

Chemical Waste Treatment Centre
Monitoring Report
Jul 98 - Dec 98

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 July 98 to December 98.

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 July 98 to December 98. 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 July 98 to December 98 are attached in Tables 7 to 12 and compliance in all stack gas control parameters has been achieved except the dioxin result for November.

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 July 98 to December 98 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 (July 1998)

Parameters	Control Limits	Result	Mean
pH	6-10 pH	7.0 - 9.7	N/A
Total Kjeldahl Nitrogen	100 mg/1	< 28.08 mg/1	N/A
Total Phosphate	10 mg/1	< 2 mg/1	N/A
Total Sulphate	2000 mg/1	101.9-1085 mg/1	596.9 mg/1
Total Sulphides	10 mg/1	< 1.32 mg/1	N/A
Total Cyanide	0.1 mg/1	< 0.09 mg/1	N/A
Total Suspended Solids	100 mg/1	< 74 mg/1	N/A
Oil and Grease	20 mg/1	< 15.9 mg/1	N/A
Total Phenols	0.5 mg/1	< 0.37 mg/1	N/A
Total Residual Chlorine	1 mg/1	< 0.6 mg/1	N/A
Anionic Detergents	15 mg/1	< 3 mg/1	N/A
Dissolved TOC	200 mg/1	< 80 mg/1	N/A
Temperature	43	27.5 – 41	N/A
Floatable Substances	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic	2 mg/1	< 0.1 mg/1	N/A
Barium	5 mg/1	< 1 mg/1	
Cadmium	0.1 mg/1	< 0.1 mg/1	
Chromium	1 mg/1	< 0.3 mg/1	
Copper	2 mg/1	< 0.57 mg/1	
Lead	2 mg/1	< 1 mg/1	
Manganese	5 mg/1	< 0.2 mg/1	
Mercury	0.05 mg/1	< 0.05 mg/1	
Nickel	2 mg/1	< 1 mg/1	
Silver	2 mg/1	< 0.4 mg/1	
Tin	5 mg/1	< 1 mg/1	
Zinc	2 mg/1	< 1 mg/1	
Total Toxic Metals #	10 mg/1	< 6.72 mg/1	
Boron	5 mg/1	< 2.13 mg/1	
Iron	10 mg/1	< 2 mg/1	N/A

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

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 (August 1998)

Parameters	Control Limits	Result	Mean
pH	6-10 pH	7.2 - 9.5	N/A
Total Kjeldahl Nitrogen	100 mg/1	< 20 mg/1	N/A
Total Phosphate	10 mg/1	< 2 mg/1	N/A
Total Sulphate	2000 mg/1	45.25-955.3 mg/1	529.12 mg/1
Total Sulphides	10 mg/1	< 5 mg/1	N/A
Total Cyanide	0.1 mg/1	< 0.04 mg/1	N/A
Total Suspended Solids	100 mg/1	< 75 mg/1	N/A
Oil and Grease	20 mg/1	< 17.09 mg/1	N/A
Total Phenols	0.5 mg/1	< 0.3 mg/1	N/A
Total Residual Chlorine	1 mg/1	< 0.6 mg/1	N/A
Anionic Detergents	15 mg/1	< 3 mg/1	N/A
Dissolved TOC	200 mg/1	< 80 mg/1	N/A
Temperature	43	30 – 41	N/A
Floatable Substances	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic	2 mg/1	< 0.1 mg/1	N/A
Barium	5 mg/1	< 1 mg/1	
Cadmium	0.1 mg/1	< 0.1 mg/1	
Chromium	1 mg/1	< 0.3 mg/1	
Copper	2 mg/1	< 0.7 mg/1	
Lead	2 mg/1	< 1 mg/1	
Manganese	5 mg/1	< 0.2 mg/1	
Mercury	0.05 mg/1	< 0.05 mg/1	
Nickel	2 mg/1	< 1 mg/1	
Silver	2 mg/1	< 0.4 mg/1	
Tin	5 mg/1	< 1 mg/1	
Zinc	2 mg/1	< 1.36 mg/1	
Total Toxic Metals #	10 mg/1	< 6.88 mg/1	
Boron	5 mg/1	< 1 mg/1	
Iron	10 mg/1	< 2 mg/1	N/A

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

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 (September 1998)

