

Chemical Waste Treatment Centre
Monitoring Report
Jan 02 - Mar 02

I. INTRODUCTION

This Operation Report is prepared by EPD for the Planning and Environmental Protection Committee of the Kwai Tsing District Council. 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 2002 to March 2002.

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 statutory and contractual discharge limits on pollutant concentration. Multiple processes are employed inside the CWTC to treat all liquid wastes to ensure a safe waste management system. These would 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 3 show the summary of effluent quality from January 2002 to March 2002. 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 2002 to March 2002 are attached in Tables 4 to 6 and compliance in all stack gas control parameters has been achieved.

Stabilised Residue

All 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 2002 to March 2002 are attached in Tables 7 to 9. All of the test parameters fell within the control limits and no exceedances occurred.

Table 1

Chemical Waste Treatment Centre
Effluent Discharge Summary (January 2002)

Parameters	Control Limits	Result	Mean
pH	6-10	6.1 – 9.1	N/A
Total Kjeldahl Nitrogen	100	< 20.0	N/A
Total Phosphate (mg/l)	10	< 1	N/A
Total Sulphate (mg/l)	2000	633.20 – 1,716.22	997.43
Total Sulphides (mg/l)	10	< 0.502	N/A
Total Cyanide (mg/l)	0.1	< 0.03	N/A
Total Suspended Solids (mg/l)	100	< 27.11	N/A
Oil and Grease (mg/l)	20	< 15.0	N/A
Total Phenols (mg/l)	0.5	< 0.304	N/A
Total Residual Chlorine (mg/l)	1	< 0.6	N/A
Anionic Detergents (mg/l)	15	< 2	N/A
Dissolved TOC (mg/l)	200	36.22 – 182.40	120.27
Temperature (°C)	43	24 – 35	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	< 3.306	
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 2002)

Parameters	Control Limits	Result	Mean
pH	6-10	6.9 – 9.1	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 42.19	N/A
Total Phosphate (mg/l)	10	< 1	N/A
Total Sulphate (mg/l)	2000	306.25 – 1,304.85	748.47
Total Sulphides (mg/l)	10	< 1.14	N/A
Total Cyanide (mg/l)	0.1	< 0.04	N/A
Total Suspended Solids (mg/l)	100	< 36.64	N/A
Oil and Grease (mg/l)	20	< 15.64	N/A
Total Phenols (mg/l)	0.5	< 0.3	N/A
Total Residual Chlorine (mg/l)	1	< 0.73	N/A
Anionic Detergents (mg/l)	15	< 2	N/A
Dissolved TOC (mg/l)	200	29.39 – 120.82	64.10
Temperature (°C)	43	21.9 – 37	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	< 0.86	
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	< 7.16	
Boron (mg/l)	5	< 1.3	
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 2002)

Parameters	Control Limits	Result	Mean
pH	6-10	7.0 – 9.1	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 36.37	N/A
Total Phosphate (mg/l)	10	< 1	N/A
Total Sulphate (mg/l)	2000	505.48 – 1,397.30	962.17
Total Sulphides (mg/l)	10	< 0.5	N/A
Total Cyanide (mg/l)	0.1	< 0.05	N/A
Total Suspended Solids (mg/l)	100	< 59.22	N/A
Oil and Grease (mg/l)	20	< 18.83	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	< 2	N/A
Dissolved TOC (mg/l)	200	26.99 – 130.26	72.83
Temperature (°C)	43	28 – 36	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	< 1.65	
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	< 7.95	
Boron (mg/l)	5	< 1.88	
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 4

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (January 2002)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	0.8 – 2.5	1.5
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	0.5	0.5
Acidity (as Sulphuric Acid) (mg/m ³)	100	3.3 – 95.9	28.3
Sulphur Dioxide (mg/m ³)	750	< 176.0	N/A
Hydrochloric Acid (mg/m ³)	38	< 5.3	N/A
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	< 0.007	N/A
Cadmium (mg/m ³)	3	< 0.048	
Antimony (mg/m ³)	3	< 0.476	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.566	N/A
Copper (mg/m ³)	10	< 0.066	
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	< 1.328	N/A
Dioxin (ng/m ³)	0.1	0.0014	N/A

