#### I. INTRODUCTION

This Monthly Report aims to provide a summary of environmental performance of the Sludge Treatment Facility (STF) over the monitoring period, which includes the air emission data collected by a Continuous Emission Monitoring System (CEMS), and the periodic monitoring of heavy metals, dioxins, and furans.

#### II. THE ENVIRONMENTAL MONITORING RESULTS

The STF is required to undertake regular checks on the air emission during the operation of the plant. There are four incineration trains, namely, Train AF, Train AE, Train BF and Train BE in the STF. Air emissions from the incineration trains under operation are closely monitored through a comprehensive management and monitoring programme to ensure that the plant is being operated safely and in an environmentally acceptable manner.

The CEMS on key parameters is installed in each incineration train to ensure combustion and air pollutant removal processes are functionally well. Furthermore, each incineration train 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 incineration train will be stopped automatically.

On 1 April 2015, Phase 1 of the STF commenced its operation. In this month, two out of three incineration trains, i.e. AF and BF were in operation.

For stack gas monitoring, emission rate of the key parameters are summarized in the tables below. All emission records and test results by the respective accredited laboratories have been checked and certified by the Consultants before publication.

In the initial operation period, the STF was under fine-tuning to maintain stable and continuous operation. The results of stack gas monitoring are in compliance with all stack gas control parameters with respect to mass emission limit.

### Stack AF

	Parameters	Emission Limits <sup>(i)</sup> (kg/hr)	Range (kg/hr)	Mean (kg/hr)	Compliance (Y/N)
(a)	Continuous Monitoring –Hourly Average (Measurement by CEMS)				
	Particulates <sup>(ii)</sup>	2.277	0.00 - 1.00	0.04	Y
	Total organic carbon	1.512	0.00 - 0.33	0.02	Y
	Hydrogen Chloride (HCl)	4.545	0.00 - 1.97	0.19	Y
	Hydrogen Fluoride (HF)	0.306	0.00 - 0.21	0.03	Y
	Sulphur Dioxide (SO <sub>2</sub> )	15.147	0.00 - 6.21	1.93	Y
	Carbon Monoxide (CO)	7.578	0.00 - 0.61	0.03	Y
	Nitrogen Oxides (NOx) as Nitrogen Dioxide (NO <sub>2</sub> )	30.303	0.56 – 10.47	3.23	Y
<b>(b)</b>	Continuous Monitoring – Daily Average (Measurement by CEMS)				
	Particulates <sup>(ii)</sup>	0.756	0.01 - 0.12	0.04	Y
	Total organic carbon	0.756	0.00 - 0.07	0.02	Y
	Hydrogen Chloride (HCl)	0.756	0.10 - 0.37	0.18	Y
	Hydrogen Fluoride (HF)	0.072	0.01 - 0.03	0.03	Y
	Sulphur Dioxide (SO <sub>2</sub> )	3.789	1.41 – 2.45	1.89	Y
	Carbon Monoxide (CO)	3.789	0.01 - 0.06	0.03	Y
	Nitrogen Oxides (NOx) as Nitrogen Dioxide (NO <sub>2</sub> )	15.147	1.43 – 7.25	3.14	Y

	Parameters	Emission Limits <sup>(i)</sup> (kg/hr)	Result (kg/hr)	Compliance (Y/N)	
(c)	Monthly Monitoring (Measurement by accredited laboratory)				
	Mercury	0.003789	< 0.00015	Y	
	Total Cadmium & Thallium	0.003789	<0.00003	Y	
	Total Heavy Metals <sup>(iii)</sup>	0.0378	<0.00077	Y	
	Dioxins and Furans <sup>(iv)</sup>	7.575 x 10 <sup>-9</sup>	2.82 x 10 <sup>-10</sup>	Y	

