosorb / carbon (raw material) | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | n/a | n/a | 160305* | D10 |
| 79091 | B455915 | 311452 | 10.00 | 0.90 | UTIL-1Waste paint tins / cloths / etc | 05-Jun-2008 | 200L Steel Combi | TPI | AVG | 3175 | 4.1 | 070513* | D10 |
| 79299 | | 311351 | 87.00 | 24.56 | B-155-3 Toluene 30%, Tetrahydrofuran 55%, Heptanes 15%, Water 0.5% | 05-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 78781 | B455917 | 311320 | 91.00 | 26.10 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 06-Jun-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 78782 | B455918 | 311320 | 92.00 | 24.42 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 06-Jun-2008 | Bulk Tank | JPR | Indaver NV | 1230 | 3 | 070504* | D10 |
| 79319 | | 311351 | 88.00 | 22.76 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 09-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79510 | B455919 | 311339 | 7.00 | 25.70 | [B-156-3] THF 70-90%Toluene 1-3%Ethanol 5-20%Acetonitrile 1-3%Water 4-8% | 10-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79511 | B455920 | 311339 | 8.00 | 25.51 | [B-156-3]THF 70-90%Toluene 1-3%Ethanol 5-20%Acetonitrile 1-3%Water 4-8% | 10-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79503 | | 311351 | 89.00 | 22.76 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 11-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79504 | | 311351 | 90.00 | 21.82 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 11-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79495 | | 311351 | 91.00 | 23.26 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 12-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79496 | | 311351 | 92.00 | 21.70 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 12-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79497 | | 311351 | 93.00 | 25.36 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 16-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79499 | | 311351 | 95.00 | 22.28 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 16-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79498 | | 311351 | 94.00 | 26.94 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 17-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79356 | | 311457 | 1.00 | 3.12 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 18-Jun-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 79356 | | 311457 | 1.00 | 0.39 | MW-190-2 20% Chlorobenzoic Acid in a Solution 70% Toluene /30% Ethanol (Residual Peroxide 0.04% Max ) | 18-Jun-2008 | 200L T/H Steel | JPR | AVG | 1993 | 3 | 070503* | D10 |
| 79356 | | 311457 | 1.00 | 0.39 | MW-26 Spor Klenz - 2.5lt -(Peroxide 0.8% peroxyacetic acid 0.06%) | 18-Jun-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070501* | D10 |
| 79356 | | 311457 | 1.00 | 2.52 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 18-Jun-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79356 | | 311457 | 1.00 | 1.56 | B-154-3 B ~ 10% THF, ~ 90% Heptane ex Mesylate - ( Free flowing liquid, trace solids] | 18-Jun-2008 | 200L T/H Steel | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79356 | | 311457 | 1.00 | 0.52 | MW-156-4 Molecular sieves – ex Acetonitrile/Toluene drying | 18-Jun-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 79356 | | 311457 | 1.00 | 0.05 | Empty Drum previously containing Waste Oil / Solvent (Acetone, and Ethyl Acetate ) / Water Ex Vacuum Pumps (MW - 1a) | 18-Jun-2008 | 200L T/H Steel | JPR | AVG | 1993 | 3 | 150110* | D10 |
| 79356 | | 311457 | 1.00 | 0.13 | QOP-3 Waste Isopar G / Solvent | 18-Jun-2008 | 200L T/H Steel | JPR | AVG | 3295 | 3 | 070504* | D10 |
| 79356 | | 311457 | 1.00 | 0.05 | MW 190-9: Waste Pyrmethyl Alcohol (Solid) | 18-Jun-2008 | 100L steel combi | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79638 | | 311351 | 97.00 | 23.60 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 19-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79637 | | 311351 | 96.00 | 26.84 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 20-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79639 | | 311351 | 98.00 | 25.30 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 23-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79632 | | 311457 | 2.00 | 0.05 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 24-Jun-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 79632 | | 311457 | 2.00 | 4.40 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 24-Jun-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79632 | | 311457 | 2.00 | 0.01 | MW-190-4 Waste Residual Solids omeprazole / Methanol (Empty) | 24-Jun-2008 | 200L T/H Steel | JPR | AVG | 1230 | 3 | 150110* | D10 |
| 79632 | | 311457 | 2.00 | 0.25 | Waste line Filters ex Sodium Salt (trace Acetonitrile, Toluene) (MW-156-5) | 24-Jun-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 79632 | | 311457 | 2.00 | 0.03 | MW-20 Waste ecosorb / carbon (raw material) | 24-Jun-2008 | 120L O/T Plastic | JPR | AVG | n/a | n/a | 160305* | D10 |
| 79632 | | 311457 | 2.00 | 0.60 | MW - 1 Waste Oil / Solvent (Acetone, and Ethyl Acetate ) / Water Ex Vacuum Pumps | 24-Jun-2008 | 200L T/H Steel | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79632 | | 311457 | 2.00 | 0.60 | MW - 1 Waste Oil / Solvent (Acetone, and Ethyl Acetate ) / Water Ex Vacuum Pumps | 24-Jun-2008 | OD 322L Steel | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79632 | | 311457 | 2.00 | 0.30 | UTIL-3 Waste Hydraulic Oils | 24-Jun-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 130899* | D10 |
| 79632 | | 311457 | 2.00 | 0.10 | (MW-88-2) Waste Guanidine heels & empty bags | 24-Jun-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79632 | | 311457 | 2.00 | 0.05 | UTIL-4 Waste Sludge / Grease / Cloths ex sludge dryer | 24-Jun-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79632 | | 311457 | 2.00 | 0.69 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 24-Jun-2008 | 120L O/T Plastic | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 79632 | | 311457 | 2.00 | 0.03 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 24-Jun-2008 | 120L O/T Steel | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 79632 | | 311457 | 2.00 | 0.09 | Waste Lab Smalls (Pyridine, Methanol) (QOP-02) | 24-Jun-2008 | 120L O/T Plastic | JPR | AVG | 1992 | 3 | 070504* | D10 |
| 79632 | | 311457 | 2.00 | 0.06 | Waste lab smalls (Tetrahydrofuran, Toluene, Heptane) TOP-02(a) | 24-Jun-2008 | 120L O/T Plastic | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79632 | | 311457 | 2.00 | 0.05 | QOP-3 Waste Isopar G / Solvent | 24-Jun-2008 | 200L T/H Steel | JPR | AVG | 3295 | 3 | 070504* | D10 |
| 79632 | | 311457 | 2.00 | 0.06 | MW-34-1 Indomethacin with trace amounts of contamination | 24-Jun-2008 | 120L O/T Plastic | JPR | AVG | 2930 | 6.1 | 070513* | D10 |
| 79632 | | 311457 | 2.00 | 0.03 | UTIL-3 Waste Hydraulic Oils | 24-Jun-2008 | 120L O/T Plastic | JPR | AVG | n/a | n/a | 130899* | D10 |

**TABLE**
**3.1.1.3C**

**Merck Sharp & Dohme (Ireland) EWC Report** **IPC Licence No: - P0011-03** **NACE Code :**
**Waste Management Company:** **2.1.2**
**Indaver Ireland Limited**
**Waste Collection Items with a Pick Up Date between 01/01/2008 - 31/12/2008**

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79640 | | 311351 | 99.00 | 26.52 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 25-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79693 | B | 311450 | 1.00 | 24.16 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 25-Jun-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79641 | | 311351 | 100.00 | 26.84 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 26-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79886 | B456328 | 311446 | 1.00 | 26.86 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 26-Jun-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79936 | | 311351 | 101.00 | 26.92 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 27-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79937 | | 311351 | 102.00 | 25.16 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 30-Jun-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79994 | B456329 | 311320 | 102.00 | 26.42 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 02-Jul-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 80003 | | 311351 | 103.00 | 22.98 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 02-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79694 | | 311450 | 2.00 | 25.06 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 20.9%, Isopropanol 12.7%, Tetrahydrofuran 61.9%, Water 4.5% | 03-Jul-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79993 | | 311343 | 4.00 | 25.36 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 04-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80004 | | 311351 | 104.00 | 9.36 | POT A - [B-154-3] Mesylate Mother bottoms-Tetrahydrofuran 10-40% and Heptane 60-90%, solids <2% and water <1% | 04-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80004 | | 311351 | 104.00 | 8.26 | POT B - [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 04-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79992 | | 311343 | 3.00 | 27.10 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 07-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80005 | | 311351 | 105.00 | 22.70 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 07-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80135 | | 311351 | 106.00 | 25.12 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 07-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80136 | | 311351 | 107.00 | 23.84 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 07-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80137 | | 311351 | 108.00 | 24.98 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 07-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80138 | | 311351 | 109.00 | 23.46 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 07-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80141 | | 311351 | 110.00 | 23.26 | B-155-1 Toluene 84%, Heptanes 15%, Tetrahydrofuran 1% | 08-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80217 | | 311351 | 111.00 | 23.14 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 09-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79695 | | 311450 | 3.00 | 25.42 | MK 518 Coupling Distillate No. 2 (B-518-2) Acetonitrile 65%, Isopropanol 5%, Tetrahydrofuran 10%, Water 20% | 11-Jul-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79789 | B456330 | 311452 | 85.00 | 0.04 | UTIL-22 Novus CE 2680E | 11-Jul-2008 | 200L Steel Combi | QYL | AVG | n/a | n/a | 160508* | D10 |
| 79789 | B456330 | 311452 | 98.00 | 0.02 | UTIL-23 Amercor 8850 (cyclohexylamine) | 11-Jul-2008 | 30L T/H Plastic | QYL | AVG | 2734 | 8 | 160508* | D10 |
| 79789 | B456330 | 311452 | 72.00 | 0.21 | MW-88-5 Methane Sulphonic Acid | 11-Jul-2008 | 200L T/H Plastic | QYL | AVG | 2922 | 8 | 200114* | D10 |
| 79789 | B456330 | 311452 | 94.00 | 0.03 | MW-518-1 Oxalyl Chloride -Raw material [ACIDIC] | 11-Jul-2008 | 200L T/H Plastic | QYL | AVG | 2927 | 6.1 | 160305* | D10 |
| 79789 | B456330 | 311452 | 104.00 | 0.11 | MW-154-3 Waste heels Mesyl Chloride (methyl sulphonyl chloride)[ACIDIC] | 11-Jul-2008 | 200L T/H Steel | QYL | AVG | 3246 | 6.1 | 070503* | D10 |
| 79789 | B456330 | 311439 | 85.00 | 0.15 | MW-364-4 Waste PPE / Cloths / Sample Jars Contaminated With Cyanuric Chloride [ACIDIC] | 11-Jul-2008 | 200L Steel Combi | QYL | AVG | 2670 | 8 | 150202* | D10 |
| 79789 | B456330 | 311452 | 94.00 | 0.03 | MW-518-1 Oxalyl Chloride -Raw material [ACIDIC] | 11-Jul-2008 | 120L Polylined Stee | QYL | AVG | 2927 | 6.1 | 160305* | D10 |
| 79789 | B456330 | 311452 | 133.00 | 0.03 | TOP - 05 Halogenated solvents - lab smalls - Dichloromethane | 11-Jul-2008 | 120L O/T Plastic | QYL | AVG | 2810 | 6.1 | 160508* | D10 |
| 79789 | B456330 | | | 0.12 | UTIL-15 Waste oxonia sterilizing solution | 11-Jul-2008 | 200L Steel Combi | IND | AVG | 3149 | 5.1 | 160904* | |
| 79789 | B456330 | | | 0.02 | IPA 411 - oxidising solid | 11-Jul-2008 | 200L Steel Combi | IND | AVG | 3085 | 5.1 | 160904* | |
| 79789 | B456330 | 311452 | 116.00 | 0.03 | MW-518-1 Oxalyl Chloride -Raw material [ACIDIC] | 11-Jul-2008 | 200L Polylnd Stl | QYL | AVG | 2927 | 6.1 | 160305* | D10 |
| 80112 | B456331 | | | 0.07 | UTIL-7 Waste consumerables (needles/swabs) ex plant health | 11-Jul-2008 | 120L O/T Plastic | IND | Ecosafe Sy | 3291 | 6.2 | 180103* | |
| 80218 | | 311351 | 112.00 | 19.48 | B-153-1 61% Heptanes, 38% Toluene, 1% Tetrahydrofuran | 11-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 79995 | B456332 | 311320 | 103.00 | 21.78 | B-518-3 Water 75%, Isopropanol 18%, Acetonitrile 1%, Tetrahydrofuran 1%, Solids 5% | 16-Jul-2008 | Bulk Tank | JPR | Indaver NV | 1993 | 3 | 070504* | D10 |
| 79633 | | 311457 | 3.00 | 4.20 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 18-Jul-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79633 | | 311457 | 3.00 | 0.45 | Waste pharmaceutical intermediate - Sodium alendronate (17kgs) MW-128-2 | 18-Jul-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79633 | | 311457 | 3.00 | 0.36 | MW 191-3 Waste Omeprazole Magnesium Salt / Methanol API | 18-Jul-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 79633 | | 311457 | 3.00 | 0.18 | Waste Cerous (Cerium) Chloride powder (MW 153-1) | 18-Jul-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070513* | D10 |
| 79633 | | 311457 | 3.00 | 0.36 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 18-Jul-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 79633 | | 311457 | 3.00 | 1.98 | B-154-3 B ~ 10% THF, ~ 90% Heptane ex Mesylate - ( Free flowing liquid, trace solids] | 18-Jul-2008 | 200L T/H Steel | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 79633 | | 311457 | 3.00 | 0.90 | Waste molecular sieves ex Acetonitrile drying ( MW-156-2) | 18-Jul-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 79633 | | 311457 | 3.00 | 0.72 | UTIL-1Waste paint tins / cloths / etc | 18-Jul-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 79633 | | 311457 | 3.00 | 0.36 | UTIL-9 Empty plastic bags with residual ferrous sulphate & water | 18-Jul-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 150110* | D10 |
| 79633 | | 311457 | 3.00 | 0.51 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 18-Jul-2008 | 120L O/T Plastic | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 80219 | | 311351 | 113.00 | 26.74 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 21-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80514 | | 311351 | 114.00 | 26.40 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 22-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80581 | | 311351 | 115.00 | 14.52 | (B-201-1) Tetrahydrofuran 40-60% and heptane 40-60% and <1% water | 25-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80650 | | 311351 | 116.00 | 24.06 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 30-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80651 | | 311351 | 117.00 | 23.92 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 30-Jul-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80789 | | 311351 | 118.00 | 21.30 | [B-155-1]Toluene 67%, Heptanes 30%, Tetrahydrofuran 3%. | 11-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80911 | | 311457 | 7.00 | 3.58 | Waste HEPA filters[liners/filters/crushed fibre kegs] (trace pharmaceutical intermediates) MW-2 | 20-Aug-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 80911 | | 311457 | 7.00 | 0.22 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 20-Aug-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 80911 | | 311457 | 7.00 | 0.67 | Waste line Filters ex Sodium Salt (trace Acetonitrile, Toluene) (MW-156-5) | 20-Aug-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 80911 | | 311457 | 7.00 | 0.08 | MW-95-5 Unused Filter Aid Heels / bags | 20-Aug-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 150202* | D10 |
| 80911 | | 311457 | 7.00 | 0.15 | MW-95-7 Waste Cloths/filters/trace nickel/water | 20-Aug-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 150202* | D10 |
| 80911 | | 311457 | 7.00 | 0.15 | QOP-3 Waste Isopar G / Solvent | 20-Aug-2008 | 200L T/H Steel | JPR | AVG | 3295 | 3 | 070504* | D10 |
| 80911 | | 311457 | 7.00 | 0.20 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 20-Aug-2008 | 120L O/T Plastic | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 80911 | | 311457 | 7.00 | 1.12 | UTIL-1Waste paint tins / cloths / etc | 20-Aug-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 80911 | | 311457 | 7.00 | 0.83 | Waste Dowtherm (Diethylbenzene) drums[MW-3] | 20-Aug-2008 | 200L T/H Steel | JPR | AVG | 2049 | 3 | 070504* | D10 |
| 80911 | | 311457 | 7.00 | 0.08 | MW-10 Waste drums of water / dowtherm ex PSV tank | 20-Aug-2008 | 200L T/H Steel | JPR | AVG | 2049 | 3 | 070504* | D10 |
| 81053 | | 311343 | 10.00 | 25.94 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 21-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81054 | | 311343 | 11.00 | 25.40 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 21-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81055 | | 311351 | 119.00 | 23.92 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 22-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81056 | | 311351 | 120.00 | 23.04 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 22-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81057 | | 311351 | 121.00 | 23.76 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 22-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80974 | | 311355 | 4.00 | 15.66 | (MW-95-4) Spent Catalyst - Raney Nickel Catalyst 3-15%, Water 55-75%, Ethanol 5-15%, Molecular Sieves 15-35%, | 28-Aug-2008 | 200L Steel Combi | JPR | Nickelhuett | 1378 | 4.2 | 160802* | R4 |
| 81221 | | 311351 | 123.00 | 24.92 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 28-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81102 | | 311351 | 122.00 | 27.26 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 29-Aug-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |

**TABLE**
**3.1.1.3C**

**Merck Sharp & Dohme (Ireland) EWC Report** **IPC Licence No: - P0011-03** **NACE Code :**
**Waste Management Company:** **2.1.2**
**Indaver Ireland Limited**
**Waste Collection Items with a Pick Up Date between 01/01/2008 - 31/12/2008**

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 81239 | | 311351 | 128.00 | 24.50 | B-95-1 Waste Ethanol 2BA (Toluene/20% Water) | 01-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81264 | | 311351 | 124.00 | 26.62 | IPAC distillates (B-203-3 (a) )water ~ 2% (v/v)Isopropyl Acetate (IPAC) ~ 90%Methanol ~ 7%Heptanes ~ 1% | 01-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81306 | | 311351 | 129.00 | 27.40 | B-95-1 Waste Ethanol 2BA (Toluene/20% Water) | 01-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80975 | | 311355 | 5.00 | 19.28 | (MW-95-4) Spent Catalyst - Raney Nickel Catalyst 3-15%, Water 55-75%, Ethanol 5-15%, Molecular Sieves 15-35%, | 02-Sep-2008 | 200L Steel Combi | JPR | Nickelhuett | 1378 | 4.2 | 160802* | R4 |
| 81285 | | 311351 | 125.00 | 23.76 | Tryptophol mother liquors (B-203-1)(v/v)Isopropyl Acetate (IPAC) ~ 71%Heptanes ~ 28% | 03-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81287 | | 311351 | 126.00 | 22.54 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 03-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80368 | B456333 | 311452 | 137.00 | 0.01 | Drum C: Lab smalls containing glass containers of Perchloric acid 70% , TOP-02 | 04-Sep-2008 | 25L O/T Plastic | QYL | AVG | 3098 | 5.1 | 160507* | D10 |
| 80368 | B456333 | | | 0.01 | Drum N: Lab smalls containin TOP-02 Tes Chloride ex Bis Tes process | 04-Sep-2008 | 25L O/T Plastic | IND | AVG | 2920 | 8 | 070503* | |
| 80368 | B456333 | 311452 | 235.00 | 0.01 | TOP - 04 Hexylithium 2.3 M soln. in hexane | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 3394 | 4.2 | 160508* | D10 |
| 80368 | B456333 | 311452 | 193.00 | 0.01 | TOP - 04 Lithium Bis (trimethyl-silyl) amide - 1 M soln. in Toluene | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 2924 | 3 | 160508* | D10 |
| 80368 | B456333 | 311452 | 171.00 | 0.01 | TOP - 04 Lithium Diisopropylamide - in THF/Heptane | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 3399 | 4.3 | 160508* | D10 |
| 80368 | B456333 | 311452 | 171.00 | 0.02 | TOP - 04 Methyl Magnesium Chloride in THF | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 3399 | 4.3 | 160508* | D10 |
| 80368 | B456333 | 311452 | 235.00 | 0.01 | TOP - 04 N-Butyl Lithium in Heptane | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 3394 | 4.2 | 160508* | D10 |
| 80368 | B456333 | 311452 | 161.00 | 0.01 | TOP - 04 T-Buthyl Lithium in Heptane | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 3399 | 4.3 | 160508* | D10 |
| 80368 | B456333 | 311452 | 143.00 | 0.03 | TOP-02 Waste Lab Smalls Sulphuryl Chloride | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 1760 | 8 | 160507* | D10 |
| 80368 | B456333 | | | 0.12 | MW-154-3 Waste heels Mesyl Chloride (methyl sulphonyl chloride)[ACIDIC] | 04-Sep-2008 | 200L T/H Steel | IND | AVG | 3246 | 6.1 | 070503* | |
| 80368 | B456333 | 311452 | 146.00 | 0.08 | MW-201-2 Waste heel drums (< 5 Lts each) of Tes Chloride ex Bis Tes process[ACIDIC] | 04-Sep-2008 | 200L T/H Steel | QYL | AVG | 2986 | 8 | 070503* | D10 |
| 80368 | B456333 | 311806 | 6.00 | 0.06 | MW-518-4 Waste N Methyl Morpholine [BASIC] | 04-Sep-2008 | 200L T/H Steel | QYL | AVG | 2535 | 3 | 160305* | D10 |
| 80368 | B456333 | 311806 | 6.00 | 0.06 | MW-518-2 24% Potassium Ethoxide in Ethanol | 04-Sep-2008 | 200L T/H Steel | QYL | AVG | 3274 | 3 | 160305* | D10 |
| 80368 | B456333 | 311444 | 46.00 | 0.09 | MW-204-2 Waste Triethylamine (BASIC) | 04-Sep-2008 | 200L T/H Steel | QYL | AVG | 1296 | 3 | 070504* | D10 |
| 80368 | B456333 | 311452 | 146.00 | 0.03 | MW-201-2 Waste heel drums (< 5 Lts each) of Tes Chloride ex Bis Tes process[ACIDIC] | 04-Sep-2008 | 200L T/H Steel | QYL | AVG | 2986 | 8 | 070503* | D10 |
| 80368 | B456333 | 311452 | 193.00 | 0.01 | TOP-04 Lithium-T-Butoxide in THF/Heptane | 04-Sep-2008 | Combination Box (4 | QYL | AVG | 2924 | 3 | 160508* | D10 |
| 80368 | B456333 | 311660 | 15.00 | 0.04 | Top-05 Lab Smalls containing heels Mesyl Chloride (methyl sulphonyl chloride) | 04-Sep-2008 | 30L O/T Plastic | QYL | Indaver NV | 2927 | 6.1 | 160508* | D10 |
| 80964 | B456334 | | | 0.96 | M&I-1, Waste general WEEE PCs, Monitor etc | 04-Sep-2008 | Metal Cage | IND | Rehab Rec | n/a | n/a | 200135* | |
| 80966 | B456335 | | | 0.17 | Mercury Lamps, used (UTIL-20) | 04-Sep-2008 | Coffin | IND | Irish Lamp | n/a | n/a | 060404* | |
| 81288 | | 311351 | 127.00 | 25.48 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 04-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81147 | | 311457 | 8.00 | 5.35 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 05-Sep-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 81147 | | 311457 | 8.00 | 1.00 | MW-203-6 Magnesium Sulphate / Sodium Carbonate Cake With < 10% IPAC | 05-Sep-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 81147 | | 311457 | 8.00 | 0.15 | Waste line Filters ex Sodium Salt (trace Acetonitrile, Toluene) (MW-156-5) | 05-Sep-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 81147 | | 311457 | 8.00 | 0.14 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 05-Sep-2008 | 120L O/T Plastic | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 81147 | | 311457 | 8.00 | 0.02 | Waste Lab Smalls (Pyridine, Methanol) (QOP-02) | 05-Sep-2008 | 120L O/T Plastic | JPR | AVG | 1992 | 3 | 070504* | D10 |
| 81147 | | 311457 | 8.00 | 0.10 | QOP-3 Waste Isopar G / Solvent | 05-Sep-2008 | 200L T/H Steel | JPR | AVG | 3295 | 3 | 070504* | D10 |
| 81147 | | 311457 | 8.00 | 0.02 | Waste lab smalls (Tetrahydrofuran, Toluene, Heptane) TOP-02(a) | 05-Sep-2008 | 120L O/T Plastic | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 81147 | | 311457 | 8.00 | 0.10 | Waste carbon / filter aid ex sparkler (acetone) MW-89-1 | 05-Sep-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070510* | D10 |
| 81516 | | 311351 | 130.00 | 25.28 | IPAC distillates (B-203-3 (a) )water ~ 2% (v/v)Isopropyl Acetate (IPAC) ~ 90%Methanol ~ 7%Heptanes ~ 1% | 11-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81432 | | 311450 | 6.00 | 24.66 | (B-203-4) Dimethylformamide ~66%, Isopropyl Acetate ~4%, Methanol ~1%, Water 21%, Heptane 7% | 12-Sep-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 81568 | | 311351 | 131.00 | 24.18 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 15-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81569 | | 311351 | 132.00 | 23.72 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 17-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81677 | B456336 | 311320 | 114.00 | 19.84 | B 89-1 Amiloride 89 Mother Liquors, Acetone (~67%), Water (~32%), Solids (~1%) | 18-Sep-2008 | Bulk Tank | JPR | Indaver NV | 1090 | 3 | 070504* | D10 |
| 81660 | | 311351 | 133.00 | 24.96 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 22-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81765 | | 311351 | 135.00 | 20.50 | Tryptophol mother liquors (B-203-1)water ~ 1% (v/v)Isopropyl Acetate (IPAC) ~ 71%Heptanes ~ 28% | 23-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81726 | | 311351 | 134.00 | 25.60 | IPAC distillates (B-203-3 (a) )water ~ 2% (v/v)Isopropyl Acetate (IPAC) ~ 90%Methanol ~ 7%Heptanes ~ 1% | 24-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81464 | | 311457 | 9.00 | 2.24 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 25-Sep-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 81464 | | 311457 | 9.00 | 2.88 | MW-88-1 Waste sodium methoxide heels & bags, waste raw material | 25-Sep-2008 | 200L Steel Combi | JPR | AVG | 1431 | 4.2 | 070513* | D10 |
| 81797 | | 311351 | 136.00 | 22.54 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 26-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81921 | | 311351 | 137.00 | 25.40 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 30-Sep-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 80976 | | 311861 | 1.00 | 15.71 | (MW-95-4) Spent Catalyst - Raney Nickel Catalyst 3-15%, Water 55-75%, Ethanol 5-15%, Molecular Sieves 15-35%, | 01-Oct-2008 | 200L Steel Combi | JPR | Nickelhuett | 1378 | 4.2 | 160802* | R4 |
| 80978 | | 311861 | 2.00 | 16.25 | (MW-95-4) Spent Catalyst - Raney Nickel Catalyst 3-15%, Water 55-75%, Ethanol 5-15%, Molecular Sieves 15-35%, | 01-Oct-2008 | 200L Steel Combi | JPR | Nickelhuett | 1378 | 4.2 | 160802* | R4 |
| 80979 | | 311861 | 3.00 | 15.97 | (MW-95-4) Spent Catalyst - Raney Nickel Catalyst 3-15%, Water 55-75%, Ethanol 5-15%, Molecular Sieves 15-35%, | 01-Oct-2008 | 200L Steel Combi | JPR | Nickelhuett | 1378 | 4.2 | 160802* | R4 |
| 81947 | | 311351 | 138.00 | 26.18 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 02-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81949 | | 311351 | 139.00 | 24.22 | IPAC distillates (B-203-3 (a) )water ~ 2% (v/v)Isopropyl Acetate (IPAC) ~ 90%Methanol ~ 7%Heptanes ~ 1% | 02-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81954 | | 311351 | 141.00 | 23.16 | Tryptophol mother liquors (B-203-1)water ~ 1% (v/v)Isopropyl Acetate (IPAC) ~ 71%Heptanes ~ 28% | 03-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82032 | | 311450 | 7.00 | 17.72 | (B-203-4) Dimethylformamide ~66%, Isopropyl Acetate ~4%, Methanol ~1%, Water 21%, Heptane 7% | 03-Oct-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 81950 | | 311351 | 140.00 | 25.36 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 06-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82070 | | 311861 | 4.00 | 4.55 | (MW-95-4) Spent Catalyst - Raney Nickel Catalyst 3-15%, Water 55-75%, Ethanol 5-15%, Molecular Sieves 15-35%, | 07-Oct-2008 | 200L Steel Combi | JPR | Nickelhuett | 1378 | 4.2 | 160802* | R4 |
| 82102 | | 311351 | 142.00 | 8.86 | POT B:B-203-2 Tryptophol DMF Distillates 85% Dmf, 10% Heptanes, 5% water, <1% THF, <0.1% solids. | 08-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82102 | | 311351 | 142.00 | 10.24 | POT A: B-203-3(a) Tryptophol IPAC Distillates:82% IPAC, 12.5% Heptanes, 3.5% Methanol, 2% Water, <0.1% Solids | 08-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 81687 | | 311457 | 10.00 | 5.40 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 09-Oct-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 81687 | | 311457 | 10.00 | 2.79 | MW-203-6 Magnesium Sulphate / Sodium Carbonate Cake With < 10% IPAC | 09-Oct-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 81687 | | 311457 | 10.00 | 1.30 | Waste carbon / filter aid ex sparkler (acetone) MW-89-1 | 09-Oct-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070510* | D10 |
| 81687 | | 311457 | 10.00 | 0.48 | MW 95-1 MCB distillation bottoms/tars | 09-Oct-2008 | 25L T/H Steel | JPR | AVG | n/a | n/a | 070508* | D10 |
| 81687 | | 311457 | 10.00 | 0.72 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 09-Oct-2008 | 120L O/T Plastic | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 81687 | | 311457 | 10.00 | 0.80 | Waste Molecular Sieves ex THF drying (contaminated with Tetrahydrofuran) (MW-156-3) | 09-Oct-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 81687 | | 311457 | 10.00 | 0.04 | Waste Lab Smalls (Pyridine, Methanol) (QOP-02) | 09-Oct-2008 | 120L O/T Plastic | JPR | AVG | 1992 | 3 | 070504* | D10 |
| 81687 | | 311457 | 10.00 | 0.08 | QOP-3 Waste Isopar G / Solvent | 09-Oct-2008 | 120L steel combi | JPR | AVG | 3295 | 3 | 070504* | D10 |
| 81687 | | 311457 | 10.00 | 0.01 | TOP-02(a) Lab Smalls containing 1,2-Dimethoxyethane | 09-Oct-2008 | 30L O/T Plastic | JPR | AVG | 1993 | 3 | 160508* | D10 |
| 81687 | | 311457 | 10.00 | 0.04 | TOP-02(a) Lab Smalls, 1,4 Dioxane | 09-Oct-2008 | 120L O/T Plastic | JPR | AVG | 1993 | 3 | 160508* | D10 |
| 81687 | | 311457 | 10.00 | 0.08 | Waste lab smalls (Tetrahydrofuran, Toluene, Heptane) TOP-02(a) | 09-Oct-2008 | 120L O/T Plastic | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 81687 | | 311457 | 10.00 | 0.20 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 09-Oct-2008 | 200L Steel Combi | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 81687 | | 311457 | 10.00 | 0.20 | (MW-88-2) Waste Guanidine heels & empty bags | 09-Oct-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070513* | D10 |

**TABLE**
**3.1.1.3C**

**Merck Sharp & Dohme (Ireland) EWC Report** **IPC Licence No: - P0011-03** **NACE Code :**
**Waste Management Company:** **2.1.2**
**Indaver Ireland Limited**
**Waste Collection Items with a Pick Up Date between 01/01/2008 - 31/12/2008**

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82142 | | 311351 | 143.00 | 24.36 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 09-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82143 | | 311351 | 144.00 | 24.78 | B-95-1 Waste Ethanol 2BA (Toluene/20% Water) | 10-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82213 | | 311351 | 145.00 | 27.02 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 13-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82214 | | 311351 | 146.00 | 25.04 | B-95-1 Waste Ethanol 2BA (Toluene/20% Water) | 13-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82249 | | 311351 | 147.00 | 9.38 | Benzoate Crude-2 dist/m/ls(B-204-1) ~ 16% IPA , ~ 9% THF, ~ 73% Isopropyl Acetate (IPAC) , Water ~2% , Dissolved Solids 0.1% | 15-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82380 | | 311351 | 148.00 | 25.48 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 23-Oct-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070503* | R2 |
| 82458 | B456337 | 311317 | 52.00 | 26.90 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 24-Oct-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 82476 | | 311669 | 1.00 | 26.70 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 28-Oct-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 82338 | | 311457 | 11.00 | 3.54 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 30-Oct-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 82338 | | 311457 | 11.00 | 0.18 | MW-20 Waste ecosorb / carbon (raw material) | 30-Oct-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 160305* | D10 |
| 82338 | | 311457 | 11.00 | 0.54 | MW-13 Waste Sodium Carbonate Anhydrous | 30-Oct-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070513* | D10 |
| 82338 | | 311457 | 11.00 | 0.18 | MW-26 Spor Klenz - 2.5lt -(Peroxide 0.8% peroxyacetic acid 0.06%) | 30-Oct-2008 | 120L O/T Plastic | JPR | AVG | n/a | n/a | 070501* | D10 |
| 82338 | | 311457 | 11.00 | 0.72 | MW-87-2Waste Sulphuryl Chloride raw material ~ 80 kgs (ACIDIC) | 30-Oct-2008 | 200L T/H Steel | JPR | AVG | 1834 | 8 | 060106* | D10 |
| 82338 | | 311457 | 11.00 | 0.36 | MW-126-3 Full/Heel/Empty bags/Cloths with phosphorous acid[ACIDIC] | 30-Oct-2008 | 200L Steel Combi | JPR | AVG | 2834 | 8 | 060104* | D10 |
| 82338 | | 311457 | 11.00 | 0.14 | MW-87-2Waste Sulphuryl Chloride raw material ~ [EMPTY] | 30-Oct-2008 | 200L T/H Steel | JPR | AVG | 1834 | 8 | 150110* | D10 |
| 82338 | | 311457 | 11.00 | 0.18 | Waste pharmaceutical intermediate - Sodium alendronate MW-128-2 | 30-Oct-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 070513* | D10 |
| 82338 | | 311457 | 11.00 | 0.13 | MW- 190-1 Empty unclean drums that previously contained Waste Thionyl Chloride. [ACIDIC] | 30-Oct-2008 | 200L T/H Steel | JPR | AVG | 1836 | 8 | 150110* | D10 |
| 82338 | | 311457 | 11.00 | 0.05 | Empty drum previously containing Tes Chloride (MW-201-2) | 30-Oct-2008 | 200L T/H Steel | JPR | AVG | 2986 | 8 | 150110* | D10 |
| 82569 | B456338 | 311756 | 4.00 | 25.86 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 31-Oct-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 82576 | | 311669 | 2.00 | 26.00 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 31-Oct-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 82613 | | 311351 | 149.00 | 22.96 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 03-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82614 | | 311351 | 150.00 | 27.06 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 04-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82631 | | 311669 | 3.00 | 27.64 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 05-Nov-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 82672 | B456339 | 311756 | 5.00 | 25.86 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 05-Nov-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 82693 | | 311354 | 1.00 | 26.92 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 05-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070503* | R2 |
| 82694 | | 311354 | 2.00 | 20.98 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 06-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070503* | R2 |
| 82615 | | 311351 | 151.00 | 22.38 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 07-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82788 | | 311351 | 152.00 | 18.10 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 07-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82789 | | 311351 | 153.00 | 24.36 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 10-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82793 | | 311669 | 4.00 | 27.22 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 10-Nov-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 82820 | | 311351 | 154.00 | 24.20 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 10-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82833 | B456340 | 311756 | 7.00 | 25.00 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 12-Nov-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 82827 | | 311457 | 12.00 | 0.45 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 13-Nov-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 82827 | | 311457 | 12.00 | 2.71 | MW-190-3 m-CPBA (3-Chloroperoxybenzoic acid) 25L drum with residue (<100g/drum) | 13-Nov-2008 | 25L O/T Plastic | JPR | AVG | 3106 | 5.2 | 150110* | D10 |
| 82880 | | 311351 | 156.00 | 22.96 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 13-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82870 | | 311351 | 155.00 | 9.66 | POT A - [B-154-3] Mesylate Mother bottoms-89% (v/v) Heptanes, 10% (v/v) Tetrahydrofuran, 1% Solids, 0.1% Water | 14-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82870 | | 311351 | 155.00 | 8.94 | POT B - [B-155-1]Toluene 72%, Heptanes 25%, Tetrahydrofuran 3%. | 14-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82872 | | 311669 | 5.00 | 27.14 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 14-Nov-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 82956 | | 311351 | 157.00 | 21.32 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 17-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82966 | | 311669 | 6.00 | 23.10 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 18-Nov-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 82968 | | 311343 | 12.00 | 26.79 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 18-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 82969 | | 311343 | 13.00 | 25.98 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 18-Nov-2008 | Bulk Tank | JPR | SRM Ltd. ( | 1993 | 3 | 070504* | R2 |
| 83001 | B455920 | 311756 | 11.00 | 27.02 | (B-192-1) Omeprazole Pure - M/Ls & Washes, Methanol 20 - 60%, Water 40 - 80 %, Solids 0 - 5% | 18-Nov-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 140603* | D10 |

**TABLE**
**3.1.1.3C**

**Merck Sharp & Dohme (Ireland) EWC Report** **IPC Licence No: - P0011-03** **NACE Code :**
**Waste Management Company:** **2.1.2**
**Indaver Ireland Limited**
**Waste Collection Items with a Pick Up Date between 01/01/2008 - 31/12/2008**

| Enquiry No | C1 No | TFS No | Load | Weight | Description of Waste | Pick Up Date | Unit Type | Haulier | Disposer | UN No. | Class | Ir. EWC No. | Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 82991 | | 311351 | 158.00 | 26.62 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 19-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 82845 | | 311457 | 13.00 | 13.50 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 20-Nov-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 82845 | | 311457 | 13.00 | 5.94 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 20-Nov-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 82845 | | 311457 | 13.00 | 2.16 | UTIL-17 Waste Carbon ex WWTP Abatement | 20-Nov-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070510* | D10 |
| 82845 | | 311457 | 13.00 | 1.44 | MW-156-1 Waste Molecular sieves ex Toluene drying | 20-Nov-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 82845 | | 311457 | 13.00 | 1.44 | UTIL-1Waste paint tins / cloths / etc | 20-Nov-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 82845 | | 311457 | 13.00 | 1.98 | Waste Molecular Sieves ex THF drying (contaminated with Tetrahydrofuran) (MW-156-3) | 20-Nov-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 82845 | | 311457 | 13.00 | 0.72 | UTIL-9 Empty plastic bags with residual ferrous sulphate & water | 20-Nov-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 150110* | D10 |
| 82993 | B456341 | 311756 | 10.00 | 25.84 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 20-Nov-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 82995 | | 311351 | 159.00 | 23.06 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 21-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83008 | | 311351 | 160.00 | 25.14 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 21-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83009 | | 311354 | 3.00 | 25.28 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 21-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070503* | R2 |
| 83079 | | 311669 | 7.00 | 26.76 | Omeprazole Crude M/Ls (B-190-2) Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 24-Nov-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 83150 | B456344 | 311982 | 5.00 | 23.66 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 24-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83151 | B456343 | 311982 | 6.00 | 26.52 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 24-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83174 | | 311354 | 4.00 | 26.94 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene ,Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 27-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070503* | R2 |
| 83175 | B456345 | 311756 | 17.00 | 27.44 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 27-Nov-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 83178 | | 311351 | 161.00 | 26.90 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 27-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83227 | | 311669 | 8.00 | 24.24 | Omeprazole Crude M/Ls (B-190-2) Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 28-Nov-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 83234 | | 311351 | 162.00 | 26.64 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 28-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83235 | | 311351 | 163.00 | 23.74 | [B-154-2] Acetonitrile 75-100% and Heptane 0-10% and Tetrahydrofuran 0-10% | 28-Nov-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83287 | B456346 | 311756 | 18.00 | 25.44 | (B-192-1) Omeprazole Pure - M/Ls & Washes, Methanol 20 - 60%, Water 40 - 80 %, Solids 0 - 5% | 02-Dec-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 140603* | D10 |
| 83288 | B456347 | 311756 | 19.00 | 25.72 | (B-192-1) Omeprazole Pure - M/Ls & Washes, Methanol 20 - 60%, Water 40 - 80 %, Solids 0 - 5% | 02-Dec-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 140603* | D10 |
| 83301 | | 311351 | 164.00 | 25.36 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 02-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83257 | | 311457 | 14.00 | 3.97 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 03-Dec-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 83257 | | 311457 | 14.00 | 0.87 | Waste lab test consumerables (gloves/plates) and samples QOP-01 | 03-Dec-2008 | 120L O/T Plastic | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 83257 | | 311457 | 14.00 | 0.03 | MW-89-2 Waste Pharmaceutical Intermediate - Amiloride Hydrochloride crude powder | 03-Dec-2008 | 120L O/T Plastic | JPR | AVG | 2811 | 6.1 | 070513* | D10 |
| 83257 | | 311457 | 14.00 | 3.42 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 03-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 83257 | | 311457 | 14.00 | 0.45 | Waste line Filters ex Sodium Salt (trace Acetonitrile, Toluene) (MW-156-5) | 03-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 83257 | | 311457 | 14.00 | 0.54 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 03-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 83257 | | 311457 | 14.00 | 0.36 | Waste Carbon ex Lisinopril pure (trace Acetone) (MW-114-2) | 03-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070510* | D10 |
| 83257 | | 311457 | 14.00 | 0.90 | MW-156-1 Waste Molecular sieves ex Toluene drying | 03-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 83257 | | 311457 | 14.00 | 0.72 | B-154-3 B ~ 10% THF, ~ 90% Heptane ex Mesylate - ( Congealed Material on Bottom of drum <20Lts ) | 03-Dec-2008 | 200L T/H Steel | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 83326 | | 311669 | 9.00 | 27.11 | Omeprazole Crude M/Ls (B-190-2) , Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 04-Dec-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 83327 | | 311351 | 165.00 | 21.76 | B-95-1 Waste Ethanol 2BA (Toluene/20% Water) | 04-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83331 | | 311351 | 166.00 | 22.82 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 04-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83337 | | 311351 | 167.00 | 21.38 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 05-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83339 | B456348 | 311756 | 21.00 | 23.16 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 05-Dec-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 83341 | | 311354 | 5.00 | 26.16 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 05-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070503* | R2 |
| 83412 | B 456276 | 311756 | 24.00 | 24.72 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 05-Dec-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 83433 | | 311669 | 10.00 | 26.22 | Omeprazole Crude M/Ls (B-190-2) ,Water ~ 67.5 % (v/v), Methanol ~ 15% , Ethanol 12.5% | 09-Dec-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 83436 | | 311457 | 15.00 | 3.25 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 10-Dec-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 83436 | | 311457 | 15.00 | 0.70 | MW-190-3 m-CPBA (3-Chloroperoxybenzoic acid) 25L drum with residue (<100g/drum) | 10-Dec-2008 | 25L O/T Steel | JPR | AVG | 3106 | 5.2 | 150110* | D10 |
| 83436 | | 311457 | 15.00 | 0.01 | MW-190-3 m-CPBA (3-Chloroperoxybenzoic acid) RAW MATERIAL | 10-Dec-2008 | 25L O/T Steel | JPR | AVG | 3106 | 5.2 | 070513* | D10 |
| 83434 | | 311986 | 1.00 | 25.28 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 11-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83471 | | 311986 | 2.00 | 23.50 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water <3% | 11-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83437 | | 311354 | 6.00 | 10.34 | Omeprazole Crude Organic Extract layer (B-190-1), 99.0 % Toluene , Water 0.02% (w/w) , THF 0.03% , Ethanol 0.6% | 12-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070503* | R2 |
| 83543 | B456277 | 311756 | 25.00 | 25.64 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 12-Dec-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 83562 | | 311669 | 11.00 | 25.88 | Omeprazole Crude M/Ls (B-190-2) , 44.5% Methanol, 5.5% Ethanol, 6.5% Solids & 43.5% water | 15-Dec-2008 | Bulk Tank | JPR | Indaver NV | 1986 | 3 | 070503* | D10 |
| 83584 | | 311457 | 16.00 | 5.20 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 17-Dec-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 83584 | | 311457 | 16.00 | 5.20 | MW 191-1 Waste Magnesium Ammonium Sulphate Cake / Methanol | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 83584 | | 311457 | 16.00 | 0.40 | Waste carbon (trace heptane/toluene) ex DCHA (MW-155-1) | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 83584 | | 311457 | 16.00 | 0.30 | Waste line Filters ex Sodium Salt (trace Acetonitrile, Toluene) (MW-156-5) | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 83584 | | 311457 | 16.00 | 1.70 | Waste molecular sieves ex Acetonitrile drying ( MW-156-2) | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 83584 | | 311457 | 16.00 | 1.54 | MW 95-1 MCB distillation bottoms/tars | 17-Dec-2008 | 25L T/H Steel | JPR | AVG | n/a | n/a | 070508* | D10 |
| 83584 | | 311457 | 16.00 | 0.30 | MW 191-3 Waste Omeprazole Magnesium Salt / Methanol API BT 263-8 | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 83584 | | 311457 | 16.00 | 0.10 | MW-95-7 Waste Cloths/filters/trace nickel/water | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | n/a | n/a | 150202* | D10 |
| 83584 | | 311457 | 16.00 | 0.80 | UTIL-1Waste paint tins / cloths / etc | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 070513* | D10 |
| 83584 | | 311457 | 16.00 | 0.80 | MW-156-4 Molecular sieves – ex Acetonitrile/Toluene drying | 17-Dec-2008 | 200L Steel Combi | JPR | AVG | 3175 | 4.1 | 150202* | D10 |
| 83631 | | 311986 | 4.00 | 21.38 | B-156-1 Aceonitrile 65-85%, Toluene 15-30% and water 6% | 18-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83679 | | 311343 | 14.00 | 26.90 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 18-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83687 | | 311986 | 5.00 | 21.68 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 18-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83564 | | 311986 | 3.00 | 9.80 | POT B - [B-155-1]Toluene 72%, Heptanes 25%, Tetrahydrofuran 3%. | 19-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83564 | | 311986 | 3.00 | 8.62 | POT A - [B-154-3] Mesylate Mother bottoms-89% (v/v) Heptanes, 10% (v/v) Tetrahydrofuran, 1% Solids, 0.1% Water | 19-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83628 | | 311457 | 17.00 | 0.18 | MW-190-3 m-CPBA (3-Chloroperoxybenzoic acid) 25L drum with residue (<100g/drum) | 19-Dec-2008 | 25L O/T Plastic | JPR | AVG | 3106 | 5.2 | 150110* | D10 |
| 83628 | | 311457 | 17.00 | 3.34 | Waste HEPA filters (trace pharmaceutical intermediates) MW-2 | 19-Dec-2008 | Pallet Box | JPR | AVG | n/a | n/a | 070513* | D10 |
| 83688 | | 311343 | 15.00 | 25.60 | B-156-3 89% Tetrahydrofuran, 6% Ethanol, 1% Toluene, 4% Water | 19-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83692 | | 311986 | 6.00 | 27.28 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 19-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83617 | | 311450 | 8.00 | 18.36 | (B-MW-1) Waste Oil - Top solvent / water layer: 65% Acetonitrile, 5% IPA, 20% THF & 10% water. Bottom layer: Mineral Oil | 23-Dec-2008 | Bulk Tank | JPR | AVG | 1993 | 3 | 070504* | D10 |
| 83779 | | 311986 | 7.00 | 23.18 | B-155-1 ~ Toluene 72%, ~ Heptanes 25%, ~ 3% Tetrahydrofuran | 23-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |
| 83788 | B456278 | 311756 | 26.00 | 25.80 | Omeprazole Magnesium Salt Mother Liquors (B-191-1) ~ 61.2 % Methanol , ~ 38.5 % (v/v) Water , ROE ~ 0.3 % (w/w) | 23-Dec-2008 | Bulk Tank | JPR | Kommunek | 1230 | 3 | 070504* | D10 |
| 83789 | B 456279 | 311982 | 8.00 | 22.64 | B-156-2 Toluene 76%, Tetrahydrofuran 10%, Ethanol 13%, Water 1%, Dissolved Solids <0.1% | 23-Dec-2008 | Bulk Tank | JPR | SRM Ltd. (I | 1993 | 3 | 070504* | R2 |

**TABLE 3.1.1.3 C**

## IPC LICENCE NO. P0011-03

## EWC Summary Report 2008

EWC is the European Waste Catalogue code of waste classification

| EWC Code | Tonnes | Description & Nature of Waste |
|---|---|---|
| **Offsite Disposals Non Hazardous** | | |
| 150102 | 7 | Waste plastic drums |
| 070512 | 607 | WWTP Dried & Dewatered Sludge generated |
| 200138 | 55 | Waste pallets & timber |
| 070599 | 78 | General site waste including C&D |
| 170407 | 74.5 | Obsolete equipment items, metals and drums sent for recovery |
| Misc. | 90 | Paper, cardboard, glass etc. |
| **Total Non Hazardous** | **911.5** | |
| **Offsite Disposals Hazardous** | | |
| 070501* | 8 | Aqueous liquors |
| 070503* | 727 | Waste streams with chlorinated solvents |
| 070504* | 7502 | Waste solvents for offsite recovery / incineration heat rec. |
| 070513* | 148 | Raw materials, intermediates, lab wastes – Incin. |
| Misc. | 219 | Misc materials for incineration |
| Misc. | 5 | Misc materials ( lamps, batteries, WEEE) for recycle |
| **Total Hazardous** | **8609** | |
| **Onsite WWTP Hazardous** | | |
| 070504 | 1099 | Organic solvents ex processing |
| 070503 | 1 | Halogenated organic solvents ex processing |
| **Total** | **1100** | |
| **Onsite Recovery Hazardous** | | |
| 070504 | 1464 | Organic solvents ex processing |
| 070503 | 43 | Halogenated organic solvents ex processing |
| **Total** | **1507** | |

Total tonnage of waste produced for both on and offsite recovery / disposal was 12127.5 tonnes.

