

Chemical Waste Treatment Centre
Operation Report
Jan 99 - Jun 99

I. INTRODUCTION

This Operation Report is prepared by EPD for the Environment and Planning Committee (EPC) of the Provisional Kwai Tsing District Board. It outlines the activities of the Chemical Waste Treatment Centre (CWTC) and provides a summary of environmental performance of the plant.

The environmental performance summary as shown in Section II of this report covers the result of environmental monitoring from January 99 to June 99.

II. ENVIRONMENTAL PERFORMANCE SUMMARY

Enviropace are required to undertake regular checks on environmental performance of the operation of the plant. These include the following:

- Effluent discharge monitoring
- Stack gas monitoring
- Stabilised residue monitoring

Effluent Discharge

Effluent from the CWTC treatment processes has to meet very strict discharge limits on pollutant concentration. Multiple processes are employed inside the CWTC to treat all liquid wastes to ensure a safe waste management system. Automatic monitoring of pH and temperature are conducted to facilitate immediate warning on any significant change detected in the composition of the effluent, such that prompt corrective response can be effected.

Effluent from the plant is discharged in batches. Each batch is sampled and analyzed, and discharges are permitted only if limits are met. Tables 1 to 6 show the summary of effluent quality from January 99 to June 99. No exceedances in effluent discharge limits were observed.

Stack Gas

Air emissions from the incineration system are closely monitored by a comprehensive management and monitoring programme to ensure that the system is operating safely and in an environmentally acceptable manner.

A continuous monitoring system on key parameters is installed in the incinerator stack to ensure combustion and air pollutant removal processes are functionally well. Furthermore, the incinerator is equipped with an automatic waste feed cut-off system. In the event that the continuous monitoring system picks up any potential sign of exceedance of any of the control parameters, waste feed to the incinerator will be stopped automatically. The result for Stack Gas Monitoring from January 99 to June 99 are attached in Tables 7 to 12 and compliance in all stack gas control parameters has been achieved except the dioxin result for February.

The dioxin result for February (0.4495 ng/m^3 , see Table 8) exceeded the control limit of 0.1 ng/m^3 . This exceedance has been due to the malfunctioning of the activated carbon injection system, which was improperly connected after the shut-down of the incinerator for maintenance from 30 January 99 to 8 February 99. To prevent the recurrence of the incident, EPD has already liaised with the contractor to enhance the monitoring procedures and increase checking frequency.

Stabilised Residue

All solid wastes and process residues at the CWTC are detoxified, chemically stabilized and physically immobilized to an environmentally benign state. Samples of the stabilized materials have to pass a series of analytical tests, proven to be innocuous before being sent to an off-site landfill for final disposal.

The summaries of result for Stabilized Residue from January 99 to June 99 are attached in Tables 13 to 18. All of the test parameters fell within the control limits and no exceedances occurred.

Table 1

Chemical Waste Treatment Centre
Effluent Discharge Summary (January 1999)

Parameters	Control Limits	Result	Mean
pH	6-10	6.9 – 9.3	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 22.65	N/A
Total Phosphate (mg/l)	10	< 2	N/A
Total Sulphate (mg/l)	2000	62.53-1149.13	544.40
Total Sulphides (mg/l)	10	< 1	N/A
Total Cyanide (mg/l)	0.1	< 0.08	N/A
Total Suspended Solids (mg/l)	100	< 52.08	N/A
Oil and Grease (mg/l)	20	< 18.01	N/A
Total Phenols (mg/l)	0.5	< 0.3	N/A
Total Residual Chlorine (mg/l)	1	< 0.6	N/A
Anionic Detergents (mg/l)	15	< 11	N/A
Dissolved TOC (mg/l)	200	< 83	N/A
Temperature (°C)	43	19 – 42	N/A
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	< 0.1	N/A
Barium (mg/l)	5	< 1	
Cadmium (mg/l)	0.1	< 0.1	
Chromium (mg/l)	1	< 0.3	
Copper (mg/l)	2	< 0.73	
Lead (mg/l)	2	< 1	
Manganese (mg/l)	5	< 0.2	
Mercury (mg/l)	0.05	< 0.05	
Nickel (mg/l)	2	< 1	
Silver (mg/l)	2	< 0.4	
Tin (mg/l)	5	< 1	
Zinc (mg/l)	2	< 1	
Total Toxic Metals # (mg/l)	10	< 6.88	
Boron (mg/l)	5	< 3.46	
Iron (mg/l)	10	< 2	N/A

