

Chemical Waste Treatment Centre
Monitoring Report
June and July 2011

I. INTRODUCTION

This Operation Report is prepared by EPD for the Community Affairs 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

CWTC 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 in June and July 2011. During this period there have been no exceedances of the regulatory control limits. For detailed test results of effluent discharge, stack gas and stabilised residues in June and July 2011, please refer to the Tables 1 and 2, 3 and 4, 5 and 6 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 emission monitoring system (CEMS) 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 CEMS picks up any potential sign of exceedance of any of the control parameters, waste feed to the incinerator will be stopped automatically.

In the Specified Process Licence issued to CWTC on 28 May 2011, the control limits of some parameters in the gas emission were revised to more stringent standards equivalent to the European Union emission standards to reduce the emission of pollutants in the flue gas from CWTC. Table 2 in this report was revised to demonstrate the compliance of the monitoring results from CWTC against the new control limits.

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 (June 2011)

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	8.3 - 9.2	8.8	Y
Total Kjeldahl Nitrogen (mg/l)	100	<20 - 28.1	22.7	Y
Total Phosphate (mg/l)	10	<1 - 2.5	1.3	Y
Total Sulphate (mg/l)	2000	570 - 1600	944	Y
Total Sulphides (mg/l)	10	<0.5 - 0.84	<0.53	Y
Total Cyanide (mg/l)	0.1	<0.04 - 0.06	0.04	Y
Total Suspended Solids (mg/l)	100	<15 - 34	17.2	Y
Oil and Grease (mg/l)	20	<15 - 18	15.2	Y
Total Phenols (mg/l)	0.5	<0.3	<0.3	Y
Total Residual Chlorine (mg/l)	1	<0.6 - 0.62	0.6	Y
Detergents (mg/l)	15	<3 - 3.6	3.1	Y
Dissolved TOC (mg/l)	200	22 - 56	37.1	Y
Temperature (°C)	43	30 - 33	31.6	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
Toxic Metals :				
Arsenic (mg/l)	2	<0.4	<0.4	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	<0.5 - 1.4	0.8	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	Y
Zinc (mg/l)	2	<1	<1	Y
Total Toxic Metals [#] (mg/l)	10	<7.0 - 7.9	7.2	Y
Boron (mg/l)	5	<1.0 - 1.6	1.1	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 2

Chemical Waste Treatment Centre
Effluent Discharge Summary (July 2011)

Parameters	Control Limits	Range	Mean	Compliance Y/N
pH	6-10	7.0 - 9.2	8.6	Y
Total Kjeldahl Nitrogen (mg/l)	100	<20 - 35	24.1	Y
Total Phosphate (mg/l)	10	<1	<1	Y
Total Sulphate (mg/l)	2000	690 - 1200	917	Y
Total Sulphides (mg/l)	10	<0.5 - 5.25	1.5	Y
Total Cyanide (mg/l)	0.1	<0.04 - 0.04	0.04	Y
Total Suspended Solids (mg/l)	100	<15 - 40	18.9	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
Detergents (mg/l)	15	<3 - 3.4	3.1	Y
Dissolved TOC (mg/l)	200	30 - 126	76.4	Y
Temperature (°C)	43	30 - 37	32.0	Y
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected	Y
Toxic Metals :				
Arsenic (mg/l)	2	<0.4	<0.4	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	<0.5 - 1.2	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	Y
Zinc (mg/l)	2	<1	<1	Y
Total Toxic Metals [#] (mg/l)	10	<7.0 - 7.6	7.1	Y
Boron (mg/l)	5	<1	<1	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 3

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (June 2011)

Parameters	Control Limits	Result	Compliance (Y/N)
(a) 30 minute average results ⁽¹⁾			
Particulates (mg/m ³)	30	1.1	Y
Sulphur Dioxide (mg/m ³)	200	29.8	Y
Hydrochloric Acid (mg/m ³)	60	7.1	Y
Hydrogen Fluoride (mg/m ³)	4	0.1	Y
Nitrogen oxides (as NO ₂) (mg/m ³)	400	214.7	Y
Total organic carbon (mg/m ³)	20	0.7	Y
Carbon Monoxide (mg/m ³)	100	87.3	Y
(b) Daily average results ⁽²⁾			
Particulates (mg/m ³)	10	1.0	Y
Sulphur Dioxide (mg/m ³)	50	2.7	Y
Hydrochloric Acid (mg/m ³)	10	2.6	Y
Hydrogen Fluoride (mg/m ³)	1	0.0	Y
Nitrogen oxides (as NO ₂) (mg/m ³)	200	141.5	Y
Total organic carbon (mg/m ³)	10	0.2	Y
Carbon Monoxide (mg/m ³)	50	4.9	Y
(c) Other results			
Chlorine and Compounds (as Cl ₂) (mg/m ³)	24	<4.4	Y
Fluorine and Compounds (as HF) (mg/m ³)	18.8	<1	Y
Acidity (as Sulphuric Acid) (mg/m ³)	37.5	<2.1	Y
Total Phosphorus (as P) (mg/m ³)	5.5	<0.23	Y
Hydrogen Bromide and Bromine (mg/m ³)	5	<2.5	Y
Toxic Metals I ⁽³⁾ :			
Total of Toxic Metals I (mg/m ³)	0.05	<0.011	Y
Toxic Metals II ⁽⁴⁾ :			
Arsenic (mg/m ³)	0.06	<0.002	Y
Total of Toxic Metals II (mg/m ³)	0.5	<0.077	Y
Mercury (mg/m ³)	0.05	<0.003	Y
Dioxin (ng/m ³)	0.075	0.0010	Y

Remark::

- (1) Largest value of 30 minute average results from CEMS on the sampling date.
- (2) Daily average results from CEMS on the sampling date
- (3) Toxic metal I include : cadmium and thallium
- (4) Toxic metal II include : antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium
- (5) The results of the measurements are standardized at the reference conditions of 273K, 101.3 kPa, 11% oxygen, dry gas.

