Chemical Waste Treatment Centre
Monitoring Report
May 93 - Sep 93

I. INTRODUCTION

This Operation Report is prepared by the Environmental Protection Department (EPD) for the Environment and Planning Committee (EPC) of the Kwai Tsing District Board. It outlines the activities of the Chemical Waste Treatment Centre (CWTC) and provides a summary of environmental performance of the plant.

The environmental performance summary as shown in Section II of this report covers the result of environmental monitoring from May 93 to September 93 (The CWTC was still undergoing a commissioning testing on April 93).

At the 3rd Meeting of the EPC on 15th October 93, EPD was requested to submit the details of the time-table of the waste collection vehicles. This is incorporated in Section III of this report. Appendix I gives the results of the traffic surveys conducted by EPD.

As requested by EPC, this report also incorporates a summary of Emergency Response Plan in Appendix II.

The next operation report will cover the period of October 93 to March 94. EPD, Enviropace and the consultant, ERM are now collecting the environmental monitoring data for compiling the report. A copy of the report will be submitted to EPC once completed.

II. ENVIRONMENTAL PERFORMANCE SUMMARY

Enviropace 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

Effluent Discharge

Effluent from the CWTC treatment processes has to meet very strict discharge limits on pollutant concentration. Multiple processes are employed inside the CWTC to treat all liquid wastes to ensure a safe waste management system. Continuous automatic monitoring of pH, temperature and flow rate are conducted to 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. Tables 1 to 5 comprise the summary of effluent quality from May 93 to September 93. No exceedances in effluent discharge limits were observed.

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. The result for Stack Gas Monitoring from May 93 to September 93 are attached in Tables 6 to 10 and compliance in all stack gas control parameters has been achieved.

Stabilised Residue

All solid wastes and 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.

The summaries of result for Stabilized Residue from May 93 to September 93 are attached in Tables 11 to 15. All of the test parameters fell within the control limits and no exceedances occurred.

Table 1

Chemical Waste Treatment Centre
Effluent Discharge Summary（May 1993）

Parameters	Control Limits	Result	Mean
pH	6-10	6.97 – 9.81	8.41
Total Kjeldahl Nitrogen (mg/l)	100	＜100	N/A
Total Phosphate (mg/l)	10	＜8	N/A
Total Sulphate (mg/l)	2000	218.6 – 1462	633.34
Total Sulphides (mg/l)	10	＜0.2	N/A
Total Cyanide (mg/l)	0.1	＜0.03	N/A
Total Suspended Solids (mg/l)	100	2 - 50	18.32
Oil and Grease (mg/l)	20	＜15	N/A
Total Phenols (mg/l)	0.5	＜0.429	N/A
Total Residual Chlorine (mg/l)	1	＜0.3	N/A
Anionic Detergents (mg/l)	15	＜2	N/A
Temperature (^{o}C)	43	30 – 42.1	34.5
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	＜0.5	N/A
Barium (mg/l)	5	＜1	
Cadmium (mg/l)	0.1	＜0.1	
Chromium (mg/l)	1	＜0.1	
Copper (mg/l)	2	＜1	
Lead (mg/l)	2	＜1	
Manganese (mg/l)	5	＜1	
Mercury (mg/l)	0.05	＜0.05	
Nickel (mg/l)	2	＜1	
Silver (mg/l)	2	＜1	
Tin (mg/l)	5	＜1	
Zinc (mg/l)	2	＜1	
Total Toxic Metals # (mg/l)	10	＜10	
Boron (mg/l)	5	＜1	
Iron (mg/l)	10	＜5	N/A

