For Information

Legislative Council Panel on Environmental Affairs

Chemical Waste Treatment Centre

Supplementary Information

Purpose

This paper briefs Members on the Administration's plan to continue to operate the Chemical Waste Treatment Centre (CWTC) at Tsing Yi by letting a follow-on operation contract upon the expiry of the current CWTC contract in April 2008. Under this contract, additional facilities would be installed to receive and treat clinical waste.

Background

2. In Hong Kong, chemical wastes are generated from different trades and activities. Typical examples of chemical wastes are spent lubricant from vehicles and machineries, spent by-products from manufacturing industries and spent developer/fixer from photofinishing shops. Chemical waste is hazardous in nature and would pose significant threat to the environment if not properly handled, treated and disposed of. To avoid the detrimental effect of improper disposal of chemical wastes, a contract was let in 1990 for the design, construction and the subsequent operation of the CWTC at Tsing Yi. A location plan of the CWTC is shown in Enclosure I. The CWTC was commissioned in April 1993 and its operation period of 15 years commenced on the same date. Since then, the CWTC has been providing essential collection, treatment and final disposal services for chemical wastes.

3. Apart from providing services to local industries and the community, the CWTC is also the reception facility for marine pollutants (MARPOL waste) which comprise mainly oily waste from ocean going vessels. According to the International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978 (MARPOL Convention), the port authority is required to provide proper reception service for the MARPOL waste and the CWTC is the only facility in Hong Kong to provide such service. In addition, the CWTC also provides support to emergency response services arising from chemical spill incidents. In 2006,

the CWTC received a total of 47,200 tonnes of chemical waste including MARPOL waste. Environmental pollution that might have been caused by improper disposal of such chemical waste was thus avoided.

4. On 20 March and 23 May 2002, the LegCo Panels on Environmental Affairs and Health Services considered the proposed Clinical Waste Control Scheme and the plan to utilize the CWTC for treatment of clinical waste. The Panels had no objection to the proposals.

5. The Waste Disposal (Amendment) Bill 2005 for controlling the clinical waste was passed on 29 March 2006. Under the Clinical Waste Control Scheme, the CWTC is designated as the facility to treat the clinical waste. Coupling with the control scheme, it is necessary to install additional facilities at the CWTC for the reception, handling and incineration of clinical waste.

Operation and Management of the CWTC

6. The CWTC is an integrated treatment facility that provides collection, treatment and disposal services for chemical waste producers. It has been designed and operated according to very stringent international standards on environmental and safety requirements. For instance, the CWTC is required to meet the dioxins emission standard of 0.1 ng I-TEQ/m^3 which is amongst the most stringent standards adopted in the world as compared to similar facilities in other countries[1]. The main treatment processes in the CWTC are high temperature incineration, oil/water separation and physical/chemical treatment with support of several ancillary systems such as wastewater treatment, chemical stabilization, laboratory, computer system, waste container handling and storage tank farm.

7. The Government has put in place a set of stringent environmental monitoring facilities and procedures for monitoring the operation of the CWTC. In order to ensure compliance of the stack emissions with the relevant environmental legislation to ensure no adverse impact on the environment and public health, the CWTC's incineration system is equipped with comprehensive emission control measures and is under the Environmental Protection Department's (EPD) close monitoring.

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[1] 1 nanogram (ng) = 10^{-9} gram. The emission standards adopted by some other economies are, European Union : 0.1 ng I-TEQ/m^3, Singapore: 0.1 – 0.5 ng I-TEQ/m^3, Japan: 0.1 – 5.0 ng I-TEQ/m^3 and the US: 0.1 – 2.3 ng I-TEQ/m^3.

8. The comprehensive emission control measures adopted at the CWTC are as follows:-

(i) The rotary kiln operates at above 1,000^{0}C.

(ii) The secondary combustion chamber operates at 1,100 – 1,250^{0}C which can retain the flue gas for more than 2 seconds so as to disintegrate harmful substances such as dioxins in the flue gas.

(iii) The flue gas is cooled abruptly to below 200^{0}C to prevent dioxins reformation.

(iv) The gas cleaning system has two independent activated carbon injection systems, spray dry absorber and fabric filter bag and is designed to remove the remaining pollutants in the gas before emission into the air.