**IPC LICENCE NO. P0011-03**
**TABLE 3.1.1.3C**

## National Waste Database Data Report Sheet 2008

| | |
|---|---|
| Industrial Sector NACE Code – manufacturer of pharmaceutical preparations | 212 |
| Reporting Period | 1/1/08 – 31/12/08 |
| Number of Employees | 403 |
| Total Tonnage of Waste Produced | 12127.5 |
| Hazardous | 11,216 |
| Non-Hazardous | 911.5 |
| Total Tonnage of Waste Recovered | 6850.7 |
| Hazardous (on & offsite solvent recovery.) | 6622.2 |
| Non-Hazardous ( metal, cardboard, paper, glass, timber recovery) | 228.5 |

Notes:
NACE is EU Statistical Programs Committees Protocol which is used as an indicator between economic activity and waste generation.

## ANNUAL WASTE MANAGEMENT DATA USED TO COMPILE TABLE 3.1.1.3.D (WASTE MINIMISATION INDICES)

| Source | Tonnes 2008 |
|---|---|
| Raw Materials Usage | 10,113 |
| Total Waste Produced | 12128 |
| | |
| **Total Hazardous Waste** | **11216** |
| Onsite Treatment WWTP | 1100 |
| Onsite Solvent Recovery | 1507 |
| Offsite Solvent Recovery | 5115 |
| Offsite Recovery ( catalyst ) | 87 |
| Total Offsite Incineration ( Solids / aqueous liquids, solvents) | 3400 |
| Misc | 5 |
| | |
| **Total Non Hazardous Waste** | **912** |
| Offsite Disposal | 683 |
| Onsite Recovery | 0 |
| Offsite Recovery | 229 |
| Offsite Incineration | 0 |

**Table 3.1.1.3 E**
**WASTE MINIMISATION INDICES 2008**

| | 2008 WaM1's |
|---|---|
| **A) Site Total Waste** | |
| • **Gross WaMI** = 12128 / 10113 X 100 = | **119.9** |
| • **Nett of Process WaMI** = 12128 – 1507/10113 X 100 = | **105.0** |
| • **Nett Site WaMI** =12128 - 1507 – 5115 / 10113 X 100 = | **54.5** |
| **B) Hazardous Waste** | |
| • **Gross WaMI** = 11216 / 10113 X 100 = | **110.9** |
| • **Nett of Process WaMI** =11216– 1507 / 10113 X 100 = | **96.0** |
| • **Nett Site WaMI** = 11216 – 1507 - 5115 / 10113 X 100 = | **45.4** |
| **C) Non Hazardous Waste** | |
| • **Gross WaMI** = 912 / 10113 X 100 = | **9.0** |
| • **Nett of Process WaMI** =912 - 0 / 10113 X 100 = | **9.0** |
| • **Nett Site WaMI** = 912 – 229 / 10113 X 100 = | **6.8** |

## Example of Waste Index Calculation

- *Gross WaMI =*

  *{ Waste Produced (t) / Raw Materials1 (t) } x 100*

- *Nett of Process WaMI =*

  $$\frac{\text{Waste Produced (t) - Amount Recovered on-site (t) x100}}{\text{Raw Materials (t)}}$$

- *Nett Site WaMI =*

  $$\frac{\text{Waste Produced (t) - Amount Recovered on-site (t) - Amount Recovered off-site (t) x100}}{\text{Raw Materials (t)}}$$

## IPC LICENCE NO. P0011-03

### Table 3.1.1.3 F
**WASTE MINIMISATION INDICES SUMMARY 2005 -2008**

| Indices | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|
| **A) Site Total Waste** | | | | |
| • **Gross WaMI** | **126.2** | **118.8** | **122.9** | **119.9** |
| • **Nett of Process WaMI** | **83.3** | **101.0** | **111.9** | **105.0** |
| • **Nett Site WaMI** | **28.2** | **49.2** | **63.1** | **54.5** |
| **B) Hazardous Waste** | | | | |
| • **Gross WaMI** | **113.8** | **106.3** | **113.4** | **110.9** |
| • **Nett of Process WaMI** | **70.8** | **88.5** | **102.4** | **96.0** |
| • **Nett Site WaMI** | **22.4** | **36.7** | **56.2** | **45.4** |
| **C) Non Hazardous Waste** | | | | |
| • **Gross WaMI** | **12.4** | **12.5** | **9.5** | **9.0** |
| • **Nett of Process WaMI** | **12.4** | **12.5** | **9.5** | **9.0** |
| • **Nett Site WaMI** | **5.8** | **9.3** | **6.8** | **6.8** |

There was a general improvement trend in the waste indices up to 2005 / 6, indicating an increasing level of material recycle and recovery. There may be year to year variations depending on the different type of production campaigns, process waste streams and raw materials used in processing.
In the 2007 / 2008 period, with the introduction of a number of new process steps to the plant, there was a reduction in the volumes available for onsite recovery and an increase in the volumes for offsite incineration.

## TABLE 3.1.1.3 G. - IPPC REG. NO. P0011-03
## Wastewater Treatment & Potable Water Sludge analysis results 2008 per schedule C.4

| PARAMETER | MONITORING FREQUENCY | 1st Qtr 25-Feb-08 | 2nd Qtr 26-May-08 | 3rd Qtr 18-Aug-08 | 4th Qtr 17-Nov-08 |
|---|---|---|---|---|---|
| **Sludge Analysis Data** | | | | | |
| % Solids | Quarterly | 97 | 89 | 84 | 98 |
| % Water | Quarterly | 3 | 11 | 16 | 12 |
| % Organic Matter (dry basis) | Quarterly | 41 | 27 | 30 | 25 |
| % Ash (dry basis) | Quarterly | 59 | 73 | 70 | 75 |
| | | | | | |
| | | | | | |
| **Heavy Metals** | Quarterly | % (w/w) | % (w/w) | % (w/w) | % (w/w) |
| Arsenic | | 0.0001 | 0.0001 | 0.0001 | 0.0002 |
| Tin | | <0.0001 | <0.0001 | 0.0001 | 0.0001 |
| Mercury | | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Chromium | | - | 0.0016 | <0.0001 | 0.0002 |
| Phosphorus | | 0.195 | 0.007 | 0.010 | 0.010 |
| Zinc | | 0.0054 | 0.0050 | 0.0101 | 0.0090 |
| Cadmium | | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Lead | | 0.0002 | 0.0002 | 0.0007 | 0.0002 |
| Cobalt | | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Nickel | | 0.0141 | 0.0050 | 0.0019 | 0.0057 |
| Iron | | 0.97 | 1.43 | 2.10 | 3.20 |
| Boron | | 0.0099 | 0.0077 | 0.0058 | 0.0052 |
| Manganese | | 0.0052 | 0.0074 | 0.0117 | 0.0152 |
| Magnesium | | 0.20 | 0.47 | 0.20 | 0.40 |
| Calcium | | 11.2 | 26.3 | 10.8 | 26.0 |
| Copper | | 0.0004 | 0.0006 | 0.0005 | 0.0008 |
| Aluminium | | 0.0403 | 0.0538 | 0.0448 | 0.0631 |
| Beryllium | | <0.0001 | - | <0.0001 | <0.0001 |
| Strontium | | 0.0094 | 0.0231 | 0.0030 | 0.0097 |
| Barium | | 0.0058 | 0.0110 | 0.0071 | 0.0114 |
| Sodium | | 0.080 | 0.061 | 0.060 | 0.102 |
| Potassium | | 0.080 | 0.066 | <0.050 | 0.040 |
| Molybdenum | | <0.0001 | 0.0002 | <0.0001 | <0.0001 |
| Selenium | | 0.0001 | <0.0001 | 0.0016 | 0.0003 |
| Antimony | | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| | | | | | |
| | | | | | |

**Note:** 1) Heavy Metals testing conducted by Bord na Mona Lab., Newbridge.

**TABLE 3.1.1.3G cont. - IPPC REG. NO. P0011-03**
WWTP & Potable Water Sludge analysis results 2008 per Schedule C.4

| PARAMETER | MONITORING FREQUENCY | 1st Qtr 25-Feb-08 | 2nd Qtr 26-May-08 | 3rd Qtr 18-Aug-08 | 4th Qtr 17-Nov-08 |
|---|---|---|---|---|---|
| **Sludge Analysis Data** | | | | | |
| % Solids | Quarterly | 97 | 89 | 84 | 98 |
| % Water | Quarterly | 3 | 11 | 16 | 12 |
| % Organic Matter (dry basis) | Quarterly | 41 | 27 | 30 | 25 |
| % Ash (dry basis) | Quarterly | 59 | 73 | 70 | 75 |
| | | | | | |
| | | | | | |
| **Nutrients & additional parameters** | Information | % (w/w) | % (w/w) | % (w/w) | % (w/w) |
| Ammonia - N | | 0.0850 | 0.0970 | 0.0900 | 0.0268 |
| Nitrate (as N) | | 0.0002 | 0.0003 | <0.0001 | 0.0004 |
| Nitrite (as N) | | <0.0001 | <0.0001 | 0.0002 | <0.0001 |
| Kjeldahl Nitrogen | | 3.3403 | 2.4863 | 2.0495 | 0.2070 |
| Chloride (as Cl) | | 0.0126 | 0.0254 | 0.0374 | 0.0326 |
| Fluoride (as F) | | 0.0002 | 0.0005 | 0.0014 | 0.0001 |
| Sulphate (as $SO_4$) | | 0.0174 | 0.0752 | 0.0854 | 0.0621 |
| | | | | | |
| | | | | | |
| | | | | | |
| **Total Extractable Organic Halides** (as Cl) | Information | <0.0001 | 0.0005 | 0.0002 | 0.0004 |
| | | | | | |
| | | | | | |

**Notes:**
1) Nutrients testing conducted by Bord na Mona Lab., Newbridge.
2) Total Extractable Organic Halide testing conducted by Chemex laboratory, Cambridge (UK).

**TABLE 3.1.1.3 H - IPPC REG. NO. P0011-03**

Wastewater Treatment & Potable Water Sludge Leachate analysis results 2008.

| PARAMETER | MONITORING FREQUENCY | 1st Qtr 25-Feb-08 | 2nd Qtr 26-May-08 | 3rd Qtr 18-Aug-08 | 4th Qtr 17-Nov-08 |
|---|---|---|---|---|---|
| **Leachate Analysis** | | | | | |
| **Heavy Metals** | Quarterly | % (w/v) | % (w/v) | % (w/v) | % (w/v) |
| Arsenic | | <0.00001 | - | <0.00001 | <0.00001 |
| Tin | | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Mercury | | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Chromium | | <0.00001 | 0.00002 | 0.00001 | <0.00001 |
| Phosphorus | | 0.0022 | 0.0038 | 0.0006 | 0.0018 |
| Zinc | | 0.00021 | 0.00010 | 0.00026 | 0.00006 |
| Cadmium | | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Lead | | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Cobalt | | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Nickel | | 0.00056 | 0.00011 | 0.00005 | 0.00012 |
| Iron | | 0.0033 | 0.0030 | <0.0020 | 0.0063 |
| Boron | | 0.00009 | 0.00029 | 0.00012 | 0.00005 |
| Manganese | | 0.00002 | 0.00002 | 0.00002 | 0.00004 |
| Magnesium | | 0.0096 | 0.0136 | 0.0110 | 0.0147 |
| Calcium | | 0.0098 | 0.0184 | 0.0157 | 0.0158 |
| Copper | | <0.00001 | 0.00001 | 0.00001 | <0.00001 |
| Aluminium | | 0.00004 | 0.00014 | 0.00002 | 0.00003 |
| Beryllium | | <0.00001 | - | <0.00001 | <0.00001 |
| Strontium | | 0.00002 | 0.00002 | 0.00002 | 0.00003 |
| Barium | | 0.00020 | 0.00025 | 0.00037 | 0.00006 |
| Sodium | | 0.0098 | 0.0080 | 0.0121 | 0.0072 |
| Potassium | | 0.0071 | 0.0043 | 0.0038 | 0.0021 |
| Molybdenum | | <0.00001 | 0.00001 | 0.00001 | <0.00001 |
| Selenium | | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Antimony | | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| **Nutrients & additional parameters** | Information | | | | |
| Ammonia - N | | 0.0352 | 0.0225 | 0.0113 | 0.0242 |
| Nitrate (as N) | | 0.00005 | 0.00008 | 0.00001 | 0.00003 |
| Nitrite (as N) | | <0.00001 | 0.00002 | 0.00004 | 0.00010 |
| Kjeldahl Nitrogen (as N) | | 0.0807 | 0.1070 | 0.0696 | 0.0736 |
| Chloride (as Cl) | | 0.0088 | 0.0034 | 0.0054 | 0.0037 |
| Fluoride (as F) | | 0.00002 | 0.00007 | 0.00010 | <0.00001 |
| Sulphate (as $SO_4$) | | 0.0225 | 0.0158 | 0.0135 | 0.0135 |
| Non-Purgeable Organic Carbon (as C) – *g/lt* | | 3.29 *g/lt* | 2.67 *g/lt* | 1.93 *g/lt* | 3.05 *g/lt* |
| Chemical Oxygen Demand – *g/lt* | | 10.78 *g/lt* | 10.07 *g/lt* | 8.60 *g/lt* | 8.83 *g/lt* |
| Total Dissolved Solids – *g/lt* | | 9.34 *g/lt* | 8.26 *g/lt* | 7.22 *g/lt* | 7.36 *g/lt* |
| | | | | | |

**Note:** 1) Heavy Metals & nutrients testing conducted by Bord na Mona Lab., Newbridge.

## TABLE 3.1.1.3 I - IPPC REG. NO. P0011-03

Wastewater Treatment & Potable Water Sludge Leachate analysis results 2008.

| PARAMETER | MONITORING FREQUENCY | 1st Qtr 25-Feb-08 | 2nd Qtr 26-May-08 | 3rd Qtr 18-Aug-08 | 4th Qtr 17-Nov-08 |
|---|---|---|---|---|---|
| **Leachate Analysis** | | | | | |
| **Toxicity Testing** | Quarterly | | | | |
| 48 hour $EC_{50}$ to Daphnia Magna | | 8.1 TU | <3.1 TU | <3.1 TU | <3.1 TU |
| 5 mins. $EC_{50}$ to Vibrio fisheri | | 4.7 TU | 5.3 TU | 5.2 TU | 7.8 TU |
| 15 mins. $EC_{50}$ to Vibrio fisheri | | 8.5 TU | 6.8 TU | 6.3 TU | 13.7 TU |
| | | | | | |
| **Organic Compounds** | Bi-Annually | % (w/v) | | % (w/v) | |
| Acetic Acid | | 0.0097 | | <0.0010 | |
| Acetonitrile | | <0.0001 | | <0.0001 | |
| Dimethylformamide | | <0.0001 | | <0.0010 | |
| Ethylene Glycol | | <0.0001 | | <0.0010 | |
| Isopropyl Acetate | | <0.00001 | | <0.00001 | |
| Ethyl Acetate | | <0.0001 | | <0.0001 | |
| Tetrahydrafuran | | <0.0001 | | <0.0001 | |
| Acetone | | 0.00005 | | 0.00006 | |
| Ethanol | | <0.0001 | | 0.0015 | |
| Methanol | | 0.00036 | | 0.00006 | |
| Propan-2-ol | | 0.00005 | | <0.00005 | |
| 1,2,3-Trichlorobenzene | | <0.000001 | | <0.000001 | |
| 1,3,5-Trimethylbenzene | | <0.000001 | | <0.000001 | |
| Benzene | | <0.000001 | | <0.000001 | |
| Carbon Tetrachloride | | <0.000001 | | <0.000001 | |
| Chloroform | | <0.000001 | | <0.000001 | |
| Chlorobenzene | | <0.000001 | | <0.000001 | |
| Dichloromethane | | <0.000001 | | <0.000001 | |
| Methylbenzene | | <0.000001 | | <0.000001 | |
| o-Xylene | | <0.000001 | | <0.000001 | |
| m,p-Xylene | | <0.000001 | | <0.000001 | |
| n-Propyl Benzene | | <0.000001 | | <0.000001 | |
| Naphthalene | | <0.000001 | | <0.000001 | |
| Styrene | | <0.000001 | | <0.000001 | |
| Toluene | | <0.000001 | | <0.000001 | |
| Trichloroethene | | <0.000001 | | <0.000001 | |
| | | | | | |

**Notes:**

1) Toxicity testing conducted by Enterprise Ireland Laboratory, Shannon.
2) Toxicity testing per water extraction method DIN - 38414 - S4.
3) Organic Compounds testing conducted by Bord na Mona Lab., Newbridge.
4) Testing conducted using US EPA 524.2 GC/MS method, GC/FID and HPLC.

# APPENDIX 4

## 2008 EPA Electronic Reporting System
## Pollution Release & Transfer Register

Copy of electronic data supplied to EPA (aerreturns@epa.ie)

Environmental Protection Agency

# AER Returns Worksheet

Version 1.1.02

| | |
|---|---|
| **REFERENCE YEAR** | 2008 |

**1. FACILITY IDENTIFICATION**

| | |
|---|---|
| Parent Company Name | Merck Sharp & Dohme (Ireland) Limited |
| Facility Name | Merck Sharp & Dohme (Ireland) Limited |
| PRTR Identification Number | P0011 |
| Licence Number | P0011-03 |

Waste or IPPC Classes of Activity

| **No.** | **class_name** |
|---|---|
| 5.16.0 | The use of a chemical or biological process for the production of basic pharmaceutical products. |

| | |
|---|---|
| Address 1 | Ballydine |
| Address 2 | Kilsheelan |
| Address 3 | Clonmel |
| Address 4 | Co. Tipperary |
| | |
| | |
| Country | Ireland |
| Coordinates of Location | 23341233 |
| River Basin District | |
| NACE Code | 212 |
| Main Economic Activity | Manufacture of pharmaceutical preparations |
| **AER Returns Contact Name** | Dr. Gervase McAleavey |
| **AER Returns Contact Email Address** | dave_barry@merck.com |
| **AER Returns Contact Position** | Engineering, Safety and Environment Manager |
| **AER Returns Contact Telephone Number** | 051-601424 |
| **AER Returns Contact Mobile Phone Number** | |
| **AER Returns Contact Fax Number** | 051-601290 |
| **Production Volume** | 109.3 |
| **Production Volume Units** | Tonnes |
| **Number of Installations** | 3 |
| **Number of Operating Hours in Year** | 8760 |

| | |
|---|---|
| **Number of Employees** | 403 |
| **User Feedback/Comments** | |
| **Web Address** | msd-ireland.com |

**2. PRTR CLASS ACTIVITIES**

| Activity Number | Activity Name |
|---|---|
| 4e | Installations using a chemical or biological process for the production on an industrial scale of basic pharmaceutical products |
| 5b | Installations for the incineration of non-hazardous waste in the scope of Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste |

**3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)**

| | |
|---|---|
| Is it applicable? | No |
| Have you been granted an exemption ? | Yes |
| If applicable which activity class applies (as per Schedule 2 of the regulations) ? | N/A |
| Is the reduction scheme compliance route being used ? | N/A |

## SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

| RELEASES TO AIR | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | | | | | QUANTITY | | |
| | | | Method Used | | A2-1 Thermal Oxidisers Nos 1&2 | A2-2 Thermal Oxidiser No 3 | A1-1 Steam Boiler Emissions | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | Emission Point 2 | Emission Point 3 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year | |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 06 | Ammonia (NH3) | M | Monitoring BS EN 13649, Analysis BS ENISO 16000-9 | Absorption and titration method | 29.0 | 0.0 | 0.0 | 29.0 | 0.0 | 0.0 | |
| 03 | Carbon dioxide (CO2) | C | PER | Guideline for the monitoring and reporting of greenhouse gas emissions | 0.0 | 0.0 | 11629000.0 | 11629000.0 | 0.0 | 0.0 | |
| 08 | Nitrogen oxides (NOx/NO2) | M | A1-1 - BS-EN 50379-3:2004 | Flue Gas analysier | 241.0 | 1856.0 | 34214.0 | 36311.0 | 0.0 | 0.0 | |
| 07 | Non-methane volatile organic compounds (NMVOC) | M | BS EN 13649:2002 | Absorption to sorbants, desorption and GC/FID analysis plus Eng. Calcs. | 0.0 | 0.0 | 0.0 | 14775.0 | 0.0 | 14775.0 | |
| 47 | PCDD + PCDF (dioxins + furans)(as Teq) | M | BS EN 1948-1:2006 | Absorption and GC/MS Analysis | 0.0 | 0.000000157 | 0.0 | 0.000000157 | 0.0 | 0.0 | |
| 11 | Sulphur oxides (SOx/SO2) | M | A1-1 - BS-EN 50379-3:2004 | Flue Gas analysier | 18.0 | 39.0 | 864.0 | 921.0 | 0.0 | 0.0 | |
| 04 | Hydro-fluorocarbons (HFCs) | C | MAB | Inventory mass balance | 0.0 | 0.0 | 0.0 | 3677.0 | 0.0 | 3677.0 | |
| 02 | Carbon monoxide (CO) | M | BS EN14181:2004 | Flue Gas anaysier & online continious monitoring | 0.0 | 7.0 | 864.0 | 871.0 | 0.0 | 0.0 | |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

## SECTION B : REMAINING PRTR POLLUTANTS

| RELEASES TO AIR | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | QUANTITY | | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Yea | A (Accidental) KG/Yea | F (Fugitive) KG/Yea |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

## SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

| RELEASES TO AIR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | | | | | QUANTITY | | | |
| | | | Method Used | | A-2-1 Thermal Oxidisers Nos 1&2 | A2.2 Thermal Oxidiser / Fl No. 3 | A1.1 Steam Boiler Emissions | | | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | Emission Point 2 | Emission Point 3 | Emission Point 4 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year | |
| 351 | Total Organic Carbon (as C) | M | BS EN 13526:2002 | Online Continious Emission Monitoring | 241.0 | 5.0 | 0.0 | 0.0 | 246.0 | 0.0 | 0.0 | |
| 319 | Inorganic acids | M | BS EN 14181:2004 | Online Continious Emission Monitoring | 17.0 | 7.0 | 0.0 | 0.0 | 24.0 | 0.0 | 0.0 | |
| 231 | TA Luft organic substances class 2 | M | BS EN 13649:2002 | Absorption to sorbants, desortption and GC/FID analysis | 612.0 | 0.0 | 0.0 | 0.0 | 612.0 | 0.0 | 0.0 | |
| 232 | TA Luft organic substances class 3 | M | ISO 8174:1986 methanol | Absorption to sorbants, desortption and GC/FID analysis | 540.0 | 0.0 | 0.0 | 0.0 | 540.0 | 0.0 | 0.0 | |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

## Additional Data Requested from Landfill operators

**For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:**

**Landfill:** Merck Sharp & Dohme (Ireland) Limited

| Please enter summary data on the quantities of methane flared and / or utilised | T (Total) kg/Year | M/C/E | Method Used: Method Code | Method Used: Designation or Description | Facility Total Capacity m3 per hour | |
|---|---|---|---|---|---|---|
| Total estimated methane generation (as per site model) | 0.0 | | | | N/A | |
| Methane flared | 0.0 | | | | 0.0 | (Total Flaring Capacity) |
| Methane utilised in engines | 0.0 | | | | 0.0 | (Total Utilising Capacity) |
| Net methane emission (as reported in Section A above) | 0.0 | | | | N/A | |

## 4.2 RELEASES TO WATERS



### SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases

| RELEASES TO WATERS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | | | | | | QUANTITY | | | |
| | | | Method Used | | SW1-Onsite WWTP Effluent | SW2A / SW2B - RO Effluent | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | Emission Point 2 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| 18 | Cadmium and compounds (as Cd) | M | BS EN ISO 11885:1997 | ICP analysis | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| 79 | Chlorides (as Cl) | M | BS EN ISO 10304:1-4:1995 | IC analysis | 270925.0 | 0.0 | 270925.0 | 0.0 | 0.0 |
| 19 | Chromium and compounds (as Cr) | M | BS EN ISO 11885:1997 | ICP analysis | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| 20 | Copper and compounds (as Cu) | M | BS EN ISO 11885:1997 | ICP analysis | 10.0 | 0.0 | 10.0 | 0.0 | 0.0 |
| 82 | Cyanides (as total CN) | M | BS EN ISO 14403:2002 | Ion selective electrode | 8.0 | 0.0 | 8.0 | 0.0 | 0.0 |
| 23 | Lead and compounds (as Pb) | M | BS EN ISO 11885:1997 | ICP analysis | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 |
| 21 | Mercury and compounds (as Hg) | M | BS EN ISO 11885:1997 | ICP analysis | 0.8 | 0.0 | 0.8 | 0.0 | 0.0 |
| 22 | Nickel and compounds (as Ni) | M | BS EN ISO 11885:1997 | ICP analysis | 17.0 | 0.0 | 17.0 | 0.0 | 0.0 |
| 12 | Total nitrogen | M | BS EN 12260:2003 | Kjedahl Nitrogen, nitrates analysis | 4989.0 | 305.0 | 5294.0 | 0.0 | 0.0 |
| 76 | Total organic carbon (TOC) (as total C or COD/3) | M | BS EN 1484:1997 | TOC analysier | 10797.0 | 0.0 | 10797.0 | 0.0 | 0.0 |
| 13 | Total phosphorus | M | BS EN 15681:1-2:2004 | Standard method | 903.0 | 23.0 | 926.0 | 0.0 | 0.0 |
| 24 | Zinc and compounds (as Zn) | M | BS EN ISO 11885:1997 | ICP analysis | 45.0 | 0.0 | 45.0 | 0.0 | 0.0 |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

### SECTION B : REMAINING PRTR POLLUTANTS

| RELEASES TO WATERS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | | | | QUANTITY | | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

### SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

| RELEASES TO WATERS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | | | | | | QUANTITY | | | |
| | | | Method Used | | SW1-Onsite WWTP Effluent | SW2A / SW2B - RO Effluent | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | Emission Point 2 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| 238 | Ammonia (as N) | M | BS EN ISO 10304:1995 | Ion selective electrode | 556.0 | 0.0 | 556.0 | 0.0 | 0.0 |
| 303 | BOD | M | Standard method laboratory analysis | Standard method | 5125.0 | 0.0 | 5125.0 | 0.0 | 0.0 |
| 330 | Organic solvents | M | GLC / FID analysis | GLC / FID analysis | 124.0 | 0.0 | 8724.0 | 0.0 | 8600.0 |
| 240 | Suspended Solids | M | ISO 11923:1997 | Standard method | 13585.0 | 0.0 | 13585.0 | 0.0 | 0.0 |
| 363 | Total Dissolved Solids | M | BS EN ISO 15216:2005 | Standard method | 1102400.0 | 23698.0 | 1126098.0 | 0.0 | 0.0 |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

## 4.3 RELEASES TO WASTEWATER OR SEWER



### SECTION A : PRTR POLLUTANTS

| OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | QUANTITY | | | |
| | | | Method Used | | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

### SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

| OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | QUANTITY | | | |
| | | | Method Used | | | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year | F (Fugitive) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

## 4.4 RELEASES TO LAND



### SECTION A : PRTR POLLUTANTS

| RELEASES TO LAND | | | | | | | |
|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | QUANTITY | | |
| | | | Method Used | | | | |
| No. Annex II | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

### SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

| RELEASES TO LAND | | | | | | | |
|---|---|---|---|---|---|---|---|
| POLLUTANT | | METHOD | | | QUANTITY | | |
| | | | Method Used | | | | |
| Pollutant No. | Name | M/C/E | Method Code | Designation or Description | Emission Point 1 | T (Total) KG/Year | A (Accidental) KG/Year |
| | | | | | 0.0 | 0.0 | 0.0 |

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

| Transfer Destination | European Waste Code | Hazardous | Quantity T/Year | Description of Waste | Waste Treatment Operation | Method Used | | Location of Treatment | Name and Licence / Permit No. of Recoverer / Disposer / Broker | Address of Recoverer / Disposer / Broker | Name and Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY) | Licence / Permit No. of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | M/C/E | Method Used | | | | | |
| To Other Countries | 06 01 04 | Yes | 0.36 | phosphoric and phosphorous acid | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 06 01 06 | Yes | 0.72 | other acids | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 07 05 01 | Yes | 0.89 | aqueous washing liquids and mother liquors | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 07 05 03 | Yes | 2.96 | organic halogenated solvents, washing liquid | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 07 05 04 | Yes | 649.52 | other organic solvents, washing liquids and n | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 07 05 08 | Yes | 2.54 | other still bottoms and reaction residues | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 07 05 10 | Yes | 7.0 | other filter cakes and spent absorbents | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 07 05 13 | Yes | 148.09 | solid wastes containing dangerous substance | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 13 08 99 | Yes | 0.33 | wastes not otherwise specified | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 16 03 05 | Yes | 0.54 | organic wastes containing dangerous substa | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 16 05 07 | Yes | 0.3 | discarded inorganic chemicals consisting of c | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 16 05 08 | Yes | 1.13 | discarded organic chemicals consisting of or | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 16 09 04 | Yes | 0.14 | oxidising substances, not otherwise specified | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 15 01 10 | Yes | 10.58 | packaging containing residues of or contamir | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 15 02 02 | Yes | 28.81 | absorbents, filter materials (including oil filter | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 20 01 14 | Yes | 0.21 | acids | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | AVG, Hamburg, Germany | N/A |
| To Other Countries | 07 05 01 | Yes | 7.0 | aqueous washing liquids and mother liquors | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Indaver, Antwerp, Belgium | N/A |
| To Other Countries | 07 05 03 | Yes | 485.33 | organic halogenated solvents, washing liquid | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Indaver, Antwerp, Belgium | N/A |
| To Other Countries | 07 05 04 | Yes | 1746.14 | other organic solvents, washing liquids and n | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Indaver, Antwerp, Belgium | N/A |
| To Other Countries | 16 05 08 | Yes | 0.04 | discarded organic chemicals consisting of or | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Indaver, Antwerp, Belgium | N/A |
| To Other Countries | 07 05 04 | Yes | 685.22 | other organic solvents, washing liquids and n | R2 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | SRM, Sunderland, England | N/A |
| To Other Countries | 07 05 03 | Yes | 238.64 | organic halogenated solvents, washing liquid | R2 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | SRM, Rye, England | N/A |
| To Other Countries | 07 04 04 | Yes | 4191.36 | other organic solvents, washing liquids and n | R2 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | SRM, Rye, England | N/A |
| To Other Countries | 07 05 04 | Yes | 229.32 | other organic solvents, washing liquids and n | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Kummonekemi, Denmark | N/A |
| To Other Countries | 14 06 03 | Yes | 78.18 | other solvents and solvent mixtures | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Kummonekemi, Denmark | N/A |
| To Other Countries | 16 08 02 | Yes | 87.42 | spent catalysts containing dangerous transiti | R4 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Nickelhutte, Aue, Germany | N/A |
| To Other Countries | 16 03 04 | No | 0.02 | inorganic wastes other than those mentioned | D10 | M | Weighed | Abroad | Indaver W0036-2 | Tolka Quay Rd. Dublin | Chemogas, Belgium | N/A |
| Within the Country | 20 01 21 | Yes | 0.69 | fluorescent tubes and other mercury-containi | R11 | M | Weighed | Offsite in Ireland | Indaver W0036-2 | Tolka Quay Rd. Dublin | Irish Lamp Recycle, Athy | 02/2000B - Kildare Co. Co. |
| Within the Country | 18 01 03 | Yes | 0.07 | wastes whose collection and disposal is subj | D10 | M | Weighed | Offsite in Ireland | Indaver W0036-2 | Tolka Quay Rd. Dublin | Ecosafe, Dublin | W0054-2 |
| Within the Country | 20 01 35 | Yes | 4.49 | discarded electrical and electronic equipmen | R11 | M | Weighed | Offsite in Ireland | Indaver W0036-2 | Tolka Quay Rd. Dublin | Rehab, Dublin | WRP-033/2 |
| Within the Country | 07 05 12 | No | 706.0 | sludges from on-site effluent treatment other | D1 | M | Weighed | Offsite in Ireland | VeoliaW0177-3 | Veolia, Waterford | Tipperary Co. Co. Donohill | W0074-2 |
| Within the Country | 20 03 01 | No | 75.9 | mixed municipal waste | D1 | M | Weighed | Offsite in Ireland | VeoliaW0177-3 | Veolia, Waterford | Tipperary Co. Co. Donohill | W0074-2 |
| Within the Country | 15 01 07 | No | 5.8 | glass packaging | R11 | M | Weighed | Offsite in Ireland | VeoliaW0177-3 | Veolia, Waterford | Veolia, Waterford | W0177-3 |
| **Within the Country** | **15 01 03** | **No** | 55.0 | wooden packaging | R11 | M | Weighed | Offsite in Ireland | VeoliaW0177-3 | Veolia, Waterford | Veolia, Waterford | W0177-3 |
| Within the Country | 15 01 01 | No | 35.6 | paper and cardboard packaging | R11 | M | Weighed | Offsite in Ireland | VeoliaW0177-3 | Veolia, Waterford | Veolia, Waterford | W0177-3 |
| Within the Country | 17 01 07 | No | 2.0 | mixture of concrete, bricks, tiles and ceramic | D1 | M | Weighed | Onsite in Ireland | VeoliaW0177-3 | Veolia, Waterford | Veolia, Waterford | W0177-3 |
| Within the Country | 20 01 40 | No | 74.5 | metals | R11 | M | Weighed | Onsite in Ireland | Cork Metal Co. | Cork | Cork Metal Co. | CK 491/07 - Cork |
| Within the Country | 15 01 01 | No | 48.6 | paper and cardboard packaging | R11 | M | Weighed | Onsite in Ireland | Iron Mountain WMP 2007/1 | Summerhill, Meath | Iron Mountain, Co. Meath | WMP 2007/1- Meath |
| Within the Country | 20 01 39 | No | 7.1 | plastics | R11 | M | Weighed | Onsite in Ireland | Retech | Cootehill, Co Cavan | Retech Processing | 07/04 Cavan Co Co. |
| Within the Country | 07 05 03 | Yes | 42.9 | organic halogenated solvents, washing liquid | R2 | M | Volume Calculation | Onsite in Ireland | MSD, Ballydine - SRU | Kilsheelan, Co Tipperary | MSD, Ballydine | P0011-03 |
| Within the Country | 07 05 03 | Yes | 1.2 | organic halogenated solvents, washing liquid | D8 | M | Volume Calculation | Onsite in Ireland | MSD, Ballydine - WWTP | Kilsheelan, Co Tipperary | MSD, Ballydine | P0011-03 |
| Within the Country | 07 05 04 | Yes | 1464.1 | other organic solvents, washing liquids and n | R2 | M | Volume Calculation | Onsite in Ireland | MSD, Ballydine - SRU | Kilsheelan, Co Tipperary | MSD, Ballydine | P0011-03 |
| Within the Country | 07 05 04 | Yes | 1099.0 | other organic solvents, washing liquids and n | D8 | M | Volume Calculation | Onsite in Ireland | MSD, Ballydine - WWTP | Kilsheelan, Co Tipperary | MSD, Ballydine | P0011-03 |

* Select a row by double-clicking the Description of Waste then click the delete button

# APPENDIX 5

## 2008 Summary EPA Environmental Monitoring

## Effluent Analysis

The EPA effluent sampling unit was on-site on 4 occasions and a summary of analysis results obtained by both the EPA laboratory and MSD are presented in Appendix 6.

2008 EPA Effluent SWI Sampling Dates:
29th January, 22nd February, 14th August, 15th December

In addition, the Storm Sewer water SW3, was sampled on 14th August and 15th December

## Atmospheric Emission Analysis

Alcontrol laboratories under the direction of the EPA conducted dioxin emission monitoring from the Thermal Oxidiser No 3 exhaust stack A2-2, for a 3 day period July 1st to July 3rd.