Parameters	Control Limits	Result	Mean
Pesticides：			
Aldrin (mg/l)	0.01	＜0.01	N/A
BHCS (mg/l)	0.01	＜0.01	
DDT (mg/l)	0.01	＜0.01	
Semi-volatile Compounds：			
Benzo (A) Pyrene (mg/l)	0.1	＜0.1	N/A
Volatile Compounds：			
1,1,1-Trichloroethane (mg/l)	0.05	＜0.05	N/A
Polychlorinated Biphenyls：			
Total PCBs (mg/l)	0.003	＜0.003	N/A
Radioactive Substances：			
Gross β (pc/l)	10000	＜10000	N/A
Radium-226 (pc/l)	30	＜30	
Strontium-90 (pc/l)	100	＜100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Remark: The COD results are heavily interfered by the presence of chloride in seawater, a constituent of MARPOL waste. As a result, all COD data in effluent samples are considered to be invalid. In the meantime, control is exercised by analysis of Oil/Grease.

Table 2

Chemical Waste Treatment Centre
Effluent Discharge Summary（June 1993）

Parameters	Control Limits	Result	Mean
pH	6-10	6.83 – 8.61	7.38
Total Kjeldahl Nitrogen (mg/l)	100	＜100	N/A
Total Phosphate (mg/l)	10	＜8	N/A
Total Sulphate (mg/l)	2000	376 - 1728	926.32
Total Sulphides (mg/l)	10	＜0.2	N/A
Total Cyanide (mg/l)	0.1	＜0.03	N/A
Total Suspended Solids (mg/l)	100	2.0 – 94	31.72
Oil and Grease (mg/l)	20	＜15	N/A
Total Phenols (mg/l)	0.5	＜0.33	N/A
Total Residual Chlorine (mg/l)	1	＜0.97	N/A
Anionic Detergents (mg/l)	15	＜2	N/A
Temperature (^{o}C)	43	28.9 – 33	31
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	＜0.5	N/A
Barium (mg/l)	5	＜1	
Cadmium (mg/l)	0.1	＜0.1	
Chromium (mg/l)	1	＜0.1	
Copper (mg/l)	2	＜1	
Lead (mg/l)	2	＜1	
Manganese (mg/l)	5	＜1	
Mercury (mg/l)	0.05	＜0.05	
Nickel (mg/l)	2	＜1	
Silver (mg/l)	2	＜1	
Tin (mg/l)	5	＜1	
Zinc (mg/l)	2	＜1	
Total Toxic Metals # (mg/l)	10	＜10	
Boron (mg/l)	5	＜1	
Iron (mg/l)	10	＜5	N/A

Parameters	Control Limits	Result	Mean
Pesticides：			
Aldrin (mg/l)	0.01	＜0.01	N/A
BHCS (mg/l)	0.01	＜0.01	
DDT (mg/l)	0.01	＜0.01	
Semi-volatile Compounds：			
Benzo (A) Pyrene (mg/l)	0.1	＜0.1	N/A
Volatile Compounds：			
1,1,1-Trichloroethane (mg/l)	0.05	＜0.05	N/A
Polychlorinated Biphenyls：			
Total PCBs (mg/l)	0.003	＜0.003	N/A
Radioactive Substances：			
Gross β (pc/l)	10000	＜10000	N/A
Radium-226 (pc/l)	30	＜30	
Strontium-90 (pc/l)	100	＜100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 3