### Stack BF

(kg/hr) (kg/hr) (kg/hr) (kg/hr) (Y/N)  (a) Continuous Monitoring –Hourly Average (Measurement by CEMS)  Particulates(ii) 2.277 0.05 – 0.71 0.16 Y  Total organic 1.512 0.00 – 1.01 0.08 Y  Carbon Hydrogen 4.545 0.00 – 1.58 0.14 Y  Chloride (HCl) Hydrogen 0.306 0.00 – 0.10 0.02 Y  Fluoride (HF)  Sulphur Dioxide (SO <sub>2</sub> )  Carbon Monoxide 7.578 0.00 – 0.20 0.04 Y  (CO) Nitrogen Oxides (NO <sub>2</sub> )  (NO <sub>2</sub> ) (SO <sub>2</sub> )  (b) Continuous Monitoring – Daily Average (Measurement by CEMS)  Particulates(ii) 0.756 0.13 – 0.25 0.16 Y  Total organic carbon 0.756 0.00 – 0.27 0.08 Y  Hydrogen Chloride (HCl)  Hydrogen Fluoride 0.072 0.01 – 0.03 0.02 Y  (HF)  Sulphur Dioxide (SO <sub>2</sub> )  Carbon Monoxide 0.756 0.00 – 0.27 0.08 Y  Hydrogen Chloride 0.756 0.00 – 0.27 0.08 Y  Hydrogen Fluoride 0.756 0.01 – 0.03 0.02 Y  (HF)  Sulphur Dioxide 3.789 0.97 – 1.99 1.54 Y  Sulphur Dioxide (SO <sub>2</sub> )  Carbon Monoxide 3.789 0.02 – 0.07 0.04 Y  (CO)  Nitrogen Oxides 15.147 1.34 – 5.37 3.24 Y		Parameters	Emission Limits(i)	Range	Mean	Compliance
(a) Continuous Monitoring -Hourly Average (Measurement by CEMS)  Particulates(ii) 2.277 0.05 - 0.71 0.16 Y  Total organic 1.512 0.00 - 1.01 0.08 Y  Carbon Hydrogen 4.545 0.00 - 1.58 0.14 Y  Chloride (HCl) Hydrogen 0.306 0.00 - 0.10 0.02 Y  Fluoride (HF)  Sulphur Dioxide 15.147 0.00 - 2.98 1.57 Y  (SO2) Carbon Monoxide 7.578 0.00 - 0.20 0.04 Y  (NOx) as Nitrogen Dioxide (NO2)  (b) Continuous Monitoring - Daily Average (Measurement by CEMS)  Particulates(ii) 0.756 0.13 - 0.25 0.16 Y  Total organic carbon 0.756 0.00 - 0.27 0.08 Y  Hydrogen Chloride (HCl)  Hydrogen Fluoride 0.072 0.01 - 0.03 0.02 Y  (HF)  Sulphur Dioxide (SO2)  Carbon Monoxide 3.789 0.97 - 1.99 1.54 Y  Carbon Monoxide 3.789 0.02 - 0.07 0.04 Y  Carbon Monoxide 3.789 0.02 - 0.07 0.04 Y  Carbon Monoxide 3.789 0.02 - 0.07 0.04 Y  Carbon Monoxide 15.147 1.34 - 5.37 3.24 Y		T drameters		_		
Particulates <sup>(ii)</sup>   2.277   0.05 - 0.71   0.16   Y     Total organic   1.512   0.00 - 1.01   0.08   Y     Carbon   Hydrogen   4.545   0.00 - 1.58   0.14   Y     Chloride (HCl)   Hydrogen   0.306   0.00 - 0.10   0.02   Y     Fluoride (HF)   Sulphur Dioxide   15.147   0.00 - 2.98   1.57   Y     (SO <sub>2</sub> )   Carbon Monoxide   7.578   0.00 - 0.20   0.04   Y     (CO)   Nitrogen Dioxide   (NO <sub>2</sub> )   (NO <sub>3</sub> ) as     Nitrogen Dioxide   (NO <sub>2</sub> )   Nitrogen Dioxide   0.756   0.13 - 0.25   0.16   Y     Total organic carbon   0.756   0.00 - 0.27   0.08   Y     Hydrogen Chloride   0.756   0.00 - 0.27   0.08   Y     Hydrogen Fluoride   0.072   0.01 - 0.03   0.02   Y     Hydrogen Fluoride   0.072   0.01 - 0.03   0.02   Y     Hydrogen Fluoride   3.789   0.97 - 1.99   1.54   Y     Sulphur Dioxide   3.789   0.02 - 0.07   0.04   Y     (CO)   Nitrogen Oxides   15.147   1.34 - 5.37   3.24   Y	(a)					(=,=,)
Total organic carbon						Y
carbon         Hydrogen         4.545         0.00 – 1.58         0.14         Y           Chloride (HCl)         Hydrogen         0.306         0.00 – 0.10         0.02         Y           Hydrogen         0.306         0.00 – 0.10         0.02         Y           Fluoride (HF)         Sulphur Dioxide (HF)         15.147         0.00 – 2.98         1.57         Y           Sulphur Dioxide (SO2)         0.00 – 0.20         0.04         Y         Y         Y           Carbon Monoxide (CO)         30.303         0.79 – 9.70         3.21         Y         Y           (NOX) as Nitrogen Dioxide (NO2)         0.13 – 0.25         0.16         Y         Y         Y         Total organic carbon 0.756         0.13 – 0.25         0.16         Y         Y         Y         Hydrogen Chloride 0.756         0.08 – 0.20         0.14         Y         Y         Hydrogen Fluoride 0.075         0.08 – 0.20         0.14         Y         Y         Hydrogen Fluoride 0.072         0.01 – 0.03         0.02         Y						
