

## Chemical Waste Treatment Centre

### Monitoring Report

August 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 August 2015. During this month 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 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 ( August 2015 )

| Parameters                             | Control Limits     | Range          | Mean         | Compliance (Y/N) |
|--|--------------------|----------------|--------------|------------------|
| pH                                     | 6-10               | 7.5 - 8.6      | 8.0          | Y                |
| Total Kjeldahl Nitrogen (mg/l)         | 100                | <20 - 21       | 20.4         | Y                |
| Total Phosphate (mg/l)                 | 10                 | <2             | <2           | Y                |
| Total Sulphate (mg/l)                  | 2000               | 645 - 1501     | 982          | Y                |
| Total Sulphides (mg/l)                 | 10                 | <0.5           | <0.5         | Y                |
| Total Cyanide (mg/l)                   | 0.1                | <0.040 - 0.069 | 0.050        | Y                |
| Total Suspended Solids (mg/l)          | 100                | 16 - 31        | 20.5         | 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                  | <0.60 - 0.68   | 0.62         | Y                |
| Detergents (mg/l)                      | 15                 | <7             | <7           | Y                |
| Chemical Oxygen Demand (mg/l)          | 2000               | <100 - 263     | 170          | Y                |
| Dissolved TOC (mg/l)                   | 200                | 11 - 32        | 21           | Y                |
| Temperature (°C)                       | 43                 | 27 - 33        | 31           | 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           | 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 - 0.56   | 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             | <1           | Y                |
| Zinc (mg/l)                            | 2                  | <1             | <1           | Y                |
| Total Toxic Metals <sup>#</sup> (mg/l) | 10                 | <7.0 - 7.0     | 7.0          | Y                |

| Parameters                         | Control Limits | Range  | Mean   | Compliance (Y/N) |
|------------------------------------|----------------|--------|--------|------------------|
| Boron (mg/l)                       | 5              | <1     | <1     | Y                |
| Iron (mg/l)                        | 10             | <2     | <2     | Y                |
| <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            | <0.06  | <0.06  | Y                |
| <b>Volatile Compounds :</b>        |                |        |        |                  |
| 1,1,1-Trichloroethane (mg/l)       | 0.05           | <0.025 | <0.025 | Y                |
| <b>Polychlorinated Biphenyls :</b> |                |        |        |                  |
| Total PCBs (mg/l)                  | 0.003          | <0.003 | <0.003 | Y                |
| <b>Radioactive Substances :</b>    |                |        |        |                  |
| 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 ( August 2015 )

| Parameters  | Control Limits | Range        | Mean  | Compliance (Y/N) |
|---|----------------|--------------|-------|------------------|
| <b>(a) 30 minute average results <sup>(1)</sup></b>               |                |              |       |                  |
| Particulates (mg/m <sup>3</sup> )                                 | 30             | 0.0 – 6.0    | 0.6   | Y                |
| Sulphur Dioxide (mg/m <sup>3</sup> )                              | 200            | 0.1 – 125.1  | 16.2  | Y                |
| Hydrochloric Acid (mg/m <sup>3</sup> )                            | 60             | 0.0 – 11.9   | 1.7   | Y                |
| Hydrogen Fluoride (mg/m <sup>3</sup> )                            | 4              | 0.0 – 0.1    | 0.0   | Y                |
| Nitrogen oxides (as NO <sub>2</sub> ) (mg/m <sup>3</sup> )        | 400            | 51.1– 224.6  | 111.6 | Y                |
| Total organic carbon (mg/m <sup>3</sup> )                         | 20             | 0.0 – 4.0    | 0.2   | Y                |
| Carbon Monoxide (mg/m <sup>3</sup> )                              | 100            | 0.1 – 78.2   | 5.4   | Y                |
| <b>(b) Daily average results <sup>(2)</sup></b>                   |                |              |       |                  |
| Particulates (mg/m <sup>3</sup> )                                 | 10             | 0.2 – 2.5    | 0.6   | Y                |
| Sulphur Dioxide (mg/m <sup>3</sup> )                              | 50             | 3.8– 30.1    | 14.9  | Y                |
| Hydrochloric Acid (mg/m <sup>3</sup> )                            | 10             | 0.2 – 4.0    | 1.5   | Y                |
| Hydrogen Fluoride (mg/m <sup>3</sup> )                            | 1              | 0.00 – 0.00  | 0.00  | Y                |
| Nitrogen oxides (as NO <sub>2</sub> ) (mg/m <sup>3</sup> )        | 200            | 90.0 – 132.2 | 109.5 | Y                |
| Total organic carbon (mg/m <sup>3</sup> )                         | 10             | 0.07 – 0.36  | 0.22  | Y                |
| Carbon Monoxide (mg/m <sup>3</sup> )                              | 50             | 3.0 – 9.5    | 5.2   | Y                |
| <b>(c) Other results</b>  |                |              |       |                  |
| Chlorine and Compounds (as Cl <sub>2</sub> ) (mg/m <sup>3</sup> ) | 24             | <1.5         | <1.5  | Y                |
| Fluorine and Compounds (as HF) (mg/m <sup>3</sup> )               | 18.8           | <1.2         | <1.2  | Y                |
| Acidity (as Sulphuric Acid) (mg/m <sup>3</sup> )                  | 37.5           | <1.1         | <1.1  | Y                |
| Total Phosphorus (as P) (mg/m <sup>3</sup> )                      | 5.5            | <0.18        | <0.18 | Y                |
| Hydrogen Bromide and Bromine (mg/m <sup>3</sup> )                 | 5              | <1.5         | <1.5  | Y                |