Chemical Waste Treatment Centre
Effluent Discharge Summary（July 1993）

Parameters	Control Limits	Result	Mean
pH	6-10	6.92 – 10.00	8.48
Total Kjeldahl Nitrogen (mg/l)	100	＜100	N/A
Total Phosphate (mg/l)	10	＜8	N/A
Total Sulphate (mg/l)	2000	439.8 – 1072.7	658.83
Total Sulphides (mg/l)	10	＜0.2	N/A
Total Cyanide (mg/l)	0.1	＜0.061	N/A
Total Suspended Solids (mg/l)	100	1.8 – 78	11.67
Oil and Grease (mg/l)	20	＜15	N/A
Total Phenols (mg/l)	0.5	＜0.438	N/A
Total Residual Chlorine (mg/l)	1	＜0.5	N/A
Anionic Detergents (mg/l)	15	＜2	N/A
Temperature (^{o}C)	43	23.2 – 35	32
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	＜0.5	N/A
Barium (mg/l)	5	＜1	
Cadmium (mg/l)	0.1	＜0.1	
Chromium (mg/l)	1	＜0.1	
Copper (mg/l)	2	＜1	
Lead (mg/l)	2	＜1	
Manganese (mg/l)	5	＜1	
Mercury (mg/l)	0.05	＜0.05	
Nickel (mg/l)	2	＜1	
Silver (mg/l)	2	＜1	
Tin (mg/l)	5	＜1	
Zinc (mg/l)	2	＜1	
Total Toxic Metals # (mg/l)	10	＜10	
Boron (mg/l)	5	＜1.7	
Iron (mg/l)	10	＜5	N/A

Parameters	Control Limits	Result	Mean
Pesticides：			
Aldrin (mg/l)	0.01	＜0.01	N/A
BHCS (mg/l)	0.01	＜0.01	
DDT (mg/l)	0.01	＜0.01	
Semi-volatile Compounds：			
Benzo (A) Pyrene (mg/l)	0.1	＜0.1	N/A
Volatile Compounds：			
1,1,1-Trichloroethane (mg/l)	0.05	＜0.05	N/A
Polychlorinated Biphenyls：			
Total PCBs (mg/l)	0.003	＜0.003	N/A
Radioactive Substances：			
Gross β (pc/l)	10000	＜10000	N/A
Radium-226 (pc/l)	30	＜30	
Strontium-90 (pc/l)	100	＜100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 4

Chemical Waste Treatment Centre
Effluent Discharge Summary（August 1993）

Parameters	Control Limits	Result	Mean
pH	6-10	6.51 – 9.66	7.87
Total Kjeldahl Nitrogen (mg/l)	100	＜80	N/A
Total Phosphate (mg/l)	10	＜8	N/A
Total Sulphate (mg/l)	2000	538.7 – 1477.4	778.90
Total Sulphides (mg/l)	10	＜0.2	N/A
Total Cyanide (mg/l)	0.1	＜0.068	N/A
Total Suspended Solids (mg/l)	100	4.7 – 92.4	25.20
Oil and Grease (mg/l)	20	＜15.8	N/A
Total Phenols (mg/l)	0.5	＜0.402	N/A
Total Residual Chlorine (mg/l)	1	＜0.75	N/A
Anionic Detergents (mg/l)	15	＜2	N/A
Temperature (^{o}C)	43	26.9 – 35	32
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	＜0.5	N/A
Barium (mg/l)	5	＜1	
Cadmium (mg/l)	0.1	＜0.1	
Chromium (mg/l)	1	＜0.1	
Copper (mg/l)	2	＜1.9	
Lead (mg/l)	2	＜1	
Manganese (mg/l)	5	＜0.5	
Mercury (mg/l)	0.05	＜0.05	
Nickel (mg/l)	2	＜1	
Silver (mg/l)	2	＜1	
Tin (mg/l)	5	＜1	
Zinc (mg/l)	2	＜1	
Total Toxic Metals # (mg/l)	10	＜10	
Boron (mg/l)	5	＜1.8	
Iron (mg/l)	10	＜5	N/A

Parameters	Control Limits	Result	Mean
Pesticides：			
Aldrin (mg/l)	0.01	＜0.01	N/A
BHCS (mg/l)	0.01	＜0.01	
DDT (mg/l)	0.01	＜0.01	
Semi-volatile Compounds：			
Benzo (A) Pyrene (mg/l)	0.1	＜0.1	N/A
Volatile Compounds：			
1,1,1-Trichloroethane (mg/l)	0.05	＜0.05	N/A
Polychlorinated Biphenyls：			
Total PCBs (mg/l)	0.003	＜0.003	N/A
Radioactive Substances：			
Gross β (pc/l)	10000	＜10000	N/A
Radium-226 (pc/l)	30	＜30	
Strontium-90 (pc/l)	100	＜100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 5