Table 5

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (February 2002)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	1.6 – 2.3	1.9
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	1.2 – 1.6	1.4
Acidity (as Sulphuric Acid) (mg/m ³)	100	7.2 – 19.5	11.9
Sulphur Dioxide (mg/m ³)	750	64.5 – 579.9	302.6
Hydrochloric Acid (mg/m ³)	38	< 4.4	N/A
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.622	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	< 0.007	N/A
Cadmium (mg/m ³)	3	< 0.053	
Antimony (mg/m ³)	3	< 0.525	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.622	N/A
Copper (mg/m ³)	10	< 0.072	
Arsenic (mg/m ³)	10	< 0.006	
Nickel (mg/m ³)	10	< 0.126	
Chromium (mg/m ³)	10	< 0.053	
Total of Toxic Metals I & II (mg/m ³)	10	< 1.463	N/A
Dioxin (ng/m ³)	0.1	0.0085	N/A

Table 6

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (March 2002)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	0.9 – 1.6	1.2
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	Not detected	N/A
Acidity (as Sulphuric Acid) (mg/m ³)	100	4.4 – 10.9	8.125
Sulphur Dioxide (mg/m ³)	750	36.2 – 172.9	86.8
Hydrochloric Acid (mg/m ³)	38	< 4.7	N/A
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.613	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 1.0	N/A
Hydrogen Bromide (mg/m ³)	7.5	< 0.9	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.008	N/A
Cadmium (mg/m ³)	3	< 0.052	
Antimony (mg/m ³)	3	< 0.517	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.613	N/A
Copper (mg/m ³)	10	< 0.071	
Arsenic (mg/m ³)	10	< 0.006	
Nickel (mg/m ³)	10	< 0.123	
Chromium (mg/m ³)	10	< 0.052	
Total of Toxic Metals I & II (mg/m ³)	10	< 1.440	N/A
Dioxin (ng/m ³)	0.1	0.0088	N/A

Table 7

Chemical Waste Treatment Centre
Stabilised Materials Summary (January 2002)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.75 – 12.85	N/A
% Solids (%)	30 (lower limit)	42.97 – 90.75	65.27
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 0.5	
Copper (ppm)	-	< 5.632	
Nickel (ppm)	-	< 0.5	
Lead (ppm)	-	< 8.106	
Zinc (ppm)	-	< 13.377	
Total of copper, nickel, lead, zinc (ppm)	25	< 16.471	
Iron (ppm)	20	< 1	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 8.11	N/A
Cyanide (ppm)	5	< 1	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2.313	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 8

Chemical Waste Treatment Centre
Stabilised Materials Summary (February 2002)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.53 –12.86	N/A
% Solids (%)	30 (lower limit)	47.26 – 99.25	65.41
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 0.5	
Copper (ppm)	-	< 8.089	
Nickel (ppm)	-	< 3.77	
Lead (ppm)	-	< 6.661	
Zinc (ppm)	-	< 9.713	
Total of copper, nickel, lead, zinc (ppm)	25	< 21.279	
Iron (ppm)	20	< 3.333	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 4.71	N/A
Cyanide (ppm)	5	< 1	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 9

Chemical Waste Treatment Centre
Stabilised Materials Summary (March 2002)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.41 – 12.89	N/A
% Solids (%)	30 (lower limit)	49.76 – 97.86	65.58
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 2.893	
Copper (ppm)	-	< 7.103	
Nickel (ppm)	-	< 0.5	
Lead (ppm)	-	< 11.844	
Zinc (ppm)	-	< 3.681	
Total of copper, nickel, lead, zinc (ppm)	25	< 15.614	
Iron (ppm)	20	< 1.028	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 7.18	N/A
Cyanide (ppm)	5	< 1	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