| Parameters                                   | Control Limits | Range  | Mean   | Compliance (Y/N) |
|--|----------------|--------|--------|------------------|
| <b>Toxic Metals I <sup>(3)</sup> :</b>       |                |        |        |                  |
| Total of Toxic Metal I (mg/m <sup>3</sup> )  | 0.05           | <0.009 | <0.009 | Y                |
| <b>Toxic Metals II <sup>(4)</sup> :</b>      |                |        |        |                  |
| Arsenic (mg/m <sup>3</sup> )                 | 0.06           | <0.002 | <0.002 | Y                |
| Total of Toxic Metal II (mg/m <sup>3</sup> ) | 0.5            | <0.060 | <0.060 | Y                |
| Mercury (mg/m <sup>3</sup> )                 | 0.05           | <0.002 | <0.002 | Y                |
| Dioxin (ng/m <sup>3</sup> )                  | 0.075          | 0.006  | 0.006  | 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 ( August 2015 )

| Parameters                                | Control Limits   | Range         | Mean  | Compliance (Y/N) |
|---|------------------|---------------|-------|------------------|
| <b>Section A</b>                          |                  |               |       |                  |
| pH (water)                                | 8 (lower limit)  | 12.3 - 12.6   | 12.4  | Y                |
| % Solids                                  | 30 (lower limit) | 60 - 92       | 74.6  | Y                |
| <b>Toxic Metals :</b>                     |                  |               |       |                  |
| Cadmium (ppm)                             | 0.5              | <0.5          | <0.5  | Y                |
| Mercury (ppm)                             | 0.1              | <0.02 - 0.021 | 0.020 | Y                |
| Total Chromium (ppm)                      | 10               | <0.5          | <0.5  | Y                |
| Copper (ppm)                              | -                | <0.5 - 3.7    | 0.7   | -                |
| Nickel (ppm)                              | -                | <0.5          | <0.5  | -                |
| Lead (ppm)                                | -                | <1.0 - 3.6    | 1.0   | -                |
| Zinc (ppm)                                | -                | <0.5 - 1.1    | 0.5   | -                |
| Total of copper, nickel, lead, zinc (ppm) | 25               | <2.5 - 5.7    | 2.8   | Y                |
| Iron (ppm)                                | 20               | <1            | <1    | Y                |
| Sulphide (ppm)                            | 10               | <5            | <5    | Y                |
| Ammoniacal Nitrogen (ppm)                 | 10               | <2.0 - 7.3    | 2.1   | Y                |
| Cyanide (ppm)                             | 5                | <5            | <5    | Y                |
| <b>Section B</b>                          |                  |               |       |                  |
| Volatile Organic Contents (ppm)           | 5000             | <15           | <15   | Y                |
| Total Organic Halides                     | 10               | <5 - 6        | 5.1   | Y                |
| Total Chlorophenols (ppm)                 | 2                | <2            | <2    | Y                |
| Polychlorinated Biphenyls (ppm)           | 1                | <1            | <1    | Y                |
| TCDD equivalent (ITEF method) (ppb)       | 1                | <1            | <1    | Y                |