**2008 MSD / EPA REGIONAL WATER LABORATORY, COMPARISON EFFLUENT (SW 1) ANALYSIS**

| LICENCE PARAMETER | LICENCE LIMIT | UNIT | 29-Jan-08 | | 22-May-08 | | 14-Aug-08 | | 15-Dec-08 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELV. | | EPA | MSD | EPA | MSD | EPA | MSD | EPA | MSD |
| | | | | | | | | | | |
| Flow | 4,500 | $m^3$/Day | **28 lt/sec.** | 1,998 | **40 lt/sec.** | 3,193 | **34.5 lt/sec** | 3,086 | **28 lt/sec** | 2,465 |
| BOD | 100 | mg/lt | **4** | 9 | **13** | 7 | **4.1** | 4 | **6** | 4 |
| COD | Info | mg/lt | **40** | 34 | **69** | 61 | **41** | 34 | **70** | 44 |
| TOC | Info | mg/lt | **nm** | 10 | **nm** | 5 | **nm** | 11 | **nm** | 8 |
| Ammonia | 10 | mg/lt | **1.3** | 0.9 | **0.26** | 0.2 | **0.1** | 0.1 | **0.82** | 0.9 |
| Phosphorous | 10 | mg/lt | **0.51** | 1.0 | **0.1** | 0.6 | **0.3** | 0.6 | **0.29** | 0.5 |
| pH | 6 - 9 | | **8.1** | 8.1 | **8.0** | 7.8 | **8.8** | 8.0 | **7.8** | 7.7 |
| Suspended Solids | 100 | mg/lt | **12** | 7 | **26** | 36 | **19** | 20 | **nm** | 12 |
| Temperature | 35 | $^0$C | **13.6** | 14 | **19.9** | 20 | **21.5** | 21.5 | **12** | 12 |
| Chloride | 1,500 | mg/lt | **423** | 276 | **266** | 249 | **270** | 248 | **394** | 347 |
| Nitrate | Info | mg/lt | **nm** | 0.24 | **0.6** | 0.30 | **0.9** | 1.04 | **0.1** | <0.2 |
| Nitrite | Info | mg/lt | **0.007** | <0.02 | **0.013** | <0.02 | **0.02** | <0.02 | **0.008** | <0.02 |
| Kjeldahl Nitrogen | Info | mg/lt | **nm** | 2.4 | **nm** | 5.8 | **nm** | 3.1 | **nm** | 5.0 |
| Total Nitrogen | 35 | mg/lt | **2.9** | 2.7 | **nm** | 6.1 | **nm** | 4.2 | **nm** | 5.2 |
| ( TKN + Nitrite / Nitrate ) | | | | | | | | | | |
| Total Dissolved Solids | 7,500 | mg/lt | **nm** | 1,202 | **nm** | 1,248 | **nm** | 1,028 | **nm** | 1,162 |
| Cyanide | 0.2 | mg/lt | **nm** | <0.01 | **nm** | <0.01 | **nm** | <0.01 | **nm** | <0.01 |
| | | | | | | | | | | |
| **Metals** | | | | | | | | | | |
| Nickel | 2 | mg/lt | **0.052** | 0.036 | **0.015** | 0.013 | **0.004** | 0.007 | **0.004** | <0.002 |
| Copper | 0.5 | mg/lt | **<0.005** | <0.002 | **0.004** | 0.011 | **0.006** | <0.002 | **0.002** | <0.002 |
| Zinc | 0.5 | mg/lt | **0.037** | 0.008 | **0.028** | 0.021 | **0.038** | 0.014 | **<0.001** | 0.010 |
| Lead | Info | mg/lt | **<0.005** | <0.002 | **0.007** | 0.002 | **<0.001** | <0.002 | **0.001** | <0.002 |
| Chromium | Info | mg/lt | **0.020** | <0.002 | **0.003** | 0.001 | **<0.001** | <0.002 | **0.008** | <0.002 |
| Cadmium | Info | mg/lt | **<0.005** | <0.002 | **<0.001** | <0.001 | **<0.001** | <0.002 | **<0.001** | <0.002 |
| Mercury | Info | mg/lt | **<0.0005** | <0.001 | **<0.0005** | <0.001 | **<0.0005** | <0.001 | **nm** | <0.001 |
| Aluminium | Info | mg/lt | **<0.025** | 0.009 | **<0.005** | 0.091 | **0.038** | 0.010 | **0.029** | <0.002 |
| Antimony | Info | mg/lt | **<0.005** | <0.002 | **<0.005** | <0.001 | **<0.001** | <0.002 | **<0.001** | <0.002 |
| Arsenic | Info | mg/lt | **<0.005** | <0.002 | **<0.001** | 0.001 | **<0.001** | <0.002 | **<0.001** | <0.002 |
| Barium | Info | mg/lt | **<0.030** | 0.008 | **0.035** | 0.035 | **0.012** | <0.002 | **0.003** | 0.015 |
| Beryllium | Info | mg/lt | **<0.005** | <0.002 | **<0.001** | <0.001 | **<0.001** | <0.002 | **<0.001** | <0.002 |
| Boron | Info | mg/lt | **0.200** | nm | **0.443** | 0.508 | **0.154** | 0.087 | **0.196** | <0.002 |
| Calcium | Info | mg/lt | **54** | 45 | **66** | 59 | **60** | 50 | **53.4** | 33 |
| Cobalt | Info | mg/lt | **<0.005** | <0.002 | **<0.001** | <0.001 | **<0.001** | <0.002 | **<0.001** | <0.002 |
| Iron | Info | mg/lt | **0.267** | <0.1 | **0.392** | 0.392 | **0.267** | <0.1 | **0.264** | 0.3 |
| Magnesium | Info | mg/lt | **40.5** | 31 | **12** | 10 | **13** | 11 | **7.03** | 6.4 |
| Manganese | Info | mg/lt | **<0.050** | 0.023 | **0.028** | 0.027 | **0.035** | 0.025 | **0.010** | 0.015 |
| Molybdenum | Info | mg/lt | **<0.005** | <0.002 | **<0.001** | nm | **0.002** | 0.002 | **0.003** | <0.002 |
| Selenium | Info | mg/lt | **<0.005** | <0.002 | **0.035** | 0.004 | **0.003** | <0.002 | **0.001** | <0.002 |
| Sodium | Info | mg/lt | **427** | 335 | **389** | 506 | **315** | 304 | **182** | 318 |
| Potassium | Info | mg/lt | **<5** | 4 | **13** | 8.3 | **6.7** | 3.7 | **1.8** | 1.9 |
| Tin | Info | mg/lt | **<0.010** | <0.002 | **<0.002** | <0.003 | **0.002** | <0.002 | **<0.001** | <0.002 |
| Thallium | Info | mg/lt | **<0.005** | <0.002 | **<0.001** | <0.001 | **<0.001** | <0.002 | **<0.001** | <0.002 |
| Uranium | Info | mg/lt | **<0.005** | <0.002 | **<0.001** | <0.001 | **<0.001** | <0.002 | **0.003** | <0.002 |
| Vanadium | Info | mg/lt | **<0.005** | <0.002 | **0.003** | <0.004 | **0.002** | <0.002 | **0.001** | <0.002 |
| | | | | | | | | | | |
| Conductivity US/cm | Info | | **nm** | … | **nm** | … | **nm** | … | **nm** | … |
| Colour - Hazen | Info | | **nm** | … | **nm** | … | **nm** | … | **nm** | … |
| GC/MS Purge & Trap | Info | mg/lt | **See Below** | | **See Below** | | **See Below** | | **See Below** | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**NOTES:** 1) During 2008 EPA did COD instead of TOC analysis
2) The number of parameters checked by the EPA varied with each sample.
3) For comparision, MSD test data included, if duplicate of a parameter was not done, nearest test date data included.

| Sample Date | EPA Analysis | * MSD Analysis |
|---|---|---|
| 29-Jan-08 | nm | 0.003 mg/lt THF<br>0.002 mg/lt Acetone |
| 22-May-08 | nm | 0.002 mg/lt Acetone |
| 14-Aug-08 | nm | 0.009 mg/lt THF |
| 15-Dec-08 | nm | 0.007 mg/lt THF |

***** MSD GC/MS Analysis carried out by Chemex International Laboratories.

## 2008 MSD / EPA REGIONAL WATER LABORATORY, COMPARISON STORM WATER (SW 3) ANALYSIS

| LICENCE PARAMETER | LICENCE LIMIT | UNIT | 14-Aug-08 | | 15-Dec-08 | |
|---|---|---|---|---|---|---|
| | ELV - SW 2A/SW 2B (EMISSION VIA SW 3) | | EPA | MSD | EPA | MSD |
| | | | | | | |
| Flow | 360 | $m^3$/Day | **nm** | nm | **nm** | nm |
| BOD | Info | mg/lt | **0.8** | 3 | **nm** | <1 |
| COD | Info | mg/lt | **< 8** | 15 | **nm** | <5 |
| TOC | Info | mg/lt | **nm** | 7 | **nm** | <1 |
| Ammonia | Info | mg/lt | **0.01** | <0.02 | **0.02** | 0.02 |
| Phosphorous | 2 | mg/lt | **0.14** | 0.2 | **0.02** | 0.1 |
| pH | 6 – 9 | | **8.1** | 7.2 | **8.0** | 7.7 |
| Suspended Solids | Info | mg/lt | **nm** | <1 | **nm** | <1 |
| Temperature | 35 | $^oC$ | **nm** | nm | **nm** | nm |
| Chloride | Info | mg/lt | **107** | 55 | **133** | 119 |
| Nitrate | Info | mg/lt | **nm** | 1.80 | **1.7** | 1.59 |
| Nitrite | Info | mg/lt | **0.012** | <0.02 | **0.01** | <0.02 |
| Kjeldahl Nitrogen | Info | mg/lt | **nm** | 2.1 | **nm** | 1.5 |
| Total Nitrogen | 15 | mg/lt | **nm** | 4.0 | **nm** | 3.1 |
| ( TKN + Nitrite / Nitrate ) | | | | | | |
| Total Dissolved Solids | 1,500 | mg/lt | **nm** | 248 | **nm** | 276 |
| Cyanide | Info | mg/lt | **nm** | <0.01 | **nm** | <0.01 |
| | | | | | | |
| **Metals** | | | | | | |
| Nickel | Info | mg/lt | **< 0.001** | <0.002 | **nm** | <0.002 |
| Copper | Info | mg/lt | **< 0.005** | <0.002 | **nm** | <0.002 |
| Zinc | Info | mg/lt | **< 0.001** | 0.061 | **nm** | <0.002 |
| Lead | Info | mg/lt | **0.056** | <0.002 | **nm** | <0.002 |
| Chromium | Info | mg/lt | **< 0.001** | <0.002 | **nm** | <0.002 |
| Cadmium | Info | mg/lt | **< 0.001** | <0.002 | **nm** | <0.002 |
| Mercury | Info | mg/lt | **< 0.0005** | <0.001 | **nm** | <0.001 |
| Aluminium | Info | mg/lt | **0.05** | 0.008 | **nm** | 0.007 |
| Antimony | Info | mg/lt | **< 0.001** | <0.002 | **nm** | <0.002 |
| Arsenic | Info | mg/lt | **< 0.001** | <0.002 | **nm** | <0.002 |
| Barium | Info | mg/lt | **< 0.006** | <0.002 | **nm** | 0.010 |
| Beryllium | Info | mg/lt | **< 0.001** | <0.002 | **nm** | <0.002 |
| Boron | Info | mg/lt | **< 0.022** | 0.008 | **nm** | 0.011 |
| Calcium | Info | mg/lt | **4.9** | 4.3 | **nm** | 3.0 |
| Cobalt | Info | mg/lt | **< 0.001** | <0.002 | **nm** | <0.002 |
| Iron | Info | mg/lt | **< 0.12** | <0.1 | **nm** | 0.6 |
| Magnesium | Info | mg/lt | **1** | <0.1 | **nm** | 0.5 |
| Manganese | Info | mg/lt | **<0.01** | <0.002 | **nm** | <0.002 |
| Molybdenum | Info | mg/lt | **<0.001** | <0.002 | **nm** | <0.002 |
| Selenium | Info | mg/lt | **0.001** | <0.002 | **nm** | <0.002 |
| Sodium | Info | mg/lt | **105** | 87 | **nm** | 79 |
| Potassium | Info | mg/lt | **2.1** | <0.1 | **nm** | 0.5 |
| Tin | Info | mg/lt | **<0.002** | <0.002 | **nm** | <0.002 |
| Thallium | Info | mg/lt | **<0.001** | <0.002 | **nm** | <0.002 |
| Uranium | Info | mg/lt | **<0.001** | <0.002 | **nm** | <0.002 |
| Vanadium | Info | mg/lt | **<0.001** | <0.002 | **nm** | <0.002 |
| | | | | | | |
| Conductivity US/cm | Info | | **nm** | … | | |
| Colour - Hazen | Info | | **nm** | … | | |
| GC/MS Purge & Trap | Info | mg/lt | **See Below** | | **See Below** | |
| | | | | | | |
| | | | | | | |

## Summary EPA atmospheric emission monitoring 2008

| Date | Emission Point | Parameter Monitored | Emission Limit Value | EPA Results |
|---|---|---|---|---|
| 01-Jul-08 | A2-2 | Dioxins | <0.1 ng/m3 | 0.02 ng/m3 |
| | | PCBs | Info | 0.002 ng/m3 |
| | | PAHs | Info | 1.2 ug/m3 |
| 02-Jul-08 | A2-2 | Dioxins | <0.1 ng/m3 | 0.01 ng/m3 |
| | | PCBs | Info | 0.002 ng/m3 |
| | | PAHs | Info | 0.3 ug/m3 |
| 03-Jul-08 | A2-2 | Dioxins | <0.1 ng/m3 | 0.01 ng/m3 |
| | | PCBs | Info | 0.002 ng/m3 |
| | | PAHs | Info | 0.3 ug/m3 |

The monitoring and testing of the exhaust from the Thermal Oxidiser No 3 (A2-2) was conducted by Alcontrol Laboratories (UK) on behalf of the EPA.

MSD did not conduct any duplicate testing during this sampling program.

# APPENDIX 6

## 2008 MSD Monitoring Results

- **WWTP Effluent Analysis**
- **Surface / Storm water Analysis**

- **Atmospheric Emission Monitoring**
  - **Boiler Emissions**
  - **Abatement System Emissions**
  - **Particulate Emissions**

**MERCK SHARP & DOHME - IPPC REG. NO. P0011-03**

**PERIOD: 2008**

**E.P. SW 1 Emissions to River Suir.**

**E.P. SW 2A/SW 2B Emissions from Reverse Osmosis Units.**

**Monitoring from Surface Water on Site.**

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: JANUARY 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 $^{O}$C | Daily ELV. Max. 4,500m$^3$/day | Daily ELV. Max. 360m$^3$/hr. |
| 01-Jan-08 | 12 | | 15 | 7.8 | 13 | 2,854 | 110 |
| 02-Jan-08 | 11 | | 11 | 7.8 | 13 | 2,501 | 109 |
| 03-Jan-08 | 10 | 10 | 12 | 7.7 | 12 | 2,452 | 127 |
| 04-Jan-08 | 11 | | 11 | 7.9 | 11 | 2,604 | 136 |
| 05-Jan-08 | 12 | | <10 | 7.8 | 11 | 2,573 | 109 |
| 06-Jan-08 | 13 | | <10 | 7.8 | 11 | 2,406 | 105 |
| 07-Jan-08 | 13 | * Note 1 | 16 | 7.7 | 11 | 2,322 | 93 |
| 08-Jan-08 | 14 | | 11 | 7.8 | 11 | 2,111 | 117 |
| 09-Jan-08 | 14 | | 16 | 7.8 | 12 | 2,468 | 151 |
| 10-Jan-08 | 15 | 13 | 16 | 7.7 | 12 | 2,877 | 142 |
| 11-Jan-08 | 15 | | 14 | 7.7 | 12 | 2,752 | 127 |
| 12-Jan-08 | 16 | | 15 | 7.6 | 13 | 2,850 | 137 |
| 13-Jan-08 | 16 | | 19 | 7.8 | 13 | 3,018 | 134 |
| 14-Jan-08 | 15 | 20 | 15 | 7.6 | 14 | 2,950 | 127 |
| 15-Jan-08 | 14 | | 22 | 7.7 | 14 | 2,766 | 115 |
| 16-Jan-08 | 12 | | 19 | 7.8 | 13 | 2,653 | 116 |
| 17-Jan-08 | 12 | 8 | 20 | 7.7 | 13 | 2,654 | 123 |
| 18-Jan-08 | 11 | | 14 | 7.8 | 14 | 2,567 | 114 |
| 19-Jan-08 | 11 | | 18 | 7.9 | 15 | 2,582 | 123 |
| 20-Jan-08 | 11 | | 11 | 8.1 | 15 | 2,594 | 112 |
| 21-Jan-08 | 10 | 7 | 10 | 7.9 | 15 | 2,551 | 114 |
| 22-Jan-08 | 10 | | <10 | 8.2 | 16 | 2,530 | 123 |
| 23-Jan-08 | 10 | | 12 | 8.3 | 16 | 2,647 | 113 |
| 24-Jan-08 | 10 | 7 | <10 | 8.2 | 15 | 2,441 | 101 |
| 25-Jan-08 | 10 | | 12 | 8.2 | 14 | 2,286 | 110 |
| 26-Jan-08 | <10 | | <10 | 8.1 | 14 | 2,394 | 108 |
| 27-Jan-08 | <10 | | 10 | 8.1 | 14 | 2,246 | 86 |
| 28-Jan-08 | <10 | 4 | <10 | 8.1 | 14 | 1,965 | 98 |
| 29-Jan-08 | <10 | | <10 | 8.1 | 14 | 1,998 | 106 |
| 30-Jan-08 | <10 | | <10 | 8.2 | 14 | 2,299 | 100 |
| 31-Jan-08 | <10 | 6 | <10 | 8.2 | 13 | 2,194 | 103 |

*Note 1: The BOD test of a 24 hr composite effluent sample on the 7th Jan, was not completed as per schedule at the contract laboratory. Additional checks have been introduced at the contract laboratory to prevent a re-occurance.

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: FEBRUARY 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 $^{o}$C | Daily ELV. Max. 4,500m$^{3}$/day | Daily ELV. Max. 360m$^{3}$/hr. |
| 01-Feb-08 | <10 | | <10 | 8.3 | 12 | 2,170 | 102 |
| 02-Feb-08 | <10 | | <10 | 8.2 | 12 | 2,153 | 121 |
| 03-Feb-08 | <10 | | <10 | 8.3 | 12 | 2,360 | 104 |
| 04-Feb-08 | <10 | 4 | <10 | 8.3 | 12 | 2,233 | 99 |
| 05-Feb-08 | <10 | | <10 | 8.3 | 12 | 2,163 | 95 |
| 06-Feb-08 | <10 | | <10 | 8.3 | 12 | 2,145 | 96 |
| 07-Feb-08 | <10 | 3 | <10 | 8.3 | 13 | 2,140 | 92 |
| 08-Feb-08 | <10 | | <10 | 8.3 | 14 | 2,025 | 97 |
| 09-Feb-08 | <10 | | <10 | 8.4 | 14 | 2,056 | 83 |
| 10-Feb-08 | <10 | | <10 | 8.4 | 14 | 1,905 | 95 |
| 11-Feb-08 | <10 | 5 | <10 | 8.4 | 14 | 2,036 | 96 |
| 12-Feb-08 | <10 | | <10 | 8.3 | 15 | 2,189 | 99 |
| 13-Feb-08 | <10 | | <10 | 8.4 | 15 | 2,270 | 100 |
| 14-Feb-08 | <10 | 4 | 11 | 8.4 | 15 | 2,294 | 100 |
| 15-Feb-08 | <10 | | 11 | 8.3 | 15 | 2,293 | 100 |
| 16-Feb-08 | <10 | | <10 | 8.4 | 15 | 2,271 | 103 |
| 17-Feb-08 | <10 | | <10 | 8.4 | 15 | 2,271 | 103 |
| 18-Feb-08 | <10 | 9 | 33 | 8.3 | 14 | 2,259 | 94 |
| 19-Feb-08 | <10 | | <10 | 8.3 | 14 | 2,024 | 87 |
| 20-Feb-08 | <10 | | <10 | 8.2 | 15 | 1,999 | 92 |
| 21-Feb-08 | <10 | 1 | <10 | 8.3 | 15 | 2,088 | 97 |
| 22-Feb-08 | 10 | | <10 | 8.3 | 15 | 2,153 | 103 |
| 23-Feb-08 | 10 | | <10 | 8.2 | 16 | 2,196 | 107 |
| 24-Feb-08 | 10 | | 17 | 8.3 | 16 | 2,327 | 105 |
| 25-Feb-08 | 10 | 10 | 22 | 8.3 | 15 | 2,271 | 113 |
| 26-Feb-08 | 10 | | 17 | 8.3 | 15 | 2,456 | 107 |
| 27-Feb-08 | 10 | | <10 | 8.4 | 15 | 2,416 | 118 |
| 28-Feb-08 | <10 | 6 | 12 | 8.4 | 16 | 2,532 | 104 |
| 29-Feb-08 | <10 | | 11 | 8.4 | 15 | 2,069 | 86 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: MARCH 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 $^{o}$C | Daily ELV. Max. 4,500m$^{3}$/day | Daily ELV. Max. 360m$^{3}$/hr. |
| 01-Mar-08 | 10 | | 22 | 8.4 | 14 | 1,711 | 74 |
| 02-Mar-08 | <10 | | 13 | 8.4 | 14 | 1,616 | 71 |
| 03-Mar-08 | <10 | 2 | 13 | 8.5 | 13 | 1,581 | 76 |
| 04-Mar-08 | <10 | | 14 | 8.5 | 12 | 1,658 | 73 |
| 05-Mar-08 | <10 | | 15 | 8.5 | 13 | 1,997 | 97 |
| 06-Mar-08 | 10 | 7 | 17 | 8.5 | 14 | 2,257 | 109 |
| 07-Mar-08 | 10 | | 20 | 8.5 | 14 | 2,253 | 105 |
| 08-Mar-08 | 10 | | 21 | 8.5 | 15 | 2,298 | 112 |
| 09-Mar-08 | 10 | | 20 | 8.4 | 14 | 2,512 | 137 |
| 10-Mar-08 | <10 | 7 | 21 | 8.5 | 14 | 2,397 | 118 |
| 11-Mar-08 | 10 | | 22 | 8.5 | 14 | 2,357 | 112 |
| 12-Mar-08 | 11 | | 21 | 8.5 | 13 | 2,327 | 114 |
| 13-Mar-08 | 11 | 7 | 20 | 8.5 | 13 | 1,777 | 87 |
| 14-Mar-08 | 10 | | 25 | 8.6 | 14 | 2,075 | 96 |
| 15-Mar-08 | 10 | | 14 | 8.5 | 15 | 2,160 | 98 |
| 16-Mar-08 | <10 | | 17 | 8.4 | 15 | 2,200 | 101 |
| 17-Mar-08 | <10 | 5 | 12 | 8.4 | 15 | 2,190 | 99 |
| 18-Mar-08 | <10 | | 16 | 8.4 | 15 | 2,251 | 99 |
| 19-Mar-08 | <10 | | 16 | 8.4 | 15 | 2,332 | 106 |
| 20-Mar-08 | <10 | 5 | 21 | 8.4 | 15 | 2,473 | 112 |
| 21-Mar-08 | <10 | | 14 | 8.4 | 14 | 2,428 | 109 |
| 22-Mar-08 | <10 | | 19 | 8.5 | 13 | 2,193 | 101 |
| 23-Mar-08 | <10 | | 16 | 8.5 | 13 | 2,093 | 110 |
| 24-Mar-08 | <10 | 5 | 14 | 8.5 | 13 | 2,177 | 108 |
| 25-Mar-08 | 10 | | 21 | 8.5 | 14 | 1,895 | 96 |
| 26-Mar-08 | 10 | | 14 | 8.5 | 14 | 2,245 | 102 |
| 27-Mar-08 | 12 | 8 | 22 | 8.4 | 14 | 2,255 | 105 |
| 28-Mar-08 | 12 | | 18 | 8.6 | 14 | 2,163 | 100 |
| 29-Mar-08 | 13 | | 18 | 8.4 | 14 | 2,057 | 104 |
| 30-Mar-08 | 12 | | 23 | 8.5 | 14 | 2,155 | 98 |
| 31-Mar-08 | 13 | 8 | 21 | 8.4 | 14 | 1,887 | 88 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: APRIL 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 $^{o}$C | Daily ELV. Max. 4,500m$^{3}$/day | Daily ELV. Max. 360m$^{3}$/hr. |
| 01-Apr-08 | 14 | | 24 | 8.5 | 14 | 1,842 | 83 |
| 02-Apr-08 | 14 | | 41 | 8.5 | 15 | 1,910 | 86 |
| 03-Apr-08 | 15 | 10 | 27 | 8.5 | 16 | 1,928 | 87 |
| 04-Apr-08 | 14 | | 25 | 8.5 | 16 | 1,898 | 86 |
| 05-Apr-08 | 13 | | 25 | 8.4 | 16 | 1,955 | 94 |
| 06-Apr-08 | 13 | | 26 | 8.3 | 14 | 2,096 | 96 |
| 07-Apr-08 | 13 | 11 | 26 | 8.2 | 14 | 2,304 | 101 |
| 08-Apr-08 | 14 | | 23 | 8.2 | 15 | 2,372 | 106 |
| 09-Apr-08 | 15 | | 22 | 8.1 | 15 | 2,484 | 109 |
| 10-Apr-08 | 16 | 3 | 26 | 8.2 | 16 | 2,476 | 110 |
| 11-Apr-08 | 16 | | 21 | 8.2 | 16 | 2,430 | 108 |
| 12-Apr-08 | 16 | | 34 | 8.2 | 16 | 2,418 | 106 |
| 13-Apr-08 | 17 | | 29 | 8.3 | 16 | 2,323 | 105 |
| 14-Apr-08 | 18 | 11 | 33 | 8.3 | 16 | 2,071 | 94 |
| 15-Apr-08 | 18 | | 27 | 8.4 | 17 | 2,023 | 91 |
| 16-Apr-08 | 19 | | 31 | 8.5 | 17 | 2,068 | 91 |
| 17-Apr-08 | 19 | 10 | 41 | 8.2 | 16 | 1,996 | 88 |
| 18-Apr-08 | 20 | | 27 | 8.0 | 15 | 1,989 | 88 |
| 19-Apr-08 | 20 | | 34 | 8.1 | 15 | 1,881 | 82 |
| 20-Apr-08 | 21 | | 36 | 8.0 | 15 | 1,894 | 83 |
| 21-Apr-08 | 22 | 1 | 32 | 7.9 | 16 | 1,957 | 84 |
| 22-Apr-08 | 21 | | 32 | 8.0 | 16 | 2,285 | 112 |
| 23-Apr-08 | 23 | | 38 | 8.0 | 17 | 2,241 | 109 |
| 24-Apr-08 | 23 | 13 | 38 | 8.1 | 18 | 2,114 | 94 |
| 25-Apr-08 | 22 | | 38 | 7.9 | 18 | 2,109 | 95 |
| 26-Apr-08 | 21 | | 37 | 7.8 | 18 | 3,215 | 153 |
| 27-Apr-08 | 20 | | 37 | 7.9 | 18 | 3,389 | 152 |
| 28-Apr-08 | 18 | 8 | 33 | 8.0 | 18 | 2,783 | 143 |
| 29-Apr-08 | 17 | | 37 | 7.9 | 18 | 1,945 | 88 |
| 30-Apr-08 | 16 | | 25 | 8.0 | 17 | 1,935 | 85 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: MAY 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 °C | Daily ELV. Max. 4,500m³/day | Daily ELV. Max. 360m³/hr. |
| 01-May-08 | 18 | 7 | 34 | 8.0 | 17 | 1,965 | 88 |
| 02-May-08 | 18 | | 33 | 7.9 | 18 | 2,066 | 94 |
| 03-May-08 | 17 | | 23 | 7.8 | 18 | 2,120 | 103 |
| 04-May-08 | 18 | | 27 | 7.8 | 19 | 2,350 | 104 |
| 05-May-08 | 19 | 12 | 18 | 7.8 | 21 | 2,440 | 110 |
| 06-May-08 | 20 | | 23 | 7.8 | 21 | 2,509 | 116 |
| 07-May-08 | 21 | | 25 | 7.8 | 22 | 2,524 | 111 |
| 08-May-08 | 20 | 20 | 21 | 7.9 | 22 | 2,504 | 113 |
| 09-May-08 | 19 | | 22 | 7.7 | 22 | 2,257 | 102 |
| 10-May-08 | 18 | | 21 | 7.7 | 22 | 2,153 | 94 |
| 11-May-08 | 17 | | <10 | 7.8 | 23 | 2,075 | 89 |
| 12-May-08 | 17 | 10 | 12 | 7.7 | 23 | 2,100 | 95 |
| 13-May-08 | 17 | | 10 | 7.8 | 24 | 1,980 | 95 |
| 14-May-08 | 17 | | <10 | 7.8 | 24 | 2,182 | 100 |
| 15-May-08 | 17 | 12 | 14 | 7.8 | 24 | 2,328 | 102 |
| 16-May-08 | 15 | | 10 | 7.7 | 23 | 2,232 | 98 |
| 17-May-08 | 13 | | 11 | 7.7 | 22 | 3,005 | 139 |
| 18-May-08 | 11 | | 13 | 7.8 | 21 | 2,818 | 139 |
| 19-May-08 | 11 | 8 | 10 | 7.8 | 21 | 2,872 | 125 |
| 20-May-08 | 13 | | <10 | 8.0 | 20 | 3,047 | 141 |
| 21-May-08 | 17 | | <10 | 8.0 | 19 | 3,585 | 170 |
| 22-May-08 | 19 | 9 | 19 | 7.4 | 20 | 3,193 | 162 |
| 23-May-08 | 20 | | 26 | 7.9 | 20 | 2,709 | 125 |
| 24-May-08 | 21 | | 19 | 7.8 | 22 | 2,517 | 114 |
| 25-May-08 | 20 | | 21 | 8.0 | 21 | 2,074 | 101 |
| 26-May-08 | 19 | 8 | 17 | 8.0 | 20 | 2,032 | 91 |
| 27-May-08 | 14 | | 14 | 8.1 | 19 | 2,036 | 91 |
| 28-May-08 | 13 | | <10 | 8.1 | 20 | 2,038 | 88 |
| 29-May-08 | 12 | 5 | 12 | 8.2 | 21 | 2,143 | 97 |
| 30-May-08 | 12 | | 10 | 8.1 | 22 | 2,200 | 105 |
| 31-May-08 | 12 | | <10 | 8.1 | 24 | 2,247 | 99 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: JUNE 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 $^{o}$C | Daily ELV. Max. 4,500m$^{3}$/day | Daily ELV. Max. 360m$^{3}$/hr. |
| 01-Jun-08 | 12 | | <10 | 8.2 | 24 | 1,728 | 105 |
| 02-Jun-08 | 12 | 10 | <10 | 8.3 | 23 | 1,905 | 87 |
| 03-Jun-08 | 14 | | 11 | 8.3 | 24 | 2,273 | 112 |
| 04-Jun-08 | 13 | | 12 | 8.2 | 23 | 2,169 | 106 |
| 05-Jun-08 | 14 | 5 | 12 | 8.2 | 23 | 2,057 | 94 |
| 06-Jun-08 | 15 | | 11 | 8.2 | 23 | 1,896 | 98 |
| 07-Jun-08 | 16 | | 14 | 8.1 | 23 | 1,875 | 87 |
| 08-Jun-08 | 16 | | 11 | 8.2 | 24 | 1,496 | 86 |
| 09-Jun-08 | 16 | 5 | 19 | 8.2 | 24 | 1,876 | 85 |
| 10-Jun-08 | 16 | | 16 | 8.0 | 25 | 2,152 | 103 |
| 11-Jun-08 | 15 | | 18 | 7.9 | 24 | 3,248 | 204 |
| 12-Jun-08 | 14 | 1 | <10 | 8.0 | 22 | 4,137 | 199 |
| 13-Jun-08 | 12 | | <10 | 8.2 | 21 | 4,114 | 185 |
| 14-Jun-08 | 12 | | 11 | 8.3 | 21 | 4,061 | 184 |
| 15-Jun-08 | 11 | | <10 | 8.2 | 21 | 3,791 | 182 |
| 16-Jun-08 | 10 | 6 | 11 | 8.1 | 20 | 3,868 | 169 |
| 17-Jun-08 | 10 | | 15 | 8.0 | 21 | 3,881 | 170 |
| 18-Jun-08 | 10 | | 17 | 8.0 | 20 | 3,622 | 187 |
| 19-Jun-08 | 11 | 11 | 14 | 8.2 | 21 | 2,843 | 129 |
| 20-Jun-08 | 11 | | 12 | 8.4 | 21 | 2,785 | 135 |
| 21-Jun-08 | 11 | | 10 | 7.9 | 20 | 3,365 | 166 |
| 22-Jun-08 | 11 | | 11 | 8.3 | 20 | 3,575 | 221 |
| 23-Jun-08 | 12 | 1 | 18 | 8.5 | 20 | 3,152 | 161 |
| 24-Jun-08 | 10 | | 18 | 8.2 | 20 | 2,301 | 107 |
| 25-Jun-08 | 11 | | 14 | 8.5 | 22 | 2,325 | 106 |
| 26-Jun-08 | 10 | 6 | 17 | 8.2 | 21 | 2,566 | 132 |
| 27-Jun-08 | 11 | | 13 | 8.4 | 22 | 2,115 | 95 |
| 28-Jun-08 | 11 | | 13 | 8.4 | 22 | 2,115 | 91 |
| 29-Jun-08 | 11 | | 14 | 8.4 | 22 | 1,681 | 88 |
| 30-Jun-08 | 12 | 10 | 18 | 8.2 | 22 | 1,865 | 89 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: JULY 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 $^{O}$C | Daily ELV. Max. 4,500m$^{3}$/day | Daily ELV. Max. 360m$^{3}$/hr. |
| 01-Jul-08 | 11 | | 19 | 8.3 | 21 | 1,956 | 97 |
| 02-Jul-08 | 11 | | 14 | 8.4 | 21 | 2,052 | 95 |
| 03-Jul-08 | 11 | 1 | 11 | 8.5 | 22 | 2,118 | 100 |
| 04-Jul-08 | 12 | | 19 | 8.4 | 21 | 2,479 | 120 |
| 05-Jul-08 | 12 | | 15 | 8.3 | 21 | 2,540 | 121 |
| 06-Jul-08 | 12 | | 19 | 8.3 | 21 | 2,991 | 144 |
| 07-Jul-08 | 12 | 1 | 16 | 8.3 | 22 | 2,910 | 131 |
| 08-Jul-08 | 11 | | 19 | 8.3 | 22 | 2,954 | 131 |
| 09-Jul-08 | 11 | | 13 | 8.3 | 23 | 2,468 | 121 |
| 10-Jul-08 | 11 | 4 | 14 | 8.3 | 22 | 2,419 | 105 |
| 11-Jul-08 | 11 | | 12 | 8.4 | 22 | 2,470 | 110 |
| 12-Jul-08 | 12 | | 20 | 8.1 | 22 | 2,179 | 104 |
| 13-Jul-08 | 13 | | 20 | 8.3 | 22 | 1,866 | 85 |
| 14-Jul-08 | 13 | 1 | 53 | 8.3 | 23 | 1,790 | 79 |
| 15-Jul-08 | 13 | | 26 | 8.3 | 23 | 1,794 | 82 |
| 16-Jul-08 | 13 | | 15 | 8.3 | 22 | 1,953 | 90 |
| 17-Jul-08 | 13 | 8 | 18 | 8.1 | 22 | 1,853 | 87 |
| 18-Jul-08 | 13 | | 15 | 8.3 | 22 | 1,595 | 73 |
| 19-Jul-08 | 13 | | 10 | 8.2 | 21 | 1,462 | 66 |
| 20-Jul-08 | 13 | | 14 | 8.3 | 21 | 1,493 | 65 |
| 21-Jul-08 | 14 | 6 | 19 | 8.4 | 21 | 1,592 | 73 |
| 22-Jul-08 | 14 | | 21 | 8.2 | 23 | 1,724 | 82 |
| 23-Jul-08 | 13 | | 20 | 8.2 | 22 | 1,763 | 78 |
| 24-Jul-08 | 13 | 1 | 16 | 7.9 | 23 | 1,758 | 78 |
| 25-Jul-08 | 12 | | 18 | 7.9 | 22 | 1,838 | 82 |
| 26-Jul-08 | 12 | | 15 | 7.8 | 23 | 1,821 | 80 |
| 27-Jul-08 | 12 | | <10 | 7.8 | 24 | 1,794 | 78 |
| 28-Jul-08 | 12 | 8 | 21 | 8.1 | 24 | 1,942 | 93 |
| 29-Jul-08 | 12 | | 15 | 8.1 | 23 | 1,892 | 91 |
| 30-Jul-08 | 12 | | 27 | 7.9 | 23 | 1,885 | 92 |
| 31-Jul-08 | 12 | 9 | 21 | 8.1 | 23 | 1,880 | 81 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: AUGUST 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 °C | Daily ELV. Max. 4,500m³/day | Daily ELV. Max. 360m³/hr. |
| 01-Aug-08 | 12 | | 11 | 7.5 | 23 | 2,085 | 102 |
| 02-Aug-08 | 12 | | 14 | 7.9 | 23 | 2,162 | 95 |
| 03-Aug-08 | 12 | | 35 | 8.2 | 23 | 1,871 | 85 |
| 04-Aug-08 | 12 | 1 | 13 | 7.6 | 22 | 1,858 | 89 |
| 05-Aug-08 | 11 | | 14 | 8.1 | 22 | 1,859 | 87 |
| 06-Aug-08 | 11 | | 14 | 8.0 | 23 | 1,951 | 85 |
| 07-Aug-08 | 11 | 3 | 16 | 7.9 | 22 | 2,015 | 90 |
| 08-Aug-08 | 11 | | 12 | 7.8 | 22 | 2,228 | 112 |
| 09-Aug-08 | 11 | | 13 | 7.6 | 22 | 2,526 | 119 |
| 10-Aug-08 | 12 | | 18 | 8.0 | 23 | 2,518 | 119 |
| 11-Aug-08 | 12 | 6 | 29 | 8.0 | 22 | 2,553 | 123 |
| 12-Aug-08 | 12 | | 27 | 7.7 | 22 | 2,297 | 105 |
| 13-Aug-08 | 11 | | 30 | 7.7 | 21 | 2,748 | 126 |
| 14-Aug-08 | 11 | 1 | 23 | 8.1 | 22 | 3,086 | 143 |
| 15-Aug-08 | 10 | | 15 | 8.0 | 22 | 2,676 | 123 |
| 16-Aug-08 | 10 | | 10 | 8.1 | 21 | 2,375 | 118 |
| 17-Aug-08 | 10 | | <10 | 8.1 | 21 | 2,337 | 111 |
| 18-Aug-08 | 11 | 2 | <10 | 7.8 | 21 | 2,043 | 120 |
| 19-Aug-08 | 11 | | 18 | 7.9 | 21 | 1,921 | 106 |
| 20-Aug-08 | 13 | | 10 | 7.9 | 21 | 2,550 | 126 |
| 21-Aug-08 | 12 | 3 | 16 | 8.0 | 22 | 2,756 | 134 |
| 22-Aug-08 | 11 | | <10 | 7.8 | 22 | 2,614 | 117 |
| 23-Aug-08 | 12 | | 16 | 7.9 | 21 | 2,625 | 136 |
| 24-Aug-08 | 12 | | 17 | 7.8 | 22 | 2,158 | 94 |
| 25-Aug-08 | 12 | 7 | <10 | 7.8 | 22 | 2,253 | 104 |
| 26-Aug-08 | 12 | | 11 | 7.9 | 22 | 2,460 | 109 |
| 27-Aug-08 | 12 | | 14 | 7.9 | 22 | 2,489 | 119 |
| 28-Aug-08 | 13 | 8 | 19 | 8.0 | 23 | 2,219 | 200 |
| 29-Aug-08 | 12 | | 19 | 7.9 | 23 | 3,250 | 152 |
| 30-Aug-08 | 12 | | 15 | 8.0 | 23 | 2,236 | 105 |
| 31-Aug-08 | 12 | | 15 | 8.0 | 23 | 2,163 | 115 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: SEPTEMBER 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 °C | Daily ELV. Max. 4,500m³/day | Daily ELV. Max. 360m³/hr. |
| 01-Sep-08 | 12 | 5 | 12 | 7.9 | 23 | 2,288 | 107 |
| 02-Sep-08 | 12 | | 13 | 7.9 | 23 | 1,795 | 103 |
| 03-Sep-08 | 12 | | 18 | 7.9 | 21 | 2,449 | 128 |
| 04-Sep-08 | 11 | 7 | 10 | 7.8 | 21 | 2,494 | 115 |
| 05-Sep-08 | 10 | | 12 | 7.7 | 21 | 2,577 | 126 |
| 06-Sep-08 | 10 | | 21 | 7.7 | 20 | 2,421 | 105 |
| 07-Sep-08 | 10 | | <10 | 7.6 | 20 | 2,276 | 103 |
| 08-Sep-08 | 10 | 7 | <10 | 7.8 | 20 | 2,594 | 134 |
| 09-Sep-08 | <10 | | <10 | 7.8 | 21 | 3,013 | 143 |
| 10-Sep-08 | <10 | | <10 | 7.9 | 20 | 3,108 | 136 |
| 11-Sep-08 | <10 | 3 | <10 | 7.8 | 20 | 3,162 | 145 |
| 12-Sep-08 | 10 | | <10 | 7.8 | 20 | 3,239 | 149 |
| 13-Sep-08 | 10 | | <10 | 7.9 | 21 | 3,152 | 139 |
| 14-Sep-08 | 10 | | 11 | 8.0 | 21 | 3,051 | 135 |
| 15-Sep-08 | 10 | 6 | 14 | 7.9 | 21 | 2,290 | 120 |
| 16-Sep-08 | 11 | | 11 | 8.0 | 20 | 2,404 | 131 |
| 17-Sep-08 | 12 | | 12 | 7.9 | 21 | 2,450 | 108 |
| 18-Sep-08 | 12 | 5 | 18 | 8.0 | 21 | 2,611 | 131 |
| 19-Sep-08 | 12 | | 13 | 8.1 | 22 | 2,599 | 114 |
| 20-Sep-08 | 12 | | 10 | 8.0 | 22 | 2,637 | 119 |
| 21-Sep-08 | 13 | | 10 | 7.9 | 22 | 2,623 | 119 |
| 22-Sep-08 | 13 | 8 | 21 | 8.0 | 22 | 2,525 | 117 |
| 23-Sep-08 | 14 | | 19 | 8.1 | 22 | 2,375 | 107 |
| 24-Sep-08 | 14 | | 25 | 8.1 | 22 | 2,394 | 106 |
| 25-Sep-08 | 16 | 8 | 19 | 7.9 | 22 | 2,253 | 128 |
| 26-Sep-08 | 17 | | 33 | 7.9 | 22 | 2,461 | 165 |
| 27-Sep-08 | 16 | | 29 | 8.0 | 21 | 2,219 | 105 |
| 28-Sep-08 | 15 | | 21 | 7.9 | 21 | 2,432 | 106 |
| 29-Sep-08 | 14 | 9 | 27 | 8.0 | 20 | 2,355 | 107 |
| 30-Sep-08 | 13 | | 24 | 7.9 | 19 | 2,330 | 105 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: OCTOBER 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 °C | Daily ELV. Max. 4,500m³/day | Daily ELV. Max. 360m³/hr. |
| 01-Oct-08 | 13 | 10 | 19 | 8.0 | 18 | 2,306 | 101 |
| 02-Oct-08 | 13 | | 17 | 8.1 | 17 | 2,066 | 96 |
| 03-Oct-08 | 13 | | 31 | 8.0 | 17 | 2,072 | 94 |
| 04-Oct-08 | 13 | | 29 | 7.7 | 17 | 2,376 | 114 |
| 05-Oct-08 | 13 | | 27 | 8.0 | 18 | 2,161 | 103 |
| 06-Oct-08 | 13 | 12 | 22 | 8.1 | 17 | 2,020 | 90 |
| 07-Oct-08 | 12 | | 16 | 7.9 | 18 | 2,268 | 102 |
| 08-Oct-08 | 12 | | 23 | 8.0 | 18 | 2,334 | 100 |
| 09-Oct-08 | 12 | 11 | 33 | 7.8 | 18 | 2,418 | 109 |
| 10-Oct-08 | 11 | | 19 | 7.8 | 18 | 2,678 | 117 |
| 11-Oct-08 | 11 | | 16 | 7.8 | 19 | 2,688 | 115 |
| 12-Oct-08 | 10 | | 14 | 7.8 | 19 | 2,665 | 113 |
| 13-Oct-08 | 10 | 3 | 14 | 7.6 | 19 | 2,601 | 115 |
| 14-Oct-08 | 10 | | 12 | 7.6 | 19 | 2,664 | 127 |
| 15-Oct-08 | <10 | | <10 | 7.5 | 19 | 2,581 | 115 |
| 16-Oct-08 | <10 | 2 | <10 | 7.6 | 18 | 2,240 | 104 |
| 17-Oct-08 | 10 | | 11 | 7.7 | 18 | 2,181 | 110 |
| 18-Oct-08 | 10 | | <10 | 7.7 | 18 | 2,628 | 115 |
| 19-Oct-08 | 11 | | <10 | 7.7 | 17 | 2,589 | 115 |
| 20-Oct-08 | 11 | 3 | <10 | 7.7 | 17 | 2,511 | 113 |
| 21-Oct-08 | 11 | | <10 | 7.7 | 16 | 2,469 | 110 |
| 22-Oct-08 | 11 | | 12 | 7.8 | 16 | 2,066 | 105 |
| 23-Oct-08 | 11 | 5 | 10 | 7.7 | 16 | 1,746 | 88 |
| 24-Oct-08 | 11 | | <10 | 7.9 | 15 | 2,083 | 100 |
| 25-Oct-08 | 12 | | <10 | 7.8 | 15 | 2,372 | 107 |
| 26-Oct-08 | 11 | | <10 | 7.7 | 15 | 2,099 | 99 |
| 27-Oct-08 | 11 | 6 | 11 | 7.7 | 15 | 2,031 | 89 |
| 28-Oct-08 | 11 | | 10 | 7.7 | 14 | 1,970 | 89 |
| 29-Oct-08 | 11 | | 11 | 7.7 | 13 | 1,908 | 90 |
| 30-Oct-08 | 12 | 4 | <10 | 7.8 | 13 | 1,818 | 80 |
| 31-Oct-08 | 13 | | 12 | 7.8 | 13 | 1,880 | 87 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: NOVEMBER 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 °C | Daily ELV. Max. 4,500m³/day | Daily ELV. Max. 360m³/hr. |
| 01-Nov-08 | 13 | | <10 | 7.8 | 13 | 1,810 | 78 |
| 02-Nov-08 | 13 | | 10 | 7.9 | 13 | 1,900 | 86 |
| 03-Nov-08 | 14 | 9 | <10 | 7.8 | 13 | 2,087 | 94 |
| 04-Nov-08 | 14 | | 10 | 7.8 | 14 | 2,234 | 104 |
| 05-Nov-08 | 14 | | 11 | 7.9 | 15 | 2,465 | 109 |
| 06-Nov-08 | 14 | 6 | 14 | 7.9 | 15 | 2,409 | 111 |
| 07-Nov-08 | 14 | | 11 | 8.0 | 15 | 2,116 | 102 |
| 08-Nov-08 | 13 | | <10 | 8.0 | 15 | 2,544 | 129 |
| 09-Nov-08 | 13 | | <10 | 8.1 | 14 | 2,501 | 114 |
| 10-Nov-08 | 13 | 1 | <10 | 8.0 | 14 | 2,353 | 103 |
| 11-Nov-08 | 13 | | 10 | 8.1 | 13 | 2,163 | 97 |
| 12-Nov-08 | 13 | | <10 | 8.2 | 13 | 2,092 | 106 |
| 13-Nov-08 | 13 | 1 | <10 | 8.1 | 14 | 2,183 | 99 |
| 14-Nov-08 | 13 | | <10 | 8.0 | 15 | 2,124 | 108 |
| 15-Nov-08 | 13 | | 13 | 8.1 | 15 | 2,991 | 133 |
| 16-Nov-08 | 13 | | <10 | 8.0 | 15 | 2,642 | 136 |
| 17-Nov-08 | 12 | 4 | 10 | 8.0 | 16 | 2,193 | 96 |
| 18-Nov-08 | 12 | | 10 | 8.1 | 15 | 2,197 | 95 |
| 19-Nov-08 | 13 | | 12 | 8.0 | 15 | 2,529 | 124 |
| 20-Nov-08 | 13 | 8 | 12 | 8.0 | 15 | 2,486 | 125 |
| 21-Nov-08 | 13 | | 13 | 8.1 | 15 | 2,307 | 101 |
| 22-Nov-08 | 12 | | <10 | 8.1 | 15 | 2,399 | 105 |
| 23-Nov-08 | 11 | | 14 | 8.0 | 15 | 2,177 | 107 |
| 24-Nov-08 | 11 | 3 | <10 | 8.1 | 13 | 2,284 | 100 |
| 25-Nov-08 | 15 | | <10 | 8.0 | 14 | 2,597 | 117 |
| 26-Nov-08 | 17 | | <10 | 8.0 | 14 | 2,204 | 115 |
| 27-Nov-08 | 16 | 2 | <10 | 8.0 | 14 | 1,758 | 111 |
| 28-Nov-08 | 15 | | <10 | 7.9 | 13 | 2,682 | 121 |
| 29-Nov-08 | 15 | | 10 | 8.0 | 13 | 2,781 | 126 |
| 30-Nov-08 | 14 | | <10 | 8.1 | 12 | 2,855 | 129 |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**PERIOD: DECEMBER 2008**