Parameters	Control Limits	Result	Mean
Pesticides :			
Aldrin (mg/l)	0.01	< 0.01	N/A
BHCS (mg/l)	0.01	< 0.01	
DDT (mg/l)	0.01	< 0.01	
Semi-volatile Compounds :			
Benzo (A) Pyrene (mg/l)	0.1	< 0.1	N/A
Volatile Compounds :			
1,1,1-Trichloroethane (mg/l)	0.05	< 0.05	N/A
Polychlorinated Biphenyls :			
Total PCBs (mg/l)	0.003	< 0.003	N/A
Radioactive Substances :			
Gross (pc/l)	10000	< 10000	N/A
Radium-226 (pc/l)	30	< 30	
Strontium-90 (pc/l)	100	< 100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 2

Chemical Waste Treatment Centre
Effluent Discharge Summary (February 1999)

Parameters	Control Limits	Result	Mean
pH	6-10	6.2 - 9.7	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 40.40	N/A
Total Phosphate (mg/l)	10	< 2	N/A
Total Sulphate (mg/l)	2000	133.82-1032	511.06
Total Sulphides (mg/l)	10	< 4.87	N/A
Total Cyanide (mg/l)	0.1	< 0.05	N/A
Total Suspended Solids (mg/l)	100	< 55.8	N/A
Oil and Grease (mg/l)	20	< 19.62	N/A
Total Phenols (mg/l)	0.5	< 0.3	N/A
Total Residual Chlorine (mg/l)	1	< 0.65	N/A
Anionic Detergents (mg/l)	15	< 3	N/A
Dissolved TOC (mg/l)	200	< 176.3	N/A
Temperature (°C)	43	16.6 – 41	N/A
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	< 0.1	N/A
Barium (mg/l)	5	< 1	
Cadmium (mg/l)	0.1	< 0.1	
Chromium (mg/l)	1	< 0.3	
Copper (mg/l)	2	< 1.5	
Lead (mg/l)	2	< 1	
Manganese (mg/l)	5	< 0.2	
Mercury (mg/l)	0.05	< 0.05	
Nickel (mg/l)	2	< 1	
Silver (mg/l)	2	< 0.4	
Tin (mg/l)	5	< 1	
Zinc (mg/l)	2	< 1	
Total Toxic Metals # (mg/l)	10	< 7.65	
Boron (mg/l)	5	< 1.6	
Iron (mg/l)	10	< 2	

Parameters	Control Limits	Result	Mean
Pesticides :			
Aldrin (mg/l)	0.01	< 0.01	N/A
BHCS (mg/l)	0.01	< 0.01	
DDT (mg/l)	0.01	< 0.01	
Semi-volatile Compounds :			
Benzo (A) Pyrene (mg/l)	0.1	< 0.1	N/A
Volatile Compounds :			
1,1,1-Trichloroethane (mg/l)	0.05	< 0.05	N/A
Polychlorinated Biphenyls :			
Total PCBs (mg/l)	0.003	< 0.003	N/A
Radioactive Substances :			
Gross (pc/l)	10000	< 10000	N/A
Radium-226 (pc/l)	30	< 30	
Strontium-90 (pc/l)	100	< 100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 3

Chemical Waste Treatment Centre
Effluent Discharge Summary (March 1999)