9. Continuous monitoring of some key parameters (eg. carbon monoxide and temperature) of the incineration system is carried out by the CWTC contractor for close monitoring of the incineration process. The feeding of waste into the incinerator will be cut off automatically if any of these parameters deviates from the pre-set limits. The contractor will immediately inspect the incineration process and identify the reasons for abnormal readings. Feeding of waste for incineration will only be resumed upon completion of all necessary improvement work.

10. The CWTC contractor has adopted a preventive maintenance approach to prevent any breakdown of the facilities at the CWTC. With proper maintenance, the various mechanical and electrical facilities are operated in a safe and effective manner. The preventive maintenance programme includes close monitoring of the operation, timely and scheduled inspection and maintenance of the facilities, aided by a computer control system to ensure the schedule is strictly followed. Annual testing is also conducted to ensure the facilities can function properly at all times.

11. The CWTC contractor submits environmental performance reports to the EPD regularly. The environmental performance reports include analytical results of the effluent, stabilized residue and stack gas. These reports are submitted regularly to the Kwai Tsing District Council (K&TDC) for reference. Apart from the continuous monitoring of the stack gas emission, ambient dioxins level is also monitored at the Cheung Ching Estate in Tsing Yi. The above environmental performance reports and the Cheung Ching Estate monitoring station's monitoring results are also uploaded to the following EPD web page for reference by the public:
http://www.epd.gov.hk/epd/english/environmentinhk/waste/data/data_cwtc.html

12. Since the commissioning of the CWTC, more than 500,000 tests have been conducted. Among the 500,000 plus tests, there were two exceedances in 1998 and 1999. Rectification work was carried out shortly afterwards. Since then, an additional activated carbon injection system has been installed and the two independent systems have been operated simultaneously. Since the installation of the additional activated carbon injection system, the concentrations of all parameters, including that of dioxins, in the stack gas are well below the statutory emission limits. Monitoring data for key stack gas parameters are shown in Enclosure II. Other discharges, i.e. stabilized residue and effluent, also comply with the statutory environmental requirements.

13. Apart from the dedicated monitoring station at Cheung Ching Estate, EPD also monitors ambient air dioxins levels at two other monitoring stations in Tsuen Wan and Central/Western districts. The monitoring results indicate that dioxins concentrations in the ambient air of Tsing Yi are comparable to those of Central/Western and Tsuen Wan districts and are generally lower than or comparable with the levels of other major cities elsewhere in the world. A summary of the ambient dioxins levels at the above mentioned 3 districts is shown in Enclosure III.

CWTC Follow-on Operation Contract

14. The current CWTC contract (with a 15-year operation period) will expire in April 2008. To maintain the essential chemical waste treatment and disposal services, the operation of the CWTC needs to be continued beyond 2008 and a new service contract, i.e. the CWTC Follow-on Operation Contract, has to be let before the expiry of the existing contract.

15. The existing facilities at the CWTC were designed in the early 1990's and since then international environmental standards have undergone changes. In 2006, EPD completed an environmental and engineering study on the CWTC. The study concluded that the CWTC does not cause any adverse environmental impact to the adjacent environment. The conditions of CWTC are satisfactory and the CWTC can continue to operate for many years. Although the CWTC has already adopted stringent environmental standards, in order to further improve the environmental performance of the CWTC, the study recommended to further enhance the environmental performance of the CWTC by upgrading the air pollution control system through installing sulphur and nitrogen oxides removal facilities to meet the latest European Union (EU) air emission standards. The EU standards are amongst the most stringent standards in the world. A comparison of the existing and future

emission standards of the CWTC is shown in Enclosure IV.

16. Under the Clinical Waste Control Scheme, the CWTC is designated as the facility to treat the clinical waste. To implement this strategy, we will need to install additional facilities at the CWTC for the reception, handling and incineration of clinical waste.

17. The scope of the CWTC Follow-on Contract is as follows:-

(i) To operate the CWTC for a period of 10 years.
(ii) To upgrade the air pollution control system.
(iii) To install additional facilities to receive and treat clinical waste.
(iv) To install additional monitoring facilities to enhance the efficiency of the CWTC.

Independent Emission Monitoring

18. We would continue to submit regular environmental monitoring reports to the K&TDC and would appoint an independent assessor to provide expert advice to the DC on the stack emission monitoring results during the commissioning and initial operation of the CWTC when the air pollution control system has been upgraded.