| Date | TOC Effluent Monitor | BOD | Suspended Solids | pH | Temperature | Flow | Flow |
|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily mgs/lt | 2/week ELV. <100 mgs/lt | Daily ELV. <100 mgs/lt | Daily ELV. 6 - 9 | Daily ELV. 35 °C | Daily ELV. Max. 4,500m³/day | Daily ELV. Max. 360m³/hr. |
| 01-Dec-08 | 15 | 4 | <10 | 8.0 | 12 | 2,448 | 127 |
| 02-Dec-08 | 16 | | <10 | 8.0 | 12 | 2,473 | 108 |
| 03-Dec-08 | 16 | | <10 | 8.0 | 12 | 2,586 | 134 |
| 04-Dec-08 | 17 | 3 | <10 | 7.9 | 12 | 2,519 | 113 |
| 05-Dec-08 | 17 | | <10 | 7.9 | 12 | 2,127 | 105 |
| 06-Dec-08 | 16 | | <10 | 8.0 | 12 | 2,007 | 87 |
| 07-Dec-08 | 16 | | 10 | 8.0 | 11 | 1,895 | 88 |
| 08-Dec-08 | 17 | 7 | 11 | 7.8 | 11 | 2,037 | 100 |
| 09-Dec-08 | 16 | | 10 | 7.9 | 11 | 1,883 | 82 |
| 10-Dec-08 | 16 | | 12 | 7.8 | 11 | 1,810 | 80 |
| 11-Dec-08 | 16 | 1 | 15 | 7.9 | 12 | 1,927 | 85 |
| 12-Dec-08 | 15 | | 10 | 7.9 | 12 | 1,862 | 108 |
| 13-Dec-08 | 14 | | <10 | 7.9 | 12 | 2,175 | 97 |
| 14-Dec-08 | 14 | | 11 | 8.0 | 11 | 2,216 | 101 |
| 15-Dec-08 | 17 | 2 | 17 | 7.9 | 12 | 2,465 | 112 |
| 16-Dec-08 | 17 | | 19 | 7.9 | 12 | 2,398 | 112 |
| 17-Dec-08 | 16 | | 25 | 7.8 | 12 | 2,207 | 113 |
| 18-Dec-08 | 15 | 6 | 36 | 7.9 | 12 | 2,083 | 95 |
| 19-Dec-08 | 13 | | 14 | 7.9 | 13 | 2,246 | 98 |
| 20-Dec-08 | 12 | | 14 | 7.9 | 13 | 2,244 | 101 |
| 21-Dec-08 | 11 | | 14 | 7.9 | 14 | 2,318 | 102 |
| 22-Dec-08 | 10 | 1 | <10 | 7.9 | 14 | 2,287 | 100 |
| 23-Dec-08 | 10 | | <10 | 7.9 | 14 | 2,022 | 99 |
| 24-Dec-08 | 10 | 1 | <10 | 8.0 | 14 | 1,858 | 83 |
| 25-Dec-08 | <10 | | 12 | 7.9 | 14 | 1,669 | 75 |
| 26-Dec-08 | <10 | | 12 | 8.0 | 14 | 1,588 | 78 |
| 27-Dec-08 | 15 | | <10 | 7.9 | 12 | 1,453 | 74 |
| 28-Dec-08 | 15 | | <10 | 7.9 | 12 | 1,647 | 81 |
| 29-Dec-08 | <10 | 5 | <10 | 8.0 | 11 | 1,648 | 76 |
| 30-Dec-08 | <10 | | <10 | 7.9 | 10 | 1,952 | 89 |
| 31-Dec-08 | <10 | | <10 | 8.0 | 10 | 1,916 | 94 |
| | 382.0 | 3.3 | 12.6 | 7.9 | 12.1 | 2063.4 | 96.7 |

**Note:**
The online TOC effluent monitor was not operational on the 27-28th of December. The reported result is taken from the laboratory TOC analysis of a 24 hour composite sample.

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**Period: January, February, March 2008**

| Parameter | ELV. | Monitoring Frequency | SW 1 Emissions | | | | | SW 1 Emissions | | | | SW 1 Emissions | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Week No. 1 31-Dec-07 | Week No. 2 07-Jan-08 | Week No. 3 14-Jan-08 | Week No. 4 21-Jan-08 | Week No. 5 28-Jan-08 | Week No. 6 04-Feb-08 | Week No. 7 11-Feb-08 | Week No. 8 18-Feb-08 | Week No. 9 25-Feb-08 | Week No. 10 03-Mar-08 | Week No. 11 10-Mar-08 | Week No. 12 17-Mar-08 | Week No. 13 24-Mar-08 | Week No. 14 31-Mar-08 |
| Total Ammonia (as N) | 10 mg/lt | Weekly | 0.1 | 0.5 | 0.2 | 0.7 | 0.9 | 0.8 | 0.5 | 0.4 | 0.7 | 0.2 | 0.2 | <0.1 | 0.1 | 0.2 |
| Total Nitrogen (as N) | 35 mg/lt | Weekly | 5.6 | 4.6 | 4.9 | 5.0 | 4.1 | 6.6 | 5.8 | 2.1 | 4.3 | 4.3 | 5.2 | 6.3 | 5.2 | 5.1 |
| | 67.5 kg/day | Weekly | 16.8 | 10.7 | 14.5 | 12.8 | 8.1 | 14.7 | 11.8 | 4.7 | 9.8 | 6.8 | 12.5 | 14.2 | 9.9 | 9.6 |
| Total Phosphorus (as P) | 10 mg/lt | Weekly | 1.5 | 0.8 | 1.2 | 1.4 | 1.2 | 1.9 | 1.5 | 0.8 | 0.9 | 0.6 | 0.7 | 0.7 | 0.9 | 2.3 |
| | 9.0 kg/day | Weekly | 4.6 | 1.9 | 3.5 | 3.5 | 2.3 | 4.2 | 3.1 | 1.8 | 2.1 | 1.0 | 1.7 | 1.5 | 1.7 | 4.3 |
| Chlorides | 1,500 mg/lt | Monthly | | | | 230 | | | | 319 | | | 367 | | | |
| Total Dissolved Solids | 7,500 mg/lt | Monthly | | 1,042 | | | | | 1,431 | | | | 1,526 | | | |
| Cyanide (as CN) | 0.2 mg/lt | Monthly | | | | <0.01 | | | | <0.01 | | | <0.01 | | | |
| Nickel | 2 mg/lt | Monthly | | | | 0.07 | | | | 0.02 | | | 0.02 | | | |
| Copper | 0.5 mg/lt | Monthly | | | | 0.03 | | | | <0.01 | | | 0.04 | | | |
| Zinc | 0.5 mg/lt | Monthly | | | | 0.02 | | | | 0.02 | | | 0.03 | | | |
| Effluent Solvent | Info (mg/lt) | Quarterly | | | | | * < 1 | | | | | | | | | |
| Effluent Toxicity | 10 T. U. | Bi - Annually | | | | | | | | | | | | | | |

**Note:**
* Total of all individual solvents in use in processing activities.

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**Period: April, May, June 2008**

| Parameter | ELV. | Monitoring Frequency | SW 1 Emissions | | | | | SW 1 Emissions | | | | SW 1 Emissions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Week No. 14 31-Mar-08 | Week No. 15 07-Apr-08 | Week No. 16 14-Apr-08 | Week No. 17 21-Apr-08 | Week No. 18 28-Apr-08 | Week No. 19 05-May-08 | Week No. 20 12-May-08 | Week No. 21 19-May-08 | Week No. 22 26-May-08 | Week No. 23 02-Jun-08 | Week No. 24 09-Jun-08 | Week No. 25 16-Jun-08 | Week No. 26 23-Jun-08 |
| Total Ammonia (as N) | 10 mg/lt | Weekly | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 1.0 | 0.4 | 0.1 | 0.2 | 3.2 | 0.8 |
| Total Nitrogen (as N) | 35 mg/lt<br>67.5 kg/day | Weekly | 5.1<br>9.6 | 4.8<br>11.1 | 6.7<br>13.9 | 9.3<br>18.2 | 7.7<br>21.4 | 8.8<br>22.0 | 9.7<br>20.4 | 7.0<br>20.1 | 6.5<br>13.2 | 5.7<br>13.0 | 4.9<br>9.2 | 7.2<br>27.8 | 4.6<br>14.5 |
| Total Phosphorus (as P) | 10 mg/lt<br>9.0 kg/day | Weekly | 2.3<br>4.3 | 2.2<br>5.1 | 1.9<br>3.9 | 2.2<br>4.2 | 1.6<br>4.4 | 2.3<br>5.8 | 1.1<br>2.4 | 0.6<br>1.8 | 0.9<br>1.9 | 0.6<br>1.3 | 0.6<br>1.1 | 0.6<br>2.2 | 0.7<br>2.3 |
| Chlorides | 1,500 mg/lt | Monthly | | | 344 | | | | 307 | | | | 340 | | |
| Total Dissolved Solids | 7,500 mg/lt | Monthly | | 1248 | | | | | 1516 | | | | 1338 | | |
| Cyanide | 0.2 mg/lt | Monthly | | | <0.01 | | | | <0.01 | | | | <0.01 | | |
| Nickel | 2 mg/lt | Monthly | | | 0.01 | | | | 0.02 | | | | 0.01 | | |
| Copper | 0.5 mg/lt | Monthly | | | 0.01 | | | | 0.01 | | | | 0.01 | | |
| Zinc | 0.5 mg/lt | Monthly | | | 0.05 | | | | 0.02 | | | | 0.03 | | |
| Effluent Solvent | Info (mg/lt) | Quarterly | | | | | | | | * < 1 | | | | | |
| Effluent Toxicity ( two species ) | 10 T. U.<br>96 hour $LC_{50}$<br>( Rainbow Trout) | Bi - Annually | | | | | | | | < 1 T.U. | | | | | |
| | 48 hour $EC_{50}$<br>( Daphnia Magna ) | | | | | | | | | < 1 T.U. | | | | | |

**Note:**

* For each individual solvent in use in processing activities.

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**Period: July, August, September 2008**

| Parameter | ELV. | Monitoring Frequency | Emission mgs/lt | | | | | Emission mgs/lt | | | | Emission mgs/lt | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Week No. 27 30-Jun-08 | Week No. 28 07-Jul-08 | Week No. 29 14-Jul-08 | Week No. 30 21-Jul-08 | Week No. 31 28-Jul-08 | Week No. 32 04-Aug-08 | Week No. 33 11-Aug-08 | Week No. 34 18-Aug-08 | Week No. 35 25-Aug-08 | Week No. 36 01-Sep-08 | Week No. 37 08-Sep-08 | Week No. 38 15-Sep-08 | Week No. 39 22-Sep-08 | Week No. 40 29-Sep-08 |
| Total Ammonia (as N) | 10 mg/lt | Weekly | 0.2 | 0.1 | 0.4 | 1.2 | 0.5 | 0.3 | 0.3 | 0.7 | 0.4 | 0.4 | 1.4 | 1.1 | 0.8 | 0.6 |
| Total Nitrogen (as N) | 35 mg/lt<br>67.5 kg/day | Weekly | 3.8<br>7.1 | 4.2<br>12.2 | 4.2<br>7.5 | 6.2<br>9.9 | 4.8<br>9.3 | 6.1<br>11.3 | 5.2<br>13.3 | 8.4<br>17.2 | 6.4<br>14.4 | 6.2<br>14.2 | 6.3<br>16.3 | 6.3<br>14.4 | 7.4<br>18.7 | 6.4<br>15.1 |
| Total Phosphorus (as P) | 10 mg/lt<br>9.0 kg/day | Weekly | 0.8<br>1.5 | 0.6<br>1.8 | 0.7<br>1.3 | 0.8<br>1.3 | 0.7<br>1.4 | 0.9<br>1.6 | 0.6<br>1.6 | 1.0<br>2.1 | 0.9<br>2.1 | 0.8<br>1.9 | 1.0<br>2.7 | 1.1<br>2.4 | 1.0<br>2.6 | 1.5<br>3.5 |
| Chlorides | 1,500 mg/lt | Monthly | | 334 | | | | | 257 | | | | 264 | | | |
| Total Dissolved Solids | 7,500 mg/lt | Monthly | | | | | 1,464 | | 970 | | | | 1,386 | | | |
| Cyanide | 0.2 mg/lt | Monthly | | <0.01 | | | | | <0.01 | | | | <0.01 | | | |
| Nickel | 2 mg/lt | Monthly | | 0.01 | | | | | 0.01 | | | | 0.03 | | | |
| Copper | 0.5 mg/lt | Monthly | | 0.01 | | | | | <0.01 | | | | 0.01 | | | |
| Zinc | 0.5 mg/lt | Monthly | | 0.04 | | | | | 0.11 | | | | 0.06 | | | |
| Effluent Solvent | Info (mg/lt) | Quarterly | | | | | | | * < 1 | | | | | | | |
| Effluent Toxicity ( two species ) | 10 T. U.<br>96 hour $LC_{50}$ ( Rainbow Trout) | Bi - Annually | | | | | | | | | | | | | < 1 | |
| | 48 hour $EC_{50}$ ( Daphnia Magna ) | | | | | | | | | | | | | | < 1 | |

Note:
* For each individual solvent in use in processing activities.

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 1 Emissions to River Suir**

**Period: October, November, December 2008**

| Parameter | ELV. | Monitoring Frequency | Emission mgs/lt | | | | Emission mgs/lt | | | | Emission mgs/lt | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Week No. 41 06-Oct-08 | Week No. 42 13-Oct-08 | Week No. 43 20-Oct-08 | Week No. 44 27-Oct-08 | Week No. 45 03-Nov-08 | Week No. 46 10-Nov-08 | Week No. 47 17-Nov-08 | Week No. 48 24-Nov-08 | Week No. 49 01-Dec-08 | Week No. 50 08-Dec-08 | Week No. 51 15-Dec-08 | Week No. 52 22-Dec-08 | Week No. 1 29-Dec-08 |
| Total Ammonia (as N) | 10 mg/lt | Weekly | 0.4 | 1.1 | 1.5 | 1.3 | 1.1 | 0.1 | 1.0 | 1.2 | 1.4 | 1.1 | 1.0 | 0.5 | 0.9 |
| Total Nitrogen (as N) | 35 mg/lt<br>67.5 kg/day | Weekly | 6.8<br>13.7 | 4.7<br>12.2 | 7.0<br>17.6 | 5.9<br>11.6 | 8.9<br>18.6 | 6.5<br>15.3 | 6.2<br>13.6 | 5.9<br>13.5 | 6.2<br>15.2 | 6.0<br>12.2 | 4.4<br>10.8 | 5.1<br>11.7 | 3.8<br>5.9 |
| Total Phosphorus (as P) | 10 mg/lt<br>9.0 kg/day | Weekly | 1.4<br>2.9 | 0.9<br>2.2 | 0.8<br>1.9 | 0.6<br>1.2 | 0.7<br>1.5 | 0.5<br>1.3 | 0.6<br>1.3 | 0.7<br>1.5 | 0.7<br>1.8 | 0.9<br>1.8 | 0.6<br>1.4 | 0.5<br>1.1 | 0.5<br>0.8 |
| Chlorides | 1,500 mg/lt | Monthly | | 363 | | | | | 332 | | | 382 | | | |
| Total Dissolved Solids | 7,500 mg/lt | Monthly | | 920 | | | | 1,498 | | | | 1,284 | | | |
| Cyanide | 0.2 mg/lt | Monthly | | <0.01 | | | | | <0.01 | | | <0.01 | | | |
| Nickel | 2 mg/lt | Monthly | | 0.02 | | | | | 0.01 | | | <0.01 | | | |
| Copper | 0.5 mg/lt | Monthly | | <0.01 | | | | | <0.01 | | | <0.01 | | | |
| Zinc | 0.5 mg/lt | Monthly | | 0.21 | | | | | <0.01 | | | 0.04 | | | |
| Effluent Solvent | Info (mg/lt) | Quarterly | | | | | | | | | | | * < 1 | | |
| Effluent Toxicity | 10 T. U. | Bi - Annually | | | | | | | | | | | | | |

Note:
* For each individual solvent in use in processing activities.

**IPPC REG. NO. P0011-03**

**MSD Monitoring of Surface Water / Storm Water Emission**

**Emission Point Reference No.: SW 3 (discharging to River Suir via SW 6)**

**Period: January, February, March 2008**

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Jan-08 | Satisfactory | Satisfactory | | |
| 02-Jan-08 | Satisfactory | Satisfactory | | |
| 03-Jan-08 | Satisfactory | Satisfactory | | |
| 04-Jan-08 | Satisfactory | Satisfactory | | |
| 05-Jan-08 | Satisfactory | Satisfactory | | |
| 06-Jan-08 | Satisfactory | Satisfactory | | |
| 07-Jan-08 | Satisfactory | Satisfactory | 8.2 | <10 |
| 08-Jan-08 | Satisfactory | Satisfactory | | |
| 09-Jan-08 | Satisfactory | Satisfactory | | |
| 10-Jan-08 | Satisfactory | Satisfactory | | |
| 11-Jan-08 | Satisfactory | Satisfactory | | |
| 12-Jan-08 | Satisfactory | Satisfactory | | |
| 13-Jan-08 | Satisfactory | Satisfactory | | |
| 14-Jan-08 | Satisfactory | Satisfactory | 7.7 | <10 |
| 15-Jan-08 | Satisfactory | Satisfactory | | |
| 16-Jan-08 | Satisfactory | Satisfactory | | |
| 17-Jan-08 | Satisfactory | Satisfactory | | |
| 18-Jan-08 | Satisfactory | Satisfactory | | |
| 19-Jan-08 | Satisfactory | Satisfactory | | |
| 20-Jan-08 | Satisfactory | Satisfactory | | |
| 21-Jan-08 | Satisfactory | Satisfactory | 7.8 | <10 |
| 22-Jan-08 | Satisfactory | Satisfactory | | |
| 23-Jan-08 | Satisfactory | Satisfactory | | |
| 24-Jan-08 | Satisfactory | Satisfactory | | |
| 25-Jan-08 | Satisfactory | Satisfactory | | |
| 26-Jan-08 | Satisfactory | Satisfactory | | |
| 27-Jan-08 | Satisfactory | Satisfactory | | |
| 28-Jan-08 | Satisfactory | Satisfactory | 7.7 | <10 |
| 29-Jan-08 | Satisfactory | Satisfactory | | |
| 30-Jan-08 | Satisfactory | Satisfactory | | |
| 31-Jan-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Feb-08 | Satisfactory | Satisfactory | | |
| 02-Feb-08 | Satisfactory | Satisfactory | | |
| 03-Feb-08 | Satisfactory | Satisfactory | | |
| 04-Feb-08 | Satisfactory | Satisfactory | 8.1 | <10 |
| 05-Feb-08 | Satisfactory | Satisfactory | | |
| 06-Feb-08 | Satisfactory | Satisfactory | | |
| 07-Feb-08 | Satisfactory | Satisfactory | | |
| 08-Feb-08 | Satisfactory | Satisfactory | | |
| 09-Feb-08 | Satisfactory | Satisfactory | | |
| 10-Feb-08 | Satisfactory | Satisfactory | | |
| 11-Feb-08 | Satisfactory | Satisfactory | 8.0 | <10 |
| 12-Feb-08 | Satisfactory | Satisfactory | | |
| 13-Feb-08 | Satisfactory | Satisfactory | | |
| 14-Feb-08 | Satisfactory | Satisfactory | | |
| 15-Feb-08 | Satisfactory | Satisfactory | | |
| 16-Feb-08 | Satisfactory | Satisfactory | | |
| 17-Feb-08 | Satisfactory | Satisfactory | | |
| 18-Feb-08 | Satisfactory | Satisfactory | 8.2 | <10 |
| 19-Feb-08 | Satisfactory | Satisfactory | | |
| 20-Feb-08 | Satisfactory | Satisfactory | | |
| 21-Feb-08 | Satisfactory | Satisfactory | | |
| 22-Feb-08 | Satisfactory | Satisfactory | | |
| 23-Feb-08 | Satisfactory | Satisfactory | | |
| 24-Feb-08 | Satisfactory | Satisfactory | | |
| 25-Feb-08 | Satisfactory | Satisfactory | 8.3 | <10 |
| 26-Feb-08 | Satisfactory | Satisfactory | | |
| 27-Feb-08 | Satisfactory | Satisfactory | | |
| 28-Feb-08 | Satisfactory | Satisfactory | | |
| 29-Feb-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Mar-08 | Satisfactory | Satisfactory | | |
| 02-Mar-08 | Satisfactory | Satisfactory | | |
| 03-Mar-08 | Satisfactory | Satisfactory | 8.3 | <10 |
| 04-Mar-08 | Satisfactory | Satisfactory | | |
| 05-Mar-08 | Satisfactory | Satisfactory | | |
| 06-Mar-08 | Satisfactory | Satisfactory | | |
| 07-Mar-08 | Satisfactory | Satisfactory | | |
| 08-Mar-08 | Satisfactory | Satisfactory | | |
| 09-Mar-08 | Satisfactory | Satisfactory | | |
| 10-Mar-08 | Satisfactory | Satisfactory | 8.3 | <10 |
| 11-Mar-08 | Satisfactory | Satisfactory | | |
| 12-Mar-08 | Satisfactory | Satisfactory | | |
| 13-Mar-08 | Satisfactory | Satisfactory | | |
| 14-Mar-08 | Satisfactory | Satisfactory | | |
| 15-Mar-08 | Satisfactory | Satisfactory | | |
| 16-Mar-08 | Satisfactory | Satisfactory | | |
| 17-Mar-08 | Satisfactory | Satisfactory | 8.2 | <10 |
| 18-Mar-08 | Satisfactory | Satisfactory | | |
| 19-Mar-08 | Satisfactory | Satisfactory | | |
| 20-Mar-08 | Satisfactory | Satisfactory | | |
| 21-Mar-08 | Satisfactory | Satisfactory | | |
| 22-Mar-08 | Satisfactory | Satisfactory | | |
| 23-Mar-08 | Satisfactory | Satisfactory | | |
| 24-Mar-08 | Satisfactory | Satisfactory | 8.6 | <10 |
| 25-Mar-08 | Satisfactory | Satisfactory | | |
| 26-Mar-08 | Satisfactory | Satisfactory | | |
| 27-Mar-08 | Satisfactory | Satisfactory | | |
| 28-Mar-08 | Satisfactory | Satisfactory | | |
| 29-Mar-08 | Satisfactory | Satisfactory | | |
| 30-Mar-08 | Satisfactory | Satisfactory | | |
| 31-Mar-08 | Satisfactory | Satisfactory | 8.1 | <10 |

**Notes:**
The term satisfactory indicates sample is "free from any abnormal colour or odour.
Licence schedule requires weekly TOC and pH testing and daily inspection for colour / odour.

**IPPC REG. NO. P0011-03**

**MSD Monitoring of Surface Water / Storm Water Emission**

**Emission Point Reference No.: SW 3 (discharging to River Suir via SW 6)**

**Period: April, May, June 2008**

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Apr-08 | Satisfactory | Satisfactory | | |
| 02-Apr-08 | Satisfactory | Satisfactory | | |
| 03-Apr-08 | Satisfactory | Satisfactory | | |
| 04-Apr-08 | Satisfactory | Satisfactory | | |
| 05-Apr-08 | Satisfactory | Satisfactory | | |
| 06-Apr-08 | Satisfactory | Satisfactory | | |
| 07-Apr-08 | Satisfactory | Satisfactory | 8.3 | <10 |
| 08-Apr-08 | Satisfactory | Satisfactory | | |
| 09-Apr-08 | Satisfactory | Satisfactory | | |
| 10-Apr-08 | Satisfactory | Satisfactory | | |
| 11-Apr-08 | Satisfactory | Satisfactory | | |
| 12-Apr-08 | Satisfactory | Satisfactory | | |
| 13-Apr-08 | Satisfactory | Satisfactory | | |
| 14-Apr-08 | Satisfactory | Satisfactory | 8.0 | <10 |
| 15-Apr-08 | Satisfactory | Satisfactory | | |
| 16-Apr-08 | Satisfactory | Satisfactory | | |
| 17-Apr-08 | Satisfactory | Satisfactory | | |
| 18-Apr-08 | Satisfactory | Satisfactory | | |
| 19-Apr-08 | Satisfactory | Satisfactory | | |
| 20-Apr-08 | Satisfactory | Satisfactory | | |
| 21-Apr-08 | Satisfactory | Satisfactory | 8.1 | <10 |
| 22-Apr-08 | Satisfactory | Satisfactory | | |
| 23-Apr-08 | Satisfactory | Satisfactory | | |
| 24-Apr-08 | Satisfactory | Satisfactory | | |
| 25-Apr-08 | Satisfactory | Satisfactory | | |
| 26-Apr-08 | Satisfactory | Satisfactory | | |
| 27-Apr-08 | Satisfactory | Satisfactory | | |
| 28-Apr-08 | Satisfactory | Satisfactory | 8.2 | <10 |
| 29-Apr-08 | Satisfactory | Satisfactory | | |
| 30-Apr-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check Odour | Visual Check Colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-May-08 | Satisfactory | Satisfactory | | |
| 02-May-08 | Satisfactory | Satisfactory | | |
| 03-May-08 | Satisfactory | Satisfactory | | |
| 04-May-08 | Satisfactory | Satisfactory | | |
| 05-May-08 | Satisfactory | Satisfactory | 8.0 | <10 |
| 06-May-08 | Satisfactory | Satisfactory | | |
| 07-May-08 | Satisfactory | Satisfactory | | |
| 08-May-08 | Satisfactory | Satisfactory | | |
| 09-May-08 | Satisfactory | Satisfactory | | |
| 10-May-08 | Satisfactory | Satisfactory | | |
| 11-May-08 | Satisfactory | Satisfactory | | |
| 12-May-08 | Satisfactory | Satisfactory | 7.6 | <10 |
| 13-May-08 | Satisfactory | Satisfactory | | |
| 14-May-08 | Satisfactory | Satisfactory | | |
| 15-May-08 | Satisfactory | Satisfactory | | |
| 16-May-08 | Satisfactory | Satisfactory | | |
| 17-May-08 | Satisfactory | Satisfactory | | |
| 18-May-08 | Satisfactory | Satisfactory | | |
| 19-May-08 | Satisfactory | Satisfactory | 8.1 | <10 |
| 20-May-08 | Satisfactory | Satisfactory | | |
| 21-May-08 | Satisfactory | Satisfactory | | |
| 22-May-08 | Satisfactory | Satisfactory | | |
| 23-May-08 | Satisfactory | Satisfactory | | |
| 24-May-08 | Satisfactory | Satisfactory | | |
| 25-May-08 | Satisfactory | Satisfactory | | |
| 26-May-08 | Satisfactory | Satisfactory | 8.2 | <10 |
| 27-May-08 | Satisfactory | Satisfactory | | |
| 28-May-08 | Satisfactory | Satisfactory | | |
| 29-May-08 | Satisfactory | Satisfactory | | |
| 30-May-08 | Satisfactory | Satisfactory | | |
| 31-May-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Jun-08 | Satisfactory | Satisfactory | | |
| 02-Jun-08 | Satisfactory | Satisfactory | 8.3 | <10 |
| 03-Jun-08 | Satisfactory | Satisfactory | | |
| 04-Jun-08 | Satisfactory | Satisfactory | | |
| 05-Jun-08 | Satisfactory | Satisfactory | | |
| 06-Jun-08 | Satisfactory | Satisfactory | | |
| 07-Jun-08 | Satisfactory | Satisfactory | | |
| 08-Jun-08 | Satisfactory | Satisfactory | | |
| 09-Jun-08 | Satisfactory | Satisfactory | 8.1 | <10 |
| 10-Jun-08 | Satisfactory | Satisfactory | | |
| 11-Jun-08 | Satisfactory | Satisfactory | | |
| 12-Jun-08 | Satisfactory | Satisfactory | | |
| 13-Jun-08 | Satisfactory | Satisfactory | | |
| 14-Jun-08 | Satisfactory | Satisfactory | | |
| 15-Jun-08 | Satisfactory | Satisfactory | | |
| 16-Jun-08 | Satisfactory | Satisfactory | 8.1 | <10 |
| 17-Jun-08 | Satisfactory | Satisfactory | | |
| 18-Jun-08 | Satisfactory | Satisfactory | | |
| 19-Jun-08 | Satisfactory | Satisfactory | | |
| 20-Jun-08 | Satisfactory | Satisfactory | | |
| 21-Jun-08 | Satisfactory | Satisfactory | | |
| 22-Jun-08 | Satisfactory | Satisfactory | | |
| 23-Jun-08 | Satisfactory | Satisfactory | 7.9 | <10 |
| 24-Jun-08 | Satisfactory | Satisfactory | | |
| 25-Jun-08 | Satisfactory | Satisfactory | | |
| 26-Jun-08 | Satisfactory | Satisfactory | | |
| 27-Jun-08 | Satisfactory | Satisfactory | | |
| 28-Jun-08 | Satisfactory | Satisfactory | | |
| 29-Jun-08 | Satisfactory | Satisfactory | | |
| 30-Jun-08 | Satisfactory | Satisfactory | 7.9 | <10 |

**Notes:**
The term satisfactory indicates sample is "free from any abnormal colour or odour.
Licence schedule requires weekly TOC and PH testing and daily inspection for colour / odour.

**IPPC REG. NO. P0011-03**

**MSD Monitoring of Surface Water / Storm Water Emission**

**Emission Point Reference No.: SW 3 (discharging to River Suir via SW 6)**

**Period: July, August, September 2008**

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Jul-08 | Satisfactory | Satisfactory | | |
| 02-Jul-08 | Satisfactory | Satisfactory | | |
| 03-Jul-08 | Satisfactory | Satisfactory | | |
| 04-Jul-08 | Satisfactory | Satisfactory | | |
| 05-Jul-08 | Satisfactory | Satisfactory | | |
| 06-Jul-08 | Satisfactory | Satisfactory | | |
| 07-Jul-08 | Satisfactory | Satisfactory | 8.0 | <10 |
| 08-Jul-08 | Satisfactory | Satisfactory | | |
| 09-Jul-08 | Satisfactory | Satisfactory | | |
| 10-Jul-08 | Satisfactory | Satisfactory | | |
| 11-Jul-08 | Satisfactory | Satisfactory | | |
| 12-Jul-08 | Satisfactory | Satisfactory | | |
| 13-Jul-08 | Satisfactory | Satisfactory | | |
| 14-Jul-08 | Satisfactory | Satisfactory | 8.3 | <10 |
| 15-Jul-08 | Satisfactory | Satisfactory | | |
| 16-Jul-08 | Satisfactory | Satisfactory | | |
| 17-Jul-08 | Satisfactory | Satisfactory | | |
| 18-Jul-08 | Satisfactory | Satisfactory | | |
| 19-Jul-08 | Satisfactory | Satisfactory | | |
| 20-Jul-08 | Satisfactory | Satisfactory | | |
| 21-Jul-08 | Satisfactory | Satisfactory | 8.2 | <10 |
| 22-Jul-08 | Satisfactory | Satisfactory | | |
| 23-Jul-08 | Satisfactory | Satisfactory | | |
| 24-Jul-08 | Satisfactory | Satisfactory | | |
| 25-Jul-08 | Satisfactory | Satisfactory | | |
| 26-Jul-08 | Satisfactory | Satisfactory | | |
| 27-Jul-08 | Satisfactory | Satisfactory | | |
| 28-Jul-08 | Satisfactory | Satisfactory | 6.9 | <10 |
| 29-Jul-08 | Satisfactory | Satisfactory | | |
| 30-Jul-08 | Satisfactory | Satisfactory | | |
| 31-Jul-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Aug-08 | Satisfactory | Satisfactory | | |
| 02-Aug-08 | Satisfactory | Satisfactory | | |
| 03-Aug-08 | Satisfactory | Satisfactory | | |
| 04-Aug-08 | Satisfactory | Satisfactory | 7.4 | <10 |
| 05-Aug-08 | Satisfactory | Satisfactory | | |
| 06-Aug-08 | Satisfactory | Satisfactory | | |
| 07-Aug-08 | Satisfactory | Satisfactory | | |
| 08-Aug-08 | Satisfactory | Satisfactory | | |
| 09-Aug-08 | Satisfactory | Satisfactory | | |
| 10-Aug-08 | Satisfactory | Satisfactory | | |
| 11-Aug-08 | Satisfactory | Satisfactory | 7.4 | <10 |
| 12-Aug-08 | Satisfactory | Satisfactory | | |
| 13-Aug-08 | Satisfactory | Satisfactory | | |
| 14-Aug-08 | Satisfactory | Satisfactory | | |
| 15-Aug-08 | Satisfactory | Satisfactory | | |
| 16-Aug-08 | Satisfactory | Satisfactory | | |
| 17-Aug-08 | Satisfactory | Satisfactory | | |
| 18-Aug-08 | Satisfactory | Satisfactory | 7.8 | <10 |
| 19-Aug-08 | Satisfactory | Satisfactory | | |
| 20-Aug-08 | Satisfactory | Satisfactory | | |
| 21-Aug-08 | Satisfactory | Satisfactory | | |
| 22-Aug-08 | Satisfactory | Satisfactory | | |
| 23-Aug-08 | Satisfactory | Satisfactory | | |
| 24-Aug-08 | Satisfactory | Satisfactory | | |
| 25-Aug-08 | Satisfactory | Satisfactory | 7.8 | <10 |
| 26-Aug-08 | Satisfactory | Satisfactory | | |
| 27-Aug-08 | Satisfactory | Satisfactory | | |
| 28-Aug-08 | Satisfactory | Satisfactory | | |
| 29-Aug-08 | Satisfactory | Satisfactory | | |
| 30-Aug-08 | Satisfactory | Satisfactory | | |
| 31-Aug-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Sep-08 | Satisfactory | Satisfactory | 8.1 | < 10 |
| 02-Sep-08 | Satisfactory | Satisfactory | | |
| 03-Sep-08 | Satisfactory | Satisfactory | | |
| 04-Sep-08 | Satisfactory | Satisfactory | | |
| 05-Sep-08 | Satisfactory | Satisfactory | | |
| 06-Sep-08 | Satisfactory | Satisfactory | | |
| 07-Sep-08 | Satisfactory | Satisfactory | | |
| 08-Sep-08 | Satisfactory | Satisfactory | 7.0 | < 10 |
| 09-Sep-08 | Satisfactory | Satisfactory | | |
| 10-Sep-08 | Satisfactory | Satisfactory | | |
| 11-Sep-08 | Satisfactory | Satisfactory | | |
| 12-Sep-08 | Satisfactory | Satisfactory | | |
| 13-Sep-08 | Satisfactory | Satisfactory | | |
| 14-Sep-08 | Satisfactory | Satisfactory | | |
| 15-Sep-08 | Satisfactory | Satisfactory | 7.9 | < 10 |
| 16-Sep-08 | Satisfactory | Satisfactory | | |
| 17-Sep-08 | Satisfactory | Satisfactory | | |
| 18-Sep-08 | Satisfactory | Satisfactory | | |
| 19-Sep-08 | Satisfactory | Satisfactory | | |
| 20-Sep-08 | Satisfactory | Satisfactory | | |
| 21-Sep-08 | Satisfactory | Satisfactory | | |
| 22-Sep-08 | Satisfactory | Satisfactory | 8.0 | < 10 |
| 23-Sep-08 | Satisfactory | Satisfactory | | |
| 24-Sep-08 | Satisfactory | Satisfactory | | |
| 25-Sep-08 | Satisfactory | Satisfactory | | |
| 26-Sep-08 | Satisfactory | Satisfactory | | |
| 27-Sep-08 | Satisfactory | Satisfactory | | |
| 28-Sep-08 | Satisfactory | Satisfactory | | |
| 29-Sep-08 | Satisfactory | Satisfactory | 8.0 | < 10 |
| 30-Sep-08 | Satisfactory | Satisfactory | | |

**Notes:**
The term satisfactory indicates sample is "free from any abnormal colour or odour.
Licence schedule requires weekly TOC and pH testing, and daily inspection for colour / odour.

