

**Chemical Waste Treatment Centre**  
**Monitoring Report**  
**October 2003 – December 2003**

**I. INTRODUCTION**

This Operation Report is prepared by EPD for the Planning and Environmental Hygiene 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.

**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

The environmental performance summary as shown in Section III of this report covers the result of environmental monitoring from October 2003 to December 2003. During this quarter there have been no exceedances of the regulatory control limits. For detailed test results of effluent discharge, stack gas and stabilised residues, please refer to the Tables 1-3, 4-6 and 7-9 respectively.

**III. THE ENVIRONMENTAL MONITORING RESULTS**

**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.

**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.

### 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.

Table 1

Chemical Waste Treatment Centre  
Effluent Discharge Summary ( October 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	7.2 - 9.1	8.1	Y
Total Kjeldahl Nitrogen (mg/l)	100	<38	24.2	Y
Total Phosphate (mg/l)	10	<1	<1	Y
Total Sulphate (mg/l)	2000	653 - 1900	1334	Y
Total Sulphides (mg/l)	10	<1.8	0.6	Y
Total Cyanide (mg/l)	0.1	<0.04	<0.04	Y
Total Suspended Solids (mg/l)	100	<29	17.7	Y
Oil and Grease (mg/l)	20	<15	<15	Y
Total Phenols (mg/l)	0.5	<0.3	<0.3	Y
Total Residual Chlorine (mg/l)	1	<0.6	<0.6	Y
Anionic Detergents (mg/l)	15	<2.5	2.1	Y
Dissolved TOC (mg/l)	200	29.6 - 115	75.9	Y
Temperature (°C)	43	19 - 28	22.3	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
Toxic Metals :				
Arsenic (mg/l)	2	<0.1	<0.1	Y
Barium (mg/l)	5	<1	<1	Y
Cadmium (mg/l)	0.1	<0.1	<0.1	Y
Chromium (mg/l)	1	<0.79	0.35	Y
Copper (mg/l)	2	<1.3	0.6	Y
Lead (mg/l)	2	<1	<1	Y
Manganese (mg/l)	5	<0.2	<0.2	Y
Mercury (mg/l)	0.05	<0.05	<0.05	Y
Nickel (mg/l)	2	<1	<1	Y
Silver (mg/l)	2	<0.4	<0.4	Y
Tin (mg/l)	5	<1.1	1.0	Y
Zinc (mg/l)	2	<1	<1	Y
Total Toxic Metals # (mg/l)	10	<7.9	6.8	Y
Boron (mg/l)	5	<2.5	1.6	Y
Iron (mg/l)	10	<2	<2	Y

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

# 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 ( November 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	7.7 - 8.9	8.2	Y
Total Kjeldahl Nitrogen (mg/l)	100	<63	27.7	Y
Total Phosphate (mg/l)	10	<1	<1	Y
Total Sulphate (mg/l)	2000	761 - 1900	1311	Y
Total Sulphides (mg/l)	10	<1.4	0.6	Y
Total Cyanide (mg/l)	0.1	<0.04	<0.04	Y
Total Suspended Solids (mg/l)	100	<32.3	16.3	Y
Oil and Grease (mg/l)	20	<15	<15	Y
Total Phenols (mg/l)	0.5	<0.3	<0.3	Y
Total Residual Chlorine (mg/l)	1	<0.6	<0.6	Y
Anionic Detergents (mg/l)	15	<2	<2	Y
Dissolved TOC (mg/l)	200	42.4 - 110	70.5	Y
Temperature (°C)	43	20 - 23	21.5	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
Toxic Metals :				
Arsenic (mg/l)	2	<0.1	<0.1	Y
Barium (mg/l)	5	<1	<1	Y
Cadmium (mg/l)	0.1	<0.1	<0.1	Y
Chromium (mg/l)	1	<0.3	<0.3	Y
Copper (mg/l)	2	<0.58	0.5	Y
Lead (mg/l)	2	<1	<1	Y
Manganese (mg/l)	5	<0.2	<0.2	Y
Mercury (mg/l)	0.05	<0.05	<0.05	Y
Nickel (mg/l)	2	<1.8	1.1	Y
Silver (mg/l)	2	<0.4	<0.4	Y
Tin (mg/l)	5	<1	<1	Y
Zinc (mg/l)	2	<1	<1	Y
Total Toxic Metals # (mg/l)	10	<7.5	6.8	Y
Boron (mg/l)	5	<1.5	1.2	Y
Iron (mg/l)	10	<2	<2	Y