Chemical Waste Treatment Centre
Effluent Discharge Summary（September 1993）

Parameters	Control Limits	Result	Mean
pH	6-10	6.17 – 9.93	8.27
Total Kjeldahl Nitrogen (mg/l)	100	＜91.7	N/A
Total Phosphate (mg/l)	10	＜8	N/A
Total Sulphate (mg/l)	2000	739 – 1991.6	1429.9
Total Sulphides (mg/l)	10	＜0.2	N/A
Total Cyanide (mg/l)	0.1	＜0.3	N/A
Total Suspended Solids (mg/l)	100	8.0 – 79	32.06 mg/l
Oil and Grease (mg/l)	20	＜17	N/A
Total Phenols (mg/l)	0.5	＜0.45	N/A
Total Residual Chlorine (mg/l)	1	＜0.74	N/A
Anionic Detergents (mg/l)	15	＜2	N/A
Temperature (^{o}C)	43	23.4 – 35.7	31.39
Floatable Substances (mg/l)	Not to be detected	Not detected	Not detected
Toxic Metals :			
Arsenic (mg/l)	2	< 0.5	N/A
Barium (mg/l)	5	＜1	
Cadmium (mg/l)	0.1	＜0.1	
Chromium (mg/l)	1	＜0.1	
Copper (mg/l)	2	＜1.9	
Lead (mg/l)	2	＜1	
Manganese (mg/l)	5	＜0.8	
Mercury (mg/l)	0.05	＜0.05	
Nickel (mg/l)	2	＜1.46	
Silver (mg/l)	2	＜1	
Tin (mg/l)	5	＜1	
Zinc (mg/l)	2	＜1	
Total Toxic Metals # (mg/l)	10	＜10	
Boron (mg/l)	5	＜1.4	
Iron (mg/l)	10	＜5	N/A

Parameters	Control Limits	Result	Mean
Pesticides：			
Aldrin (mg/l)	0.01	＜0.01	N/A
BHCS (mg/l)	0.01	＜0.01	
DDT (mg/l)	0.01	＜0.01	
Semi-volatile Compounds：			
Benzo (A) Pyrene (mg/l)	0.1	＜0.1	N/A
Volatile Compounds：			
1,1,1-Trichloroethane (mg/l)	0.05	＜0.05	N/A
Polychlorinated Biphenyls：			
Total PCBs (mg/l)	0.003	＜0.003	N/A
Radioactive Substances：			
Gross β (pc/l)	10000	＜10000	N/A
Radium-226 (pc/l)	30	＜30	
Strontium-90 (pc/l)	100	＜100	

Total toxic metals include: Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Tin, Zinc.

Table 6

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary（May 1993）

Parameters	Control Limits	Result	Mean
Particulates (mg/m^3)	75	3 – 73.8	38.4
Chlorine and Compounds (as Cl_2) (mg/m^3)	100	< 2.7	N/A
Fluorine and Compounds (as HF) (mg/m^3)	25	< 0.3	N/A
Hydrogen Sulphide (mg/m^3)	5	Not detected	N/A
Acidity (as Sulphuric Acid) (mg/m^3)	100	4.8 – 97.6	50.4
Sulphur Dioxide (mg/m^3)	750	6.4 – 121.4	62.7
Hydrochloric Acid (mg/m^3)	38	4.1 – 11.7	6.7
Total Phosphorus (as P) (mg/m^3)	7.5	< 1.9	N/A
Hydrogen Fluoride (mg/m^3)	7.5	< 1.1	N/A
Hydrogen Bromide (mg/m^3)	7.5	< 1.1	N/A
Toxic Metals I :			
Mercury (mg/m^3)	3	< 0.002	N/A
Cadmium (mg/m^3)	3	< 0.038	
Antimony (mg/m^3)	3	< 0.38	
Toxic Metals II :			
Lead (mg/m^3)	10	< 0.38	N/A
Copper (mg/m^3)	10	< 0.38	
Arsenic (mg/m^3)	10	< 0.002	
Nickel (mg/m^3)	10	< 0.38	
Chromium (mg/m^3)	10	< 0.038	
Total of Toxic Metals I & II (mg/m^3)	10	< 1.098	N/A
Dioxin (ng/m^3)	0.1	< 0.000934	N/A