**IPPC REG. NO. P0011-03**

**MSD Monitoring of Surface Water / Storm Water Emission**

**Emission Point Reference No.: SW 3 (discharging to River Suir via SW 6)**

**Period: October, November, December 2008**

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Oct-08 | Satisfactory | Satisfactory | | |
| 02-Oct-08 | Satisfactory | Satisfactory | | |
| 03-Oct-08 | Satisfactory | Satisfactory | | |
| 04-Oct-08 | Satisfactory | Satisfactory | | |
| 05-Oct-08 | Satisfactory | Satisfactory | | |
| 06-Oct-08 | Satisfactory | Satisfactory | 8.0 | <10 |
| 07-Oct-08 | Satisfactory | Satisfactory | | |
| 08-Oct-08 | Satisfactory | Satisfactory | | |
| 09-Oct-08 | Satisfactory | Satisfactory | | |
| 10-Oct-08 | Satisfactory | Satisfactory | | |
| 11-Oct-08 | Satisfactory | Satisfactory | | |
| 12-Oct-08 | Satisfactory | Satisfactory | | |
| 13-Oct-08 | Satisfactory | Satisfactory | 7.6 | <10 |
| 14-Oct-08 | Satisfactory | Satisfactory | | |
| 15-Oct-08 | Satisfactory | Satisfactory | | |
| 16-Oct-08 | Satisfactory | Satisfactory | | |
| 17-Oct-08 | Satisfactory | Satisfactory | | |
| 18-Oct-08 | Satisfactory | Satisfactory | | |
| 19-Oct-08 | Satisfactory | Satisfactory | | |
| 20-Oct-08 | Satisfactory | Satisfactory | 8.1 | <10 |
| 21-Oct-08 | Satisfactory | Satisfactory | | |
| 22-Oct-08 | Satisfactory | Satisfactory | | |
| 23-Oct-08 | Satisfactory | Satisfactory | | |
| 24-Oct-08 | Satisfactory | Satisfactory | | |
| 25-Oct-08 | Satisfactory | Satisfactory | | |
| 26-Oct-08 | Satisfactory | Satisfactory | | |
| 27-Oct-08 | Satisfactory | Satisfactory | 7.9 | <10 |
| 28-Oct-08 | Satisfactory | Satisfactory | | |
| 29-Oct-08 | Satisfactory | Satisfactory | | |
| 30-Oct-08 | Satisfactory | Satisfactory | | |
| 31-Oct-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Nov-08 | Satisfactory | Satisfactory | | |
| 02-Nov-08 | Satisfactory | Satisfactory | | |
| 03-Nov-08 | Satisfactory | Satisfactory | 8.2 | <10 |
| 04-Nov-08 | Satisfactory | Satisfactory | | |
| 05-Nov-08 | Satisfactory | Satisfactory | | |
| 06-Nov-08 | Satisfactory | Satisfactory | | |
| 07-Nov-08 | Satisfactory | Satisfactory | | |
| 08-Nov-08 | Satisfactory | Satisfactory | | |
| 09-Nov-08 | Satisfactory | Satisfactory | | |
| 10-Nov-08 | Satisfactory | Satisfactory | 7.8 | <10 |
| 11-Nov-08 | Satisfactory | Satisfactory | | |
| 12-Nov-08 | Satisfactory | Satisfactory | | |
| 13-Nov-08 | Satisfactory | Satisfactory | | |
| 14-Nov-08 | Satisfactory | Satisfactory | | |
| 15-Nov-08 | Satisfactory | Satisfactory | | |
| 16-Nov-08 | Satisfactory | Satisfactory | | |
| 17-Nov-08 | Satisfactory | Satisfactory | 7.8 | <10 |
| 18-Nov-08 | Satisfactory | Satisfactory | | |
| 19-Nov-08 | Satisfactory | Satisfactory | | |
| 20-Nov-08 | Satisfactory | Satisfactory | | |
| 21-Nov-08 | Satisfactory | Satisfactory | | |
| 22-Nov-08 | Satisfactory | Satisfactory | | |
| 23-Nov-08 | Satisfactory | Satisfactory | | |
| 24-Nov-08 | Satisfactory | Satisfactory | 7.8 | <10 |
| 25-Nov-08 | Satisfactory | Satisfactory | | |
| 26-Nov-08 | Satisfactory | Satisfactory | | |
| 27-Nov-08 | Satisfactory | Satisfactory | | |
| 28-Nov-08 | Satisfactory | Satisfactory | | |
| 29-Nov-08 | Satisfactory | Satisfactory | | |
| 30-Nov-08 | Satisfactory | Satisfactory | | |

| Date | Visual Check odour | Visual Check colour | pH | TOC mg/lt |
|---|---|---|---|---|
| Frequency | Daily | Daily | Weekly | Weekly |
| 01-Dec-08 | Satisfactory | Satisfactory | 8.3 | <10 |
| 02-Dec-08 | Satisfactory | Satisfactory | | |
| 03-Dec-08 | Satisfactory | Satisfactory | | |
| 04-Dec-08 | Satisfactory | Satisfactory | | |
| 05-Dec-08 | Satisfactory | Satisfactory | | |
| 06-Dec-08 | Satisfactory | Satisfactory | | |
| 07-Dec-08 | Satisfactory | Satisfactory | | |
| 08-Dec-08 | Satisfactory | Satisfactory | 7.8 | <10 |
| 09-Dec-08 | Satisfactory | Satisfactory | | |
| 10-Dec-08 | Satisfactory | Satisfactory | | |
| 11-Dec-08 | Satisfactory | Satisfactory | | |
| 12-Dec-08 | Satisfactory | Satisfactory | | |
| 13-Dec-08 | Satisfactory | Satisfactory | | |
| 14-Dec-08 | Satisfactory | Satisfactory | | |
| 15-Dec-08 | Satisfactory | Satisfactory | 8.1 | <10 |
| 16-Dec-08 | Satisfactory | Satisfactory | | |
| 17-Dec-08 | Satisfactory | Satisfactory | | |
| 18-Dec-08 | Satisfactory | Satisfactory | | |
| 19-Dec-08 | Satisfactory | Satisfactory | | |
| 20-Dec-08 | Satisfactory | Satisfactory | | |
| 21-Dec-08 | Satisfactory | Satisfactory | | |
| 22-Dec-08 | Satisfactory | Satisfactory | 7.6 | <10 |
| 23-Dec-08 | Satisfactory | Satisfactory | | |
| 24-Dec-08 | Satisfactory | Satisfactory | | |
| 25-Dec-08 | Satisfactory | Satisfactory | | |
| 26-Dec-08 | Satisfactory | Satisfactory | | |
| 27-Dec-08 | Satisfactory | Satisfactory | | |
| 28-Dec-08 | Satisfactory | Satisfactory | | |
| 29-Dec-08 | Satisfactory | Satisfactory | 7.9 | <10 |
| 30-Dec-08 | Satisfactory | Satisfactory | | |
| 31-Dec-08 | Satisfactory | Satisfactory | | |

**Notes:**
The term satisfactory indicates sample is "free from any abnormal colour or odour.
Licence schedule requires weekly TOC and PH testing and daily inspection for colour / odour.

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 2A/SW 2B Reverse Osmosis Effluent**

**Period: January, February, March 2008**

| Date | Flow | Flow | Date | Flow | Flow | Date | Flow | Flow |
|---|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. | Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. | Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. |
| 01-Jan-08 | 274 | <12 | 01-Feb-08 | 236 | <12 | 01-Mar-08 | 271 | <12 |
| 02-Jan-08 | 268 | <12 | 02-Feb-08 | 270 | <12 | 02-Mar-08 | 272 | <12 |
| 03-Jan-08 | 270 | <12 | 03-Feb-08 | 270 | <12 | 03-Mar-08 | 272 | <12 |
| 04-Jan-08 | 232 | <12 | 04-Feb-08 | 267 | <12 | 04-Mar-08 | 256 | <12 |
| 05-Jan-08 | 270 | <14 | 05-Feb-08 | 270 | <13 | 05-Mar-08 | 257 | <13 |
| 06-Jan-08 | 269 | <12 | 06-Feb-08 | 252 | <12 | 06-Mar-08 | 240 | <12 |
| 07-Jan-08 | 270 | <12 | 07-Feb-08 | 270 | <12 | 07-Mar-08 | 240 | <12 |
| 08-Jan-08 | 270 | <12 | 08-Feb-08 | 229 | <12 | 08-Mar-08 | 271 | <12 |
| 09-Jan-08 | 250 | <13 | 09-Feb-08 | 266 | <11 | 09-Mar-08 | 272 | <12 |
| 10-Jan-08 | 256 | <12 | 10-Feb-08 | 267 | <12 | 10-Mar-08 | 271 | <12 |
| 11-Jan-08 | 227 | <13 | 11-Feb-08 | 269 | <12 | 11-Mar-08 | 244 | <14 |
| 12-Jan-08 | 235 | <12 | 12-Feb-08 | 289 | <14 | 12-Mar-08 | 271 | <12 |
| 13-Jan-08 | 276 | <12 | 13-Feb-08 | 252 | <12 | 13-Mar-08 | 239 | <12 |
| 14-Jan-08 | 270 | <12 | 14-Feb-08 | 269 | <12 | 14-Mar-08 | 271 | <12 |
| 15-Jan-08 | 270 | <13 | 15-Feb-08 | 235 | <12 | 15-Mar-08 | 270 | <12 |
| 16-Jan-08 | 243 | <12 | 16-Feb-08 | 270 | <13 | 16-Mar-08 | 271 | <12 |
| 17-Jan-08 | 270 | <13 | 17-Feb-08 | 268 | <12 | 17-Mar-08 | 271 | <12 |
| 18-Jan-08 | 234 | <14 | 18-Feb-08 | 270 | <12 | 18-Mar-08 | 255 | <12 |
| 19-Jan-08 | 250 | <13 | 19-Feb-08 | 270 | <14 | 19-Mar-08 | 245 | <12 |
| 20-Jan-08 | 236 | <12 | 20-Feb-08 | 251 | <12 | 20-Mar-08 | 271 | <12 |
| 21-Jan-08 | 270 | <14 | 21-Feb-08 | 269 | <12 | 21-Mar-08 | 271 | <12 |
| 22-Jan-08 | 234 | <12 | 22-Feb-08 | 242 | <12 | 22-Mar-08 | 270 | <12 |
| 23-Jan-08 | 270 | <14 | 23-Feb-08 | 272 | <12 | 23-Mar-08 | 271 | <12 |
| 24-Jan-08 | 270 | <14 | 24-Feb-08 | 270 | <12 | 24-Mar-08 | 272 | <12 |
| 25-Jan-08 | 236 | <14 | 25-Feb-08 | 272 | <12 | 25-Mar-08 | 255 | <13 |
| 26-Jan-08 | 248 | <12 | 26-Feb-08 | 272 | <12 | 26-Mar-08 | 272 | <12 |
| 27-Jan-08 | 270 | <12 | 27-Feb-08 | 252 | <12 | 27-Mar-08 | 223 | <12 |
| 28-Jan-08 | 270 | <12 | 28-Feb-08 | 272 | <12 | 28-Mar-08 | 270 | <12 |
| 29-Jan-08 | 270 | <12 | 29-Feb-08 | 241 | <12 | 29-Mar-08 | 259 | <12 |
| 30-Jan-08 | 252 | <14 | | | | 30-Mar-08 | 270 | <12 |
| 31-Jan-08 | 264 | <13 | | | | 31-Mar-08 | 271 | <12 |

| Date | pH | Total Dissolved Solids | Total Nitrogen ( as N ) | Total Phosphorous ( as P ) |
|---|---|---|---|---|
| Frequency Emission Limit | Monthly ELV. 6 - 9 | Monthly ELV. 1,500 mg/lt | Quarterly ELV. 15 mg/lt | Quarterly ELV. 2 mg/lt |
| 16-Jan-08 | 8.4 | 301 | 1.6 | 0.4 |
| 20-Feb-08 | 8.1 | 247 | - | - |
| 12-Mar-08 | 8.1 | 315 | - | - |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 2A/SW 2B Reverse Osmosis Effluent**

**Period: April, May, June 2008**

| Date | Flow | Flow |
|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. |
| 01-Apr-08 | 251 | <12 |
| 02-Apr-08 | 269 | <12 |
| 03-Apr-08 | 242 | <12 |
| 04-Apr-08 | 268 | <12 |
| 05-Apr-08 | 268 | <12 |
| 06-Apr-08 | 270 | <12 |
| 07-Apr-08 | 270 | <12 |
| 08-Apr-08 | 253 | <12 |
| 09-Apr-08 | 270 | <12 |
| 10-Apr-08 | 241 | <12 |
| 11-Apr-08 | 271 | <12 |
| 12-Apr-08 | 270 | <12 |
| 13-Apr-08 | 270 | <12 |
| 14-Apr-08 | 270 | <12 |
| 15-Apr-08 | 252 | <12 |
| 16-Apr-08 | 269 | <12 |
| 17-Apr-08 | 237 | <12 |
| 18-Apr-08 | 270 | <12 |
| 19-Apr-08 | 230 | <12 |
| 20-Apr-08 | 271 | <12 |
| 21-Apr-08 | 278 | <12 |
| 22-Apr-08 | 253 | <12 |
| 23-Apr-08 | 269 | <12 |
| 24-Apr-08 | 240 | <12 |
| 25-Apr-08 | 267 | <11 |
| 26-Apr-08 | 267 | <12 |
| 27-Apr-08 | 266 | <12 |
| 28-Apr-08 | 264 | <13 |
| 29-Apr-08 | 250 | <13 |
| 30-Apr-08 | 267 | <11 |

| Date | Flow | Flow |
|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. |
| 01-May-08 | 239 | <12 |
| 02-May-08 | 274 | <12 |
| 03-May-08 | 266 | <11 |
| 04-May-08 | 264 | <11 |
| 05-May-08 | 264 | <11 |
| 06-May-08 | 246 | <12 |
| 07-May-08 | 262 | <11 |
| 08-May-08 | 230 | <12 |
| 09-May-08 | 263 | <11 |
| 10-May-08 | 267 | <11 |
| 11-May-08 | 267 | <11 |
| 12-May-08 | 265 | <11 |
| 13-May-08 | 236 | <12 |
| 14-May-08 | 266 | <11 |
| 15-May-08 | 233 | <11 |
| 16-May-08 | 267 | <11 |
| 17-May-08 | 267 | <11 |
| 18-May-08 | 268 | <11 |
| 19-May-08 | 268 | <11 |
| 20-May-08 | 246 | <12 |
| 21-May-08 | 273 | <12 |
| 22-May-08 | 217 | <13 |
| 23-May-08 | 273 | <12 |
| 24-May-08 | 273 | <12 |
| 25-May-08 | 273 | <12 |
| 26-May-08 | 273 | <12 |
| 27-May-08 | 250 | <13 |
| 28-May-08 | 273 | <12 |
| 29-May-08 | 228 | <12 |
| 30-May-08 | 242 | <12 |
| 31-May-08 | 273 | <12 |

| Date | Flow | Flow |
|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. |
| 01-Jun-08 | 274 | <12 |
| 02-Jun-08 | 250 | <14 |
| 03-Jun-08 | 273 | <12 |
| 04-Jun-08 | 277 | <12 |
| 05-Jun-08 | 192 | <13 |
| 06-Jun-08 | 273 | <12 |
| 07-Jun-08 | 273 | <12 |
| 08-Jun-08 | 271 | <13 |
| 09-Jun-08 | 273 | <12 |
| 10-Jun-08 | 255 | <12 |
| 11-Jun-08 | 273 | <12 |
| 12-Jun-08 | 186 | <13 |
| 13-Jun-08 | 182 | <13 |
| 14-Jun-08 | 273 | <12 |
| 15-Jun-08 | 273 | <12 |
| 16-Jun-08 | 273 | <12 |
| 17-Jun-08 | 256 | <14 |
| 18-Jun-08 | 273 | <12 |
| 19-Jun-08 | 234 | <13 |
| 20-Jun-08 | 275 | <13 |
| 21-Jun-08 | 276 | <13 |
| 22-Jun-08 | 275 | <12 |
| 23-Jun-08 | 275 | <12 |
| 24-Jun-08 | 246 | <13 |
| 25-Jun-08 | 275 | <12 |
| 26-Jun-08 | 217 | <13 |
| 27-Jun-08 | 273 | <12 |
| 28-Jun-08 | 273 | <12 |
| 29-Jun-08 | 275 | <12 |
| 30-Jun-08 | 275 | <12 |

| Date | pH | Total Dissolved Solids | Total Nitrogen ( as N ) | Total Phosphorous ( as P ) |
|---|---|---|---|---|
| Frequency Emission Limit | Monthly ELV. 6 - 9 | Monthly ELV. 1,500 mg/lt | Quarterly ELV. 15 mg/lt | Quarterly ELV. 2 mg/lt |
| 16-Apr-08 | 8.1 | 258 | - | - |
| 21-May-08 | 8.0 | 222 | 2.0 | 0.3 |
| 11-Jun-08 | 7.9 | 288 | - | - |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 2A/SW 2B Reverse Osmosis Effluent**

**Period: July, August, September 2008**

| Date | Flow | Flow | Date | Flow | Flow | Date | Flow | Flow |
|---|---|---|---|---|---|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | ELV. Max. 15 $m^3$/hr. | Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. | Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. |
| 01-Jul-08 | 254 | <14 | 01-Aug-08 | 164 | <7 | 01-Sep-08 | 275 | < 12 |
| 02-Jul-08 | 266 | <14 | 02-Aug-08 | 164 | <7 | 02-Sep-08 | 236 | < 14 |
| 03-Jul-08 | 217 | <12 | 03-Aug-08 | 178 | <14 | 03-Sep-08 | 264 | < 14 |
| 04-Jul-08 | 275 | <12 | 04-Aug-08 | 203 | <14 | 04-Sep-08 | 239 | < 14 |
| 05-Jul-08 | 269 | <12 | 05-Aug-08 | 203 | <12 | 05-Sep-08 | 272 | < 14 |
| 06-Jul-08 | 269 | <12 | 06-Aug-08 | 269 | <14 | 06-Sep-08 | 274 | < 12 |
| 07-Jul-08 | 272 | <13 | 07-Aug-08 | 242 | <13 | 07-Sep-08 | 265 | < 14 |
| 08-Jul-08 | 256 | <13 | 08-Aug-08 | 275 | <12 | 08-Sep-08 | 266 | < 13 |
| 09-Jul-08 | 274 | <14 | 09-Aug-08 | 275 | <12 | 09-Sep-08 | 249 | < 14 |
| 10-Jul-08 | 238 | <12 | 10-Aug-08 | 275 | <12 | 10-Sep-08 | 275 | < 12 |
| 11-Jul-08 | 275 | <12 | 11-Aug-08 | 275 | <12 | 11-Sep-08 | 184 | < 13 |
| 12-Jul-08 | 237 | <13 | 12-Aug-08 | 244 | <14 | 12-Sep-08 | 202 | < 9 |
| 13-Jul-08 | 166 | <7 | 13-Aug-08 | 276 | <12 | 13-Sep-08 | 202 | < 9 |
| 14-Jul-08 | 166 | <7 | 14-Aug-08 | 231 | <13 | 14-Sep-08 | 202 | < 9 |
| 15-Jul-08 | 166 | <7 | 15-Aug-08 | 273 | <14 | 15-Sep-08 | 266 | < 14 |
| 16-Jul-08 | 136 | <9 | 16-Aug-08 | 275 | <12 | 16-Sep-08 | 224 | < 14 |
| 17-Jul-08 | 182 | <12 | 17-Aug-08 | 275 | <12 | 17-Sep-08 | 274 | < 12 |
| 18-Jul-08 | 176 | <12 | 18-Aug-08 | 275 | <12 | 18-Sep-08 | 183 | < 12 |
| 19-Jul-08 | 169 | <12 | 19-Aug-08 | 238 | <12 | 19-Sep-08 | 202 | < 9 |
| 20-Jul-08 | 188 | <14 | 20-Aug-08 | 275 | <12 | 20-Sep-08 | 262 | < 14 |
| 21-Jul-08 | 176 | <12 | 21-Aug-08 | 232 | <13 | 21-Sep-08 | 274 | < 12 |
| 22-Jul-08 | 198 | <12 | 22-Aug-08 | 275 | <12 | 22-Sep-08 | 275 | < 12 |
| 23-Jul-08 | 190 | <14 | 23-Aug-08 | 275 | <12 | 23-Sep-08 | 243 | < 14 |
| 24-Jul-08 | 186 | <14 | 24-Aug-08 | 275 | <12 | 24-Sep-08 | 275 | < 12 |
| 25-Jul-08 | 114 | <14 | 25-Aug-08 | 275 | <12 | 25-Sep-08 | 243 | < 14 |
| 26-Jul-08 | 128 | <14 | 26-Aug-08 | 244 | <14 | 26-Sep-08 | 275 | < 12 |
| 27-Jul-08 | 174 | <12 | 27-Aug-08 | 275 | <12 | 27-Sep-08 | 217 | < 12 |
| 28-Jul-08 | 115 | <13 | 28-Aug-08 | 217 | <13 | 28-Sep-08 | 275 | < 12 |
| 29-Jul-08 | 214 | <14 | 29-Aug-08 | 271 | <13 | 29-Sep-08 | 278 | < 12 |
| 30-Jul-08 | 179 | <14 | 30-Aug-08 | 275 | <12 | 30-Sep-08 | 249 | < 12 |
| 31-Jul-08 | 167 | <7 | 31-Aug-08 | 275 | <12 | | | |

| Date | pH | Total Dissolved Solids | Total Nitrogen ( as N ) | Total Phosphorous ( as P ) |
|---|---|---|---|---|
| Frequency Emission Limit | Monthly ELV. 6 - 9 | Monthly ELV. 1,500 mg/lt | Quarterly ELV. 15 mg/lt | Quarterly ELV. 2 mg/lt |
| 09-Jul-08 | 8.0 | 282 | 4.1 | 0.2 |
| 13-Aug-08 | 7.5 | 348 | - | - |
| 10-Sep-08 | 7.7 | 260 | - | - |

**IPPC REG. NO. P0011-03**

**MSD Emission Point Reference No.: SW 2A/SW 2B Reverse Osmosis Effluent**

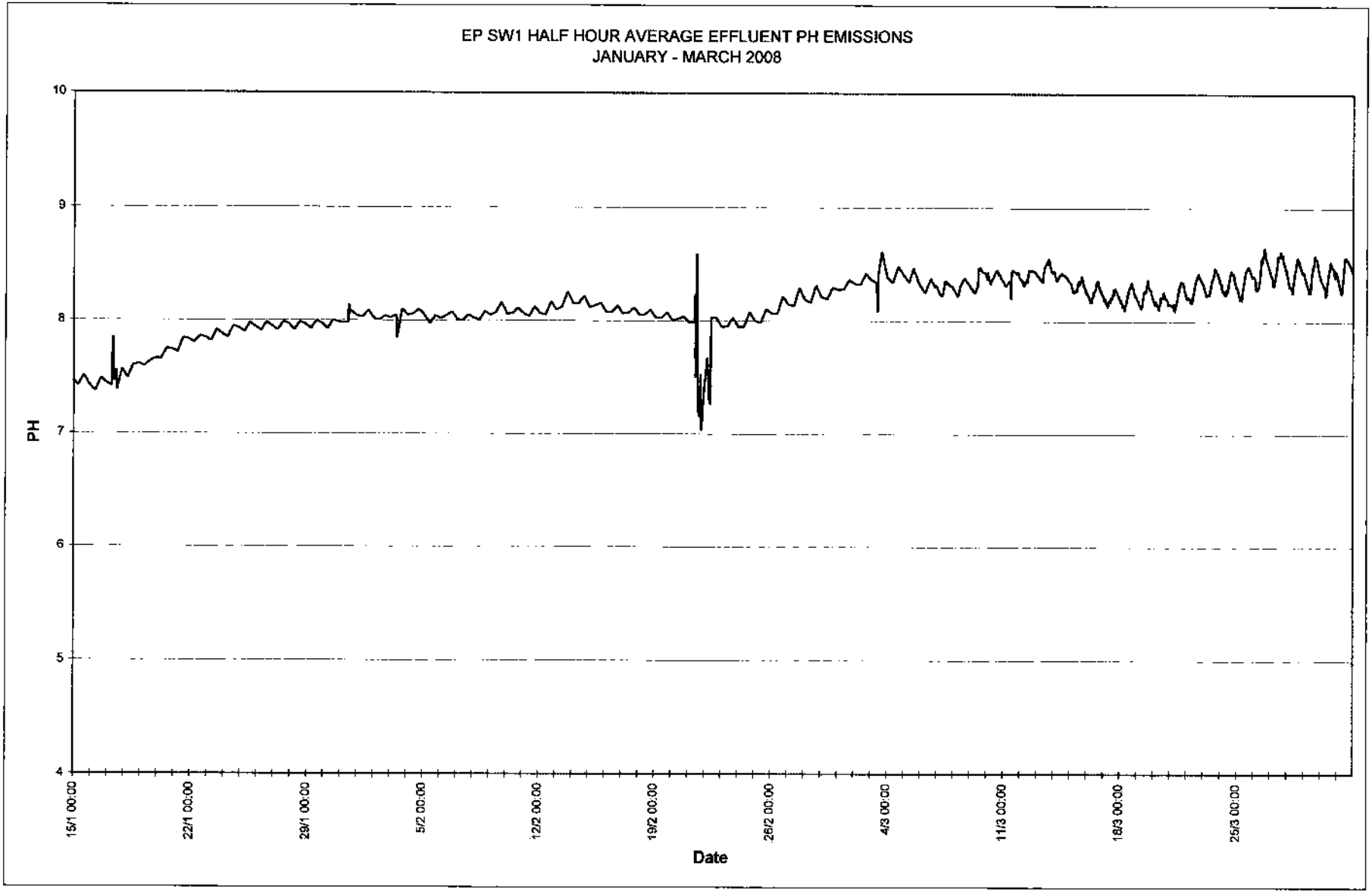
**Period: October, November, December 2008**

| Date | Flow | Flow |
|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | ELV. Max. 15 $m^3$/hr. |
| 01-Oct-08 | 280 | <12 |
| 02-Oct-08 | 234 | <12 |
| 03-Oct-08 | 278 | <12 |
| 04-Oct-08 | 280 | <12 |
| 05-Oct-08 | 279 | <12 |
| 06-Oct-08 | 279 | <12 |
| 07-Oct-08 | 246 | <12 |
| 08-Oct-08 | 279 | <12 |
| 09-Oct-08 | 245 | <12 |
| 10-Oct-08 | 279 | <12 |
| 11-Oct-08 | 279 | <12 |
| 12-Oct-08 | 279 | <12 |
| 13-Oct-08 | 276 | <12 |
| 14-Oct-08 | 239 | <12 |
| 15-Oct-08 | 266 | <14 |
| 16-Oct-08 | 236 | <13 |
| 17-Oct-08 | 275 | <12 |
| 18-Oct-08 | 275 | <12 |
| 19-Oct-08 | 274 | <13 |
| 20-Oct-08 | 276 | <12 |
| 21-Oct-08 | 248 | <13 |
| 22-Oct-08 | 275 | <12 |
| 23-Oct-08 | 229 | <13 |
| 24-Oct-08 | 275 | <14 |
| 25-Oct-08 | 267 | <12 |
| 26-Oct-08 | 275 | <12 |
| 27-Oct-08 | 275 | <12 |
| 28-Oct-08 | 227 | <13 |
| 29-Oct-08 | 273 | <13 |
| 30-Oct-08 | 233 | <14 |
| 31-Oct-08 | 273 | <14 |

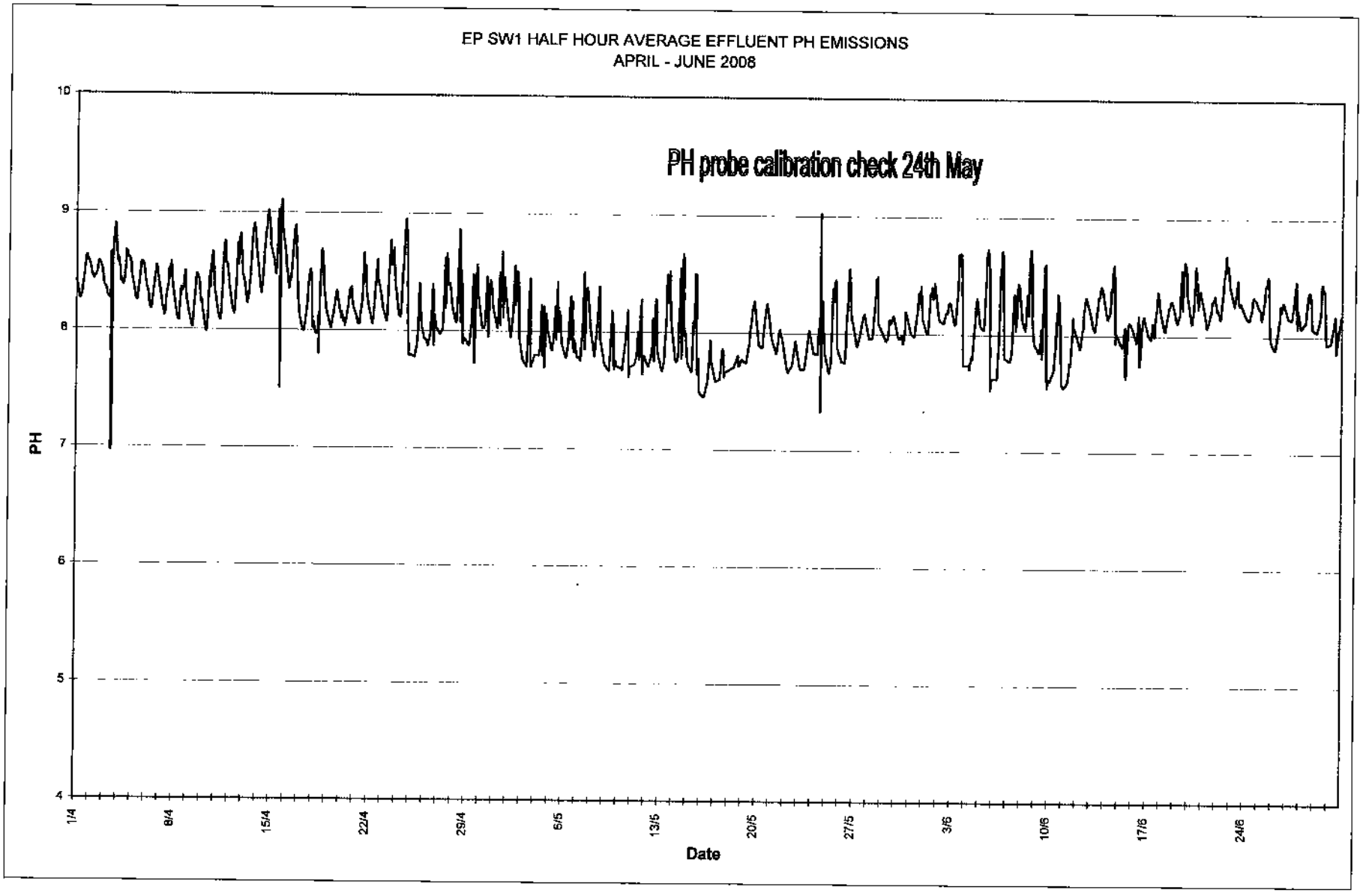
| Date | Flow | Flow |
|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. |
| 01-Nov-08 | 275 | <12 |
| 02-Nov-08 | 275 | <12 |
| 03-Nov-08 | 266 | <12 |
| 04-Nov-08 | 247 | <12 |
| 05-Nov-08 | 275 | <12 |
| 06-Nov-08 | 211 | <13 |
| 07-Nov-08 | 275 | <12 |
| 08-Nov-08 | 275 | <12 |
| 09-Nov-08 | 275 | <12 |
| 10-Nov-08 | 274 | <14 |
| 11-Nov-08 | 235 | <14 |
| 12-Nov-08 | 221 | <14 |
| 13-Nov-08 | 177 | <14 |
| 14-Nov-08 | 273 | <14 |
| 15-Nov-08 | 275 | <12 |
| 16-Nov-08 | 275 | <12 |
| 17-Nov-08 | 275 | <12 |
| 18-Nov-08 | 248 | <12 |
| 19-Nov-08 | 275 | <12 |
| 20-Nov-08 | 234 | <13 |
| 21-Nov-08 | 273 | <14 |
| 22-Nov-08 | 275 | <12 |
| 23-Nov-08 | 275 | <12 |
| 24-Nov-08 | 275 | <12 |
| 25-Nov-08 | 242 | <14 |
| 26-Nov-08 | 275 | <14 |
| 27-Nov-08 | 222 | <14 |
| 28-Nov-08 | 275 | <12 |
| 29-Nov-08 | 275 | <12 |
| 30-Nov-08 | 275 | <12 |

| Date | Flow | Flow |
|---|---|---|
| Frequency Emission Limit | Daily ELV. Max. 360 $m^3$/day | Daily ELV. Max. 15 $m^3$/hr. |
| 01-Dec-08 | 275 | <12 |
| 02-Dec-08 | 236 | <12 |
| 03-Dec-08 | 275 | <12 |
| 04-Dec-08 | 235 | <14 |
| 05-Dec-08 | 271 | <12 |
| 06-Dec-08 | 275 | <12 |
| 07-Dec-08 | 275 | <12 |
| 08-Dec-08 | 272 | <13 |
| 09-Dec-08 | 238 | <12 |
| 10-Dec-08 | 247 | <14 |
| 11-Dec-08 | 223 | <12 |
| 12-Dec-08 | 275 | <12 |
| 13-Dec-08 | 275 | <12 |
| 14-Dec-08 | 275 | <12 |
| 15-Dec-08 | 275 | <12 |
| 16-Dec-08 | 250 | <12 |
| 17-Dec-08 | 275 | <12 |
| 18-Dec-08 | 226 | <12 |
| 19-Dec-08 | 271 | <12 |
| 20-Dec-08 | 247 | <12 |
| 21-Dec-08 | 220 | <14 |
| 22-Dec-08 | 112 | <13 |
| 23-Dec-08 | 168 | <10 |
| 24-Dec-08 | 192 | <9 |
| 25-Dec-08 | 192 | <8 |
| 26-Dec-08 | 248 | <13 |
| 27-Dec-08 | 272 | <12 |
| 28-Dec-08 | 250 | <13 |
| 29-Dec-08 | 272 | <12 |
| 30-Dec-08 | 237 | <12 |
| 31-Dec-08 | 272 | <12 |

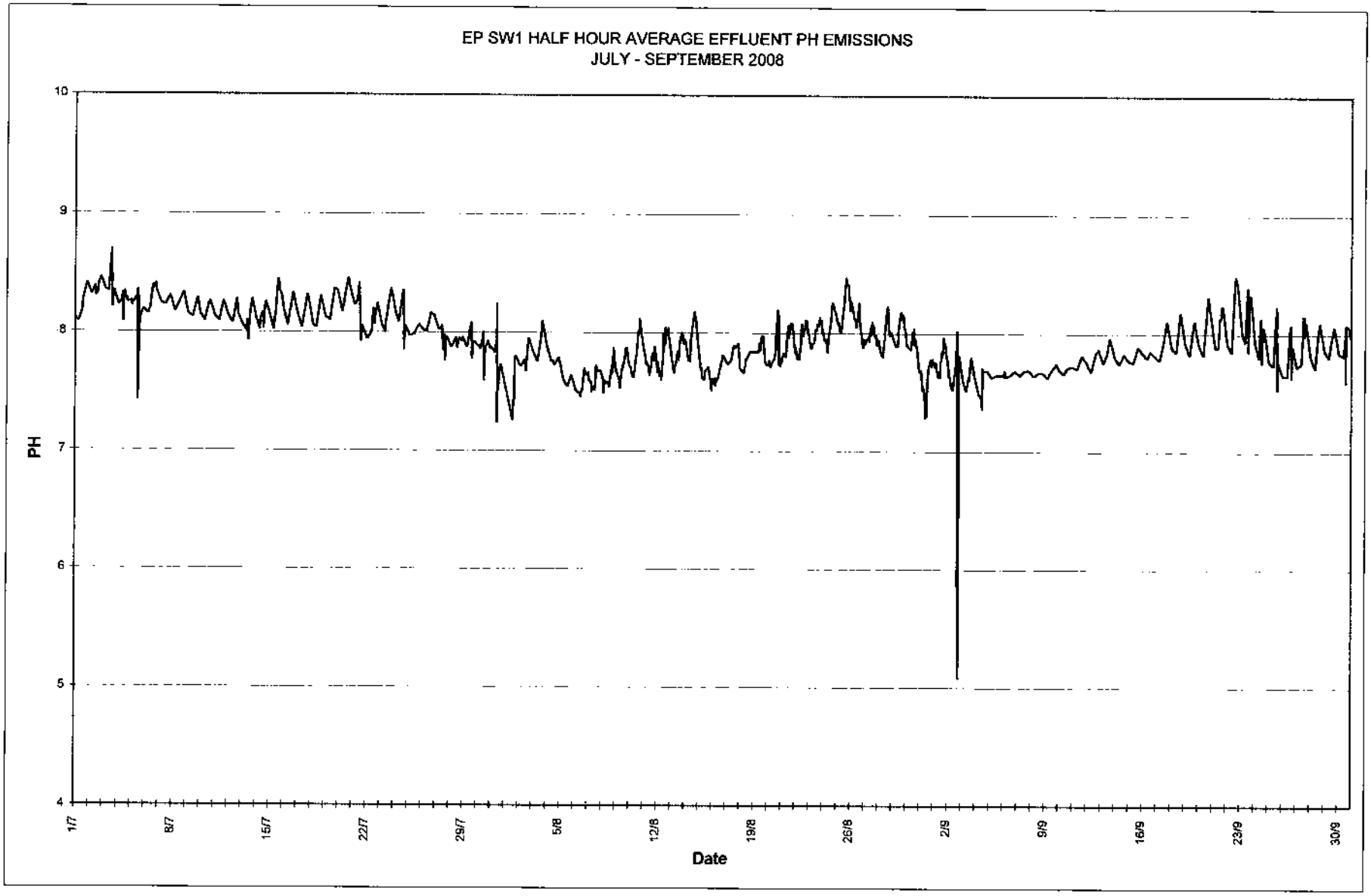
| Date | pH | Total Dissolved Solids | Total Nitrogen ( as N ) | Total Phosphorous ( as P ) |
|---|---|---|---|---|
| Frequency Emission Limit | Monthly ELV. 6 - 9 | Monthly ELV. 1,500 mg/lt | Quarterly ELV. 15 mg/lt | Quarterly ELV. 2 mg/lt |
| 15-Oct-08 | 8.2 | 212 | 5.4 | 0.1 |
| 12-Nov-08 | 8.6 | 269 | - | - |
| 10-Dec-08 | 8.3 | 250 | - | - |



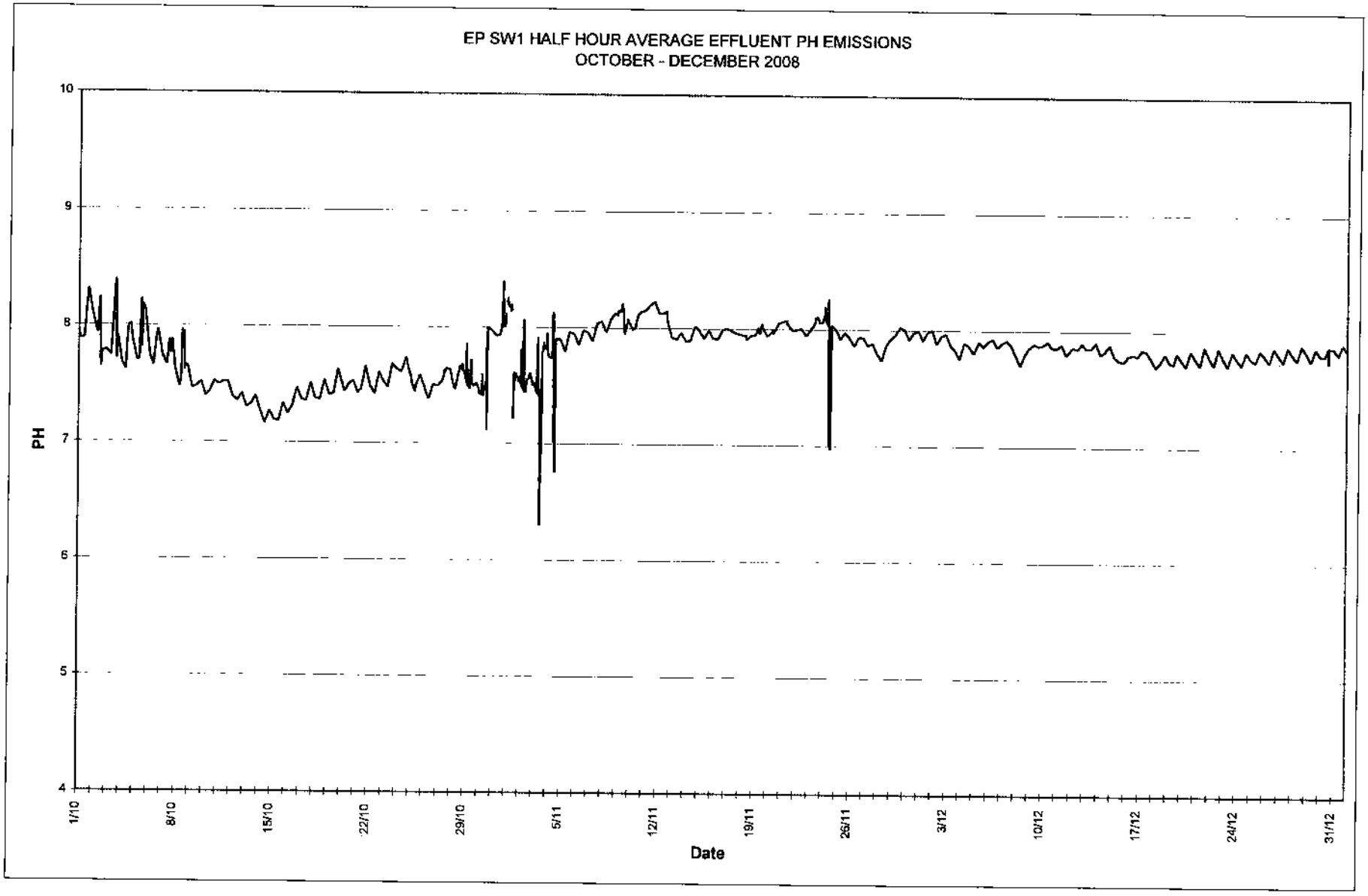

The WWTP effluent online PH was commissioned on Jan 15th and half hour average results are trended from that date.




The WWTP effluent online PH probe trends half hour average results. On April 15th, the effluent PH recorded 9.17 versus ELV of < 9 for a 6 hour period. The elevated result on May 24th was due to a calibration check.




The waste water treatment plant effluent online PH report trends half hour average results. Spikes due to instrument calibration.




The online pH probe trends half-hour average results.

**MERCK SHARP & DOHME - IPPC REG. NO. P0011-03**

**PERIOD: 2008**

**E.P. A1-1 Boiler Stack Emissions.**

**E.P. A2-1 Scrubber / Regenerative TO No.'s 1 & 2 Exhaust Stack Emissions.**

**E.P. A2-2 TO No. 3 (Fume Incinerator) Exhaust Stack Emissions.**

**E.P. A3 Particulate Emissions Monitoring**

## IPPC REG. NO. P0011-03

### MSD - EP A1-1

### Steam Boiler Stack Emissions.

### PERIOD: 2008

| PARAMETER | MONITORING DATE | EMISSION LIMIT VALUE | MEASURED EMISSION |
|---|---|---|---|
| **INORGANIC SUBSTANCES** | | | |
| | | **mg/Nm$^3$** | **mg/Nm$^3$** |
| Sulphur Dioxide | 30-Jun-08 | 35 | <5 |
| Nitrogen Oxides ( as $NO_2$ ) | 30-Jun-08 | 350 | 198 |
| Carbon Monoxide | 30-Jun-08 | 150 | <5 |

**Notes:**

1) Monitoring duration was 0.5 hour using a flue gas analyser.

2) Annual monitoring frequency is specified.