Project Implementation and Financial Implications

19. The CWTC is a complex facility and requires a contractor with specialist knowledge and experience to operate. We will invite contractors with appropriate qualification and experience to tender for the CWTC Follow-on Operation Contract. The programme for prequalification of tenderers and the subsequent contract award is as follows:-

(i) Prequalification of specialist contractors	April 2007– August 2007
(ii) Tendering and tender evaluation	August 2007– April 2008
(iii) Award CWTC Follow-on Operation Contract	April 2008

20. We estimate that the average annual fees for undertaking the operation and works set out in paragraph 17 of this paper would be around $330 million at September 2006 prices. The expenses would be charged to EPD's recurrent vote, i.e. Head 44 Subhead 297 – Fees for Operation of Waste Facilities.

21. We estimate that the project will continue to provide 220 existing jobs (50 professional/technical/clerical staff and 170 labourers).

Public Consultation

22. In September and October 2006, we conducted an extensive public communication programme to inform the Kwai Tsing community of the future plan for the CWTC, i.e. upgrading of the air pollution control system and installing additional facilities to receive and treat clinical waste. The programme included public displays, briefing sessions, an Open Day at the CWTC as well as distribution of leaflets and posters.

23. On 17 October 2006, EPD attended the Planning and Environmental Hygiene Committee (PEHC) meeting of the K&TDC to brief members on the proposal to upgrade the air pollution control system of the CWTC to meet the new European Union air emission standards, our intention to let a new 10-year operation contract (i.e. the CWTC Follow-on Operation Contract) and the scope of the Contract. The PEHC did not raise objection to the proposals contained in the submitted discussion paper. A member however expressed dissatisfaction about treating all types of chemical waste at Tsing Yi whilst another member enquired whether it would be feasible to expedite the upgrading of the air pollution control system.

24. At the request of the PEHC, EPD attended another PEHC meeting on 19 December 2006 to further brief the DC members on matters related to the tendering of the CWTC Follow-on Operation Contract including the scope of the Contract. We did not receive any adverse comment on the Contract. The PEHC requested EPD to provide further information on the tender programme and more detailed requirements of the Contract in due course.

25. On 27 February 2007, EPD attended the PEHC meeting to brief members on more detailed requirements of the CWTC Follow-on Contract and associated tender programme. The PEHC did not raise objection to the Contract. The PEHC put forward a number of suggestions and requested EPD to consider them during the course of drafting the tender documents for the Contract. The suggestions comprised mainly the length of the contract period, provisions to require the new contractor to assist relocation of the CWTC should it be decided later to relocate it elsewhere prior to the expiry of the contract period and the setting up of a monitoring group to monitor the performance of the CWTC.

Environmental Implications

26. In 1991, an EIA study was conducted on the CWTC which was approved by the then Environmental Pollution Advisory Committee. We completed a Supplementary EIA (SEIA) study covering the proposal to modify the CWTC by provision of additional facilities to receive and treat clinical waste in March 1999 and the report was endorsed by ACE in May 1999. The SEIA study concludes that the treatment of clinical waste at the modified CWTC is not expected to cause any adverse environmental impact. Aerial emissions will meet the relevant criteria. There will be no effect on effluent discharge and no water quality impact. Construction impacts will be within the existing standards. The SEIA study shows that the proposal would comply with the relevant environmental standards and criteria. We will implement the key recommended measures in the SEIA including the draft Code of Practice for the Management of Clinical Wastes, which includes measures for management of health and safety, minimization of direct waste handling, personal protective equipment and personal hygiene. Aerial emission standards including those specified in the Best Practical Means for Pathological Waste Incinerators can be met by operating the existing activated carbon injection system. We will undertake a performance test prior to the full operation of the clinical waste handling facilities and we will carry out stringent monitoring and auditing of emissions, including mercury and dioxins. Incineration residues will be tested and where necessary stabilized before landfill disposal.

