

**Chemical Waste Treatment Centre**  
**Monitoring Report**  
**July 2005 – September 2005**

**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 July 2005 to September 2005. 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 ( July 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	7.6 - 9.2	8.4	Y
Total Kjeldahl Nitrogen (mg/l)	100	<20	<20	Y
Total Phosphate (mg/l)	10	<1	<1	Y
Total Sulphate (mg/l)	2000	93 - 1600	867	Y
Total Sulphides (mg/l)	10	<0.9	0.52	Y
Total Cyanide (mg/l)	0.1	<0.04	<0.04	Y
Total Suspended Solids (mg/l)	100	<29.3	15.6	Y
Oil & Grease (mg/l)	20	<15.5	15.0	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
Total Dissolved TOC (mg/l)	200	10 - 92	50.0	Y
Temperature (°C)	43	29 - 36	33.9	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
<b>Toxic Metals:</b>				
Arsenic (mg/l)	2	<0.4	<0.4	Y
Barium (mg/l)	5	<1.1	1.0	Y
Cadmium (mg/l)	0.1	<0.1	<0.1	Y
Chromium (mg/l)	1	<0.3	<0.3	Y
Copper (mg/l)	2	<0.56	0.50	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	<1.4	1.0	Y
Zinc (mg/l)	2	<1	<1	Y
Total toxic metals # (mg/l)	10	<7.1	6.9	Y
Boron (mg/l)	5	<1.6	1.1	Y
Iron (mg/l)	10	<2	<2	Y

Parameters	Control Limits	Range	Mean	Compliance Y/N
<b>Pesticides:</b>				
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
<b>Semi-volatile Compounds:</b>				
Benzo (A) Pyrene (mg/l)	0.1	<0.1	<0.1	Y
<b>Volatile Compounds:</b>				
1,1,1-Trichloroethane (mg/l)	0.05	<0.05	<0.05	Y
<b>Polychlorinated Biphenyls:</b>				
Total PCBs (mg/l)	0.003	<0.003	<0.003	Y
<b>Radioactive Substances:</b>				
Gross beta (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 ( August 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	7.7 - 9.2	8.5	Y
Total Kjeldahl Nitrogen (mg/l)	100	<22	20.2	Y
Total Phosphate (mg/l)	10	<1.4	1.0	Y
Total Sulphate (mg/l)	2000	398 - 1600	925	Y
Total Sulphides (mg/l)	10	<1.0	0.54	Y
Total Cyanide (mg/l)	0.1	<0.04	<0.04	Y
Total Suspended Solids (mg/l)	100	<20.3	15.3	Y
Oil & Grease (mg/l)	20	<17.1	15.1	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
Total Dissolved TOC (mg/l)	200	31.6 – 104.2	65.8	Y
Temperature (°C)	43	22 – 35	31.4	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
<b>Toxic Metals:</b>				
Arsenic (mg/l)	2	<0.4	<0.2	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	<0.65	0.51	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	<1.2	1.0	Y
Zinc (mg/l)	2	<1.1	1.0	Y
Total toxic metals # (mg/l)	10	<7.0	6.8	Y
Boron (mg/l)	5	<2.5	1.5	Y
Iron (mg/l)	10	<2	<2	Y