**IPPC REG. NO. P0011-03**

**MSD - Emission Point Reference No. A2-1**
**Scrubber / Regenerative TO No.'s 1 & 2 Exhaust Stack**
**PERIOD: 2008**

| PARAMETER | EMISSION LIMIT VALUE | MONITORING DATES | MEASURED EMISSION | MONITORING DATES | MEASURED EMISSION | MONITORING DATES | MEASURED EMISSION |
|---|---|---|---|---|---|---|---|
| ORGANIC SUBSTANCES | kg/hr | | kg/hr | | kg/hr | | kg/hr |
| CLASS 1 | 0.10 | 25-Jan-08 | < 0.05 | 28-Feb-08 | < 0.05 | 11-Mar-08 | < 0.05 |
| CLASS 11 | 2.00 | 25-Jan-08 | < 0.05 | 28-Feb-08 | < 0.05 | 11-Mar-08 | < 0.05 |
| CLASS 111 | 3.00 | 25-Jan-08 | < 0.05 | 28-Feb-08 | < 0.05 | 11-Mar-08 | < 0.05 |
| ORGANIC SUBSTANCES TOTAL | | | < 0.20 | | < 0.20 | | < 0.20 |
| INORGANIC SUBSTANCES | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ |
| NITROGEN OXIDES ($NO_2$) | 300 | 23-Jan-08 | 1 | 27-Feb-08 | 1 | 11-Mar-08 | 23 |
| SULPHUR OXIDES ($SO_2$) | 300 | 23-Jan-08 | < 1 | 27-Feb-08 | < 1 | 11-Mar-08 | < 1 |
| AMMONIA | 30 | 23-Jan-08 | < 1 | 27-Feb-08 | < 1 | 11-Mar-08 | < 1 |
| ORGANIC SUBSTANCES | kg/hr | | kg/hr | | kg/hr | | kg/hr |
| CLASS 1 | 0.10 | 30-Apr-08 | < 0.05 | 21-May-08 | < 0.05 | 10-Jun-08 | < 0.05 |
| CLASS 11 | 2.00 | 30-Apr-08 | < 0.05 | 21-May-08 | < 0.05 | 10-Jun-08 | < 0.05 |
| CLASS 111 | 3.00 | 30-Apr-08 | < 0.05 | 21-May-08 | < 0.10 | 10-Jun-08 | < 0.05 |
| ORGANIC SUBSTANCES TOTAL | | | < 0.20 | | < 0.20 | | < 0.20 |
| INORGANIC SUBSTANCES | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ |
| NITROGEN OXIDES ($NO_2$) | 300 | 16-Apr-08 | < 1 | 21-May-08 | < 1 | 10-Jun-08 | 8 |
| SULPHUR OXIDES ($SO_2$) | 300 | 16-Apr-08 | < 1 | 21-May-08 | < 1 | 10-Jun-08 | < 1 |
| AMMONIA | 30 | 16-Apr-08 | < 1 | 21-May-08 | 1 | 10-Jun-08 | < 1 |
| ORGANIC SUBSTANCES | kg/hr | | kg/hr | | kg/hr | | kg/hr |
| CLASS 1 | 0.10 | 01-Jul-08 | < 0.05 | 19-Aug-08 | < 0.05 | 09-Sep-08 | < 0.05 |
| CLASS 11 | 2.00 | 01-Jul-08 | < 0.30 | 19-Aug-08 | < 0.05 | 09-Sep-08 | < 0.05 |
| CLASS 111 | 3.00 | 01-Jul-08 | < 0.20 | 19-Aug-08 | < 0.05 | 09-Sep-08 | < 0.05 |
| ORGANIC SUBSTANCES TOTAL | | | < 0.50 | | < 0.20 | | < 0.20 |
| INORGANIC SUBSTANCES | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ |
| NITROGEN OXIDES ($NO_2$) | 300 | 01-Jul-08 | 33 | 19-Aug-08 | 26 | 09-Sep-08 | 29 |
| SULPHUR OXIDES ($SO_2$) | 300 | 01-Jul-08 | < 1 | 19-Aug-08 | < 1 | 09-Sep-08 | 1 |
| AMMONIA | 30 | 01-Jul-08 | < 1 | 19-Aug-08 | 2 | 09-Sep-08 | 4 |
| ORGANIC SUBSTANCES | kg/hr | | kg/hr | | kg/hr | | kg/hr |
| CLASS 1 | 0.10 | 23-Oct-08 | < 0.05 | 24-Nov-08 | < 0.05 | 09-Dec-08 | < 0.05 |
| CLASS 11 | 2.00 | 23-Oct-08 | < 0.05 | 24-Nov-08 | < 0.05 | 09-Dec-08 | < 0.05 |
| CLASS 111 | 3.00 | 23-Oct-08 | < 0.05 | 24-Nov-08 | < 0.05 | 09-Dec-08 | < 0.05 |
| ORGANIC SUBSTANCES TOTAL | | | < 0.20 | | < 0.20 | | < 0.20 |
| INORGANIC SUBSTANCES | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ | | mg/Nm$^3$ |
| NITROGEN OXIDES ($NO_2$) | 300 | 23-Oct-08 | < 1 | 24-Nov-08 | 20 | 09-Dec-08 | 13 |
| SULPHUR OXIDES ($SO_2$) | 300 | 23-Oct-08 | < 1 | 24-Nov-08 | < 1 | 09-Dec-08 | < 1 |
| AMMONIA | 30 | 23-Oct-08 | 5 | 24-Nov-08 | 8 | 09-Dec-08 | 1 |

**Notes:**
1) Organic substances monitoring duration 1.0 hour.
2) Inorganic substances monitoring duration > 0.5 hour.

**MERCK SHARP & DOHME (IRL) LTD.**

**IPPC REG. NO. P0011-03**

**MSD - Emission Point Reference No. A2-1**

## January – March 2008 graphical trend of TOC emissions

Refer to graphical trend of 30 minute average emissions for TOC for the period January to March 2008, during this period a number of TOC spikes occurred.

The TOC mass emission for the 1st February was 0.5 kgs.

The TOC mass emission for the 20th March was 0.6 kgs.

The TOC mass emission for the 21st March was 2.1 kgs; the maximum hourly emission occurred between 9:30 to 10:30 hrs and was comprised of 1.2 kgs of toluene and 0.9 kgs of heptane.

The emission levels were below the emission limit values for Ta Luft organic substances Class II (toluene) of 2 kg/ hour and Class III (heptane) of 3 kg / hour.

## April – June 2008 graphical trend of TOC emissions

Refer to graphical trend of 30 minute average emissions for TOC for the period April to June 2008, during this period a number of TOC spikes occurred.

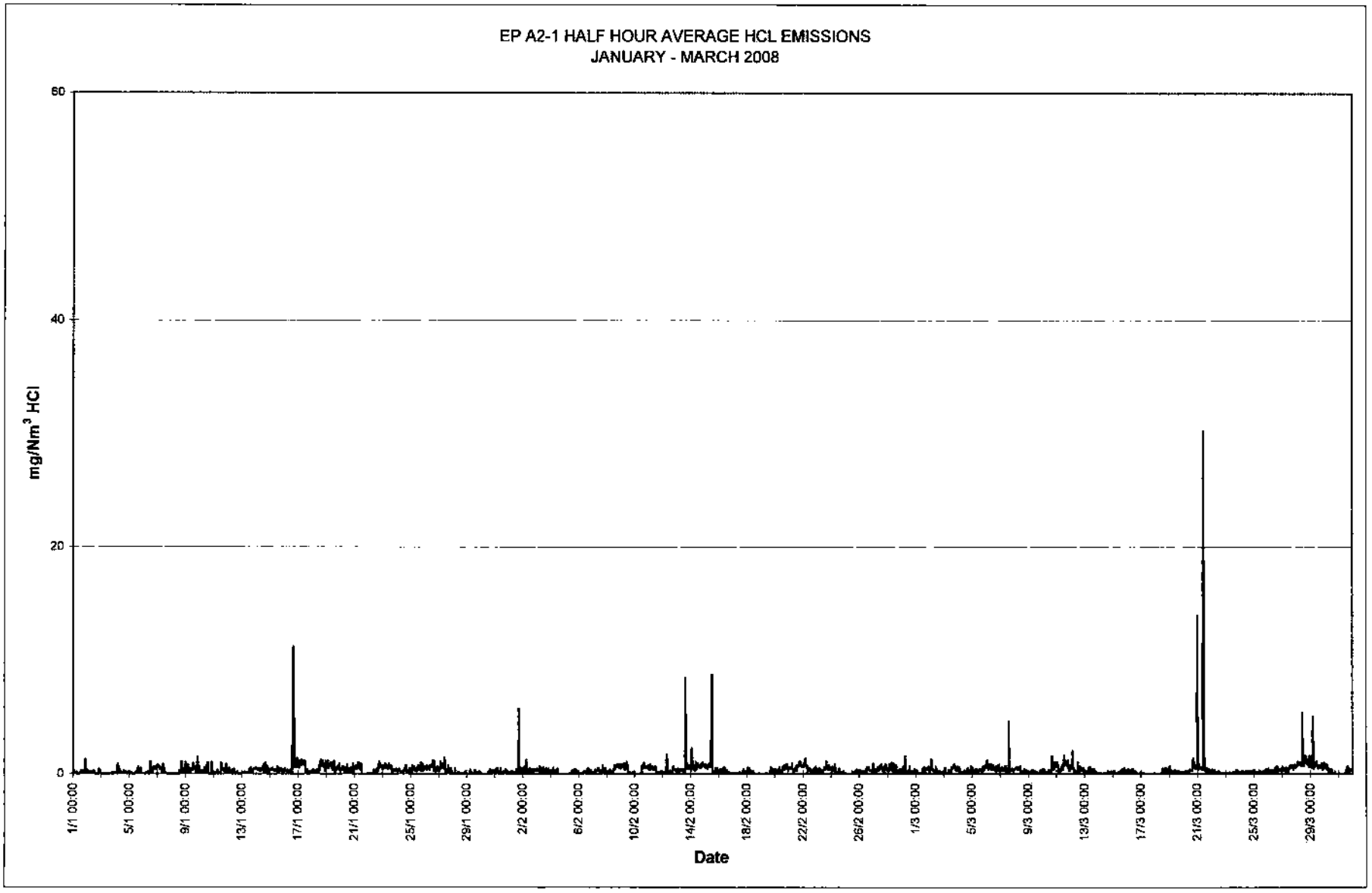
The TOC maximum mass emission for the 3rd May was 0.8 kgs for a 1 hour period.

The TOC maximum mass emission for the 7th May was 2.9 kgs for a 1 hour period. An incident notification was advised to the EPA

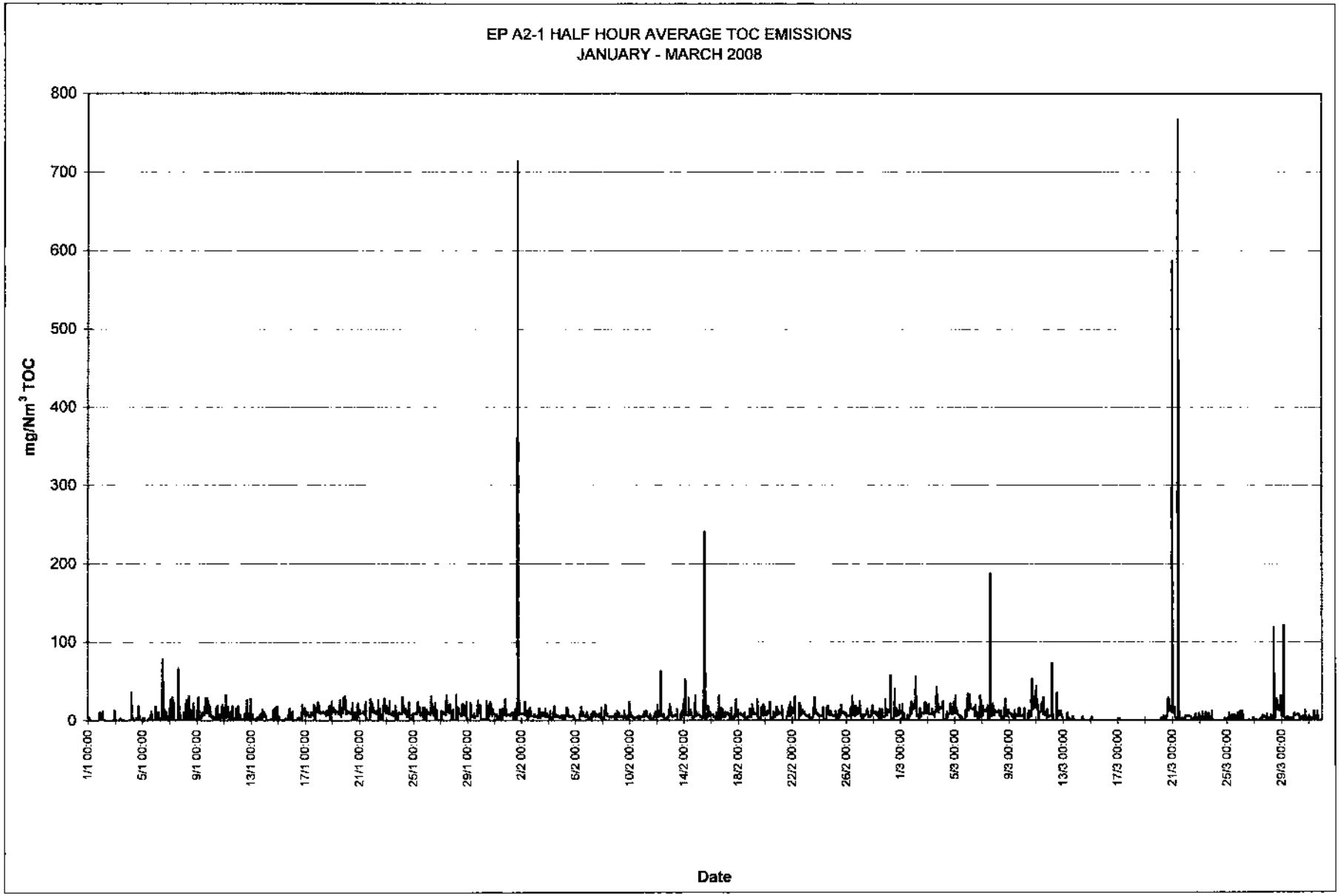
## July – September 2008 graphical trend of TOC emissions

Refer to graphical trend of 30 minute average emissions for TOC for the period July to September 2008, during this period, 1 TOC spike occurred.

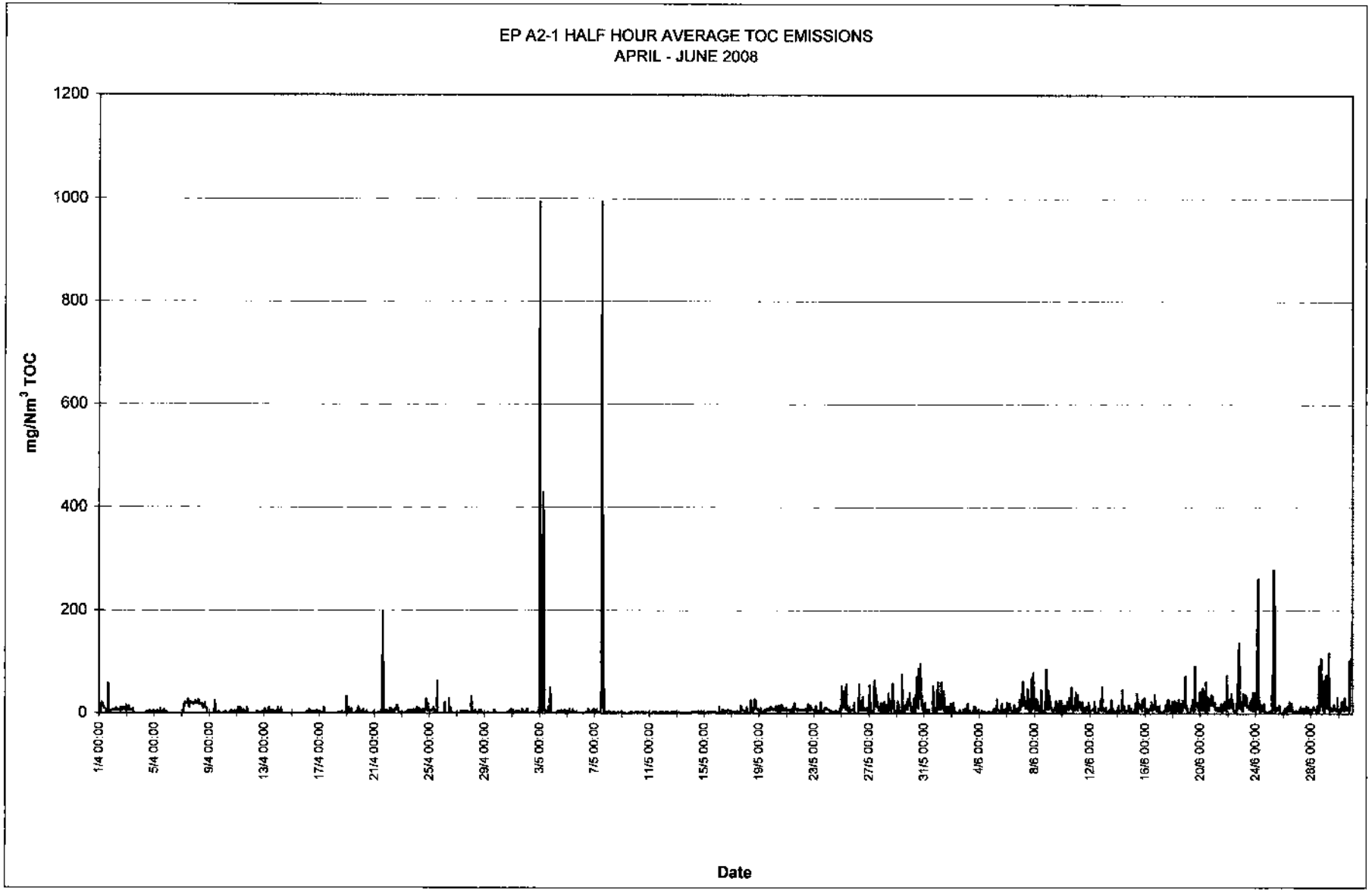
The TOC maximum mass emission for the 20th July was 1.0 kgs for a 1 hour period.

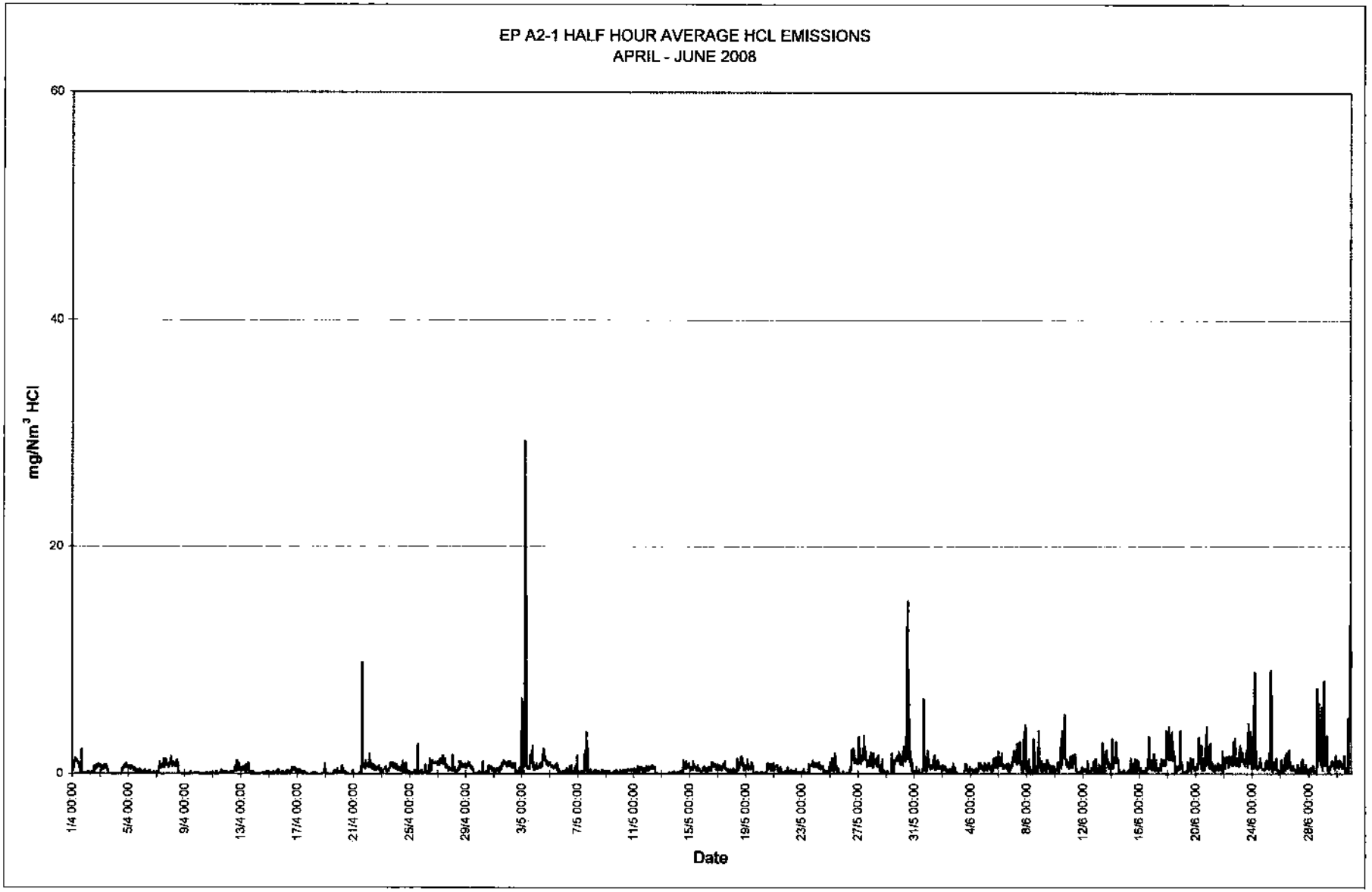


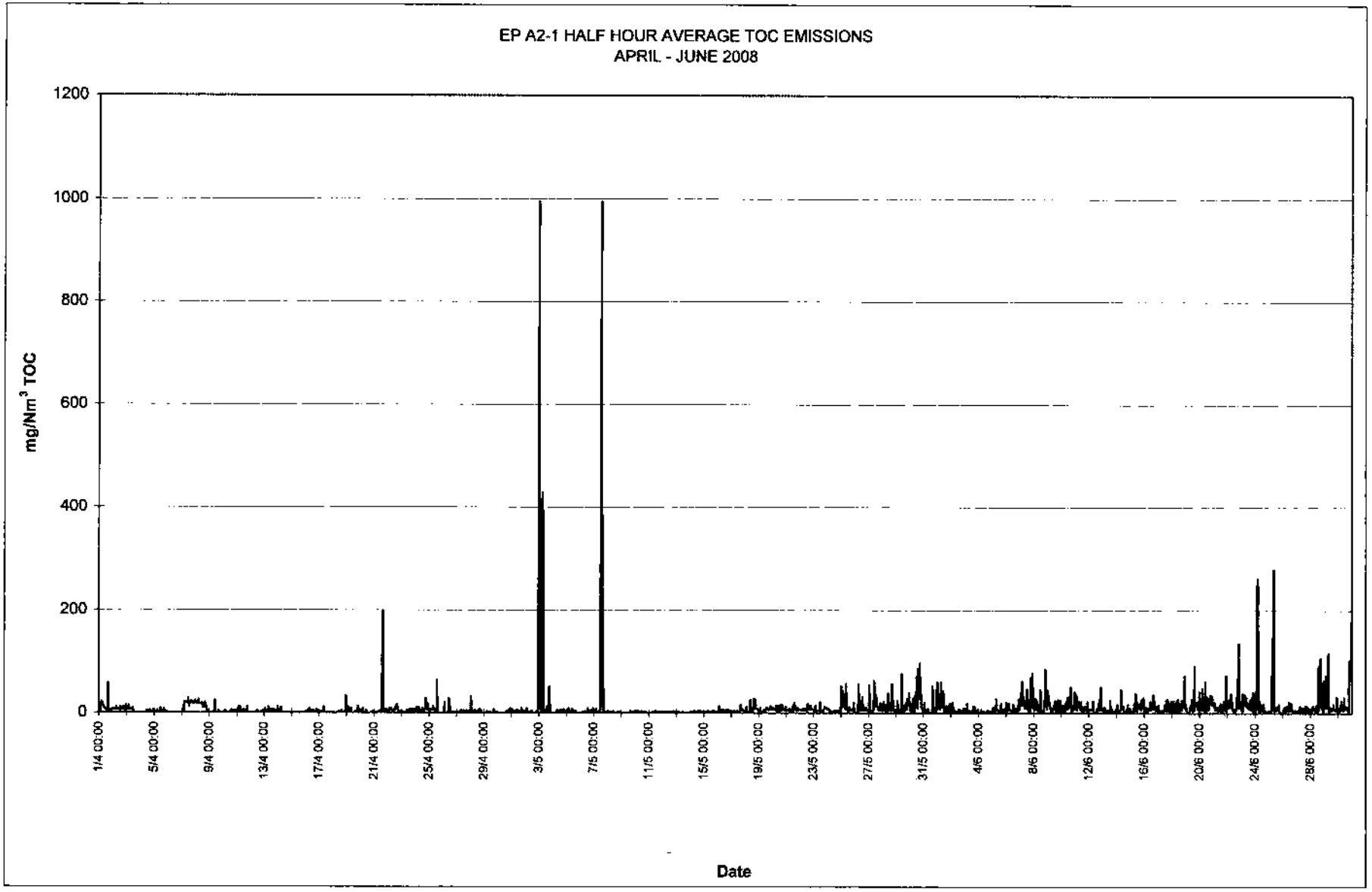

The periods with elevated HCL were due to either positive TOC interference or coincided with instrument calibration activities.

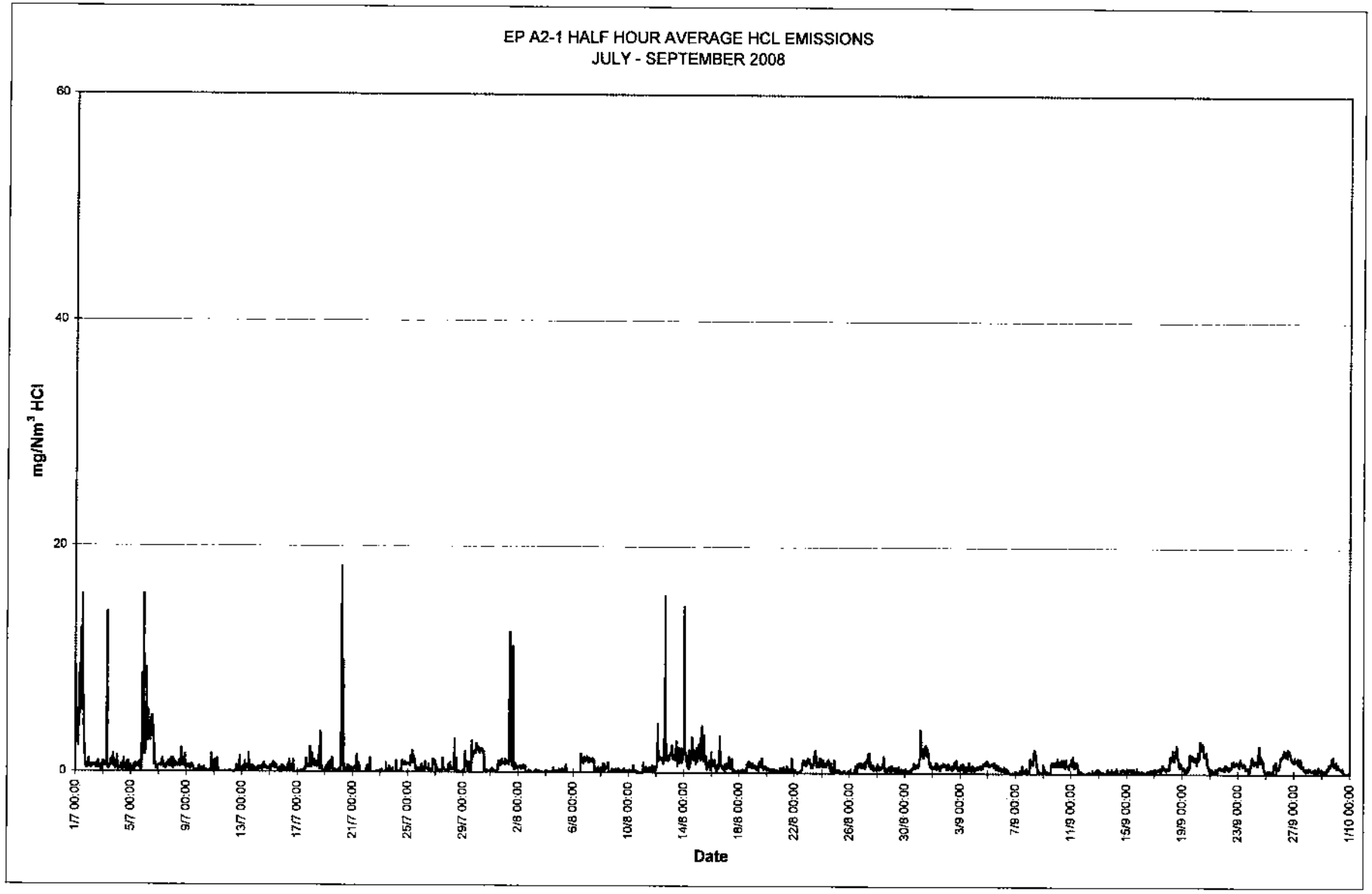


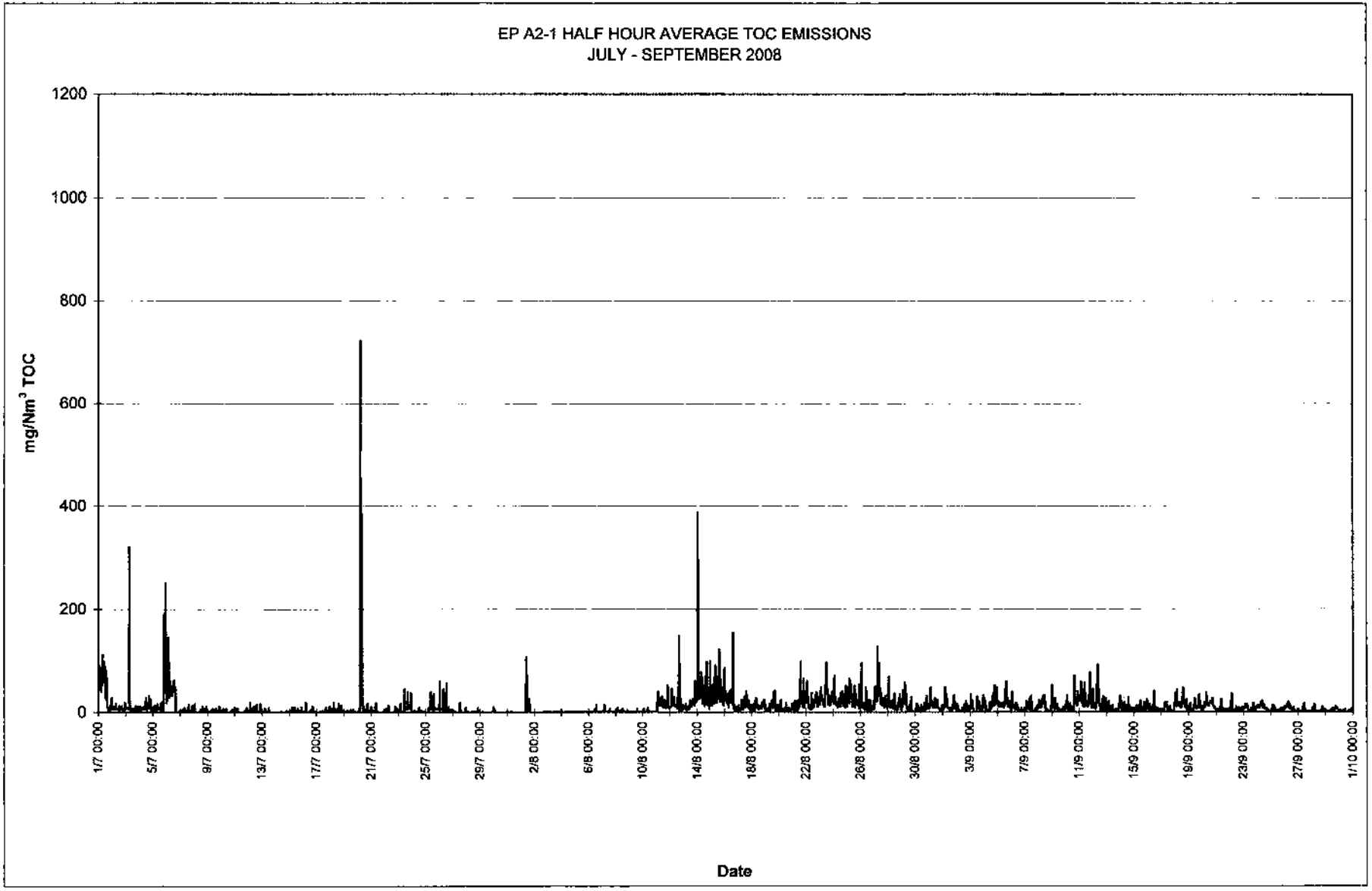

Notes re elevated TOC emissions are outlined in emission point A2-1 attachment.

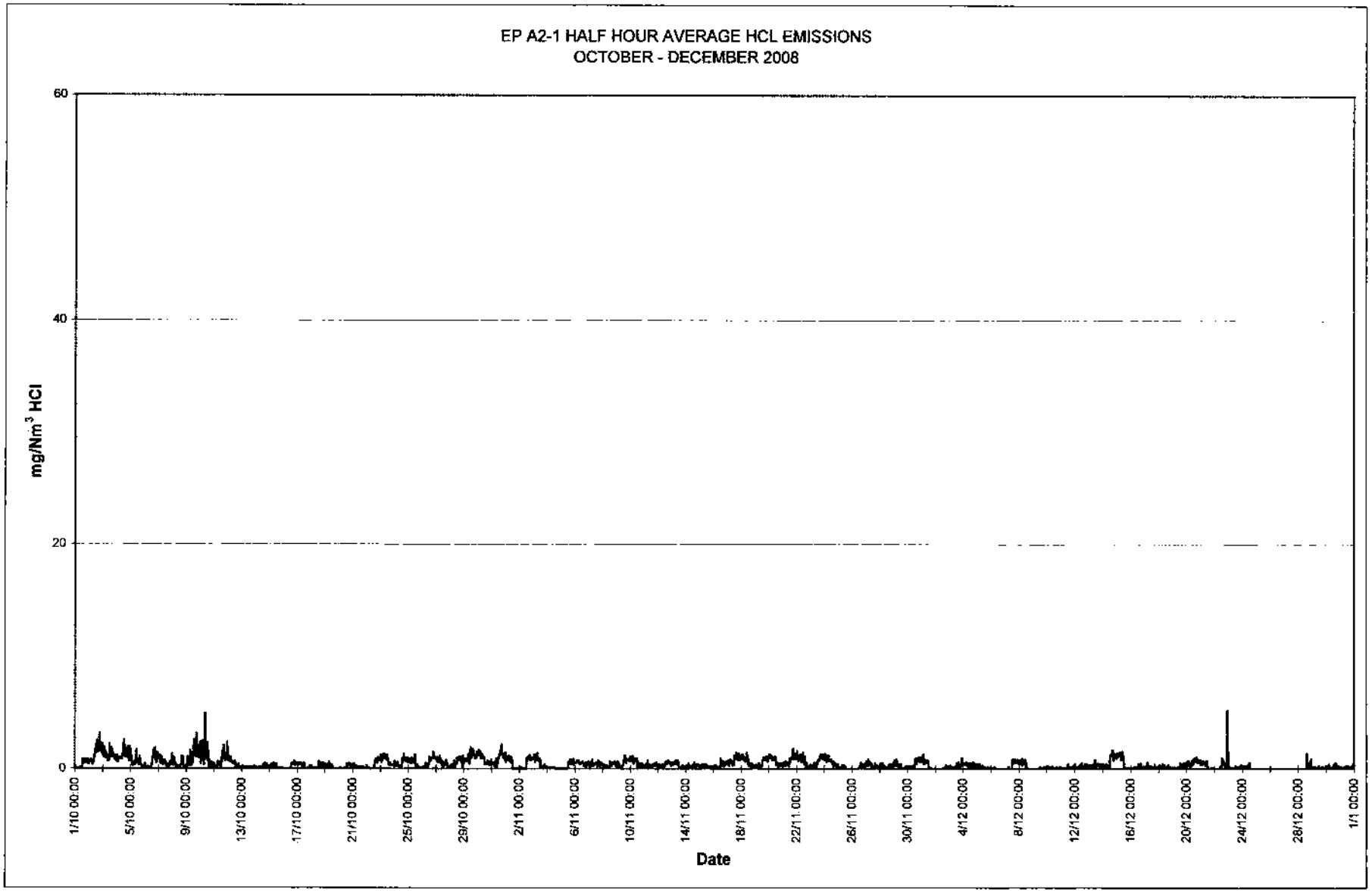

EP A2-1 HALF HOUR AVERAGE TOC EMISSIONS
APRIL - JUNE 2008
mg/Nm3 TOC
1200
1000
800
600
400
200
0
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
27/5 00:00
31/5 00:00
4/6 00:00
8/6 00:00
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date


EP A2-1 HALF HOUR AVERAGE HCL EMISSIONS
APRIL - JUNE 2008
mg/Nm3 HCl
60
40
20
0
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
27/5 00:00
31/5 00:00
4/6 00:00
8/6 00:00
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date

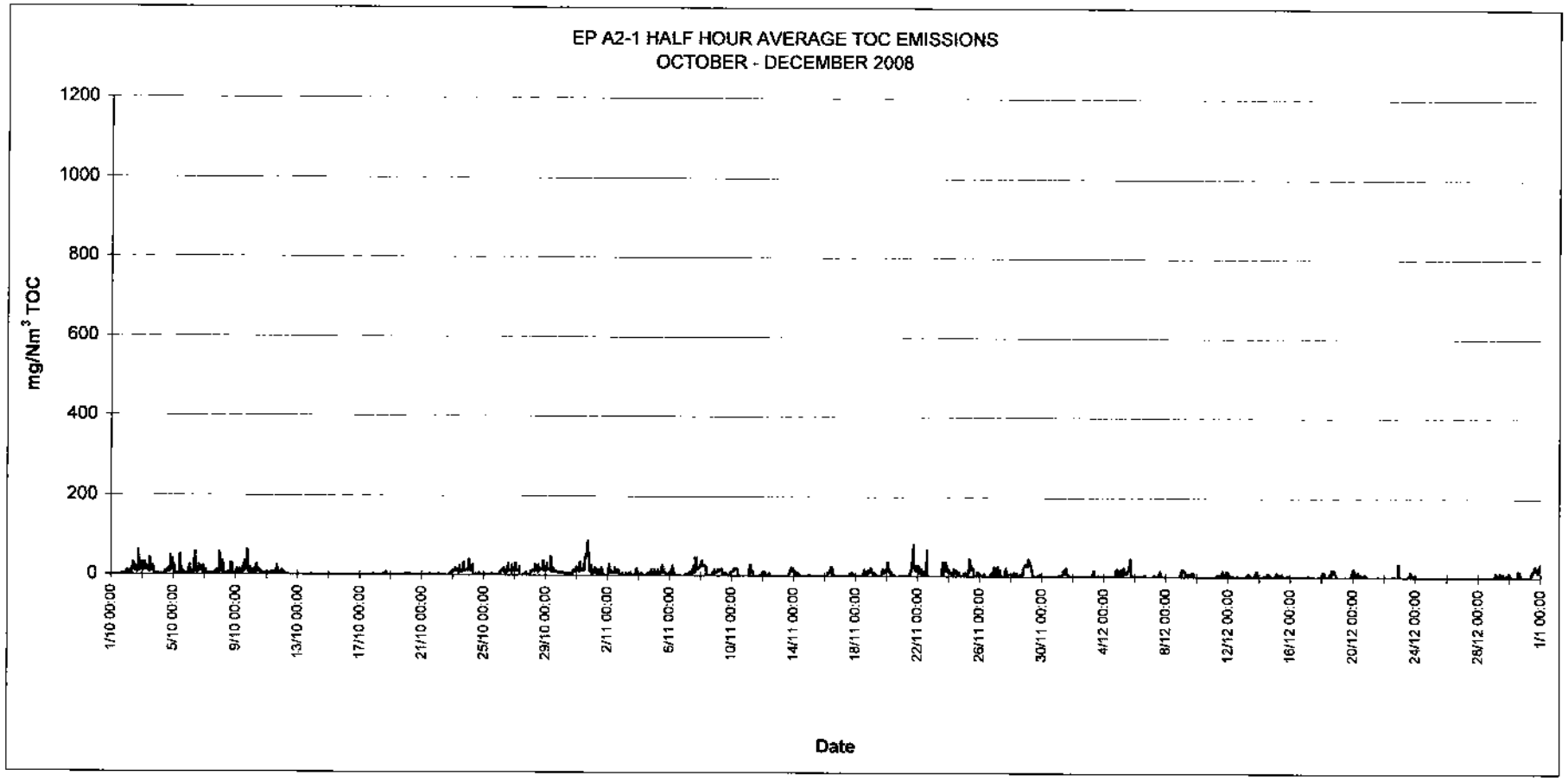

EP A2-1 HALF HOUR AVERAGE TOC EMISSIONS
APRIL - JUNE 2008
mg/Nm3 TOC
1200
1000
800
600
400
200
0
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
27/5 00:00
31/5 00:00
4/6 00:00
8/6 00:00
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date


EP A2-1 HALF HOUR AVERAGE HCL EMISSIONS
JULY - SEPTEMBER 2008
mg/Nm3 HCl
60
40
20
0
1/7 00:00
5/7 00:00
9/7 00:00
13/7 00:00
17/7 00:00
21/7 00:00
25/7 00:00
29/7 00:00
2/8 00:00
6/8 00:00
10/8 00:00
14/8 00:00
18/8 00:00
22/8 00:00
26/8 00:00
30/8 00:00
3/9 00:00
7/9 00:00
11/9 00:00
15/9 00:00
19/9 00:00
23/9 00:00
27/9 00:00
1/10 00:00
Date


EP A2-1 HALF HOUR AVERAGE TOC EMISSIONS
JULY - SEPTEMBER 2008
1200
1000
800
600
400
200
0
mg/Nm3 TOC
1/7 00:00
5/7 00:00
9/7 00:00
13/7 00:00
17/7 00:00
21/7 00:00
25/7 00:00
29/7 00:00
2/8 00:00
6/8 00:00
10/8 00:00
14/8 00:00
18/8 00:00
22/8 00:00
26/8 00:00
30/8 00:00
3/9 00:00
7/9 00:00
11/9 00:00
15/9 00:00
19/9 00:00
23/9 00:00
27/9 00:00
1/10 00:00
Date




The Thermal Oxidiser was offline from 12:10 hrs on the 24 th Dec to 15:00 hrs on the 28th Dec.
No processing operations were conducted during this time period.



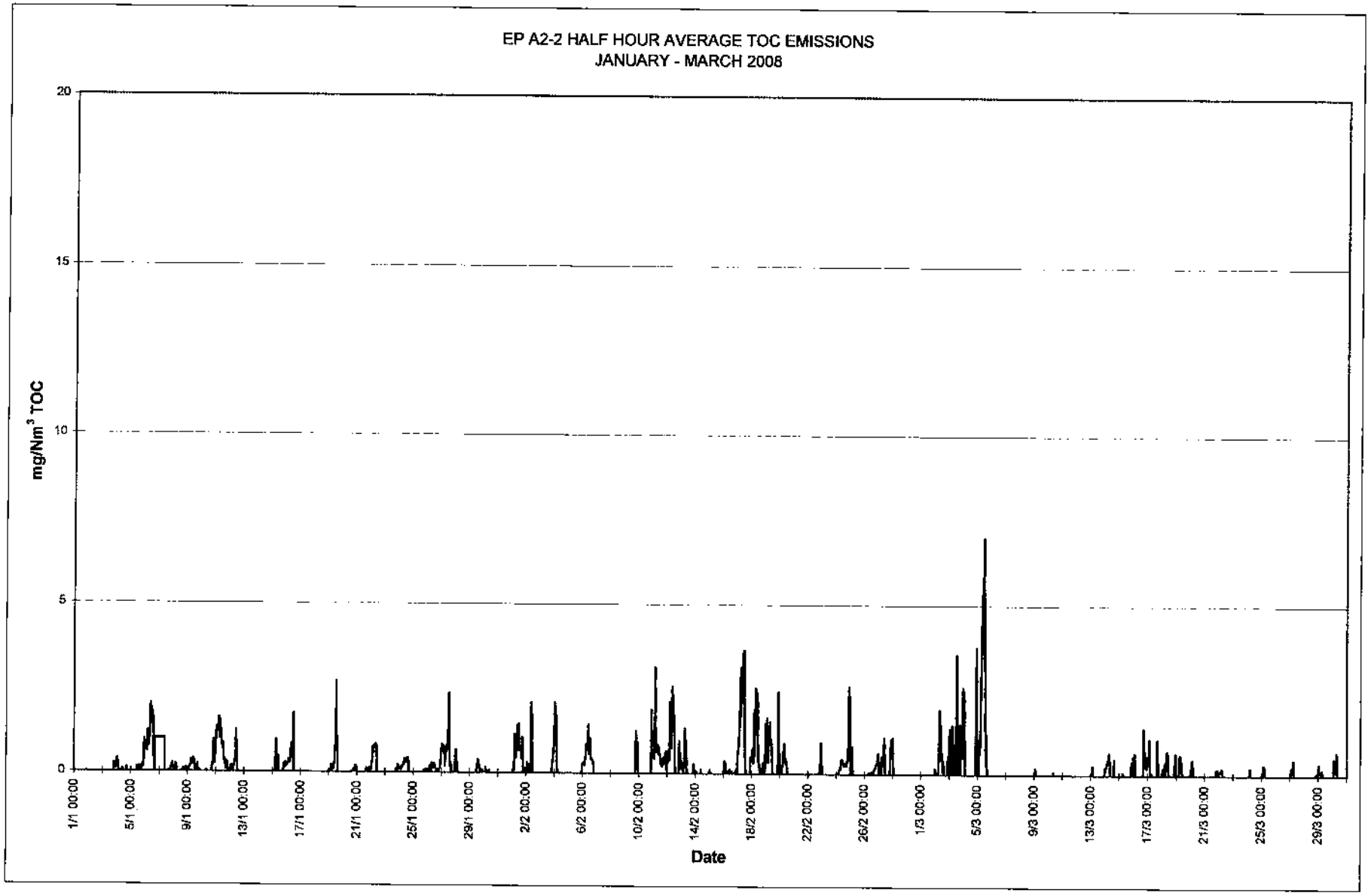

Note:- The TO was offline from 12:10 hrs 24th Dec to 15:00 hrs on the 28th Dec.

