Chemical Waste Treatment Centre
Monitoring Report
December 2015

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 is 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 December 2015. During this month, the detergent concentrations in 6 batches of effluent have exceeded the regulatory control limit and details are provided in Table 1 below. For detailed test results of effluent discharge, stack gas and stabilised residues, please refer to Table 1-3 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（December 2015）

Parameters	Control Limits	Range	Mean	Compliance (Y/N)
pH	6-10	7.4 - 8.3	7.8	Y
Total Kjeldahl Nitrogen (mg/l)	100	<20	<20	Y
Total Phosphate (mg/l)	10	<2	<2	Y
Total Sulphate (mg/l)	2000	650 - 1700	1088	Y
Total Sulphides (mg/l)	10	<0.5 - 4.4	1.3	Y
Total Cyanide (mg/l)	0.1	<0.040 - 0.070	0.051	Y
Total Suspended Solids (mg/l)	100	<15 - 44	23.7	Y
Oil and Grease (mg/l)	20	<10	<10	Y
Total Phenols (mg/l)	0.5	<0.3	<0.3	Y
Total Residual Chlorine (mg/l)	1	<0.6 - 0.9	0.66	Y
Detergents (mg/l)	15	<8 - <105	63.4	N[1]
Chemical Oxygen Demand (mg/l)	2000	290 - 795	596	Y
Dissolved TOC (mg/l)	200	46 - 163	120	Y
Temperature (^{o}C)	43	21 - 28	23	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	<0.50 - 0.99	0.62	Y
Lead (mg/l)	2	<1	<1	Y
Manganese (mg/l)	5	<0.20 - 0.22	0.2	Y

[1] During the above environmental monitoring period, the detergent concentrations in 6 batches of effluent were found to have exceeded the regulatory control limit, and the total volume involved was 1,153 cubic meters. The relevant contractor has submitted the incident report in early February 2016 providing the case details, cause of the incident and proposed remedial measures to avoid further similar incidents in the future. After further investigation by EPD, it was found that the relevant contractor has failed to comply with the contract requirements, i.e. to have each batch of effluent sampled, analyzed, and confirmed the limit was met before making the discharge. Accordingly, EPD has urged the contractor to comply strictly with the relevant contract requirements and implement the proposed remedial measures, and penalty would be effected for the failure to comply with the Environmental Performance Requirement. Owing to the fact that the discharge was made to the public sewerage system, i.e. via Tsing Yi Preliminary Treatment works to Stonecutters Island Sewage Treatment works for treatment, and considering the nature of pollutants and quantity of effluent involved, the associated environmental impact of the above incident, if any, was considered minimal.

Parameters	Control Limits	Range	Mean	Compliance (Y/N)
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 - 7.5	7.1	Y
Boron (mg/l)	5	<1	<1	Y
Iron (mg/l)	10	<2	<2	Y
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	<0.06	<0.06	Y
Volatile Compounds：				
1,1,1-Trichloroethane (mg/l)	0.05	<0.025	<0.025	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

Stack Gas Monitoring Summary（December 2015）

Parameters	Control Limits	Range	Mean	Compliance (Y/N)
(a) 30 minute average results [(1)]				
Particulates (mg/m^3)	30	0.4 – 16.0	3.3	Y
Sulphur Dioxide (mg/m^3)	200	0.0 – 123.4	7.0	Y
Hydrochloric Acid (mg/m^3)	60	0.3 – 13.7	1.7	Y
Hydrogen Fluoride (mg/m^3)	4	0.0 – 0.0	0.0	Y
Nitrogen oxides (as NO_2) (mg/m^3)	400	56.6– 195.6	112.9	Y
Total organic carbon (mg/m^3)	20	0.0 – 5.5	0.3	Y
Carbon Monoxide (mg/m^3)	100	0.3 – 80.1	5.5	Y
(b) Daily average results [(2)]				
Particulates (mg/m^3)	10	2.0 – 5.7	3.4	Y
Sulphur Dioxide (mg/m^3)	50	1.1 – 16.3	6.9	Y
Hydrochloric Acid (mg/m^3)	10	0.4 – 3.7	1.7	Y
Hydrogen Fluoride (mg/m^3)	1	0.00 – 0.00	0.00	Y
Nitrogen oxides (as NO_2) (mg/m^3)	200	99.2– 125.3	113.0	Y
Total organic carbon (mg/m^3)	10	0.17 – 0.41	0.27	Y
Carbon Monoxide (mg/m^3)	50	1.9 – 11.5	5.7	Y
(c) Other results				
Chlorine and Compounds (as Cl_2) (mg/m^3)	24	<1.7	<1.7	Y
Fluorine and Compounds (as HF) (mg/m^3)	18.8	<1.3	<1.3	Y
Acidity (as Sulphuric Acid) (mg/m^3)	37.5	<1.2	<1.2	Y
Total Phosphorus (as P) (mg/m^3)	5.5	<0.18	<0.18	Y
Hydrogen Bromide and Bromine (mg/m^3)	5	<1.7	<1.7	Y

Parameters	Control Limits	Range	Mean	Compliance (Y/N)
Toxic Metals I [3] :				
Total of Toxic Metal I (mg/m^3)	0.05	<0.009	<0.009	Y
Toxic Metals II [4] :				
Arsenic (mg/m^3)	0.06	<0.002	<0.002	Y
Total of Toxic Metal II (mg/m^3)	0.5	<0.061	<0.061	Y
Mercury (mg/m^3)	0.05	<0.002	<0.002	Y
Dioxin (ng/m^3)	0.075	0.005	0.005	Y

Remark:

(1) 30 minute average results from CEMS in the sampling month

(2) Daily average results from CEMS in the sampling month

(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 3

Chemical Waste Treatment Centre
Stabilised Materials Summary（December 2015）

Parameters	Control Limits	Range	Mean	Compliance (Y/N)
Section A				
pH (water)	8 (lower limit)	12.1 - 12.6	12.4	Y
% Solids	30 (lower limit)	54 - 86	72.6	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)	-	<0.5 - 4.8	2.3	-
Nickel (ppm)	-	<0.5	<0.5	-
Lead (ppm)	-	<1.0 - 17	1.6	-
Zinc (ppm)	-	<0.5 - 1.1	0.5	-
Total of copper, nickel, lead, zinc (ppm)	25	<2.5 - 20	4.9	Y
Iron (ppm)	20	<1	<1	Y
Sulphide (ppm)	10	<5	<5	Y
Ammoniacal Nitrogen (ppm)	10	<2.0	<2.0	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