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

# 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 ( December 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	7.8 - 8.7	8.2	Y
Total Kjeldahl Nitrogen (mg/l)	100	<71	30.2	Y
Total Phosphate (mg/l)	10	<1	<1	Y
Total Sulphate (mg/l)	2000	600 - 1703	1137	Y
Total Sulphides (mg/l)	10	<0.55	0.50	Y
Total Cyanide (mg/l)	0.1	<0.04	<0.04	Y
Total Suspended Solids (mg/l)	100	<23	16	Y
Oil and Grease (mg/l)	20	<19	15.2	Y
Total Phenols (mg/l)	0.5	<0.3	<0.3	Y
Total Residual Chlorine (mg/l)	1	<0.6	<0.6	Y
Anionic Detergents (mg/l)	15	<2.2	<2	Y
Dissolved TOC (mg/l)	200	39.2 - 95	66.2	Y
Temperature (°C)	43	19 - 25	20.9	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
<b>Toxic Metals :</b>				
Arsenic (mg/l)	2	<0.1	<0.1	Y
Barium (mg/l)	5	<1	<1	Y
Cadmium (mg/l)	0.1	<0.1	<0.1	Y
Chromium (mg/l)	1	<0.3	<0.3	Y
Copper (mg/l)	2	<1.4	0.6	Y
Lead (mg/l)	2	<1	<1	Y
Manganese (mg/l)	5	<0.2	<0.2	Y
Mercury (mg/l)	0.05	<0.05	<0.05	Y
Nickel (mg/l)	2	<1.7	1.1	Y
Silver (mg/l)	2	<0.4	<0.4	Y
Tin (mg/l)	5	<1	<1	Y
Zinc (mg/l)	2	<1	<1	Y
Total Toxic Metals # (mg/l)	10	<7.8	6.9	Y
Boron (mg/l)	5	<1.7	1.2	Y
Iron (mg/l)	10	<2	<2	Y

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

# 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 ( October 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Particulates (mg/m <sup>3</sup> )	75	3.8 - 6.6	5.4	Y
Chlorine and Compounds (as Cl <sub>2</sub> ) (mg/m <sup>3</sup> )	100	<4.3	<4.0	Y
Fluorine and Compounds (as HF) (mg/m <sup>3</sup> )	25	<0.5	<0.4	Y
Acidity (as Sulphuric Acid) (mg/m <sup>3</sup> )	100	10.7 - 16.2	13.8	Y
Sulphur Dioxide (mg/m <sup>3</sup> )	750	169.2 - 318.1	257.3	Y
Hydrochloric Acid (mg/m <sup>3</sup> )	38	<5.0	<4.5	Y
Total Phosphorus (as P) (mg/m <sup>3</sup> )	7.5	<0.693	<0.630	Y
Hydrogen Fluoride (mg/m <sup>3</sup> )	7.5	<1.0	<0.9	Y
Hydrogen Bromide (mg/m <sup>3</sup> )	7.5	<5.0	<4.4	Y
Toxic Metals I :				
Mercury (mg/m <sup>3</sup> )	3	<0.009	<0.008	Y
Cadmium (mg/m <sup>3</sup> )	3	<0.058	<0.053	Y
Antimony (mg/m <sup>3</sup> )	3	<0.584	<0.532	Y
Toxic Metals II :				
Lead (mg/m <sup>3</sup> )	10	<0.693	<0.630	Y
Copper (mg/m <sup>3</sup> )	10	<0.080	<0.073	Y
Arsenic (mg/m <sup>3</sup> )	10	<0.007	<0.006	Y
Nickel (mg/m <sup>3</sup> )	10	<0.139	<0.126	Y
Chromium (mg/m <sup>3</sup> )	10	<0.058	<0.053	Y
Total of Toxic Metals I & II (mg/m <sup>3</sup> )	10	<1.628	<1.483	Y
Dioxin (ng/m <sup>3</sup> )	0.1	0.0099	0.0099	Y