Parameters	Control Limits	Result	Mean
pH	6-10	6.8 - 9.4	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 20	N/A
Total Phosphate (mg/l)	10	< 2	N/A
Total Sulphate (mg/l)	2000	54.74-947.7	476.32
Total Sulphides (mg/l)	10	< 1	N/A
Total Cyanide (mg/l)	0.1	< 0.06	N/A
Total Suspended Solids (mg/l)	100	< 30.75	N/A
Oil and Grease (mg/l)	20	< 17.9	N/A
Total Phenols (mg/l)	0.5	< 0.3	N/A
Total Residual Chlorine (mg/l)	1	< 0.6	N/A
Anionic Detergents (mg/l)	15	< 3	N/A
Dissolved TOC (mg/l)	200	18.78-125.93	60.70
Temperature (°C)	43	21.58 – 41	N/A
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	< 0.25	N/A
Barium (mg/l)	5	< 1	
Cadmium (mg/l)	0.1	< 0.1	
Chromium (mg/l)	1	< 0.3	
Copper (mg/l)	2	< 0.66	
Lead (mg/l)	2	< 1.07	
Manganese (mg/l)	5	< 0.2	
Mercury (mg/l)	0.05	< 0.05	
Nickel (mg/l)	2	< 1	
Silver (mg/l)	2	< 0.4	
Tin (mg/l)	5	< 1	
Zinc (mg/l)	2	< 1	
Total Toxic Metals # (mg/l)	10	< 6.83	
Boron (mg/l)	5	< 2.377	
Iron (mg/l)	10	< 2	N/A

Parameters	Control Limits	Result	Mean
Pesticides :			
Aldrin (mg/l)	0.01	< 0.01	N/A
BHCS (mg/l)	0.01	< 0.01	
DDT (mg/l)	0.01	< 0.01	
Semi-volatile Compounds :			
Benzo (A) Pyrene (mg/l)	0.1	< 0.1	N/A
Volatile Compounds :			
1,1,1-Trichloroethane (mg/l)	0.05	< 0.05	N/A
Polychlorinated Biphenyls :			
Total PCBs (mg/l)	0.003	< 0.003	N/A
Radioactive Substances :			
Gross (pc/l)	10000	< 10000	N/A
Radium-226 (pc/l)	30	< 30	
Strontium-90 (pc/l)	100	< 100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 4

Chemical Waste Treatment Centre
Effluent Discharge Summary (April 1999)

Parameters	Control Limits	Result	Mean
pH	6-10	6.6 - 9.5	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 25.84	N/A
Total Phosphate (mg/l)	10	< 2	N/A
Total Sulphate (mg/l)	2000	26.1–890.91	485.95
Total Sulphides (mg/l)	10	< 2.79	N/A
Total Cyanide (mg/l)	0.1	< 0.07	N/A
Total Suspended Solids (mg/l)	100	< 26.63	N/A
Oil and Grease (mg/l)	20	< 15.64	N/A
Total Phenols (mg/l)	0.5	< 0.31	N/A
Total Residual Chlorine (mg/l)	1	< 0.6	N/A
Anionic Detergents (mg/l)	15	< 3	N/A
Dissolved TOC (mg/l)	200	54.52-148.59	94.15
Temperature (°C)	43	28 – 42	N/A
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	< 0.25	N/A
Barium (mg/l)	5	< 1	
Cadmium (mg/l)	0.1	< 0.1	
Chromium (mg/l)	1	< 0.3	
Copper (mg/l)	2	< 0.51	
Lead (mg/l)	2	< 1	
Manganese (mg/l)	5	< 0.2	
Mercury (mg/l)	0.05	< 0.05	
Nickel (mg/l)	2	< 1	
Silver (mg/l)	2	< 0.82	
Tin (mg/l)	5	< 1	
Zinc (mg/l)	2	< 1	
Total Toxic Metals # (mg/l)	10	< 7.1	
Boron (mg/l)	5	< 1.8	
Iron (mg/l)	10	< 2	N/A