27. An environmental and engineering study on the CWTC was completed in 2006. The study recommended to upgrade the air pollution control system of the CWTC in 2008. We will tighten the emission limits of many pollutants to meet the latest air emission standards adopted by the EU. The environmental monitoring results indicate that the concentrations of the air pollutants emitted by the CWTC are well below the current emission limits. As such, the concentrations of the majority of the pollutants already meet the latest EU emission standards and only the concentrations of sulphur dioxide and nitrogen dioxide need to be further lowered. In this regard, to comply with the respective EU emission limits, we will install sulphur and nitrogen oxides removal facilities at the air pollution control system.

28. During the contract period, we will withhold payments to the contractor if there is any non-compliance with the required environmental standards.

29. We would include requirements in the contract documents to

request the contractor to recover/recycle as much as possible the recoverable/recyclable material from the chemical waste received. At present, The CWTC receives common chemical wastes from producers as well as residue from recyclers which cannot be further recycled. Fuel oil, copper oxide and mercury are being recovered from waste oil/oily water, etchant and fluorescent lamps respectively.

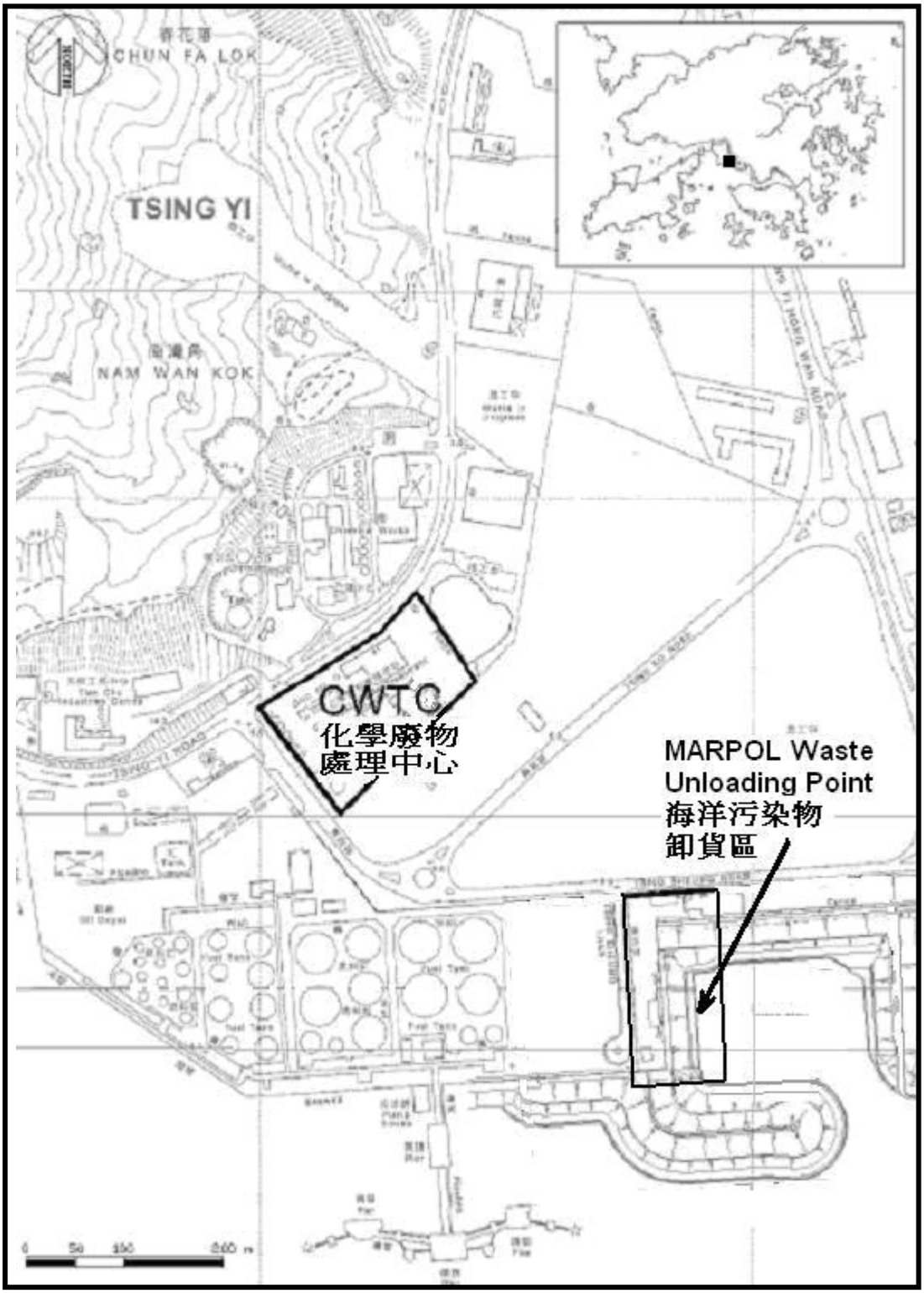
Conclusion

30. Members are invited to note our plan of letting the CWTC Follow-on Operation Contract to continue the operation of the CWTC upon expiry of the current CWTC contract.

Environmental Protection Department
May 2007

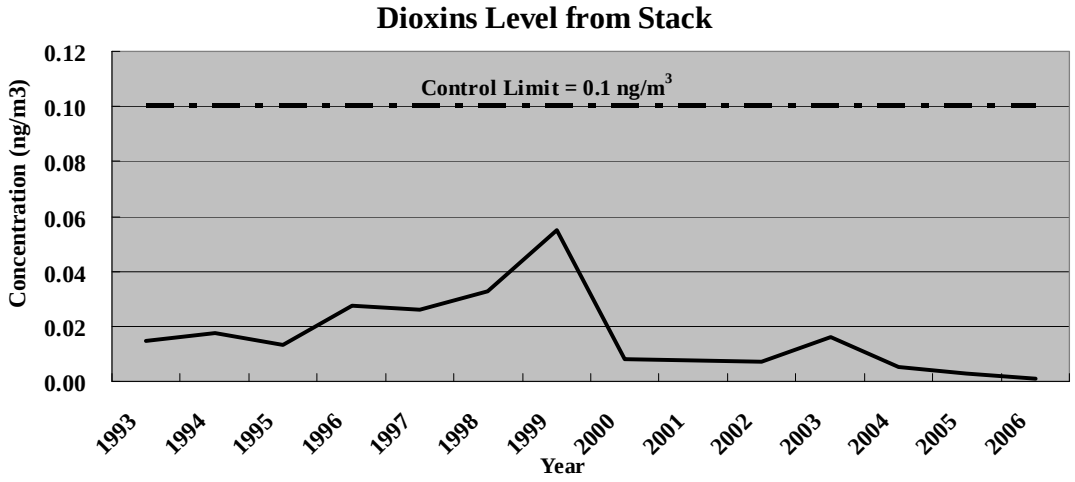
Enclosure I

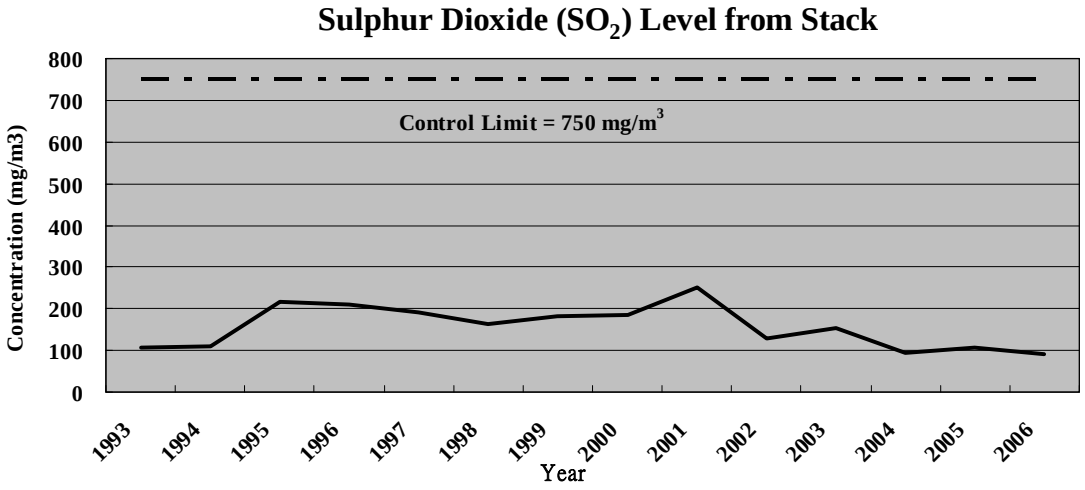
Location Plan of the Chemical Waste Treatment Centre