Table 5

Chemical Waste Treatment Centre  
Stack Gas Monitoring Summary ( November 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Particulates (mg/m <sup>3</sup> )	75	3.0 - 6.7	4.7	Y
Chlorine and Compounds (as Cl <sub>2</sub> ) (mg/m <sup>3</sup> )	100	<3.1	<2.8	Y
Fluorine and Compounds (as HF) (mg/m <sup>3</sup> )	25	<0.3	<0.3	Y
Acidity (as Sulphuric Acid) (mg/m <sup>3</sup> )	100	5.2 - 9.4	8.1	Y
Sulphur Dioxide (mg/m <sup>3</sup> )	750	16.6 - 134.9	60.5	Y
Hydrochloric Acid (mg/m <sup>3</sup> )	38	<3.8	<3.5	Y
Total Phosphorus (as P) (mg/m <sup>3</sup> )	7.5	<0.681	<0.588	Y
Hydrogen Fluoride (mg/m <sup>3</sup> )	7.5	<0.8	<0.7	Y
Hydrogen Bromide (mg/m <sup>3</sup> )	7.5	<3.7	<3.4	Y
Toxic Metals I :				
Mercury (mg/m <sup>3</sup> )	3	<0.008	<0.007	Y
Cadmium (mg/m <sup>3</sup> )	3	<0.057	<0.050	Y
Antimony (mg/m <sup>3</sup> )	3	<0.573	<0.496	Y
Toxic Metals II :				
Lead (mg/m <sup>3</sup> )	10	<0.681	<0.588	Y
Copper (mg/m <sup>3</sup> )	10	<0.079	<0.068	Y
Arsenic (mg/m <sup>3</sup> )	10	<0.007	<0.006	Y
Nickel (mg/m <sup>3</sup> )	10	<0.136	<0.118	Y
Chromium (mg/m <sup>3</sup> )	10	<0.057	<0.050	Y
Total of Toxic Metals I & II (mg/m <sup>3</sup> )	10	<1.599	<1.381	Y
Dioxin (ng/m <sup>3</sup> )	0.1	0.0030	0.0030	Y

Table 6

Chemical Waste Treatment Centre  
Stack Gas Monitoring Summary ( December 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Particulates (mg/m <sup>3</sup> )	75	4.5 - 8.4	6.6	Y
Chlorine and Compounds (as Cl <sub>2</sub> ) (mg/m <sup>3</sup> )	100	<4.7	<3.8	Y
Fluorine and Compounds (as HF) (mg/m <sup>3</sup> )	25	<0.5	<0.4	Y
Acidity (as Sulphuric Acid) (mg/m <sup>3</sup> )	100	12.2 - 33.1	22.7	Y
Sulphur Dioxide (mg/m <sup>3</sup> )	750	<171.7	95.7	Y
Hydrochloric Acid (mg/m <sup>3</sup> )	38	<4.7	4.3	Y
Total Phosphorus (as P) (mg/m <sup>3</sup> )	7.5	<0.616	<0.566	Y
Hydrogen Fluoride (mg/m <sup>3</sup> )	7.5	<0.9	<0.8	Y
Hydrogen Bromide (mg/m <sup>3</sup> )	7.5	<4.2	<3.9	Y
Toxic Metals I :				
Mercury (mg/m <sup>3</sup> )	3	<0.008	<0.007	Y
Cadmium (mg/m <sup>3</sup> )	3	<0.052	<0.048	Y
Antimony (mg/m <sup>3</sup> )	3	<0.520	<0.478	Y
Toxic Metals II :				
Lead (mg/m <sup>3</sup> )	10	<0.616	<0.566	Y
Copper (mg/m <sup>3</sup> )	10	<0.071	<0.066	Y
Arsenic (mg/m <sup>3</sup> )	10	<0.006	<0.006	Y
Nickel (mg/m <sup>3</sup> )	10	<0.123	<0.113	Y
Chromium (mg/m <sup>3</sup> )	10	<0.052	<0.048	Y
Total of Toxic Metals I & II (mg/m <sup>3</sup> )	10	<1.446	<1.331	Y
Dioxin (ng/m <sup>3</sup> )	0.1	0.0001	0.0001	Y