Table 4

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary (July 2011)

Parameters	Control Limits	Result	Compliance (Y/N)
(a) 30 minute average results ⁽¹⁾			
Particulates (mg/m ³)	30	4.5	Y
Sulphur Dioxide (mg/m ³)	200	36.5	Y
Hydrochloric Acid (mg/m ³)	60	11.8	Y
Hydrogen Fluoride (mg/m ³)	4	0.3	Y
Nitrogen oxides (as NO ₂) (mg/m ³)	400	186.1	Y
Total organic carbon (mg/m ³)	20	5.0	Y
Carbon Monoxide (mg/m ³)	100	84.9	Y
(b) Daily average results ⁽²⁾			
Particulates (mg/m ³)	10	3.4	Y
Sulphur Dioxide (mg/m ³)	50	1.5	Y
Hydrochloric Acid (mg/m ³)	10	2.9	Y
Hydrogen Fluoride (mg/m ³)	1	0.1	Y
Nitrogen oxides (as NO ₂) (mg/m ³)	200	135.8	Y
Total organic carbon (mg/m ³)	10	0.2	Y
Carbon Monoxide (mg/m ³)	50	7.7	Y
(c) Other results			
Chlorine and Compounds (as Cl ₂) (mg/m ³)	24	<4.1	Y
Fluorine and Compounds (as HF) (mg/m ³)	18.8	<1.1	Y
Acidity (as Sulphuric Acid) (mg/m ³)	37.5	<2.4	Y
Total Phosphorus (as P) (mg/m ³)	5.5	<0.28	Y
Hydrogen Bromide and Bromine (mg/m ³)	5	<2.7	Y
Toxic Metals I ⁽³⁾ :			
Total of Toxic Metals I (mg/m ³)	<0.05	<0.014	Y
Toxic Metals II ⁽⁴⁾ :			
Arsenic (mg/m ³)	0.06	<0.003	Y
Total of Toxic Metals II (mg/m ³)	<0.5	<0.095	Y
Mercury (mg/m ³)	0.05	<0.003	Y
Dioxin (ng/m ³)	0.075	0.002	Y

Remark::

- (1) Largest value of 30 minute average results from CEMS on the sampling date.
- (2) Daily average results from CEMS on the sampling date
- (3) Toxic metal I include : cadmium and thallium
- (4) Toxic metal II include : antimony, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium.
- (5) The results of the measurements are standardized at the reference conditions of 273K, 101.3 kPa, 11% oxygen, dry gas.

Table 5

Chemical Waste Treatment Centre
Stabilised Materials Summary (June 2011)

Parameters	Control Limits	Range	Mean	Compliance Y/N
Section A				
pH (water)	8 (lower limit)	11.7 - 12.6	12.4	Y
% Solids	30 (lower limit)	57 - 100	72.7	Y
Toxic Metals :				
Cadmium (ppm)	0.5	<0.5	<0.5	Y
Mercury (ppm)	0.1	<0.02 - 0.046	0.02	Y
Total Chromium (ppm)	10	<0.5 - 0.53	0.5	Y
Copper (ppm)	-	<0.5 - 2.9	1.1	-
Nickel (ppm)	-	<0.5 - 0.78	0.5	-
Lead (ppm)	-	<1 - 8.4	1.7	-
Zinc (ppm)	-	<0.5 - 1.8	0.6	-
Total of copper, nickel, lead, zinc (ppm)	25	<2.5 - 11	3.9	Y
Iron (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<5	<5	Y
Ammoniacal Nitrogen (ppm)	10	<1 - 1.9	1.1	Y
Cyanide (ppm)	5	<5	<5	Y
Section B				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides	10	<5	<5	Y
Total Chlorophenols (ppm)	2	<2	<2	Y
Polychlorinated Biphenyls (ppm)	1	<1	<1	Y
TCDD equivalent (ITEF method) (ppb)	1	<1	<1	Y

Table 6

Chemical Waste Treatment Centre
Stabilised Materials Summary (July 2011)

Parameters	Control Limits	Range	Mean	Compliance Y/N
Section A				
pH (water)	8 (lower limit)	12.1 - 12.5	12.4	Y
% Solids	30 (lower limit)	54 - 89	73.0	Y
Toxic Metals :				
Cadmium (ppm)	0.5	<0.5	<0.5	Y
Mercury (ppm)	0.1	<0.02 - 0.032	0.02	Y
Total Chromium (ppm)	10	<0.5 - 1.7	0.6	Y
Copper (ppm)	-	<0.5 - 3.2	0.8	-
Nickel (ppm)	-	<0.5	<0.5	-
Lead (ppm)	-	<1 - 6.1	1.6	-
Zinc (ppm)	-	<0.5 - 1.4	0.6	-
Total of copper, nickel, lead, zinc (ppm)	25	<2.5 - 8.6	3.5	Y
Iron (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<5	<5	Y
Ammoniacal Nitrogen (ppm)	10	<1 - 2.3	1.0	Y
Cyanide (ppm)	5	<5	<5	Y
Section B				
Volatile Organic Contents (ppm)	5000	<15	<15	Y
Total Organic Halides	10	<5	<5	Y
Total Chlorophenols (ppm)	2	<2	<2	Y
Polychlorinated Biphenyls (ppm)	1	<1	<1	Y
TCDD equivalent (ITEF method) (ppb)	1	<1	<1	Y