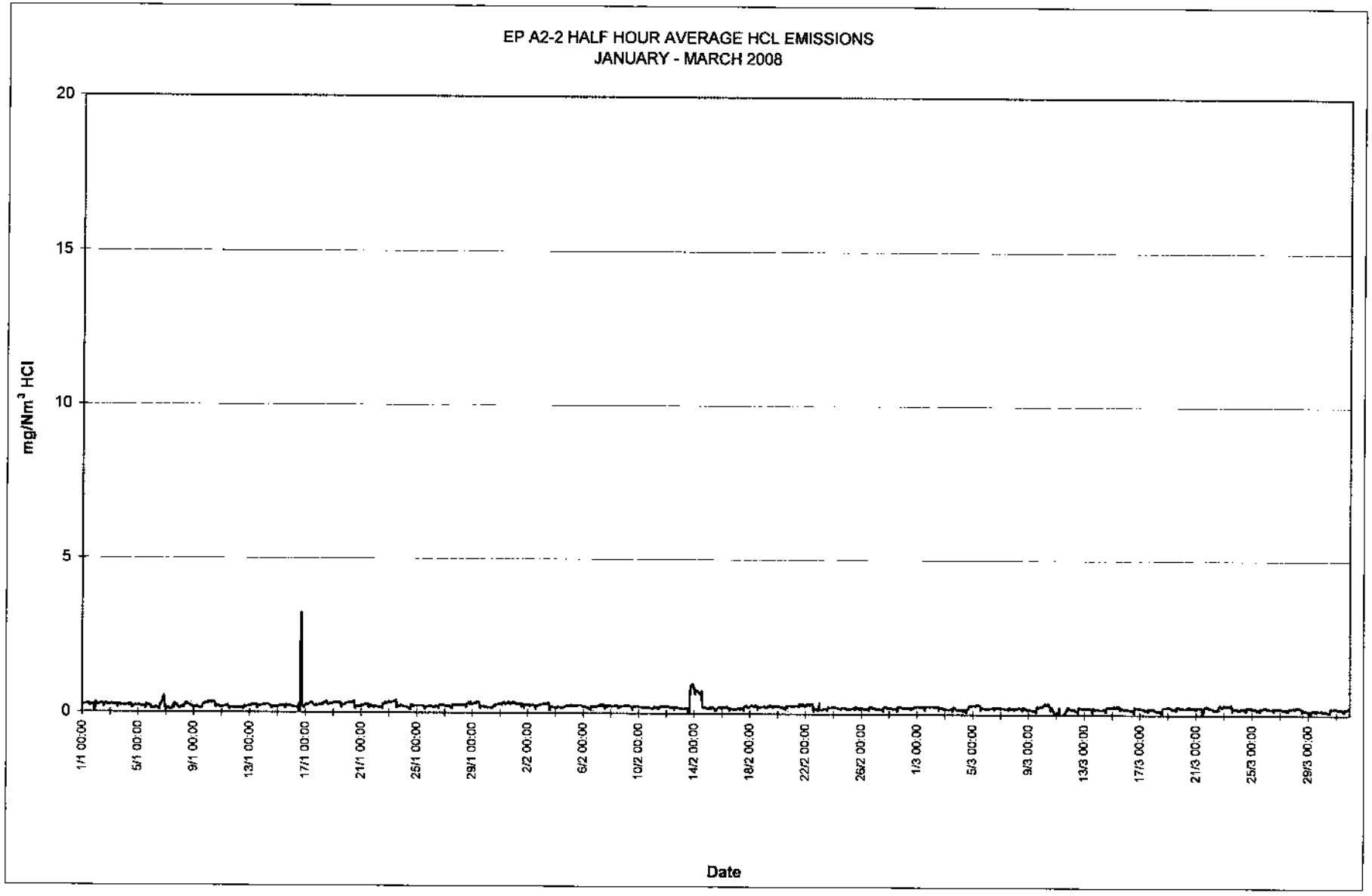
**IPPC REG. NO. P0011-03**

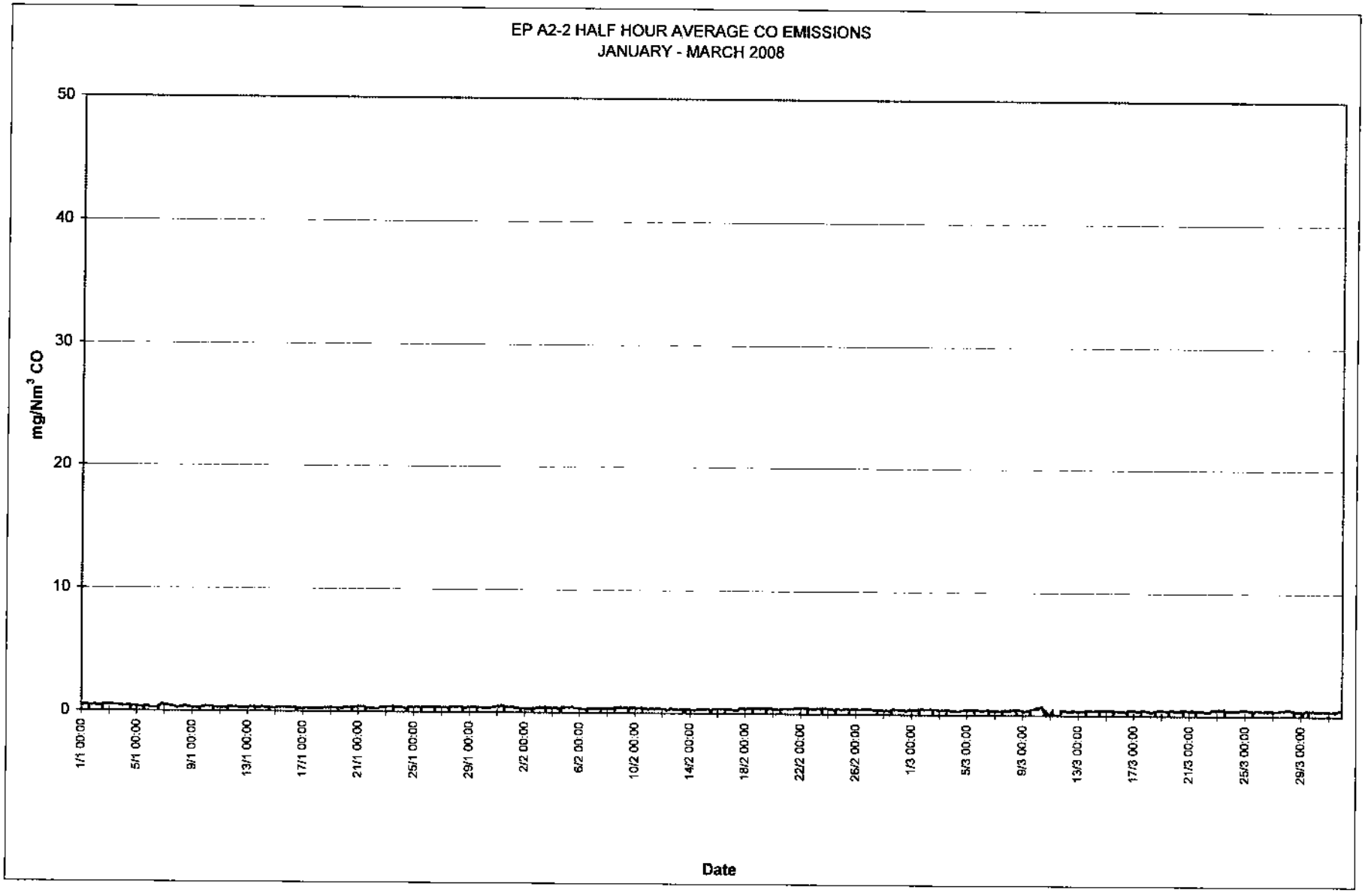
**MSD - Emission Point Reference No. A2-2**

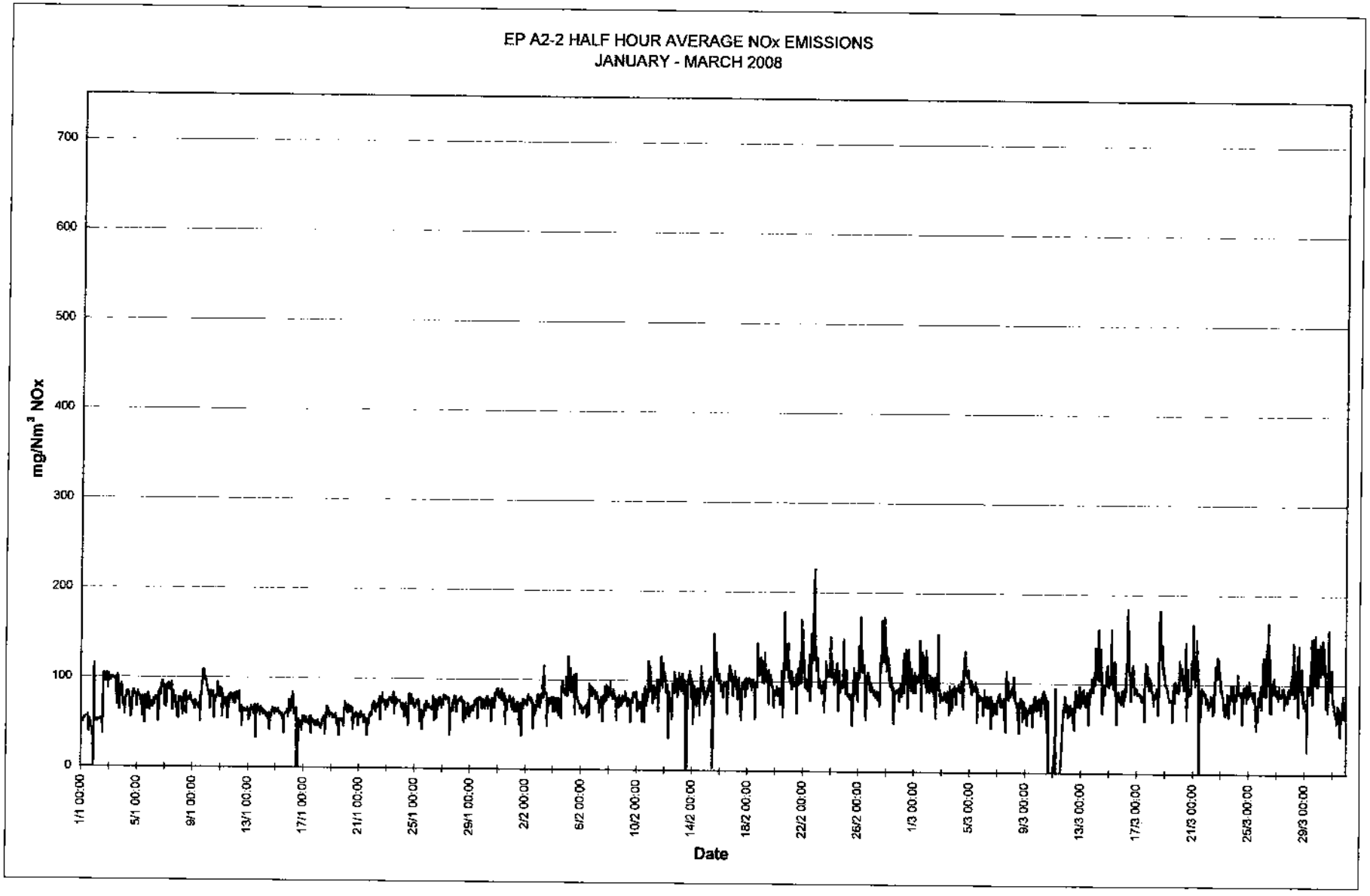
TO No. 3 (Fume Incinerator) Exhaust Stack
Dioxins & Hydrogen Fluoride Monitoring
PERIOD: 2008

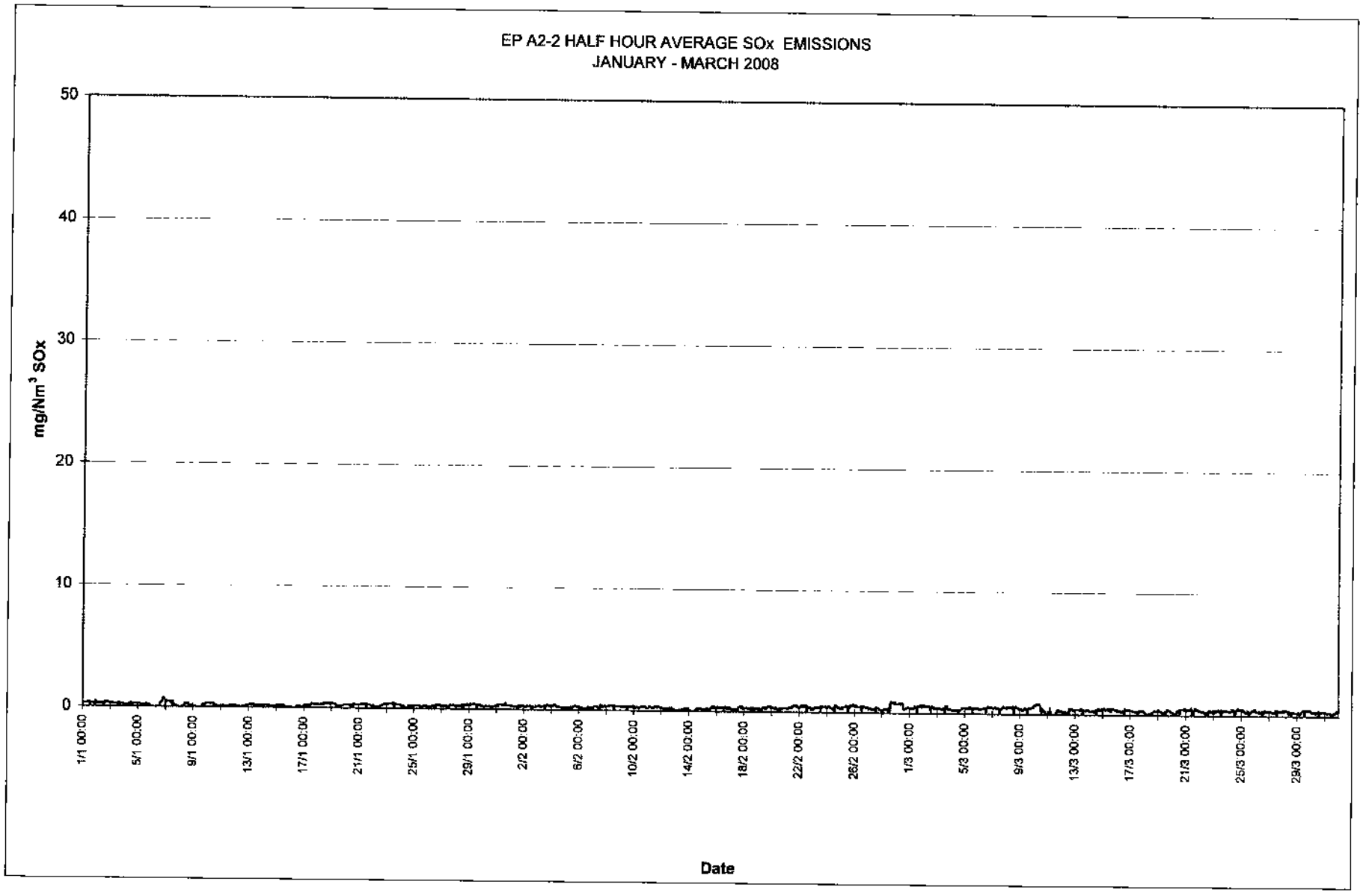
| PARAMETER | MONITORING DATE | EMISSION LIMIT VALUE | MEASURED EMISSION |
|---|---|---|---|
| | | **ng/Nm$^3$** | **ng/Nm$^3$** |
| Flue Gas Dioxins (TEQ) ( Wright / AES) | May 13, 2008 | 0.1 | 0.000092 |
| Flue Gas Dioxins (TEQ) ( Wright / AES) | October 21, 2008 | 0.1 | 0.00003 |
| Flue Gas Dioxins (TEQ) | July 1, 2008 | 0.1 | 0.02 |
| Flue Gas Dioxins (TEQ) | July 2, 2008 | 0.1 | 0.01 |
| Flue Gas Dioxins (TEQ) (EPA / Alcontrol monitoring) | July 3, 2008 | 0.1 | 0.01 |
| | **Average** | | **0.00802** |
| | | **mg/Nm$^3$** | **mg/Nm$^3$** |
| HYDROGEN FLUORIDE | 3rd March, 2008 | 4 | <0.4 |
| HYDROGEN FLUORIDE | May 13, 2008 | 4 | <0.4 |
| HYDROGEN FLUORIDE | August 27, 2008 | 4 | <0.4 |
| HYDROGEN FLUORIDE | October 21, 2008 | 4 | <0.4 |
| | **Average** | | < 0.4 |

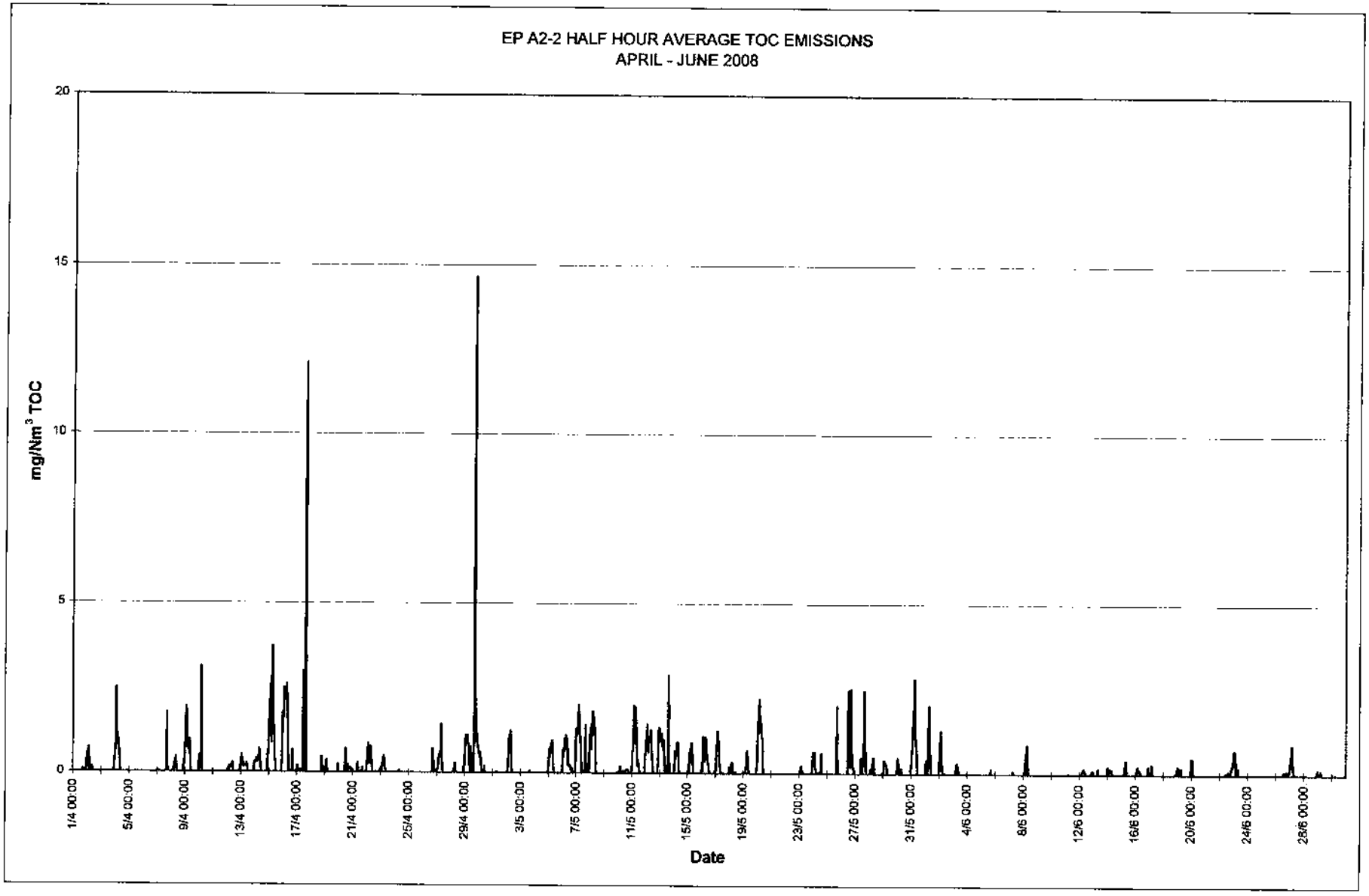

EP A2-2 HALF HOUR AVERAGE TOC EMISSIONS
JANUARY - MARCH 2008
mg/Nm3 TOC
20
15
10
5
0
1/1 00:00
5/1 00:00
9/1 00:00
13/1 00:00
17/1 00:00
21/1 00:00
25/1 00:00
29/1 00:00
2/2 00:00
6/2 00:00
10/2 00:00
14/2 00:00
18/2 00:00
22/2 00:00
26/2 00:00
1/3 00:00
5/3 00:00
9/3 00:00
13/3 00:00
17/3 00:00
21/3 00:00
25/3 00:00
29/3 00:00
Date

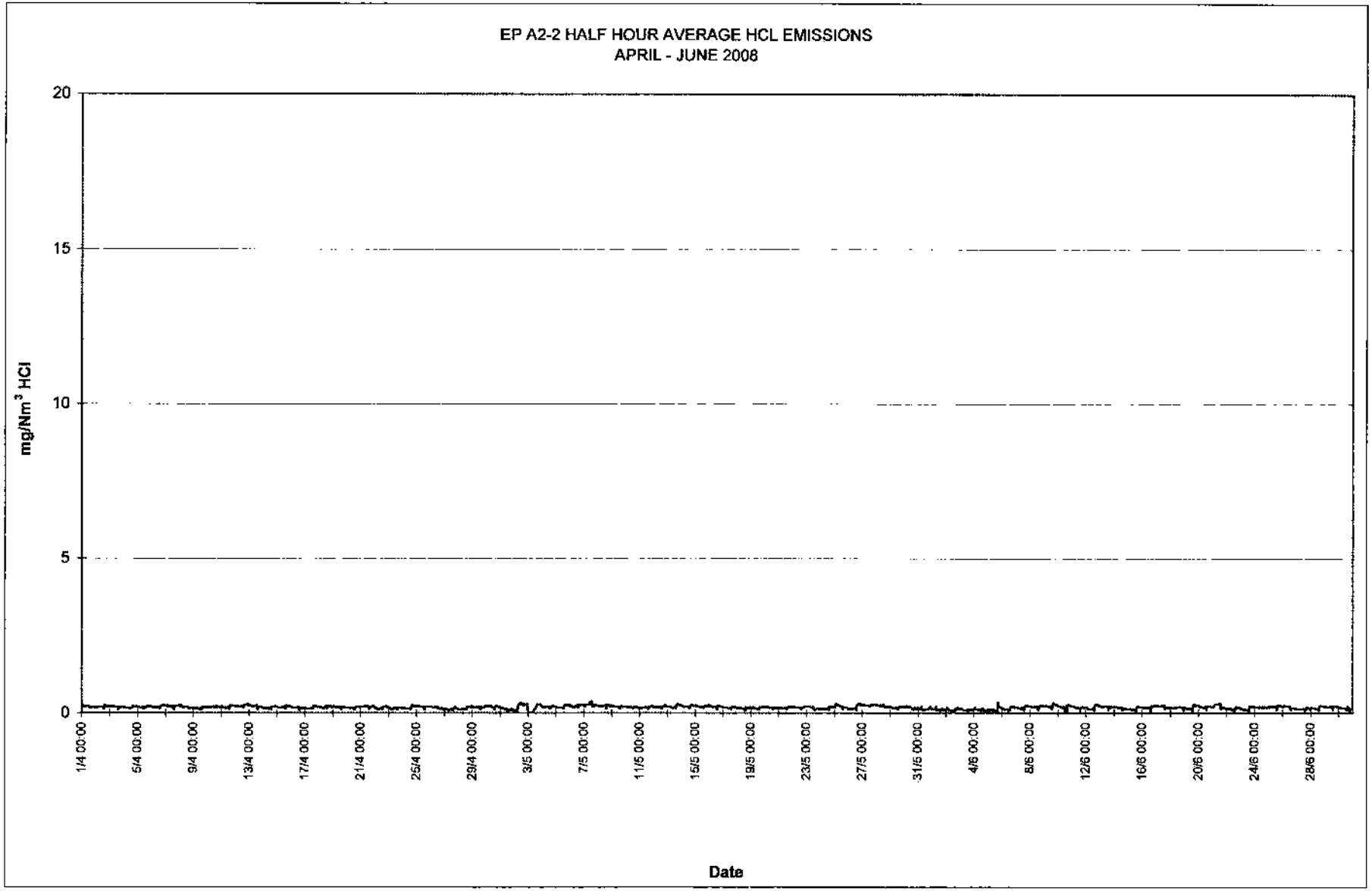

EP A2-2 HALF HOUR AVERAGE HCL EMISSIONS
JANUARY - MARCH 2008
mg/Nm3 HCl
20
15
10
5
0
1/1 00:00
5/1 00:00
9/1 00:00
13/1 00:00
17/1 00:00
21/1 00:00
25/1 00:00
29/1 00:00
2/2 00:00
6/2 00:00
10/2 00:00
14/2 00:00
18/2 00:00
22/2 00:00
26/2 00:00
1/3 00:00
5/3 00:00
9/3 00:00
13/3 00:00
17/3 00:00
21/3 00:00
25/3 00:00
29/3 00:00
Date

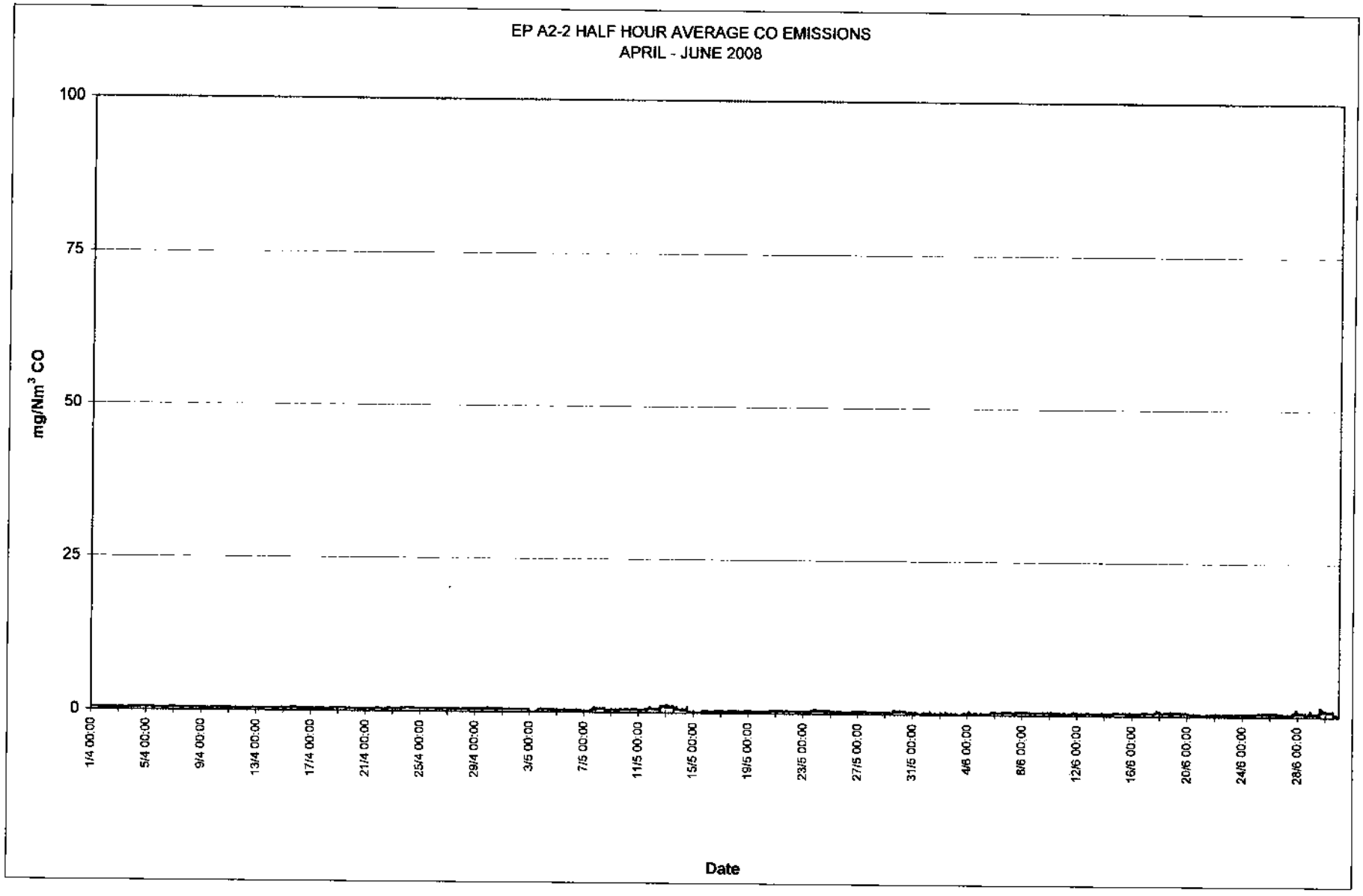

EP A2-2 HALF HOUR AVERAGE CO EMISSIONS
JANUARY - MARCH 2008
mg/Nm3 CO
50
40
30
20
10
0
1/1 00:00
5/1 00:00
9/1 00:00
13/1 00:00
17/1 00:00
21/1 00:00
25/1 00:00
29/1 00:00
2/2 00:00
6/2 00:00
10/2 00:00
14/2 00:00
18/2 00:00
22/2 00:00
26/2 00:00
1/3 00:00
5/3 00:00
9/3 00:00
13/3 00:00
17/3 00:00
21/3 00:00
25/3 00:00
29/3 00:00
Date

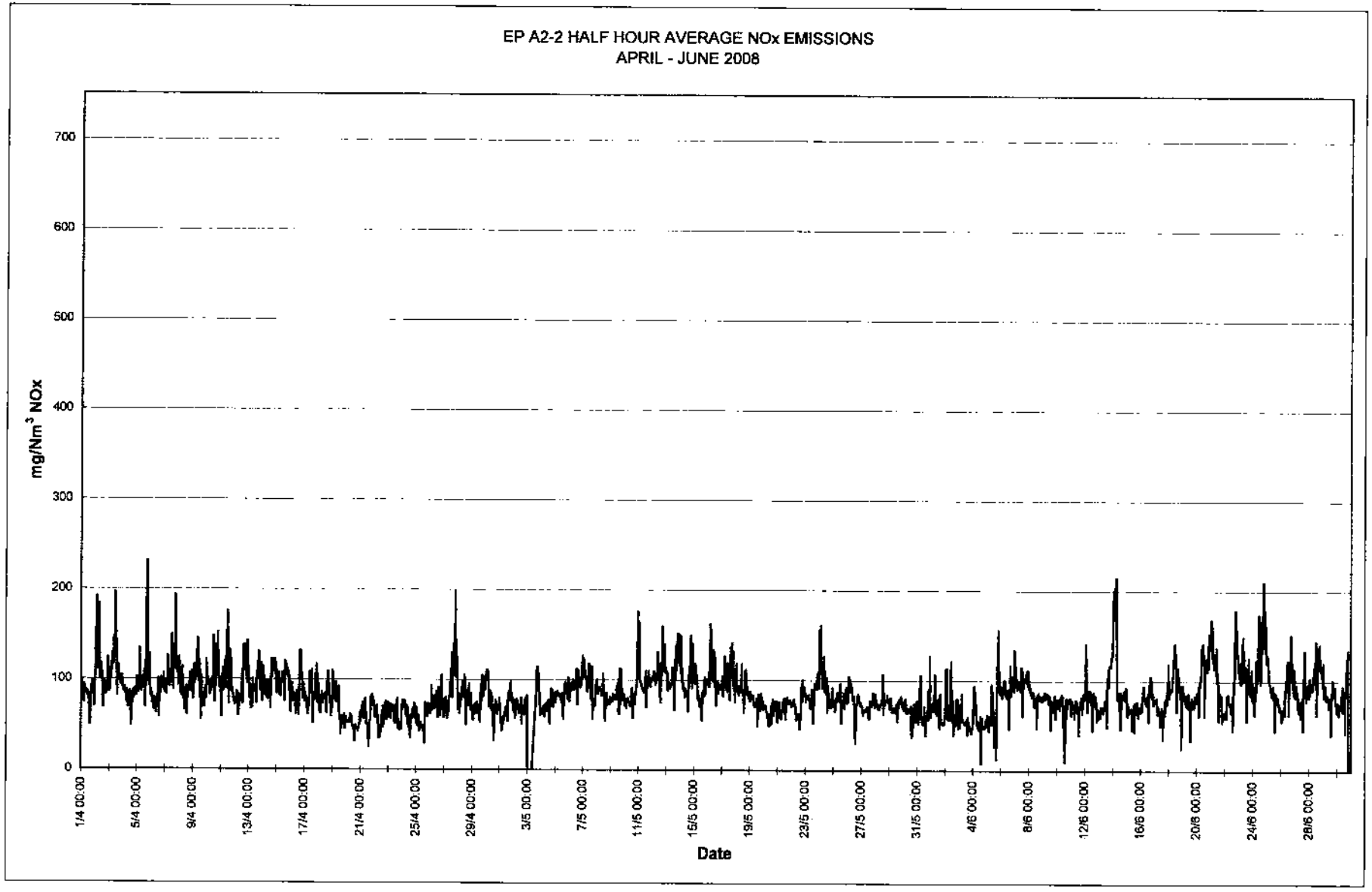

EP A2-2 HALF HOUR AVERAGE NOx EMISSIONS
JANUARY - MARCH 2008
mg/Nm3 NOx
700
600
500
400
300
200
100
0
1/1 00:00
5/1 00:00
9/1 00:00
13/1 00:00
17/1 00:00
21/1 00:00
25/1 00:00
29/1 00:00
2/2 00:00
6/2 00:00
10/2 00:00
14/2 00:00
18/2 00:00
22/2 00:00
26/2 00:00
1/3 00:00
5/3 00:00
9/3 00:00
13/3 00:00
17/3 00:00
21/3 00:00
25/3 00:00
29/3 00:00
Date


EP A2-2 HALF HOUR AVERAGE SOx EMISSIONS
JANUARY - MARCH 2008
mg/Nm3 SOx
50
40
30
20
10
0
1/1 00:00
5/1 00:00
9/1 00:00
13/1 00:00
17/1 00:00
21/1 00:00
25/1 00:00
29/1 00:00
2/2 00:00
6/2 00:00
10/2 00:00
14/2 00:00
18/2 00:00
22/2 00:00
26/2 00:00
1/3 00:00
5/3 00:00
9/3 00:00
13/3 00:00
17/3 00:00
21/3 00:00
25/3 00:00
29/3 00:00
Date


EP A2-2 HALF HOUR AVERAGE TOC EMISSIONS
APRIL - JUNE 2008
mg/Nm3 TOC
20
15
10
5
0
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
27/5 00:00
31/5 00:00
4/6 00:00
8/6 00:00
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date


EP A2-2 HALF HOUR AVERAGE HCL EMISSIONS
APRIL - JUNE 2008
mg/Nm3 HCl
20
15
10
5
0
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
27/5 00:00
31/5 00:00
4/6 00:00
8/6 00:00
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date


EP A2-2 HALF HOUR AVERAGE CO EMISSIONS
APRIL - JUNE 2008
100
75
50
25
0
mg/Nm3 CO
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
27/5 00:00
31/5 00:00
4/6 00:00
8/6 00:00
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date


EP A2-2 HALF HOUR AVERAGE NOx EMISSIONS
APRIL - JUNE 2008
mg/Nm3 NOx
700
600
500
400
300
200
100
0
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
27/5 00:00
31/5 00:00
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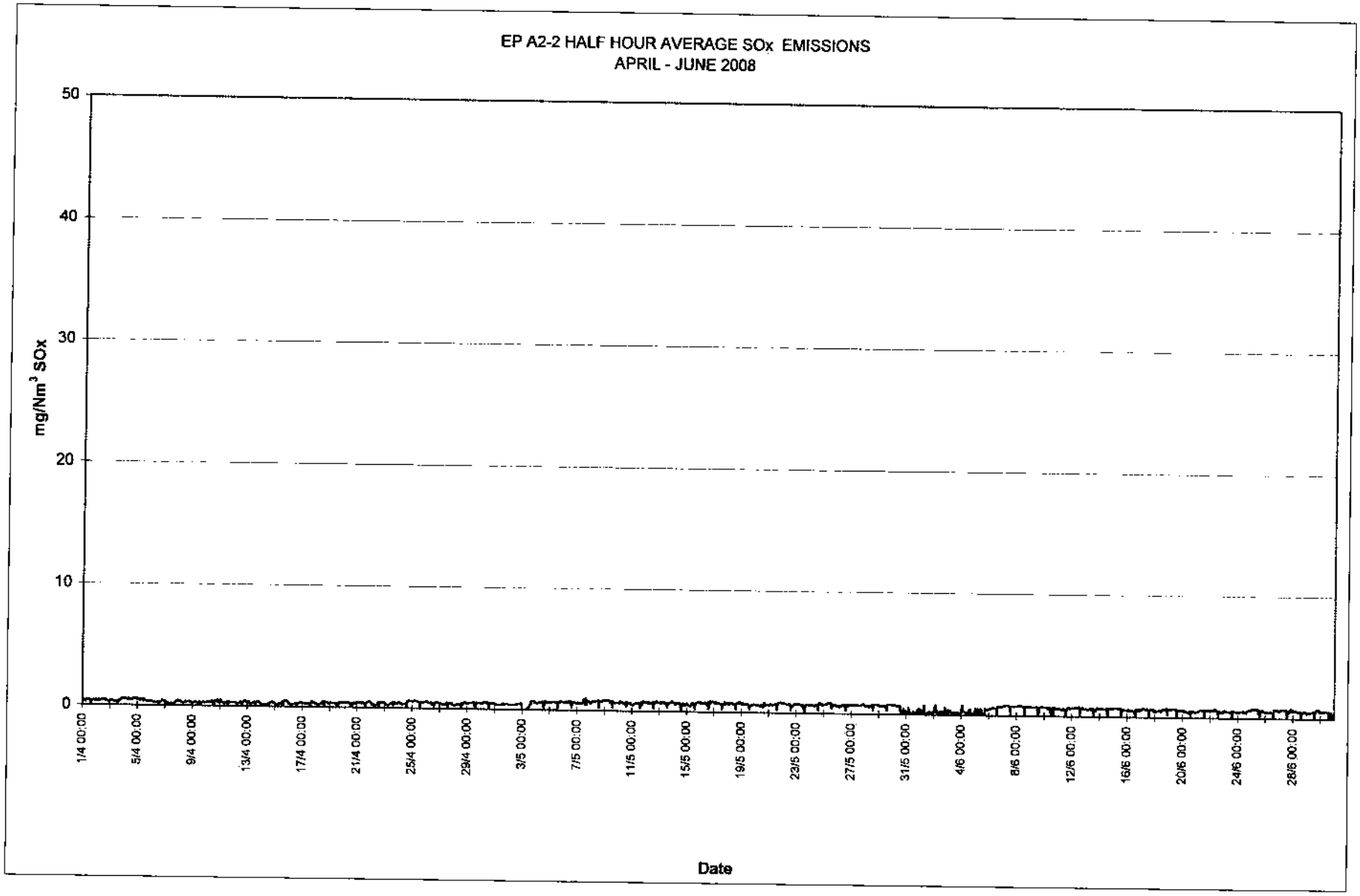
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date