Parameters	Control Limits	Result	Mean
pH	6-10 pH	6.2 - 9.6	N/A
Total Kjeldahl Nitrogen	100 mg/1	< 20 mg/1	N/A
Total Phosphate	10 mg/1	< 2 mg/1	N/A
Total Sulphate	2000 mg/1	186.05-1008.02mg/1	632.54 mg/1
Total Sulphides	10 mg/1	< 1 mg/1	N/A
Total Cyanide	0.1 mg/1	< 0.03 mg/1	N/A
Total Suspended Solids	100 mg/1	< 78 mg/1	N/A
Oil and Grease	20 mg/1	< 15 mg/1	N/A
Total Phenols	0.5 mg/1	< 0.3 mg/1	N/A
Total Residual Chlorine	1 mg/1	< 1.0 mg/1	N/A
Anionic Detergents	15 mg/1	< 3 mg/1	N/A
Dissolved TOC	200 mg/1	< 80 mg/1	N/A
Temperature	43	28 – 42	N/A
Floatable Substances	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic	2 mg/1	< 0.1 mg/1	N/A
Barium	5 mg/1	< 1 mg/1	
Cadmium	0.1 mg/1	< 0.1 mg/1	
Chromium	1 mg/1	< 0.4 mg/1	
Copper	2 mg/1	< 0.7 mg/1	
Lead	2 mg/1	< 1 mg/1	
Manganese	5 mg/1	< 0.2 mg/1	
Mercury	0.05 mg/1	< 0.05 mg/1	
Nickel	2 mg/1	< 1 mg/1	
Silver	2 mg/1	< 0.4 mg/1	
Tin	5 mg/1	< 1 mg/1	
Zinc	2 mg/1	< 1 mg/1	
Total Toxic Metals #	10 mg/1	< 6.78 mg/1	
Boron	5 mg/1	< 1 mg/1	
Iron	10 mg/1	< 2 mg/1	N/A

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

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 (October 1998)

Parameters	Control Limits	Result	Mean
pH	6-10 pH	7.3 - 9.3	N/A
Total Kjeldahl Nitrogen	100 mg/1	< 26.51 mg/1	N/A
Total Phosphate	10 mg/1	< 2 mg/1	N/A
Total Sulphate	2000 mg/1	60.9-1053 mg/1	491.16 mg/1
Total Sulphides	10 mg/1	< 1 mg/1	N/A
Total Cyanide	0.1 mg/1	< 0.03 mg/1	N/A
Total Suspended Solids	100 mg/1	< 61.88 mg/1	N/A
Oil and Grease	20 mg/1	< 15.29 mg/1	N/A
Total Phenols	0.5 mg/1	< 0.31 mg/1	N/A
Total Residual Chlorine	1 mg/1	< 0.6 mg/1	N/A
Anionic Detergents	15 mg/1	< 3 mg/1	N/A
Dissolved TOC	200 mg/1	< 80 mg/1	N/A
Temperature	43	27.4-41	N/A
Floatable Substances	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic	2 mg/1	< 0.1 mg/1	N/A
Barium	5 mg/1	< 1 mg/1	
Cadmium	0.1 mg/1	< 0.1 mg/1	
Chromium	1 mg/1	< 0.3 mg/1	
Copper	2 mg/1	< 0.5 mg/1	
Lead	2 mg/1	< 1 mg/1	
Manganese	5 mg/1	< 0.2 mg/1	
Mercury	0.05 mg/1	< 0.05 mg/1	
Nickel	2 mg/1	< 1 mg/1	
Silver	2 mg/1	< 0.4 mg/1	
Tin	5 mg/1	< 1 mg/1	
Zinc	2 mg/1	< 1 mg/1	
Total Toxic Metals #	10 mg/1	< 6.88 mg/1	
Boron	5 mg/1	< 1 mg/1	
Iron	10 mg/1	< 2 mg/1	N/A

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

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 (November 1998)