Parameters	Control Limits	Result	Mean
Pesticides :			
Aldrin (mg/l)	0.01	< 0.01	N/A
BHCS (mg/l)	0.01	< 0.01	
DDT (mg/l)	0.01	< 0.01	
Semi-volatile Compounds :			
Benzo (A) Pyrene (mg/l)	0.1	< 0.1	N/A
Volatile Compounds :			
1,1,1-Trichloroethane (mg/l)	0.05	< 0.05	N/A
Polychlorinated Biphenyls :			
Total PCBs (mg/l)	0.003	< 0.003	N/A
Radioactive Substances :			
Gross (pc/l)	10000	< 10000	N/A
Radium-226 (pc/l)	30	< 30	
Strontium-90 (pc/l)	100	< 100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 5

Chemical Waste Treatment Centre
Effluent Discharge Summary (May 1999)

Parameters	Control Limits	Result	Mean
pH	6-10	6.6 – 8.9	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 20	N/A
Total Phosphate (mg/l)	10	< 2	N/A
Total Sulphate (mg/l)	2000	280.98-689.90	499.46
Total Sulphides (mg/l)	10	< 1	N/A
Total Cyanide (mg/l)	0.1	< 0.05	N/A
Total Suspended Solids (mg/l)	100	< 30.92	N/A
Oil and Grease (mg/l)	20	< 15	N/A
Total Phenols (mg/l)	0.5	< 0.3	N/A
Total Residual Chlorine (mg/l)	1	< 0.6	N/A
Anionic Detergents (mg/l)	15	< 3	N/A
Dissolved TOC (mg/l)	200	< 113.92	N/A
Temperature (°C)	43	26 – 43	N/A
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	< 0.25	N/A
Barium (mg/l)	5	< 1	
Cadmium (mg/l)	0.1	< 0.1	
Chromium (mg/l)	1	< 0.3	
Copper (mg/l)	2	< 0.88	
Lead (mg/l)	2	< 1	
Manganese (mg/l)	5	< 0.2	
Mercury (mg/l)	0.05	< 0.05	
Nickel (mg/l)	2	< 1	
Silver (mg/l)	2	< 0.53	
Tin (mg/l)	5	< 1	
Zinc (mg/l)	2	< 1	
Total Toxic Metals # (mg/l)	10	< 7.88	
Boron (mg/l)	5	< 2.91	
Iron (mg/l)	10	< 2	

Parameters	Control Limits	Result	Mean
Pesticides :			
Aldrin (mg/l)	0.01	< 0.01	N/A
BHCS (mg/l)	0.01	< 0.01	
DDT (mg/l)	0.01	< 0.01	
Semi-volatile Compounds :			
Benzo (A) Pyrene (mg/l)	0.1	< 0.1	N/A
Volatile Compounds :			
1,1,1-Trichloroethane (mg/l)	0.05	< 0.05	N/A
Polychlorinated Biphenyls :			
Total PCBs (mg/l)	0.003	< 0.003	N/A
Radioactive Substances :			
Gross (pc/l)	10000	< 10000	N/A
Radium-226 (pc/l)	30	< 30	
Strontium-90 (pc/l)	100	< 100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 6

Chemical Waste Treatment Centre
Effluent Discharge Summary (June 1999)

Parameters	Control Limits	Result	Mean
pH	6-10	7.2 – 8.8	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 25.4	N/A
Total Phosphate (mg/l)	10	< 2	N/A
Total Sulphate (mg/l)	2000	438.1-1163.87	856.14
Total Sulphides (mg/l)	10	< 1	N/A
Total Cyanide (mg/l)	0.1	< 0.07	N/A
Total Suspended Solids (mg/l)	100	< 24.25	N/A
Oil and Grease (mg/l)	20	< 17.1	N/A
Total Phenols (mg/l)	0.5	< 0.3	N/A
(mg/l)	1	< 0.6	N/A
Anionic Detergents (mg/l)	15	< 3	N/A
Dissolved TOC (mg/l)	200	28.84-96.77	50.43
Temperature (°C)	43	31-42	N/A
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	< 0.25	N/A
Barium (mg/l)	5	< 1	
Cadmium (mg/l)	0.1	< 0.1	
Chromium (mg/l)	1	< 0.3	
Copper (mg/l)	2	< 0.5	
Lead (mg/l)	2	< 1	
Manganese (mg/l)	5	< 0.2	
Mercury (mg/l)	0.05	< 0.05	
Nickel (mg/l)	2	< 1	
Silver (mg/l)	2	< 0.4	
Tin (mg/l)	5	< 1	
Zinc (mg/l)	2	< 1	
Total Toxic Metals # (mg/l)	10	< 6.8	
Boron (mg/l)	5	1.12-4.16	
Iron (mg/l)	10	< 2	N/A