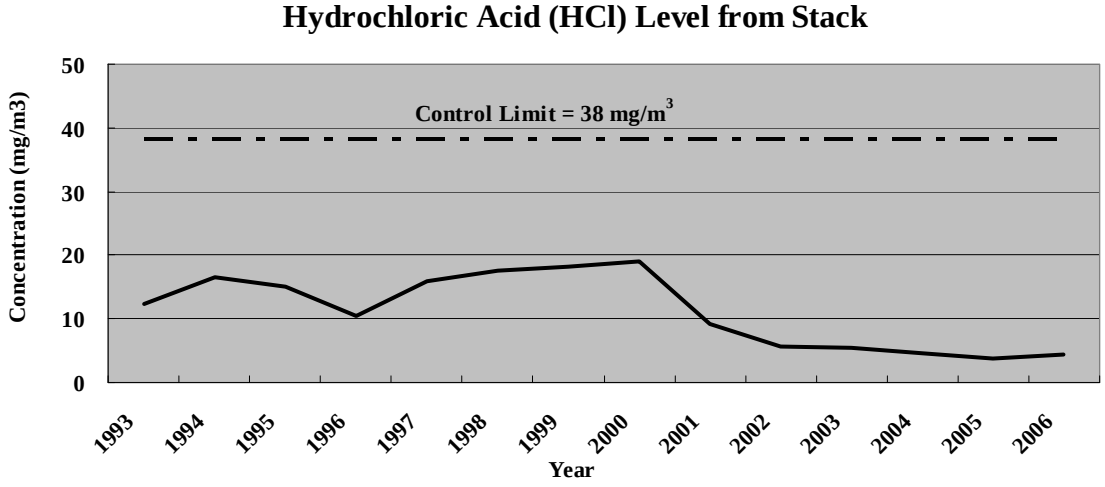


Enclosure II

CWTC – Monitoring Records for Key Stack Emission Parameters







Enclosure III

Ambient Dioxins Concentration in Tsing Yi, Tsuen Wan and Central/Western District (Year 2002 to 2006)

Year	International Toxic Equivalency (I-TEQ) in picogram/m^3 (1 picogram = 1/1,000,000,000,000 gram)		
	Tsing Yi	Tsuen Wan	Central/ Western District
2002	0.044	0.063	0.057
2003	0.059	0.071	0.066
2004	0.069	0.055	0.073
2005	0.068	0.071	0.082
2006	0.064	0.066	0.060

Enclosure IV

Current and Future Emission Standards At CWTC

Pollutant	Current Emission Limits All in milligram/m^3	Proposed Emission Limits based on latest EU Emission Standards All in milligram/m^3	
		Half-hourly average	Daily average
Total hydrocarbons (as carbon)	35*	-	-
Gaseous and vaporous organic substances (as total organic carbon)	-	26.7	13.3
Hydrogen chloride	38*	80	13.3
Carbon monoxide	150*	133.3	66.7
Sulphur dioxide	750*	266.7	66.7
Nitrogen oxides (as NO2)	500*	533.3	266.7
Total dust	75	40	13.3
Hydrogen fluoride	7.5	5.33	1.33
Toxic metal I – Mercury, Cadmium, Antimony and their compounds	3	**N/A**	
Toxic metal II – Lead, Copper, Arsenic, Nickel, Chromium and their compounds	10	**N/A**	
Total of toxic metals I and II	10	**N/A**	
Mercury and its compounds	**N/A**	0.067	
Cadmium, Thallium and their compounds	**N/A**	0.067	
Antimony, Arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel, Vanadium and their compounds	**N/A**	0.667	
Dioxin and furans	0.1nanogram/m^3	0.1nanagram/m^3	
Chlorine and its compounds (as Cl2)	100	100	
Fluorine and its compounds (as HF)	25	25	
Acidity (as sulphuric acid)	100	100	
Total phosphorus (as P)	7.5	7.5	
Hydrogen bromide (HBr)	7.5	**N/A**	
Hydrogen bromide and Bromine (HBr + Br_2)	**N/A**	6.67	

Note : The figures in the table Standardized at 273K (absolute temperature), 101.3kPA, 12% CO_2, dry gas.

*** = hourly average**