Parameters	Control Limits	Result	Mean
pH	6-10 pH	6.4 - 9.5	N/A
Total Kjeldahl Nitrogen	100 mg/1	< 31.24 mg/1	N/A
Total Phosphate	10 mg/1	< 2 mg/1	N/A
Total Sulphate	2000 mg/1	88.8-1189.12 mg/1	650.38 mg/1
Total Sulphides	10 mg/1	< 1 mg/1	N/A
Total Cyanide	0.1 mg/1	< 0.1 mg/1	N/A
Total Suspended Solids	100 mg/1	< 95.29 mg/1	N/A
Oil and Grease	20 mg/1	< 16.46 mg/1	N/A
Total Phenols	0.5 mg/1	< 0.3 mg/1	N/A
Total Residual Chlorine	1 mg/1	< 0.6 mg/1	N/A
Anionic Detergents	15 mg/1	< 3 mg/1	N/A
Dissolved TOC	200 mg/1	< 80 mg/1	N/A
Temperature	43	24.5 – 41	N/A
Floatable Substances	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic	2 mg/1	< 0.1 mg/1	N/A
Barium	5 mg/1	< 1 mg/1	
Cadmium	0.1 mg/1	< 0.1 mg/1	
Chromium	1 mg/1	< 0.3 mg/1	
Copper	2 mg/1	< 1.02 mg/1	
Lead	2 mg/1	< 1 mg/1	
Manganese	5 mg/1	< 0.2 mg/1	
Mercury	0.05 mg/1	< 0.05 mg/1	
Nickel	2 mg/1	< 1 mg/1	
Silver	2 mg/1	< 0.4 mg/1	
Tin	5 mg/1	< 1 mg/1	
Zinc	2 mg/1	< 1 mg/1	
Total Toxic Metals #	10 mg/1	< 8.12 mg/1	
Boron	5 mg/1	< 2.62 mg/1	
Iron	10 mg/1	< 2 mg/1	N/A

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

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 (December 1998)

Parameters	Control Limits	Result	Mean
pH	6-10 pH	6.8 - 9.8	N/A
Total Kjeldahl Nitrogen	100 mg/1	< 47.06 mg/1	N/A
Total Phosphate	10 mg/1	< 2 mg/1	N/A
Total Sulphate	2000 mg/1	51.79-1138.47 mg/1	444.82 mg/1
Total Sulphides	10 mg/1	< 1 mg/1	N/A
Total Cyanide	0.1 mg/1	< 0.05 mg/1	N/A
Total Suspended Solids	100 mg/1	< 51.53 mg/1	N/A
Oil and Grease	20 mg/1	< 15.33 mg/1	N/A
Total Phenols	0.5 mg/1	< 0.3 mg/1	N/A
Total Residual Chlorine	1 mg/1	< 0.6 mg/1	N/A
Anionic Detergents	15 mg/1	< 3 mg/1	N/A
Dissolved TOC	200 mg/1	< 96.8 mg/1	N/A
Temperature	43	25-41	N/A
Floatable Substances	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic	2 mg/1	< 0.1 mg/1	N/A
Barium	5 mg/1	< 1 mg/1	
Cadmium	0.1 mg/1	< 0.1 mg/1	
Chromium	1 mg/1	< 0.3 mg/1	
Copper	2 mg/1	< 1.13 mg/1	
Lead	2 mg/1	< 1 mg/1	
Manganese	5 mg/1	< 0.2 mg/1	
Mercury	0.05 mg/1	< 0.05 mg/1	
Nickel	2 mg/1	< 1 mg/1	
Silver	2 mg/1	< 0.4 mg/1	
Tin	5 mg/1	< 1 mg/1	
Zinc	2 mg/1	< 1 mg/1	
Total Toxic Metals #	10 mg/1	< 7 mg/1	
Boron	5 mg/1	< 3.87 mg/1	
Iron	10 mg/1	< 2 mg/1	N/A

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

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 (July 1998)

Parameters	Control Limits (mg/m ³)	Result (mg/m ³)	Mean (mg/m ³)
Particulates	75	4.9 – 20	11.9
Chlorine and Compounds (as Cl ₂)	100	< 2.8	N/A
Fluorine and Compounds (as HF)	25	< 0.3	N/A
Hydrogen Sulphide	5	0.5	N/A
Acidity (as Sulphuric Acid)	100	< 6.2	N/A
Sulphur Dioxide	750	< 115	N/A
Hydrochloric Acid	38	11.4-14.3	9.7
Total Phosphorus (as P)	7.5	< 0.51	N/A
Hydrogen Fluoride	7.5	< 0.9	N/A
Hydrogen Bromide	7.5	< 0.9	N/A
Toxic Metals I :			
Mercury	3	< 0.032	N/A
Cadmium	3	< 0.043	
Antimony	3	< 0.432	
Toxic Metals II :			
Lead	10	< 0.510	N/A
Copper	10	< 0.059	
Arsenic	10	< 0.005	
Nickel	10	< 0.102	
Chromium	10	< 0.043	
Total of Toxic Metals I & II	10	< 1.223	N/A
Dioxin (Monthly)	0.1 ng/m ³	< 0.0128 ng/m ³	N/A

Table 8

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (August 1998)