Parameters	Control Limits	Range	Mean	Compliance Y/N
<b>Pesticides:</b>				
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
<b>Semi-volatile Compounds:</b>				
Benzo (A) Pyrene (mg/l)	0.1	<0.1	<0.1	Y
<b>Volatile Compounds:</b>				
1,1,1-Trichloroethane (mg/l)	0.05	<0.05	<0.05	Y
<b>Polychlorinated Biphenyls:</b>				
Total PCBs (mg/l)	0.003	<0.003	<0.003	Y
<b>Radioactive Substances:</b>				
Gross beta (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 ( September 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	6.7 - 8.9	8.3	Y
Total Kjeldahl Nitrogen (mg/l)	100	<26.6	20.1	Y
Total Phosphate (mg/l)	10	<1	<1	Y
Total Sulphate (mg/l)	2000	342 - 1700	942	Y
Total Sulphides (mg/l)	10	<0.5	<0.5	Y
Total Cyanide (mg/l)	0.1	<0.040	0.040	Y
Total Suspended Solids (mg/l)	100	<51.3	17.1	Y
Oil and Grease (mg/l)	20	<17.0	15.1	Y
Total Phenols (mg/l)	0.5	<0.3	<0.3	Y
Total Residual Chlorine (mg/l)	1	<0.63	0.60	Y
Anionic Detergents (mg/l)	15	<2	<2	Y
Dissolved TOC (mg/l)	200	24.2 - 115	59.6	Y
Temperature (°C)	43	30 - 43	36.3	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
Toxic Metals :				
Arsenic (mg/l)	2	<0.4	<0.24	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	<0.83	0.54	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	1.0	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	<7.1	6.9	Y
Boron (mg/l)	5	<3.1	1.4	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 :				
Grossβ (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 ( July 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Particulates (mg/m <sup>3</sup> )	75	1.3	1.3	Y
Chlorine and Compounds (as Cl <sub>2</sub> ) (mg/m <sup>3</sup> )	100	<3.8	<3.8	Y
Flourine and Compounds (as HF) (mg/m <sup>3</sup> )	25	<0.4	<0.4	Y
Acidity (as Sulphuric Acid) (mg/m <sup>3</sup> )	100	34.6	34.6	Y
Sulphur Dioxide (mg/m <sup>3</sup> )	750	165.1	165.1	Y
Hydrochloric Acid (mg/m <sup>3</sup> )	38	<4.2	<4.2	Y
Total Phosphorus (as P) (mg/m <sup>3</sup> )	7.5	<0.604	<0.604	Y
Hydrogen Fluoride (mg/m <sup>3</sup> )	7.5	<0.9	<0.9	Y
Hydrogen Bromide (mg/m <sup>3</sup> )	7.5	<4.1	<4.1	Y
<b>Toxic Metals I:</b>				
Mercury (mg/m <sup>3</sup> )	3	<0.007	<0.007	Y
Cadmium (mg/m <sup>3</sup> )	3	<0.051	<0.051	Y
Antimony (mg/m <sup>3</sup> )	3	<0.509	<0.509	Y
<b>Toxic metal II:</b>				
Lead (mg/m <sup>3</sup> )	10	<0.604	<0.604	Y
Copper (mg/m <sup>3</sup> )	10	<0.070	<0.070	Y
Arsenic (mg/m <sup>3</sup> )	10	<0.006	<0.006	Y
Nickel (mg/m <sup>3</sup> )	10	<0.121	<0.121	Y
Chromium (mg/m <sup>3</sup> )	10	<0.051	<0.051	Y
Total of Toxic Metals I & II (mg/m <sup>3</sup> )	10	<1.418	<1.418	Y
Dioxin (ng/m <sup>3</sup> )	0.1	0.0001	0.0001	Y

Table 5

Chemical Waste Treatment Centre  
Stack Gas Monitoring Summary ( August 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Particulates (mg/m <sup>3</sup> )	75	0.2	0.2	Y
Chlorine and Compounds (as Cl <sub>2</sub> ) (mg/m <sup>3</sup> )	100	<4.6	<4.6	Y
Flourine and Compounds (as HF) (mg/m <sup>3</sup> )	25	<0.5	<0.5	Y
Acidity (as Sulphuric Acid) (mg/m <sup>3</sup> )	100	19.5	19.5	Y
Sulphur Dioxide (mg/m <sup>3</sup> )	750	104.0	104.0	Y
Hydrochloric Acid (mg/m <sup>3</sup> )	38	<4.4	<4.4	Y
Total Phosphorus (as P) (mg/m <sup>3</sup> )	7.5	<0.615	<0.615	Y
Hydrogen Fluoride (mg/m <sup>3</sup> )	7.5	<0.9	<0.9	Y
Hydrogen Bromide (mg/m <sup>3</sup> )	7.5	<4.4	<4.4	Y
Toxic Metals I:				
Mercury (mg/m <sup>3</sup> )	3	<0.007	<0.007	Y
Cadmium (mg/m <sup>3</sup> )	3	<0.052	<0.052	Y
Antimony (mg/m <sup>3</sup> )	3	<0.519	<0.519	Y
Toxic metal II:				
Lead (mg/m <sup>3</sup> )	10	<0.615	<0.615	Y
Copper (mg/m <sup>3</sup> )	10	<0.071	<0.071	Y
Arsenic (mg/m <sup>3</sup> )	10	<0.006	<0.006	Y
Nickel (mg/m <sup>3</sup> )	10	<0.123	<0.123	Y
Chromium (mg/m <sup>3</sup> )	10	<0.052	<0.052	Y
Total of Toxic Metals I & II (mg/m <sup>3</sup> )	10	<1.445	<1.445	Y
Dioxin (ng/m <sup>3</sup> )	0.1	0.0020	0.0020	Y