Table 7

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary（June 1993）

Parameters	Control Limits	Result	Mean
Particulates (mg/m^3)	75	3.7 – 11.2	6.57
Chlorine and Compounds (as Cl_2) (mg/m^3)	100	< 2.3	N/A
Fluorine and Compounds (as HF) (mg/m^3)	25	< 0.6	N/A
Hydrogen Sulphide (mg/m^3)	5	Not detected	N/A
Acidity (as Sulphuric Acid) (mg/m^3)	100	35.6 – 83	59.3
Sulphur Dioxide (mg/m^3)	750	5.5 – 173.5	89.5
Hydrochloric Acid (mg/m^3)	38	3.7 – 37.1	17.2
Total Phosphorus (as P) (mg/m^3)	7.5	< 1.501	N/A
Hydrogen Fluoride (mg/m^3)	7.5	< 0.7	N/A
Hydrogen Bromide (mg/m^3)	7.5	< 0.7	N/A
Toxic Metals I :			
Mercury (mg/m^3)	3	< 0.04	N/A
Cadmium (mg/m^3)	3	< 0.030	
Antimony (mg/m^3)	3	< 0.300	
Toxic Metals II :			
Lead (mg/m^3)	10	< 0.300	N/A
Copper (mg/m^3)	10	< 0.300	
Arsenic (mg/m^3)	10	< 0.002	
Nickel (mg/m^3)	10	< 0.300	
Chromium (mg/m^3)	10	< 0.030	
Total of Toxic Metals I & II (mg/m^3)	10	< 1.263	N/A
Dioxin (ng/m^3)	0.1	< 0.00168	N/A

Table 8

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary（July 1993）

Parameters	Control Limits	Result	Mean
Particulates (mg/m^3)	75	9.7 – 24.4	15.9
Chlorine and Compounds (as Cl_2) (mg/m^3)	100	< 3.4	N/A
Fluorine and Compounds (as HF) (mg/m^3)	25	< 0.4	N/A
Hydrogen Sulphide (mg/m^3)	5	Not detected	N/A
Acidity (as Sulphuric Acid) (mg/m^3)	100	18.1 – 93.9	47.9
Sulphur Dioxide (mg/m^3)	750	68.3 – 503.4	187.5
Hydrochloric Acid (mg/m^3)	38	3.1 – 6.7	5.2
Total Phosphorus (as P) (mg/m^3)	7.5	< 1.948	N/A
Hydrogen Fluoride (mg/m^3)	7.5	< 0.8	N/A
Hydrogen Bromide (mg/m^3)	7.5	< 0.7	N/A
Toxic Metals I :			
Mercury (mg/m^3)	3	< 0.004	N/A
Cadmium (mg/m^3)	3	< 0.039	
Antimony (mg/m^3)	3	< 0.390	
Toxic Metals II :			
Lead (mg/m^3)	10	< 0.390	N/A
Copper (mg/m^3)	10	< 0.390	
Arsenic (mg/m^3)	10	< 0.002	
Nickel (mg/m^3)	10	< 0.390	
Chromium (mg/m^3)	10	< 0.039	
Total of Toxic Metals I & II (mg/m^3)	10	< 1.642	N/A
Dioxin (ng/m^3)	0.1	< 0.00154	N/A