Parameters	Control Limits (mg/m ³)	Result (mg/m ³)	Mean (mg/m ³)
Particulates	75	7 - 10.2	8.5
Chlorine and Compounds (as Cl ₂)	100	< 2.7	N/A
Fluorine and Compounds (as HF)	25	< 0.3	N/A
Hydrogen Sulphide	5	Not detected	N/A
Acidity (as Sulphuric Acid)	100	< 11.4	N/A
Sulphur Dioxide	750	< 274.5	N/A
Hydrochloric Acid	38	5 – 16.9	10.3
Total Phosphorus (as P)	7.5	< 0.55	N/A
Hydrogen Fluoride	7.5	< 0.9	N/A
Hydrogen Bromide	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury	3	< 0.056	N/A
Cadmium	3	< 0.046	
Antimony	3	< 0.465	
Toxic Metals II :			
Lead	10	< 0.549	N/A
Copper	10	< 0.063	
Arsenic	10	< 0.005	
Nickel	10	< 0.110	
Chromium	10	< 0.046	
Total of Toxic Metals I & II	10	< 1.292	N/A
Dioxin (Monthly)	0.1 ng/m ³	Note (1)	N/A

Note: (1) The sample collected on 27 Aug 1998 was void.

Table 9

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (September 1998)

Parameters	Control Limits (mg/m ³)	Result (mg/m ³)	Mean (mg/m ³)
Particulates	75	5.1 – 29.1	25.6
Chlorine and Compounds (as Cl ₂)	100	< 3.6	N/A
Fluorine and Compounds (as HF)	25	< 0.4	N/A
Hydrogen Sulphide	5	0.3 – 1	0.57
Acidity (as Sulphuric Acid)	100	7 – 9.2	8.2
Sulphur Dioxide	750	< 27.3	N/A
Hydrochloric Acid	38	< 28.8	N/A
Total Phosphorus (as P)	7.5	< 0.53	N/A
Hydrogen Fluoride	7.5	< 0.9	N/A
Hydrogen Bromide	7.5	< 3.7	N/A
Toxic Metals I :			
Mercury	3	< 0.009	N/A
Cadmium	3	< 0.045	
Antimony	3	< 0.447	
Toxic Metals II :			
Lead	10	< 0.528	N/A
Copper	10	< 0.061	
Arsenic	10	< 0.005	
Nickel	10	< 0.106	
Chromium	10	< 0.045	
Total of Toxic Metals I & II	10	< 1.245	N/A
Dioxin (Monthly)	0.1 ng/m ³	0.009 ng/m ³	N/A

Table 10

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (October 1998)

Parameters	Control Limits (mg/m ³)	Result (mg/m ³)	Mean (mg/m ³)
Particulates	75	4.2 – 12.8	8.5
Chlorine and Compounds (as Cl ₂)	100	< 3.0	N/A
Fluorine and Compounds (as HF)	25	< 0.3	N/A
Hydrogen Sulphide	5	< 1.7	N/A
Acidity (as Sulphuric Acid)	100	< 8.9	N/A
Sulphur Dioxide	750	< 197.7	N/A
Hydrochloric Acid	38	13.8	N/A
Total Phosphorus (as P)	7.5	< 0.606	N/A
Hydrogen Fluoride	7.5	< 0.7	N/A
Hydrogen Bromide	7.5	< 0.7	N/A
Toxic Metals I :			
Mercury	3	< 0.008	N/A
Cadmium	3	< 0.051	
Antimony	3	< 0.513	
Toxic Metals II :			
Lead	10	< 0.606	N/A
Copper	10	< 0.070	
Arsenic	10	< 0.006	
Nickel	10	< 0.121	
Chromium	10	< 0.051	
Total of Toxic Metals I & II	10	< 1.427	N/A
Dioxin (Monthly)	0.1 ng/m ³	0.0027 ng/m ³	N/A

Table 11

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (November 1998)

Parameters	Control Limits (mg/m ³)	Result (mg/m ³)	Mean (mg/m ³)
Particulates	75	5.4 - 6.4	6
Chlorine and Compounds (as Cl ₂)	100	< 3.0	N/A
Fluorine and Compounds (as HF)	25	< 0.3	N/A
Hydrogen Sulphide	5	1 - 2.1	1.7
Acidity (as Sulphuric Acid)	100	2.9 – 9.3	7
Sulphur Dioxide	750	< 580.8	N/A
Hydrochloric Acid	38	7.2 – 21.4	12.5
Total Phosphorus (as P)	7.5	< 0.501	N/A
Hydrogen Fluoride	7.5	< 0.8	N/A
Hydrogen Bromide	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury	3	< 0.008	N/A
Cadmium	3	< 0.042	
Antimony	3	< 0.414	
Toxic Metals II :			
Lead	10	< 0.491	N/A
Copper	10	< 0.058	
Arsenic	10	< 0.005	
Nickel	10	< 0.100	
Chromium	10	< 0.042	
Total of Toxic Metals I & II	10	< 1.153	N/A
Dioxin (Monthly)	0.1 ng/m ³	0.2142 ng/m ³	N/A