Chloride (HCl)		_				
Hydrogen		Hydrogen	4.545	0.00 - 1.58	0.14	Y
Fluoride (HF)   Sulphur Dioxide   15.147   0.00 – 2.98   1.57   Y   (SO <sub>2</sub> )		Chloride (HCl)				
Sulphur Dioxide   15.147   0.00 – 2.98   1.57   Y     (SO <sub>2</sub> )     Carbon Monoxide   7.578   0.00 – 0.20   0.04   Y     (CO)   Nitrogen Oxides   30.303   0.79 – 9.70   3.21   Y     (NOx) as   Nitrogen Dioxide   (NO <sub>2</sub> )     Particulates <sup>(ii)</sup>   0.756   0.13 – 0.25   0.16   Y     Total organic carbon   0.756   0.00 – 0.27   0.08   Y     Hydrogen Chloride   0.756   0.08 – 0.20   0.14   Y     (HCl)   Hydrogen Fluoride   0.072   0.01 – 0.03   0.02   Y     (HF)   Sulphur Dioxide   3.789   0.97 – 1.99   1.54   Y     (SO <sub>2</sub> )   Carbon Monoxide   3.789   0.02 – 0.07   0.04   Y     (CO)   Nitrogen Oxides   15.147   1.34 – 5.37   3.24   Y		Hydrogen	0.306	0.00 - 0.10	0.02	Y
Carbon Monoxide   7.578   0.00 – 0.20   0.04   Y		Fluoride (HF)				
Carbon Monoxide		Sulphur Dioxide	15.147	0.00 - 2.98	1.57	Y
CO		(SO <sub>2</sub> )				
Nitrogen Oxides (NOx) as   Nitrogen Dioxide (NO2)   Nitrogen Dioxide (NO2)		Carbon Monoxide	7.578	0.00 - 0.20	0.04	Y
(NOx) as Nitrogen Dioxide (NO <sub>2</sub> )  (b) Continuous Monitoring – Daily Average (Measurement by CEMS)  Particulates <sup>(ii)</sup> 0.756 0.13 – 0.25 0.16 Y  Total organic carbon 0.756 0.00 – 0.27 0.08 Y  Hydrogen Chloride 0.756 0.08 – 0.20 0.14 Y  (HCl)  Hydrogen Fluoride 0.072 0.01 – 0.03 0.02 Y  (HF)  Sulphur Dioxide 3.789 0.97 – 1.99 1.54 Y  (SO <sub>2</sub> )  Carbon Monoxide 3.789 0.02 – 0.07 0.04 Y  (CO)  Nitrogen Oxides 15.147 1.34 – 5.37 3.24 Y		(CO)				
Nitrogen Dioxide (NO <sub>2</sub> )		C	30.303	0.79 - 9.70	3.21	Y
(NO2)  (b) Continuous Monitoring – Daily Average (Measurement by CEMS)  Particulates <sup>(ii)</sup> 0.756 0.13 – 0.25 0.16 Y  Total organic carbon 0.756 0.00 – 0.27 0.08 Y  Hydrogen Chloride 0.756 0.08 – 0.20 0.14 Y  (HCl)  Hydrogen Fluoride 0.072 0.01 – 0.03 0.02 Y  (HF)  Sulphur Dioxide 3.789 0.97 – 1.99 1.54 Y  (SO2)  Carbon Monoxide 3.789 0.02 – 0.07 0.04 Y  (CO)  Nitrogen Oxides 15.147 1.34 – 5.37 3.24 Y		` ´				
(b) Continuous Monitoring – Daily Average (Measurement by CEMS)           Particulates <sup>(ii)</sup> 0.756         0.13 – 0.25         0.16         Y           Total organic carbon         0.756         0.00 – 0.27         0.08         Y           Hydrogen Chloride (HCl)         0.756         0.08 – 0.20         0.14         Y           Hydrogen Fluoride (HF)         0.072         0.01 – 0.03         0.02         Y           Sulphur Dioxide (SO <sub>2</sub> )         3.789         0.97 – 1.99         1.54         Y           Carbon Monoxide (CO)         3.789         0.02 – 0.07         0.04         Y           Nitrogen Oxides         15.147         1.34 – 5.37         3.24         Y						