Parameters	Control Limits	Result	Mean
Pesticides :			
Aldrin (mg/l)	0.01	< 0.01	N/A
BHCS (mg/l)	0.01	< 0.01	
DDT (mg/l)	0.01	< 0.01	
Semi-volatile Compounds :			
Benzo (A) Pyrene (mg/l)	0.1	< 0.1	N/A
Volatile Compounds :			
1,1,1-Trichloroethane (mg/l)	0.05	< 0.05	N/A
Polychlorinated Biphenyls :			
Total PCBs (mg/l)	0.003	< 0.003	N/A
Radioactive Substances :			
Gross (pc/l)	10000	< 10000	N/A
Radium-226 (pc/l)	30	< 30	
Strontium-90 (pc/l)	100	< 100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 7

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (January 1999)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	1.6 – 4.3	2.65
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 3.6	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m ³)	5	1.1 – 1.7	1.3
Acidity (as Sulphuric Acid) (mg/m ³)	100	16.1 – 32.8	23.2
Sulphur Dioxide (mg/m ³)	750	47.5 – 295.1	144.3
Hydrochloric Acid (mg/m ³)	38	11.6 – 23.7	18.2
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.566	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 0.9	N/A
Hydrogen Bromide (mg/m ³)	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.024	N/A
Cadmium (mg/m ³)	3	< 0.048	
Antimony (mg/m ³)	3	< 0.283	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.371	N/A
Copper (mg/m ³)	10	< 0.065	
Arsenic (mg/m ³)	10	< 0.006	
Nickel (mg/m ³)	10	< 0.113	
Chromium (mg/m ³)	10	< 0.048	
Total of Toxic Metals I & II (mg/m ³)	10	< 0.946	N/A
Dioxin (ng/m ³)	0.1	0.0188	N/A

Table 8

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (February 1999)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	1 – 11.6	4.8
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 3.5	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m ³)	5	0.4 – 1.6	0.8
Acidity (as Sulphuric Acid) (mg/m ³)	100	16.8 – 20.8	18.7
Sulphur Dioxide (mg/m ³)	750	76.4 – 105.5	94.6
Hydrochloric Acid (mg/m ³)	38	5.1 – 16.9	10.9
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.540	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 0.8	N/A
Hydrogen Bromide	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.006	N/A
Cadmium (mg/m ³)	3	< 0.045	
Antimony (mg/m ³)	3	< 0.270	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.355	N/A
Copper (mg/m ³)	10	< 0.062	
Arsenic (mg/m ³)	10	< 0.005	
Nickel (mg/m ³)	10	< 0.108	
Chromium (mg/m ³)	10	< 0.045	
Total of Toxic Metals I & II (mg/m ³)	10	< 0.896	N/A
Dioxin (ng/m ³)	0.1	0.0991–0.4495	0.2743

Table 9

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (March 1999)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	< 5.3	N/A
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 4.0	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m ³)	5	0.5 – 1.7	0.93
Acidity (as Sulphuric Acid) (mg/m ³)	100	15.3 – 31.9	22.48
Sulphur Dioxide (mg/m ³)	750	132.4 – 552.9	323.43
Hydrochloric Acid (mg/m ³)	38	< 20.4	N/A
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.588	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 0.9	N/A
Hydrogen Bromide (mg/m ³)	7.5	< 0.9	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.129	N/A
Cadmium (mg/m ³)	3	< 0.050	
Antimony (mg/m ³)	3	< 0.293	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.386	N/A
Copper (mg/m ³)	10	< 0.068	
Arsenic (mg/m ³)	10	< 0.006	
Nickel (mg/m ³)	10	< 0.117	
Chromium (mg/m ³)	10	< 0.050	
Total of Toxic Metals I & II (mg/m ³)	10	< 0.977	N/A
Dioxin (ng/m ³)	0.1	0.0252-0.0476	0.0364