Table 12

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (December 1998)

Parameters	Control Limits (mg/m ³)	Result (mg/m ³)	Mean (mg/m ³)
Particulates	75	1.6 – 10.9	4.9
Chlorine and Compounds (as Cl ₂)	100	< 3.3	N/A
Fluorine and Compounds (as HF)	25	< 0.4	N/A
Hydrogen Sulphide	5	0.3 – 0.9	0.6
Acidity (as Sulphuric Acid)	100	6.6 – 23.1	12.2
Sulphur Dioxide	750	155.9 – 606.9	291.2
Hydrochloric Acid	38	13.3 – 24.2	19.7
Total Phosphorus (as P)	7.5	< 0.536	N/A
Hydrogen Fluoride	7.5	< 0.9	N/A
Hydrogen Bromide	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury	3	< 0.016	N/A
Cadmium	3	< 0.045	
Antimony	3	< 0.268	
Toxic Metals II :			
Lead	10	< 0.351	N/A
Copper	10	< 0.062	
Arsenic	10	< 0.005	
Nickel	10	< 0.107	
Chromium	10	< 0.045	
Total of Toxic Metals I & II	10	< 1.303	N/A
Dioxin (Monthly)	0.1 ng/m ³	0.0057 – 0.0355 ng/m ³	0.0158 ng/m ³

Table 13

Chemical Waste Treatment Centre
Stabilised Materials Summary (July 1998)

Parameters	Control Limits (ppm)	Result (ppm)	Mean (ppm)
Section A			
pH (water)	8 (lower limit)	11.24-12.92	N/A
% Solids	30 (lower limit)	50.85 – 100	82.92
Toxic Metals :			
Cadmium	0.5	< 0.5	N/A
Mercury	0.1	< 0.05	
Total Chromium	10	< 0.9	
Copper	-	< 8.25	
Nickel	-	< 1.52	
Lead	-	< 9.88	
Zinc	-	< 2.14	
Total of copper, nickel, lead, zinc	25	< 18.33	
Iron	20	< 1.6	N/A
Sulphide	10	< 5	N/A
Ammoniacal Nitrogen	10	< 3.27	N/A
Cyanide	5	< 5	N/A
Section B			
Volatile Organic Contents	5000	< 15	N/A
Total Organic Halides	10	< 2.02	N/A
Total Chloro Phenols	2	< 2	N/A
Polychlorinated Biphenyls	1	< 1	N/A
TCDD equivalent (ITEF method)	1 ppb	< 1 ppb	N/A

Chemical Waste Treatment Centre
Stabilised Materials Summary (August 1998)

Parameters	Control Limits (ppm)	Result (ppm)	Mean (ppm)
Section A			
pH (water)	8 (lower limit)	11.06-12.92	N/A
% Solids	30 (lower limit)	40.7-97.78	76.08
Toxic Metals :			
Cadmium	0.5	< 0.5	N/A
Mercury	0.1	< 0.02	
Total Chromium	10	< 3.14	
Copper	-	< 5.79	
Nickel	-	< 0.79	
Lead	-	< 6.63	
Zinc	-	< 0.52	
Total of copper, nickel, lead, zinc	25	< 23.19	
Iron	20	< 2.15	N/A
Sulphide	10	< 5	N/A
Ammoniacal Nitrogen	10	< 2.81	N/A
Cyanide	5	< 5	N/A
Section B			
Volatile Organic Contents	5000	< 15	N/A
Total Organic Halides	10	< 2	N/A
Total Chloro Phenols	2	< 2	N/A
Polychlorinated Biphenyls	1	< 1	N/A
TCDD equivalent (ITEF method)	1 ppb	< 1 ppb	N/A

Table 15

Chemical Waste Treatment Centre
Stabilised Materials Summary (September 1998)