Table 6

Chemical Waste Treatment Centre  
Stack Gas Monitoring Summary ( September 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
Particulates (mg/m <sup>3</sup> )	75	0.7	0.7	Y
Chlorine and Compounds (as Cl <sub>2</sub> ) (mg/m <sup>3</sup> )	100	<3.3	<3.3	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	14.9	14.9	Y
Sulphur Dioxide (mg/m <sup>3</sup> )	750	40.3	40.3	Y
Hydrochloric Acid (mg/m <sup>3</sup> )	38	<3.6	<3.6	Y
Total Phosphorus (as P) (mg/m <sup>3</sup> )	7.5	<0.596	<0.596	Y
Hydrogen Fluoride (mg/m <sup>3</sup> )	7.5	<0.7	<0.7	Y
Hydrogen Bromide (mg/m <sup>3</sup> )	7.5	<3.6	<3.6	Y
Toxic Metals I :				
Mercury (mg/m <sup>3</sup> )	3	<0.006	<0.006	Y
Cadmium (mg/m <sup>3</sup> )	3	<0.050	<0.050	Y
Antimony (mg/m <sup>3</sup> )	3	<0.502	<0.502	Y
Toxic Metals II :				
Lead (mg/m <sup>3</sup> )	10	<0.596	<0.596	Y
Copper (mg/m <sup>3</sup> )	10	<0.069	<0.069	Y
Arsenic (mg/m <sup>3</sup> )	10	<0.006	<0.006	Y
Nickel (mg/m <sup>3</sup> )	10	<0.119	<0.119	Y
Chromium (mg/m <sup>3</sup> )	10	<0.050	<0.050	Y
Total of Toxic Metals I & II (mg/m <sup>3</sup> )	10	<1.399	<1.399	Y
Dioxin (ng/m <sup>3</sup> )	0.1	0.00005	0.00005	Y

Table 7

Chemical Waste Treatment Centre  
Stabilised Materials Summary ( July 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
<b>Section A</b>				
pH (water)	8 (lower limit)	12.5 - 12.8	12.6	Y
% Solids (%)	30 (lower limit)	48 - 97	68.8	Y
<b>Toxic Metals :</b>				
Cadmium (Cd) (ppm)	0.5	<0.5	<0.5	Y
Mercury (Hg)	0.1	<0.02	<0.02	Y
Total Chromium (Cr) (ppm)	10	<3.5	0.57	Y
Copper (Cu) (ppm)	-	<5.3	3.3	-
Nickel (Ni) (ppm)	-	<0.5	<0.5	-
Lead (Pb) (ppm)	-	<12	2.2	-
Zinc (Zn) (ppm)	-	<5.1	1.8	-
Total of Cu, Ni, Pb, Zn (ppm)	25	<17	7.8	Y
Iron (Fe) (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<5	<5	Y
Ammoniacal Nitrogen (ppm)	10	<7.1	1.5	Y
Cyanide (ppm)	5	<5	<5	Y
<b>Section B</b>				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides (ppm)	10	<5	<5	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 ( August 2005 )

Parameters	Control Limits)	Range	Mean	Compliance Y/N
<b>Section A</b>				
pH (water)	8 (lower limit)	12.5 – 13.0	12.6	Y
% Solids (%)	30 (lower limit)	54 – 84	68.1	Y
<b>Toxic Metals :</b>				
Cadmium (Cd) (ppm)	0.5	<0.5	<0.5	Y
Mercury (Hg) (ppm)	0.1	<0.02	<0.02	Y
Total Chromium (Cr) (ppm)	10	<5.5	0.58	Y
Copper (Cu) (ppm)	-	<6	3.6	-
Nickel (Ni) (ppm)	-	<0.5	<0.5	-
Lead (Pb) (ppm)	-	<12	3.5	-
Zinc (Zn) (ppm)	-	<9.8	1.8	-
Total of Cu, Ni, Pb, Zn (ppm)	25	<19	9.2	Y
Iron (Fe) (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<5	<5	Y
Ammoniacal Nitrogen (ppm)	10	<6.2	1.3	Y
Cyanide (ppm)	5	<5	<5	Y
<b>Section B</b>				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides (ppm)	10	<5	<5	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 ( September 2005 )

Parameters	Control Limits	Range	Mean	Compliance Y/N
<b>Section A</b>				
pH (water)	8 (lower limit)	12.1 - 12.7	12.4	Y
% Solids (%)	30 (lower limit)	55 - 92	68.0	Y
<b>Toxic Metals :</b>				
Cadmium (ppm)	0.5	<0.5	<0.5	Y
Mercury (ppm)	0.1	<0.02	<0.02	Y
Total Chromium (ppm)	10	<0.57	0.50	Y
Copper (ppm)	-	<10	3.2	-
Nickel (ppm)	-	<0.5	<0.5	-
Lead (ppm)	-	<9.9	2.8	-
Zinc (ppm)	-	<5.7	1.1	-
Total of copper, nickel, lead, zinc (ppm)	25	<17	7.6	Y
Iron (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<5	<5	Y
Ammoniacal Nitrogen (ppm)	10	<8	1.7	Y
Cyanide (ppm)	5	<5	<5	Y
<b>Section B</b>				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides (ppm)	10	<6	5.1	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