

Chemical Waste Treatment Centre
Operation Report
Jan 01 - Mar 01

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 2001 to March 2001.

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 2001 to March 2001. 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 2001 to March 2001 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 2001 to March 2001 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 2001)

Parameters	Control Limits	Result	Mean
pH	6-10	7.2 – 10	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 20	N/A
Total Phosphate (mg/l)	10	< 1	N/A
Total Sulphate (mg/l)	2000	345.19 – 1496.06	632.76
Total Sulphides (mg/l)	10	< 0.5	N/A
Total Cyanide (mg/l)	0.1	< 0.08	N/A
Total Suspended Solids (mg/l)	100	< 32.22	N/A
Oil and Grease (mg/l)	20	< 17.63	N/A
Total Phenols (mg/l)	0.5	< 0.41	N/A
Total Residual Chlorine (mg/l)	1	< 0.60	N/A
Anionic Detergents (mg/l)	15	< 2	N/A
Dissolved TOC (mg/l)	200	67.02 – 187.20	108.61
Temperature (°C)	43	26.5 – 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	< 0.32	
Copper (mg/l)	2	< 0.8	
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	< 7.12	
Boron (mg/l)	5	< 4.34	
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 2001)

Parameters	Control Limits	Result	Mean
pH	6-10	6.8 – 9.3	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 20	N/A
Total Phosphate (mg/l)	10	< 1	N/A
Total Sulphate (mg/l)	2000	233.87-1590.58	848.42
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	< 28.02	N/A
Oil and Grease (mg/l)	20	< 17.96	N/A
Total Phenols (mg/l)	0.5	< 0.35	N/A
Total Residual Chlorine (mg/l)	1	< 0.63	N/A
Anionic Detergents (mg/l)	15	< 2	N/A
Dissolved TOC (mg/l)	200	50.45 –176.06	101.17
Temperature (°C)	43	26.1 – 39	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	< 1.16	
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	< 7.46	
Boron (mg/l) (mg/l)	5	< 2.43	
Iron	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 3

Chemical Waste Treatment Centre
Effluent Discharge Summary (March 2001)

Parameters	Control Limits	Result	Mean
pH	6-10	6.8 – 8.9	N/A
Total Kjeldahl Nitrogen (mg/l)	100	< 20	N/A
Total Phosphate (mg/l)	10	< 1	N/A
Total Sulphate (mg/l)	2000	605.55 – 1725.35	973.91
Total Sulphides (mg/l)	10	< 0.5	N/A
Total Cyanide (mg/l)	0.1	< 0.03	N/A
Total Suspended Solids (mg/l)	100	< 34.25	N/A
Oil and Grease (mg/l)	20	< 19.32	N/A
Total Phenols (mg/l)	0.5	< 0.50	N/A
Total Residual Chlorine (mg/l)	1	< 0.63	N/A
Anionic Detergents (mg/l)	15	< 2	N/A
Dissolved TOC (mg/l)	200	119.96 -187.49	157.82
Temperature (°C)	43	24 – 32.3	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	< 1.02	
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	< 0.40	
Tin (mg/l)	5	< 1	
Zinc (mg/l)	2	< 1	
Total Toxic Metals # (mg/l)	10	< 7.32	
Boron (mg/l)	5	< 2.40	
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
Stack Gas Monitoring Summary (January 2001)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	1.0 – 3.3	2.3
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 4.1	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m ³)	5	0.02 – 1.4	0.7
Acidity (as Sulphuric Acid) (mg/m ³)	100	4.0 – 8.4	6.0
Sulphur Dioxide (mg/m ³)	750	< 419.8	N/A
Hydrochloric Acid (mg/m ³)	38	3.6 – 14.1	8.24
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.592	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	< 0.007	N/A
Cadmium (mg/m ³)	3	< 0.050	
Antimony (mg/m ³)	3	< 0.500	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.592	N/A
Copper (mg/m ³)	10	< 0.068	
Arsenic (mg/m ³)	10	< 0.006	
Nickel (mg/m ³)	10	< 0.118	
Chromium (mg/m ³)	10	< 0.050	
Total of Toxic Metals I & II (mg/m ³)	10	< 1.393	N/A
Dioxin (ng/m ³)	0.1	0.0199	N/A