EP A2-2 HALF HOUR AVERAGE SOx EMISSIONS
APRIL - JUNE 2008
mg/Nm3 SOx
50
40
30
20
10
0
1/4 00:00
5/4 00:00
9/4 00:00
13/4 00:00
17/4 00:00
21/4 00:00
25/4 00:00
29/4 00:00
3/5 00:00
7/5 00:00
11/5 00:00
15/5 00:00
19/5 00:00
23/5 00:00
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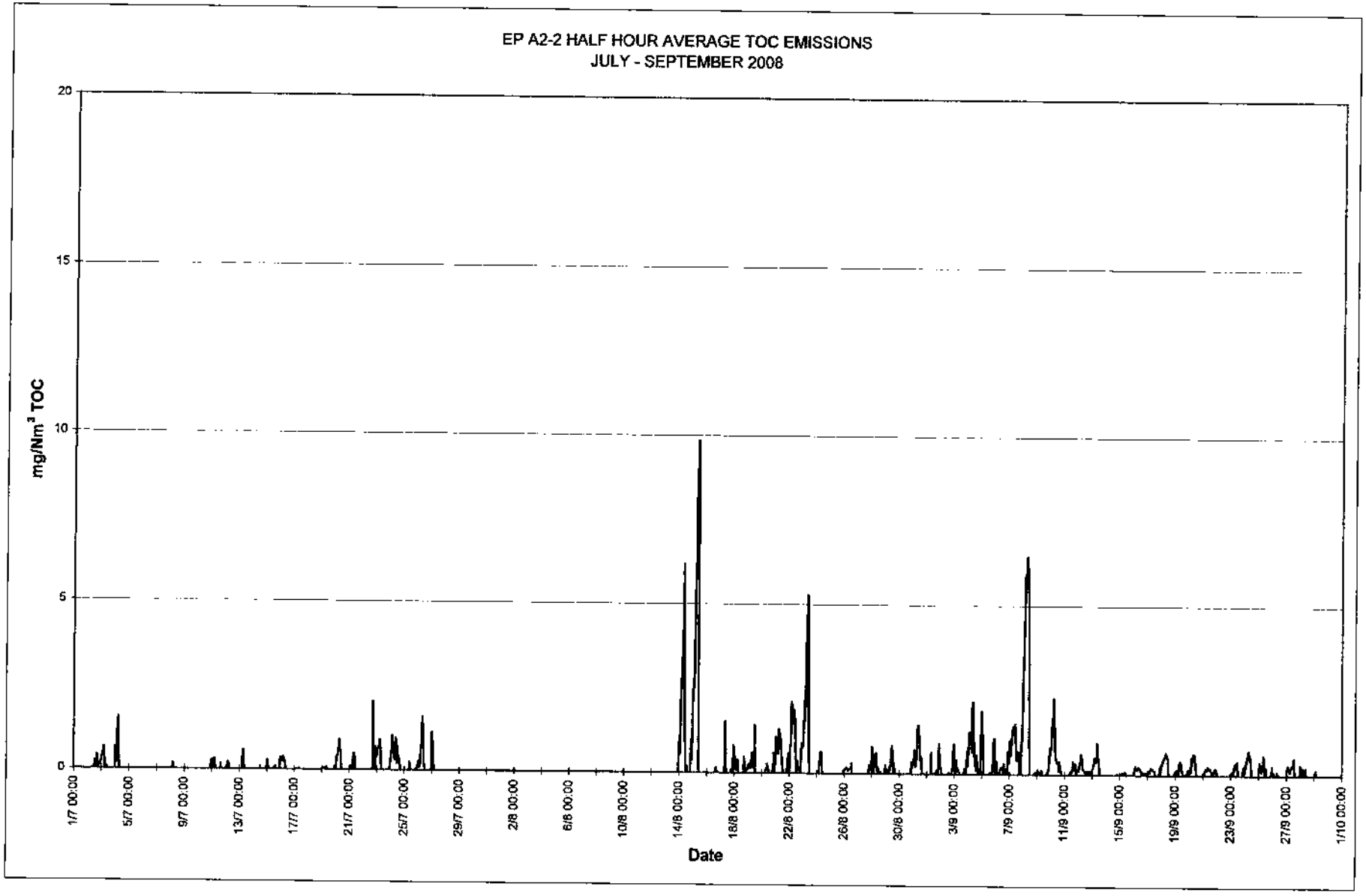
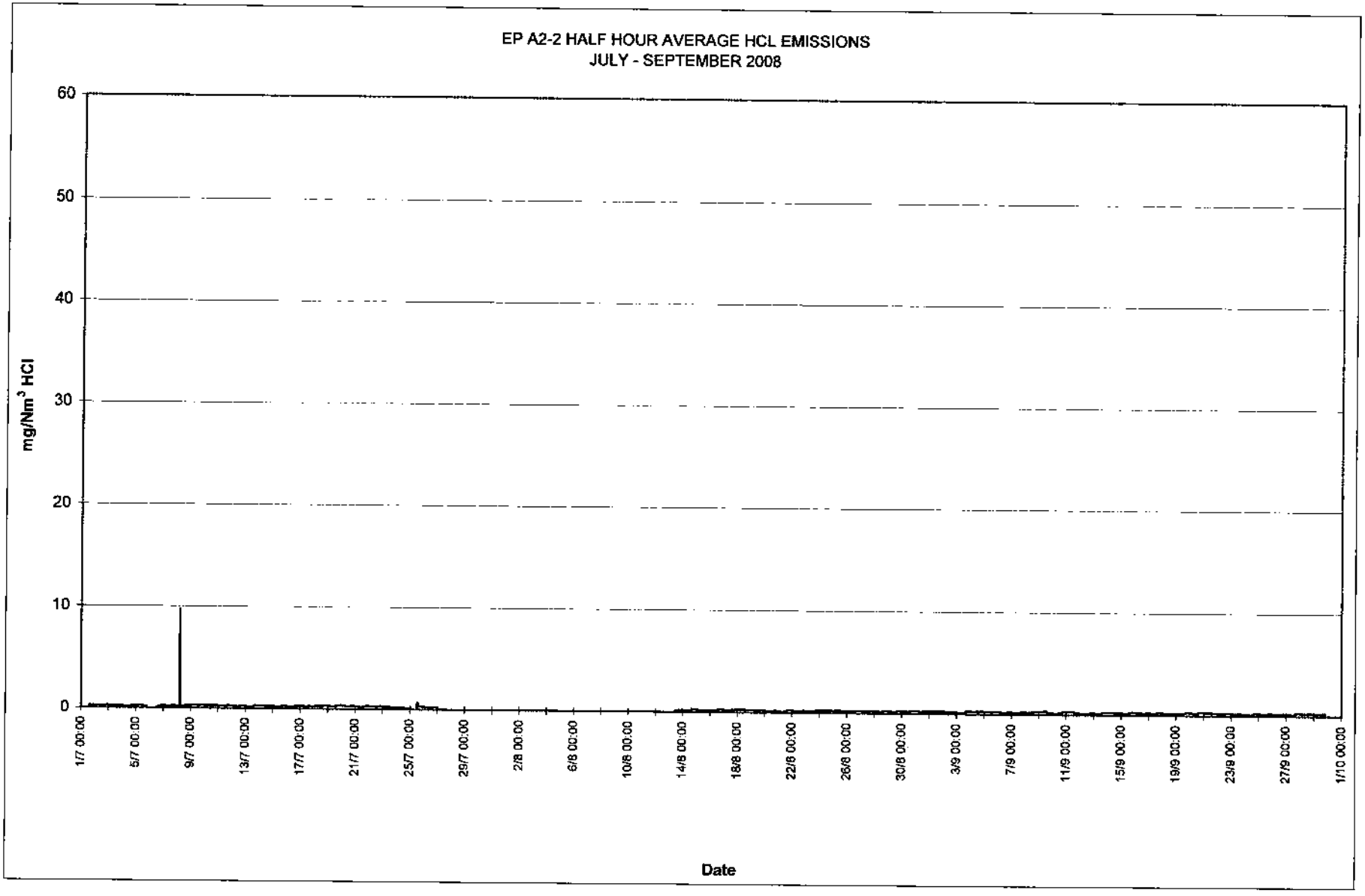
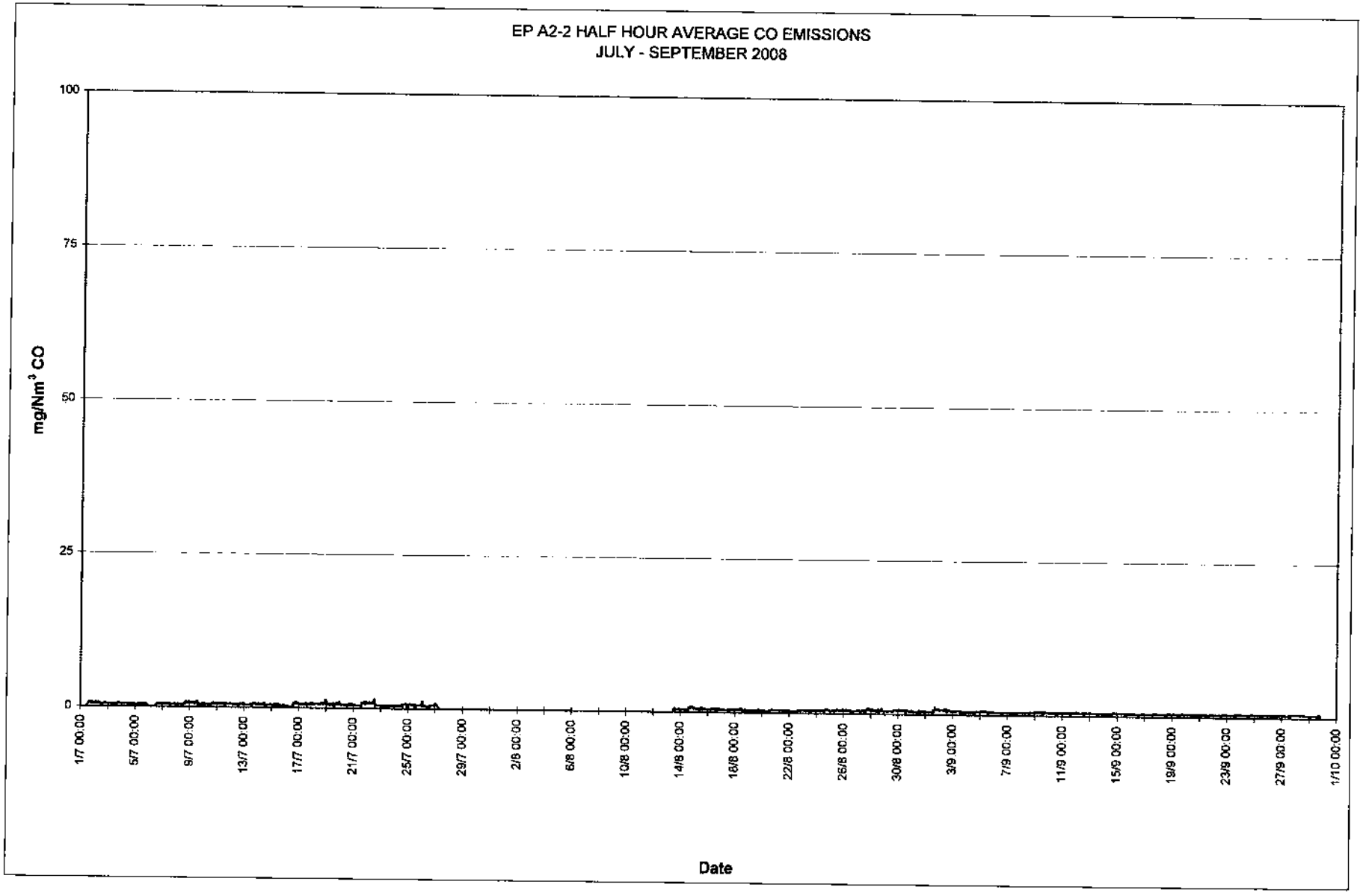
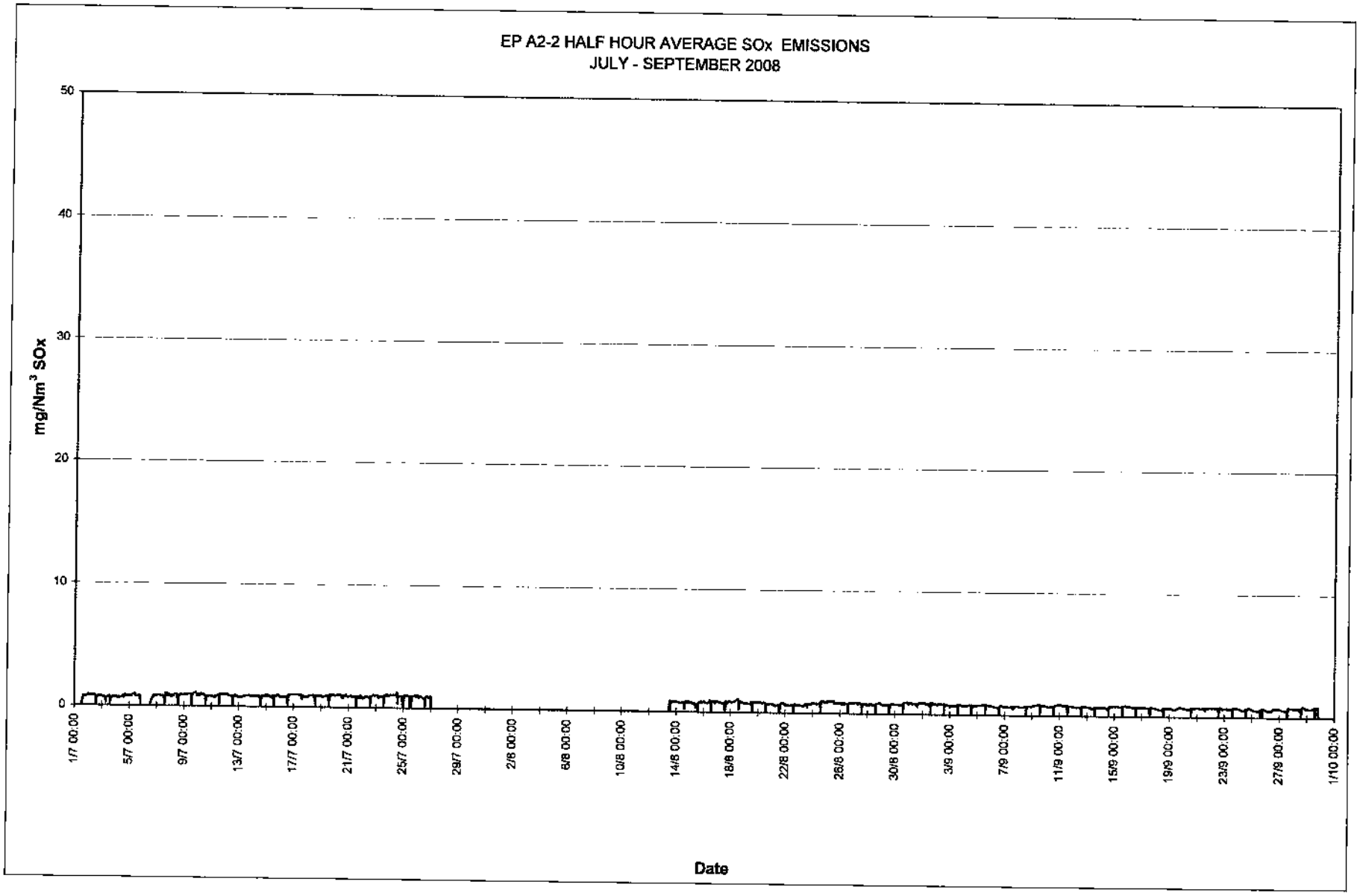
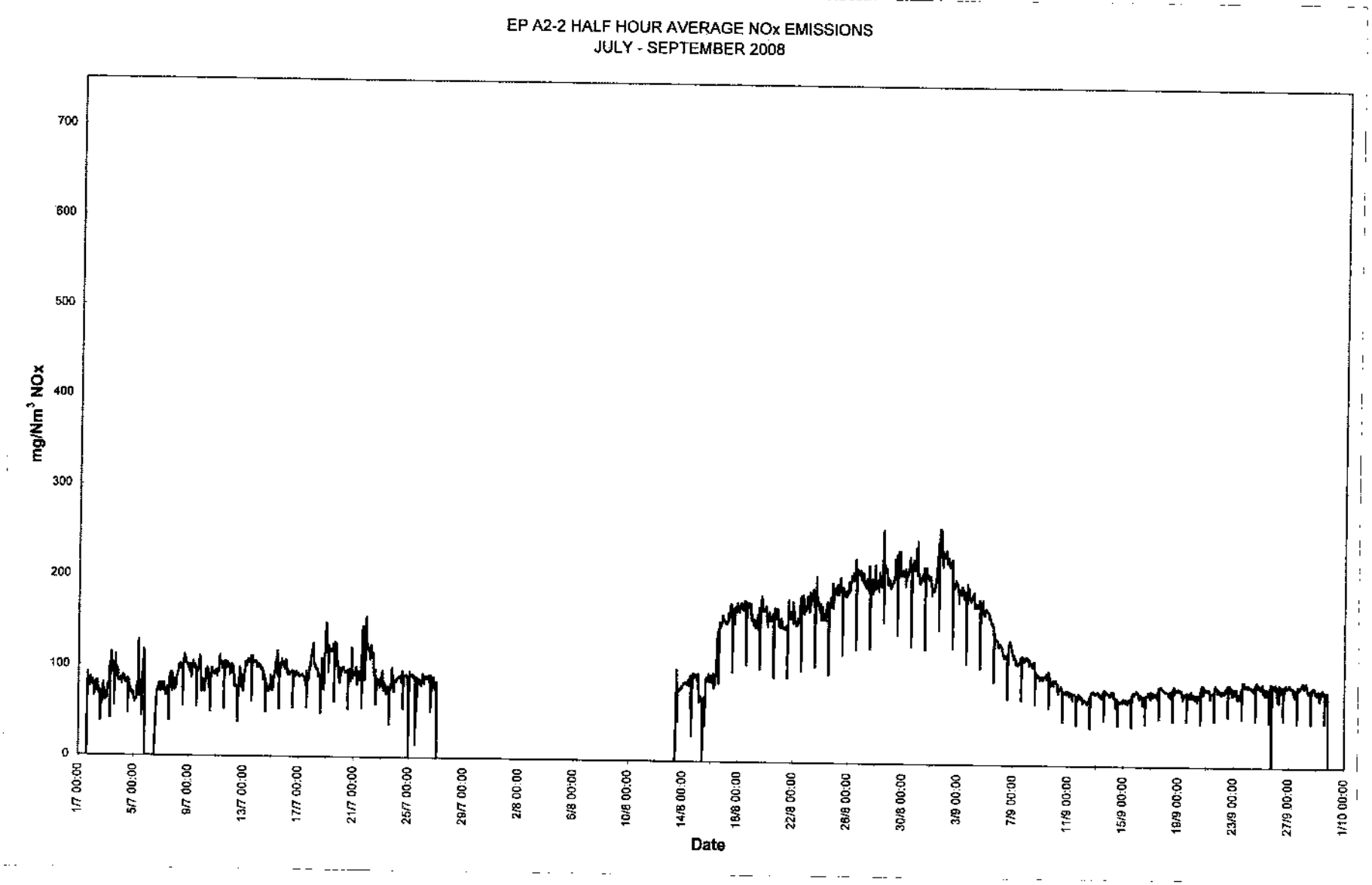
31/5 00:00
4/6 00:00
8/6 00:00
12/6 00:00
16/6 00:00
20/6 00:00
24/6 00:00
28/6 00:00
Date


EP A2-2 HALF HOUR AVERAGE TOC EMISSIONS
JULY - SEPTEMBER 2008
mg/Nm3 TOC
20
15
10
5
0
1/7 00:00
5/7 00:00
9/7 00:00
13/7 00:00
17/7 00:00
21/7 00:00
25/7 00:00
29/7 00:00
2/8 00:00
6/8 00:00
10/8 00:00
14/8 00:00
18/8 00:00
22/8 00:00
26/8 00:00
30/8 00:00
3/9 00:00
7/9 00:00
11/9 00:00
15/9 00:00
19/9 00:00
23/9 00:00
27/9 00:00
1/10 00:00
Date

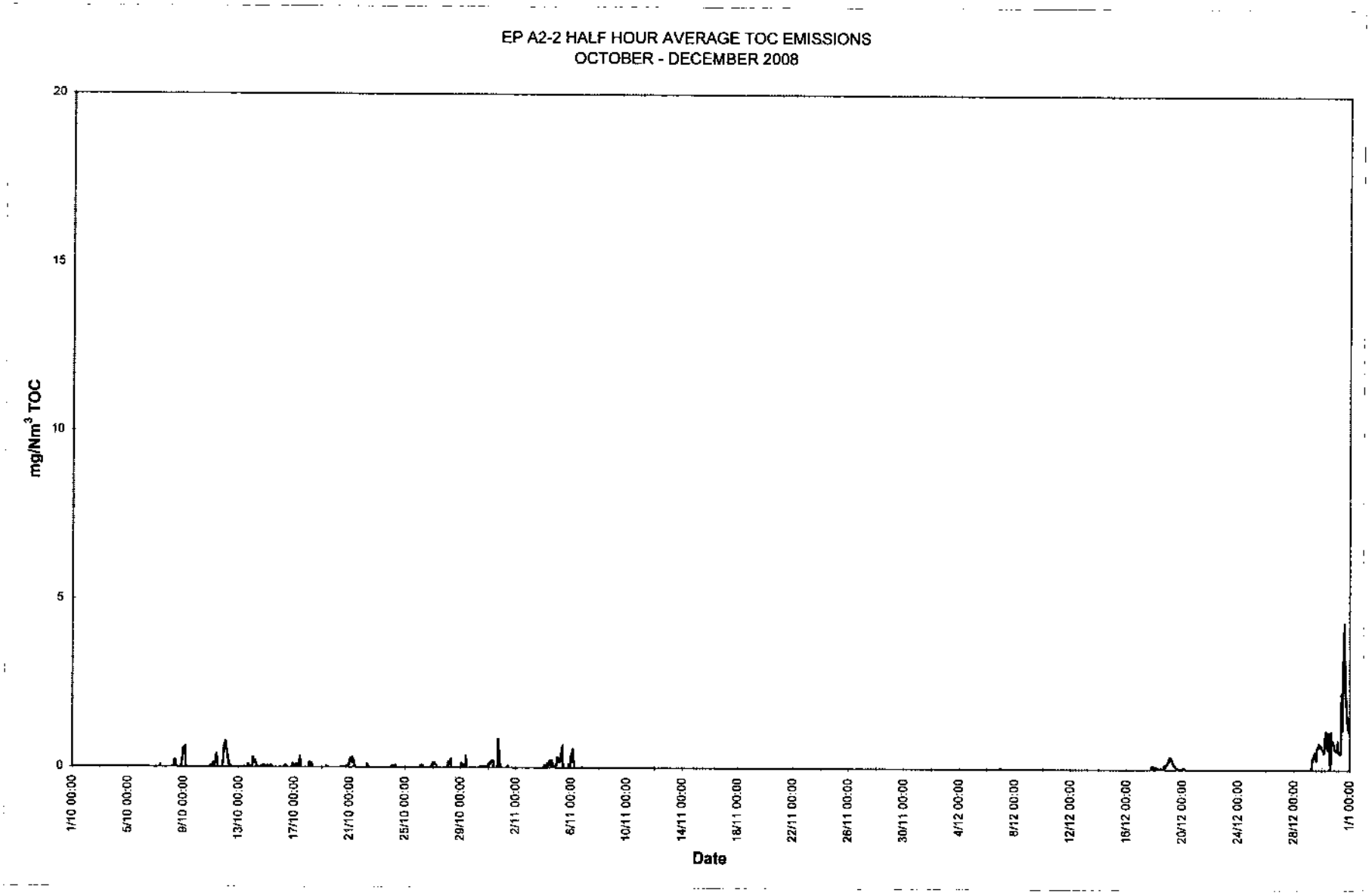

EP A2-2 HALF HOUR AVERAGE HCL EMISSIONS
JULY - SEPTEMBER 2008
mg/Nm3 HCl
60
50
40
30
20
10
0
1/7 00:00
5/7 00:00
9/7 00:00
13/7 00:00
17/7 00:00
21/7 00:00
25/7 00:00
29/7 00:00
2/8 00:00
6/8 00:00
10/8 00:00
14/8 00:00
18/8 00:00
22/8 00:00
26/8 00:00
30/8 00:00
3/9 00:00
7/9 00:00
11/9 00:00
15/9 00:00
19/9 00:00
23/9 00:00
27/9 00:00
1/10 00:00
Date

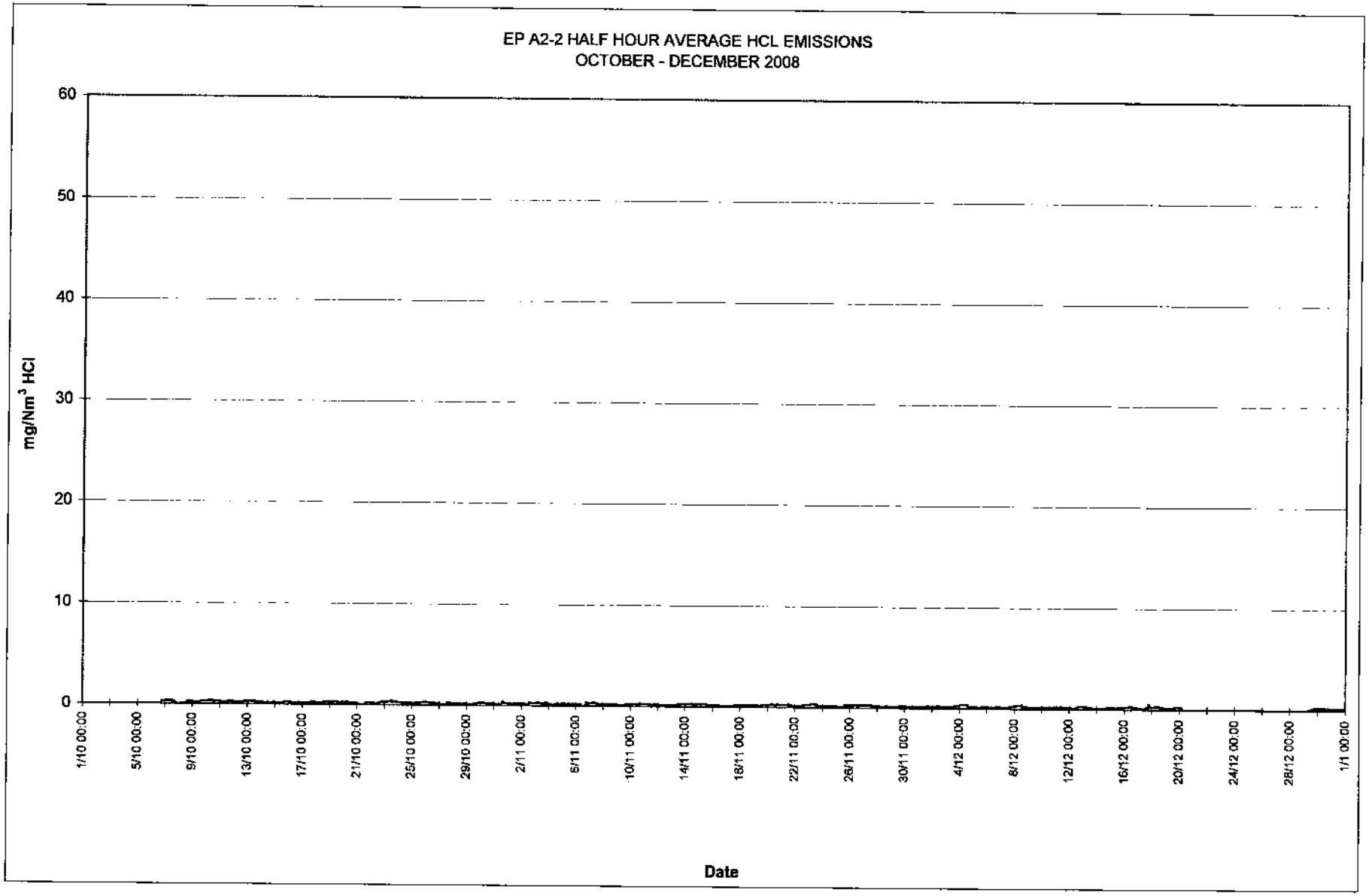

EP A2-2 HALF HOUR AVERAGE CO EMISSIONS
JULY - SEPTEMBER 2008
mg/Nm3 CO
100
75
50
25
0
1/7 00:00
5/7 00:00
9/7 00:00
13/7 00:00
17/7 00:00
21/7 00:00
25/7 00:00
29/7 00:00
2/8 00:00
6/8 00:00
10/8 00:00
14/8 00:00
18/8 00:00
22/8 00:00
26/8 00:00
30/8 00:00
3/9 00:00
7/9 00:00
11/9 00:00
15/9 00:00
19/9 00:00
23/9 00:00
27/9 00:00
1/10 00:00
Date

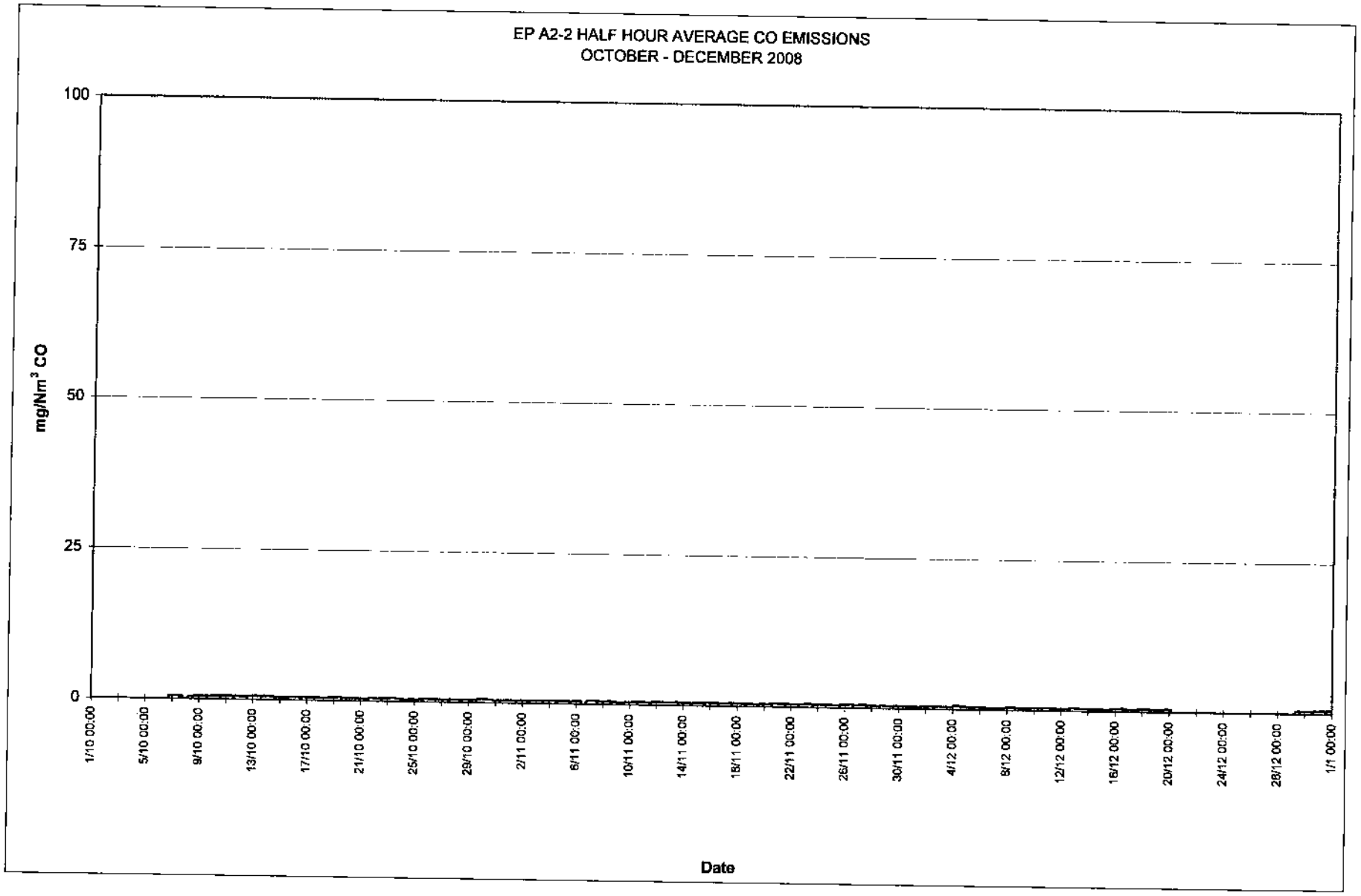

EP A2-2 HALF HOUR AVERAGE SOx EMISSIONS
JULY - SEPTEMBER 2008
mg/Nm3 SOx
50
40
30
20
10
0
1/7 00:00
5/7 00:00
9/7 00:00
13/7 00:00
17/7 00:00
21/7 00:00
25/7 00:00
29/7 00:00
2/8 00:00
6/8 00:00
10/8 00:00
14/8 00:00
18/8 00:00
22/8 00:00
26/8 00:00
30/8 00:00
3/9 00:00
7/9 00:00
11/9 00:00
15/9 00:00
19/9 00:00
23/9 00:00
27/9 00:00
1/10 00:00
Date

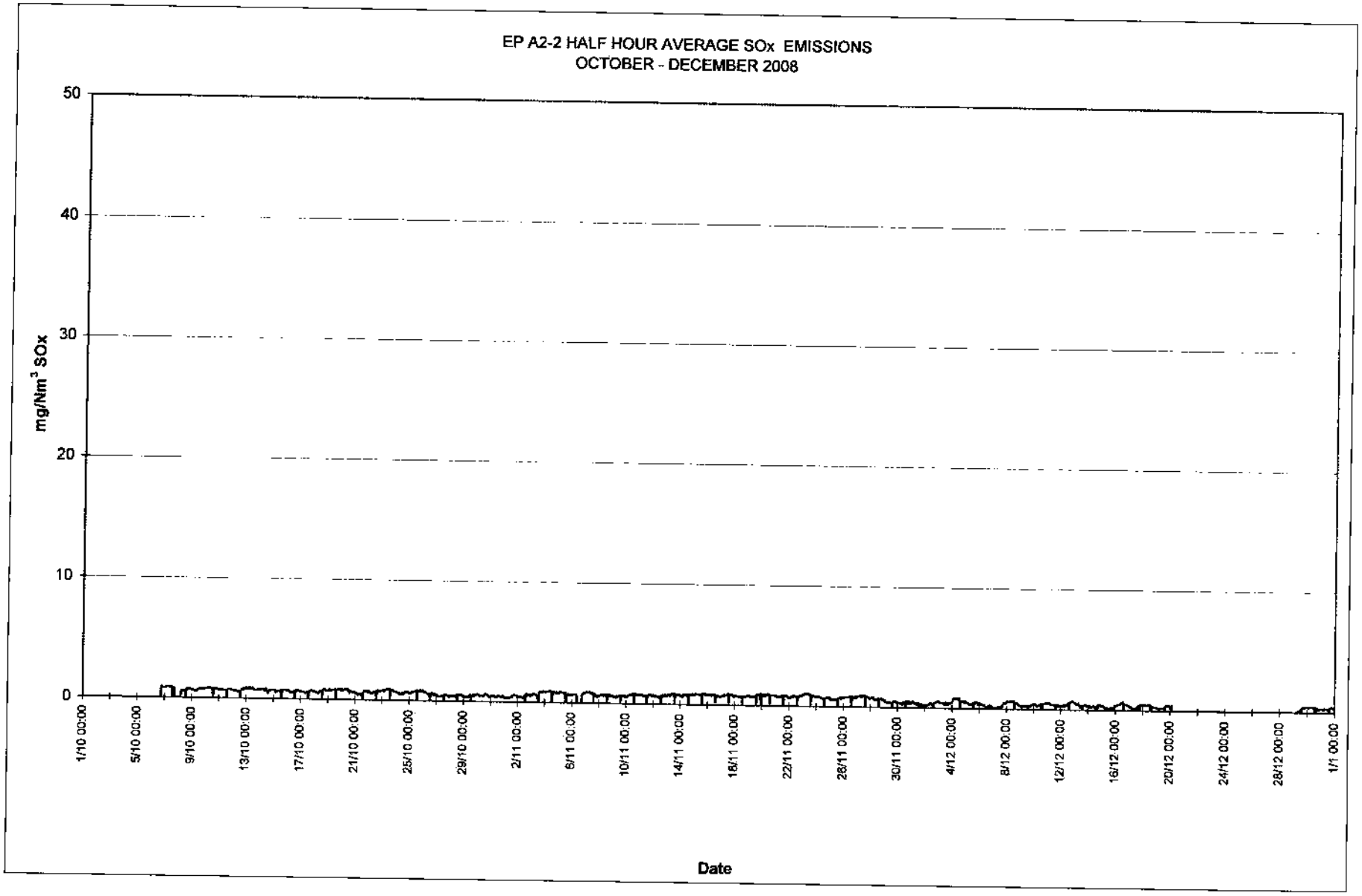



Fume Incinerator was not required from 27th July to 13th August.


EP A2-2 HALF HOUR AVERAGE TOC EMISSIONS
OCTOBER - DECEMBER 2008
mg/Nm3 TOC
20
15
10
5
0
1/10 00:00
5/10 00:00
9/10 00:00
13/10 00:00
17/10 00:00
21/10 00:00
25/10 00:00
29/10 00:00
2/11 00:00
6/11 00:00
10/11 00:00
14/11 00:00
18/11 00:00
22/11 00:00
26/11 00:00
30/11 00:00
4/12 00:00
8/12 00:00
12/12 00:00
16/12 00:00
20/12 00:00
24/12 00:00
28/12 00:00
1/1 00:00
Date


EP A2-2 HALF HOUR AVERAGE HCL EMISSIONS
OCTOBER - DECEMBER 2008
mg/Nm3 HCl
60
50
40
30
20
10
0
1/10 00:00
5/10 00:00
9/10 00:00
13/10 00:00
17/10 00:00
21/10 00:00
25/10 00:00
29/10 00:00
2/11 00:00
6/11 00:00
10/11 00:00
14/11 00:00
18/11 00:00
22/11 00:00
26/11 00:00
30/11 00:00
4/12 00:00
8/12 00:00
12/12 00:00
16/12 00:00
20/12 00:00
24/12 00:00
28/12 00:00
1/1 00:00
Date


EP A2-2 HALF HOUR AVERAGE CO EMISSIONS
OCTOBER - DECEMBER 2008
100
75
50
25
0
mg/Nm3 CO
1/10 00:00
5/10 00:00
9/10 00:00
13/10 00:00
17/10 00:00
21/10 00:00
25/10 00:00
29/10 00:00
2/11 00:00
6/11 00:00
10/11 00:00
14/11 00:00
18/11 00:00
22/11 00:00
26/11 00:00
30/11 00:00
4/12 00:00
8/12 00:00
12/12 00:00
16/12 00:00
20/12 00:00
24/12 00:00
28/12 00:00
1/1 00:00
Date


EP A2-2 HALF HOUR AVERAGE SOx EMISSIONS
OCTOBER - DECEMBER 2008
mg/Nm3 SOx
50
40
30
20
10
0
1/10 00:00
5/10 00:00
9/10 00:00
13/10 00:00
17/10 00:00
21/10 00:00
25/10 00:00
29/10 00:00
2/11 00:00
6/11 00:00
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14/11 00:00
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4/12 00:00
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16/12 00:00
20/12 00:00
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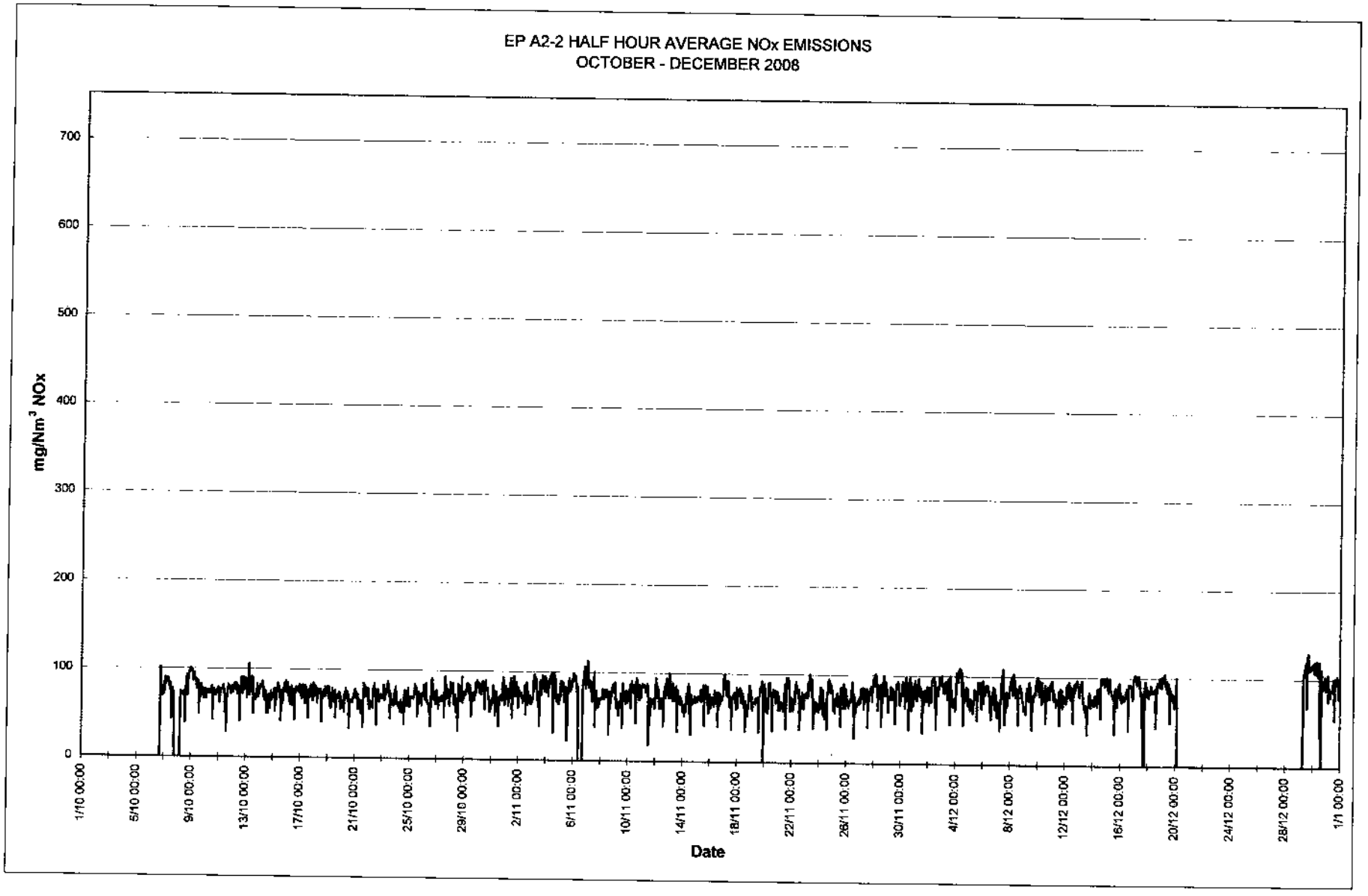
1/1 00:00
Date


EP A2-2 HALF HOUR AVERAGE NOx EMISSIONS
OCTOBER - DECEMBER 2008
mg/Nm3 NOx
700
600
500
400
300
200
100
0
1/10 00:00
5/10 00:00
9/10 00:00
13/10 00:00
17/10 00:00
21/10 00:00
25/10 00:00
29/10 00:00
2/11 00:00
6/11 00:00
10/11 00:00
14/11 00:00
18/11 00:00
22/11 00:00
26/11 00:00
30/11 00:00
4/12 00:00
8/12 00:00
12/12 00:00
16/12 00:00
20/12 00:00
24/12 00:00
28/12 00:00
1/1 00:00
Date

**IPPC REG. NO. P0011-03**

**MSD - Emission Point Reference No.s A3.1 to A3.9, A3.12, A3.13, A3.15, A3.16, A3.19, A3.20 & A3.67**

**Total Particulates**

**PERIOD: OCTOBER, NOVEMBER, DECEMBER 2008**

| EMISSION POINT | LOCATION | MONITORING DATE | MONITORING DURATION | TOTAL PARTICULATES | | PHARMACEUTICAL DUST | |
|---|---|---|---|---|---|---|---|
| | | | | EMISSION LIMIT VALUE | MEASURED EMISSION | EMISSION LIMIT VALUE | MEASURED EMISSION |
| E.P. A3.15 | Fac 03 Drier / Blending rooms HEPA Specific Ventilation & Charge Cubicle Exhausts (EF 102) | 27-Jun-08 | 5.6 hrs | 1 mg/m3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.16 | Fac 03 HEPA Specific Ventilation & Charge Cubi Exhausts BL9801 / BL9811 / BL9812 / BL4130 | 23-Jun-08 | 4.8 hrs | 1 mg/m3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.1 | Rotoclone Mo 9959 (2.5/2.3/Dr726) | 09-Sep-08 | 5.3 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.2 | Rotoclone Mo 9957 (2.6/1.6/g.6) | 17-Sep-08 | 5.5 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.3 | Rotoclone Mo 9958 (2.4/1.4/g.4) | 15-Sep-08 | 5.3 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.6 | Drier 736 Bag Filter Exhaust | 03-Jul-08 | 5.2 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.7 | Hoffman Filter Exhaust PBS 9960 (Bag) | 19-Sep-08 | 2.8 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.17 | U32 Subdivision station - unloading glove box | 05-Sep-08 | 4.6 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.19 | HEPA filters from Flomat charge station | 16-Sep-08 | 5.7 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.4 | Rotoclone Mo 9956 (2.9/1.9/g.9) | 26-Nov-08 | 5.1 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |
| E.P. A3.20 | Thiol Acid Charge Station - cubicle | 27-Nov-08 | 4.5 hrs | 1 mg/Nm3 | <0.1 mg/Nm3 | 0.15 mg/m3 | N/A |

Note:
Emissions from these sources would be expected to be non variable.
Analysis for pharmaceutical dust required where the total particulates content of the emission exceeds 0.15 mg/m3, and where the massflow of total particulates exceeds 1 g/hr.