Table 10

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (April 1999)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	2.0 – 4.2	3.23
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 3.5	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m ³)	5	Not detected	N/A
Acidity (as Sulphuric Acid) (mg/m ³)	100	12.6 – 18.1	14.97
Sulphur Dioxide (mg/m ³)	750	315.6 – 491.8	426.13
Hydrochloric Acid (mg/m ³)	38	< 21.6	N/A
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.522	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 0.9	N/A
Hydrogen Bromide (mg/m ³)	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.007	N/A
Cadmium (mg/m ³)	3	< 0.044	
Antimony (mg/m ³)	3	< 0.261	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.341	N/A
Copper (mg/m ³)	10	< 0.060	
Arsenic (mg/m ³)	10	< 0.005	
Nickel (mg/m ³)	10	< 0.104	
Chromium (mg/m ³)	10	< 0.044	
Total of Toxic Metals I & II (mg/m ³)	10	< 0.868	N/A
Dioxin (ng/m ³)	0.1	0.0065	N/A

Table 11

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (May 1999)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	2.3 – 3.4	2.83
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 3.9	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m ³)	5	< 2.2	N/A
Acidity (as Sulphuric Acid) (mg/m ³)	100	13.0 – 26.1	20.53
Sulphur Dioxide (mg/m ³)	750	290.3 – 621.2	427.27
Hydrochloric Acid (mg/m ³)	38	9.2 – 21.1	16.37
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.542	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 0.8	N/A
Hydrogen Bromide (mg/m ³)	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.014	N/A
Cadmium (mg/m ³)	3	< 0.046	
Antimony (mg/m ³)	3	< 0.271	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.355	N/A
Copper (mg/m ³)	10	< 0.063	
Arsenic (mg/m ³)	10	< 0.005	
Nickel (mg/m ³)	10	< 0.108	
Chromium (mg/m ³)	10	< 0.046	
Total of Toxic Metals I & II (mg/m ³)	10	< 0.900	N/A
Dioxin (ng/m ³)	0.1	0.0820	N/A

Table 12

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (June 1999)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	1.3 – 5.6	3.38
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 3.4	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m ³)	5	< 3.6	N/A
Acidity (as Sulphuric Acid) (mg/m ³)	100	4.4 - 25	10.62
Sulphur Dioxide (mg/m ³)	750	16.2 – 286.7	130.88
Hydrochloric Acid (mg/m ³)	38	9.9 – 34.9	18.72
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.539	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 0.8	N/A
Hydrogen Bromide (mg/m ³)	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.116	N/A
Cadmium (mg/m ³)	3	< 0.046	
Antimony (mg/m ³)	3	< 0.269	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.352	N/A
Copper (mg/m ³)	10	< 0.062	
Arsenic (mg/m ³)	10	< 0.005	
Nickel (mg/m ³)	10	< 0.108	
Chromium (mg/m ³)	10	< 0.046	
Total of Toxic Metals I & II (mg/m ³)	10	< 0.951	N/A
Dioxin (ng/m ³)	0.1	0.0561	N/A

Table 13

Chemical Waste Treatment Centre
Stabilised Materials Summary (January 1999)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.08 – 12.97	N/A
% Solids (%)	30 (lower limit)	36.85 - 100	65.8
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 0.5	
Copper (ppm)	-	< 11.01	
Nickel (ppm)	-	< 1.92	
Lead (ppm)	-	< 2.70	
Zinc (ppm)	-	< 3.2	
Total of copper, nickel, lead, zinc (ppm)	25	< 15.91	
Iron (ppm)	20	< 6.2	N/A
Sulphide (ppm)	10	< 5	N/A
Ammoniacal Nitrogen (ppm)	10	< 7.04	N/A
Cyanide (ppm)	5	< 5	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 14