Table 5

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (February 2001)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	0.8 – 7.2	3.3
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 4.9	N/A
Fluorine and Compounds (as HF) (mg/m ³)	25	< 0.5	N/A
Hydrogen Sulphide (mg/m ³)	5	1.0 – 1.1	1.05
Acidity (as Sulphuric Acid) (mg/m ³)	100	5.3 – 8.7	6.7
Sulphur Dioxide (mg/m ³)	750	16.2 – 158.7	79.5
Hydrochloric Acid (mg/m ³)	38	4.7 – 13.2	7.4
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.529	N/A
Hydrogen Fluoride (mg/m ³)	7.5	< 1.0	N/A
Hydrogen Bromide (mg/m ³)	7.5	< 1.0	N/A
Toxic Metals I :			
Mercury (mg/m ³)	3	< 0.010	N/A
Cadmium (mg/m ³)	3	< 0.045	
Antimony (mg/m ³)	3	< 0.447	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.529	N/A
Copper (mg/m ³)	10	< 0.061	
Arsenic (mg/m ³)	10	< 0.005	
Nickel (mg/m ³)	10	< 0.106	
Chromium (mg/m ³)	10	< 0.045	
Total of Toxic Metals I & II (mg/m ³)	10	< 1.244	N/A
Dioxin (ng/m ³)	0.1	0.0114	N/A

Table 6

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (March 2001)

Parameters	Control Limits	Result	Mean
Particulates (mg/m ³)	75	2.3	2.3
Chlorine and Compounds (as Cl ₂) (mg/m ³)	100	< 3.8	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	5.1 – 11.2	8.2
Sulphur Dioxide (mg/m ³)	750	< 426.5	N/A
Hydrochloric Acid (mg/m ³)	38	10.5 – 11.4	11.0
Total Phosphorus (as P) (mg/m ³)	7.5	< 0.605	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	< 0.051	
Antimony (mg/m ³)	3	< 0.510	
Toxic Metals II :			
Lead (mg/m ³)	10	< 0.605	N/A
Copper (mg/m ³)	10	< 0.070	
Arsenic (mg/m ³)	10	< 0.006	
Nickel (mg/m ³)	10	< 0.121	
Chromium (mg/m ³)	10	< 0.051	
Total of Toxic Metals I & II (mg/m ³)	10	< 1.421	N/A
Dioxin (ng/m ³)	0.1	Note (1)	Note (1)

Note: (1) Dioxin sample collected on 28/03/2001 was void because of the air leakage during sampling. Make up sample was taken on 03/04/2001.

Table 7

Chemical Waste Treatment Centre
Stabilised Materials Summary (January 2001)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.19 – 12.72	N/A
% Solids (%)	30 (lower limit)	32.33 – 90.89	65.58
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 1.227	
Copper (ppm)	-	< 4.795	
Nickel (ppm)	-	< 3.205	
Lead (ppm)	-	< 17.01	
Zinc (ppm)	-	< 1.154	
Total of copper, nickel, lead, zinc (ppm)	25	< 21.802	
Iron (ppm)	20	< 2.111	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 3.67	N/A
Cyanide (ppm)	5	< 1	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 3.07	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 2001)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.54 – 13.03	N/A
% Solids (%)	30 (lower limit)	49.61 – 88.8	66.24
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 0.72	
Copper (ppm)	-	< 6.234	
Nickel (ppm)	-	< 2.281	
Lead (ppm)	-	< 20.78	
Zinc (ppm)	-	< 3.403	
Total of copper, nickel, lead, zinc (ppm)	25	< 24.081	
Iron (ppm)	20	< 4.987	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 7.65	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 2001)

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.37 – 12.98	N/A
% Solids (%)	30 (lower limit)	48.26 – 99.36	65.55
Toxic Metals :			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.02	
Total Chromium (ppm)	10	< 0.522	
Copper (ppm)	-	< 9.783	
Nickel (ppm)	-	< 7.655	
Lead (ppm)	-	< 17.7	
Zinc (ppm)	-	< 9.97	
Total of copper, nickel, lead, zinc (ppm)	25	< 22.28	
Iron (ppm)	20	< 1	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 6.46	N/A
Cyanide (ppm)	5	< 1	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2.071	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