Parameters	Control Limits (ppm)	Result (ppm)	Mean (ppm)
Section A			
pH (water)	8 (lower limit)	11.31-12.83	N/A
% Solids	30 (lower limit)	50.63-92.22	75.56
Toxic Metals :			
Cadmium	0.5	< 0.5	N/A
Mercury	0.1	< 0.02	
Total Chromium	10	< 0.62	
Copper	-	< 5.99	
Nickel	-	< 0.5	
Lead	-	< 4.1	
Zinc	-	< 0.5	
Total of copper, nickel, lead, zinc	25	< 7.99	
Iron	20	< 1.64	N/A
Sulphide	10	< 5	N/A
Ammoniacal Nitrogen	10	< 6.77	N/A
Cyanide	5	< 5	N/A
Section B			
Volatile Organic Contents	5000	< 15	N/A
Total Organic Halides	10	< 2	N/A
Total Chloro Phenols	2	< 2	N/A
Polychlorinated Biphenyls	1	< 1	N/A
TCDD equivalent (ITEF method)	1 ppb	< 1 ppb	N/A

Table 16

Chemical Waste Treatment Centre
Stabilised Materials Summary (October 1998)

Parameters	Control Limits (ppm)	Result (ppm)	Mean (ppm)
Section A			
pH (water)	8 (lower limit)	9.35-12.9	N/A
% Solids	30 (lower limit)	36.48-100	75.44
Toxic Metals :			
Cadmium	0.5	< 0.5	N/A
Mercury	0.1	< 0.02	
Total Chromium	10	< 0.98	
Copper	-	< 7.48	
Nickel	-	< 0.73	
Lead	-	< 22.4	
Zinc	-	< 2.36	
Total of copper, nickel, lead, zinc	25	< 23.9	
Iron	20	< 7.46	N/A
Sulphide	10	< 5	N/A
Ammoniacal Nitrogen	10	< 5.17	N/A
Cyanide	5	< 5	N/A
Section B			
Volatile Organic Contents	5000	< 15	N/A
Total Organic Halides	10	< 2	N/A
Total Chloro Phenols	2	< 2	N/A
Polychlorinated Biphenyls	1	< 1	N/A
TCDD equivalent (ITEF method)	1 ppb	< 1 ppb	N/A

Table 17

Chemical Waste Treatment Centre
Stabilised Materials Summary (November 1998)

Parameters	Control Limits (ppm)	Result (ppm)	Mean (ppm)
Section A			
pH (water)	8 (lower limit)	10.58-12.83	N/A
% Solids	30 (lower limit)	48.54-96.77	72.43
Toxic Metals :			
Cadmium	0.5	< 0.5	N/A
Mercury	0.1	< 0.02	
Total Chromium	10	< 0.5	
Copper	-	< 20.03	
Nickel	-	< 1.99	
Lead	-	< 2.04	
Zinc	-	< 16.59	
Total of copper, nickel, lead, zinc	25	< 24.39	
Iron	20	< 17.95	N/A
Sulphide	10	< 5	N/A
Ammoniacal Nitrogen	10	< 8.01	N/A
Cyanide	5	< 5	N/A
Section B			
Volatile Organic Contents	5000	< 15	N/A
Total Organic Halides	10	< 2	N/A
Total Chloro Phenols	2	< 2	N/A
Polychlorinated Biphenyls	1	< 1	N/A
TCDD equivalent (ITEF method)	1 ppb	< 1 ppb	N/A

Chemical Waste Treatment Centre
Stabilised Materials Summary (December 1998)

Parameters	Control Limits (ppm)	Result (ppm)	Mean (ppm)
Section A			
pH (water)	8 (lower limit)	10.85-13.37	N/A
% Solids	30 (lower limit)	54.95-95.56	71.39
Toxic Metals :			
Cadmium	0.5	< 0.5	N/A
Mercury	0.1	< 0.04	
Total Chromium	10	< 0.98	
Copper	-	< 19.89	
Nickel	-	< 2.98	
Lead	-	< 7	
Zinc	-	< 4.92	
Total of copper, nickel, lead, zinc	25	< 24.19	
Iron	20	< 18.27	N/A
Sulphide	10	< 5	N/A
Ammoniacal Nitrogen	10	< 7.95	N/A
Cyanide	5	< 5	N/A
Section B			
Volatile Organic Contents	5000	< 15	N/A
Total Organic Halides	10	< 2	N/A
Total Chloro Phenols	2	< 2	N/A
Polychlorinated Biphenyls	1	< 1	N/A
TCDD equivalent (ITEF method)	1 ppb	< 1 ppb	N/A