Particulates <sup>(ii)</sup>   0.756   0.13 – 0.25   0.16   Y     Total organic carbon   0.756   0.00 – 0.27   0.08   Y     Hydrogen Chloride   0.756   0.08 – 0.20   0.14   Y     (HCl)   Hydrogen Fluoride   0.072   0.01 – 0.03   0.02   Y     (HF)   Sulphur Dioxide   3.789   0.97 – 1.99   1.54   Y     (SO <sub>2</sub> )   Carbon Monoxide   3.789   0.02 – 0.07   0.04   Y     (CO)   Nitrogen Oxides   15.147   1.34 – 5.37   3.24   Y						
Total organic carbon   0.756   0.00 - 0.27   0.08   Y     Hydrogen Chloride   0.756   0.08 - 0.20   0.14   Y     (HCl)     Hydrogen Fluoride   0.072   0.01 - 0.03   0.02   Y     (HF)   Sulphur Dioxide   3.789   0.97 - 1.99   1.54   Y     (SO <sub>2</sub> )   Carbon Monoxide   3.789   0.02 - 0.07   0.04   Y     (CO)   Nitrogen Oxides   15.147   1.34 - 5.37   3.24   Y				age (Measuremen	nt by CEMS)	
Hydrogen Chloride (HCl)		Particulates <sup>(ii)</sup>	0.756	0.13 - 0.25	0.16	Y
(HCl)       Hydrogen Fluoride       0.072       0.01 – 0.03       0.02       Y         (HF)       Sulphur Dioxide       3.789       0.97 – 1.99       1.54       Y         (SO <sub>2</sub> )       Carbon Monoxide       3.789       0.02 – 0.07       0.04       Y         (CO)       Nitrogen Oxides       15.147       1.34 – 5.37       3.24       Y				0.00 - 0.27	0.08	Y
Hydrogen Fluoride   0.072   0.01 – 0.03   0.02   Y			0.756	0.08 - 0.20	0.14	Y
(HF)         Sulphur Dioxide       3.789       0.97 – 1.99       1.54       Y         (SO <sub>2</sub> )         Carbon Monoxide       3.789       0.02 – 0.07       0.04       Y         (CO)         Nitrogen Oxides       15.147       1.34 – 5.37       3.24       Y		· · · ·				
Sulphur Dioxide       3.789       0.97 – 1.99       1.54       Y         (SO <sub>2</sub> )       Carbon Monoxide       3.789       0.02 – 0.07       0.04       Y         (CO)       Nitrogen Oxides       15.147       1.34 – 5.37       3.24       Y		_	0.072	0.01 - 0.03	0.02	Y
(SO <sub>2</sub> )         Carbon Monoxide       3.789       0.02 – 0.07       0.04       Y         (CO)       Nitrogen Oxides       15.147       1.34 – 5.37       3.24       Y				0.07 1.00		
Carbon Monoxide         3.789         0.02 – 0.07         0.04         Y           (CO)         Nitrogen Oxides         15.147         1.34 – 5.37         3.24         Y		-	3.789	0.97 – 1.99	1.54	Y
(CO)         Nitrogen Oxides         15.147         1.34 – 5.37         3.24         Y		•	2.700	0.02 0.07	0.04	37
Nitrogen Oxides 15.147 1.34 – 5.37 3.24 Y			3.789	0.02 – 0.07	0.04	Y
			15 147	1 3/1 5 27	3 24	v
11 111111111111111111111111111111111111		•	13.14/	1.34 – 3.37	3.24	1
Nitrogen Dioxide		,				
(NO <sub>2</sub> )		_				

	Parameters	Emission Limits <sup>(i)</sup> (kg/hr)	Result (kg/hr)	Compliance (Y/N)		
(c)	Monthly Monitoring (Measurement by accredited laboratory)					
	Mercury	0.003789	< 0.00016	Y		
	Total Cadmium & Thallium	0.003789	<0.00003	Y		
	Total Heavy Metals <sup>(iii)</sup>	0.0378	<0.00078	Y		
	Dioxins and Furans <sup>(iv)</sup>	7.575 x 10 <sup>-9</sup>	1.16 x 10 <sup>-10</sup>	Y		

#### **Explanatory Notes**

- (i) The results of measurements are standardized at the reference conditions of 0°C temperature, 101.325 kPa pressure, dry and 11% oxygen content conditions.
- (ii) The particulates mean the respirable suspended particulates, which are suspended particulates in air with a nominal aerodynamic diameter of 10 μm or smaller.
- (iii) Average values over a sampling period of a minimum of 30 minutes and a maximum of 8 hours, including Sb, As, Pb, Co, Cr, Cu, Mn, V and Ni.
- (iv) Average values over a sampling period of 6 to 8 hours.

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