Chemical Waste Treatment Centre
Stabilised Materials Summary (February 1999)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.89–12.91	N/A
% Solids (%)	30 (lower limit)	33.53-98.41	61.6
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 0.5	
Copper (ppm)	-	< 8.7	
Nickel (ppm)	-	< 1.9	
Lead (ppm)	-	< 2.28	
Zinc (ppm)	-	< 13.71	
Total of copper, nickel, lead, zinc (ppm)	25	< 16	
Iron (ppm)	20	< 7.79	N/A
Sulphide (ppm)	10	< 5	N/A
Ammoniacal Nitrogen (ppm)	10	< 4.01	N/A
Cyanide (ppm)	5	< 5	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 15

Chemical Waste Treatment Centre
Stabilised Materials Summary (March 1999)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.31–13.59	N/A
% Solids (%)	30 (lower limit)	44.83-99.84	63.34
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 1.36	
Copper (ppm)	-	< 7.67	
Nickel (ppm)	-	< 2.74	
Lead (ppm)	-	< 8.52	
Zinc (ppm)	-	< 1.84	
Total of copper, nickel, lead, zinc (ppm)	25	< 12.82	
Iron (ppm)	20	< 2.7	N/A
Sulphide (ppm)	10	< 5	N/A
Ammoniacal Nitrogen (ppm)	10	< 9.96	N/A
Cyanide (ppm)	5	< 5	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 26.9	N/A
Total Organic Halides (ppm)	10	< 8.84	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 16

Chemical Waste Treatment Centre
Stabilised Materials Summary (April 1999)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.03-12.89	N/A
% Solids (%)	30 (lower limit)	4.83-92.46	69.06
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.03	
Total Chromium (ppm)	10	< 0.5	
Copper (ppm)	-	< 18.39	
Nickel (ppm)	-	< 0.99	
Lead (ppm)	-	< 4.74	
Zinc (ppm)	-	< 15.58	
Total of copper, nickel, lead, zinc (ppm)	25	< 23.31	
Iron (ppm)	20	< 2.47	N/A
Sulphide (ppm)	10	< 5	N/A
Ammoniacal Nitrogen (ppm)	10	< 7.74	N/A
Cyanide (ppm)	5	< 5	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 17

Chemical Waste Treatment Centre
Stabilised Materials Summary (May 1999)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.09-12.89	N/A
% Solids (%)	30 (lower limit)	51.51-92.31	66.87
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.097	
Total Chromium (ppm)	10	< 0.7	
Copper (ppm)	-	< 9.57	
Nickel (ppm)	-	< 7.33	
Lead (ppm)	-	< 18.6	
Zinc (ppm)	-	< 1.31	
Total of copper, nickel, lead, zinc (ppm)	25	< 24.5	
Iron (ppm)	20	< 1.01	N/A
Sulphide (ppm)	10	< 5	N/A
Ammoniacal Nitrogen (ppm)	10	< 3.55	N/A
Cyanide (ppm)	5	< 5	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 18

Chemical Waste Treatment Centre
Stabilised Materials Summary (June 1999)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.57-12.58	N/A
% Solids (%)	30 (lower limit)	46.92-88.49	63.98
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 0.5	
Copper (ppm)	-	< 14.29	
Nickel (ppm)	-	< 4.39	
Lead (ppm)	-	< 1	
Zinc (ppm)	-	< 6.38	
Total of copper, nickel, lead, zinc (ppm)	25	< 23.65	
Iron (ppm)	20	< 2.99	N/A
Sulphide (ppm)	10	< 5	N/A
Ammoniacal Nitrogen (ppm)	10	< 4.67	N/A
Cyanide (ppm)	5	< 5	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A