Table 7

Chemical Waste Treatment Centre  
Stabilised Materials Summary ( October 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Section A				
pH (water)	8 (lower limit)	12.3 - 12.8	12.6	Y
% Solids (%)	30 (lower limit)	43 - 93	67	Y
Toxic Metals :				
Cadmium (ppm)	0.5	<0.5	<0.5	Y
Mercury (ppm)	0.1	<0.02	<0.02	Y
Total Chromium (ppm)	10	<0.72	0.50	Y
Copper (ppm)	-	<5	2.5	-
Nickel (ppm)	-	<0.58	0.50	-
Lead (ppm)	-	<17	3.3	-
Zinc (ppm)	-	<3	0.59	-
Total of copper, nickel, lead, zinc (ppm)	25	<22	7.0	Y
Iron (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<1	<1	Y
Ammoniacal Nitrogen (ppm)	10	<8.7	2.4	Y
Cyanide (ppm)	5	<1	<1	Y
Section B				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides (ppm)	10	<2.1	2.0	Y
Total Chloro Phenols (ppm)	2	<2	<2	Y
Polychlorinated Biphenyls (ppm)	1	<1	<1	Y
TCDD equivalent (ITEF method) (ppb)	1	<1	<1	Y

Table 8

Chemical Waste Treatment Centre  
Stabilised Materials Summary ( Nov 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Section A				
pH (water)	8 (lower limit)	11.6 - 12.9	12.6	Y
% Solids (%)	30 (lower limit)	42 - 100	64	Y
Toxic Metals :				
Cadmium (ppm)	0.5	<0.5	<0.5	Y
Mercury (ppm)	0.1	<0.02	<0.02	Y
Total Chromium (ppm)	10	<0.5	<0.5	Y
Copper (ppm)	-	<5.8	2.8	-
Nickel (ppm)	-	<0.5	<0.5	-
Lead (ppm)	-	<18	2.8	-
Zinc (ppm)	-	<5.5	1.3	-
Total of copper, nickel, lead, zinc (ppm)	25	<21	7.4	Y
Iron (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<1	<1	Y
Ammoniacal Nitrogen (ppm)	10	<8.9	2.2	Y
Cyanide (ppm)	5	<1	<1	Y
Section B				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides (ppm)	10	<2.7	2.0	Y
Total Chloro Phenols (ppm)	2	<2	<2	Y
Polychlorinated Biphenyls (ppm)	1	<1	<1	Y
TCDD equivalent (ITEF method) (ppb)	1	<1	<1	Y

Table 9

Chemical Waste Treatment Centre  
Stabilised Materials Summary ( December 2003 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Section A				
pH (water)	8 (lower limit)	12.4 - 12.9	12.7	Y
% Solids (%)	30 (lower limit)	46 - 85	67	Y
Toxic Metals :				
Cadmium (ppm)	0.5	<0.5	<0.5	Y
Mercury (ppm)	0.1	<0.02	<0.02	Y
Total Chromium (ppm)	10	<8.6	0.59	Y
Copper (ppm)	-	<6	2.9	-
Nickel (ppm)	-	<0.5	<0.5	-
Lead (ppm)	-	<20	4.6	-
Zinc (ppm)	-	<3.2	0.95	-
Total of copper, nickel, lead, zinc (ppm)	25	<23	8.9	Y
Iron (ppm)	20	<4.1	1.0	Y
Sulphide (ppm)	10	<1	<1	Y
Ammoniacal Nitrogen (ppm)	10	<7.8	2.2	Y
Cyanide (ppm)	5	<1	<1	Y
Section B				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides (ppm)	10	<2	<2	Y
Total Chloro Phenols (ppm)	2	<2	<2	Y
Polychlorinated Biphenyls (ppm)	1	<1	<1	Y
TCDD equivalent (ITEF method) (ppb)	1	<1	<1	Y