Table 9

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary（August 1993）

Parameters	Control Limits	Result	Mean
Particulates (mg/m^3)	75	6.7 – 24.4	17.7
Chlorine and Compounds (as Cl_2) (mg/m^3)	100	< 3.8	N/A
Fluorine and Compounds (as HF) (mg/m^3)	25	< 0.6	N/A
Hydrogen Sulphide (mg/m^3)	5	0.3	N/A
Acidity (as Sulphuric Acid) (mg/m^3)	100	2.5 – 29.7	16.5
Sulphur Dioxide (mg/m^3)	750	47.5 – 399.6	237.8
Hydrochloric Acid (mg/m^3)	38	4.5 – 53.5	29.0
Total Phosphorus (as P) (mg/m^3)	7.5	< 2.188	N/A
Hydrogen Fluoride (mg/m^3)	7.5	< 0.8	N/A
Hydrogen Bromide (mg/m^3)	7.5	< 0.8	N/A
Toxic Metals I :			
Mercury (mg/m^3)	3	< 0.009	N/A
Cadmium (mg/m^3)	3	< 0.044	
Antimony (mg/m^3)	3	< 0.438	
Toxic Metals II :			
Lead (mg/m^3)	10	< 0.438	N/A
Copper (mg/m^3)	10	< 0.438	
Arsenic (mg/m^3)	10	< 0.002	
Nickel (mg/m^3)	10	< 0.438	
Chromium (mg/m^3)	10	< 0.044	
Total of Toxic Metals I & II (mg/m^3)	10	< 1.849	N/A
Dioxin (ng/m^3)	0.1	0.02	N/A

Table 10

Chemical Waste Treatment Centre
Stack Gas Monitoring Summary（September 1993）

Parameters	Control Limits	Result	Mean
Particulates (mg/m^3)	75	3.7 – 29.2	13.42
Chlorine and Compounds (as Cl_2) (mg/m^3)	100	< 3.3	N/A
Fluorine and Compounds (as HF) (mg/m^3)	25	< 0.3	N/A
Hydrogen Sulphide (mg/m^3)	5	1.4 – 1.7	1.55
Acidity (as Sulphuric Acid) (mg/m^3)	100	21.5 - 83	59.3
Sulphur Dioxide (mg/m^3)	750	21.5 – 180.6	93.02
Hydrochloric Acid (mg/m^3)	38	5.6 – 19.2	11
Total Phosphorus (as P) (mg/m^3)	7.5	< 1.542	N/A
Hydrogen Fluoride (mg/m^3)	7.5	< 1.2	N/A
Hydrogen Bromide (mg/m^3)	7.5	< 7.1	N/A
Toxic Metals I :			
Mercury (mg/m^3)	3	< 0.004	N/A
Cadmium (mg/m^3)	3	< 0.031	
Antimony (mg/m^3)	3	< 0.308	
Toxic Metals II :			
Lead (mg/m^3)	10	< 0.308	N/A
Copper (mg/m^3)	10	< 0.308	
Arsenic (mg/m^3)	10	< 0.009	
Nickel (mg/m^3)	10	< 0.303	
Chromium (mg/m^3)	10	< 0.031	
Total of Toxic Metals I & II (mg/m^3)	10	< 1.3	N/A
Dioxin (ng/m^3)	0.1	0.0227 – 0.0280	0.02535

Table 11

Chemical Waste Treatment Centre
Stabilised Materials Summary（May 1993）

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.52 – 12.77	12.3
% Solids (%)	30 (lower limit)	58.8 – 100	86.35
Toxic Metals：			
Cadmium (ppm)	0.5	< 0.3	N/A
Mercury (ppm)	0.1	< 0.05	
Total Chromium (ppm)	10	< 0.7	
Copper (ppm)	—	< 1.6	
Nickel (ppm)	—	< 7	
Lead (ppm)	—	< 0.8	
Zinc (ppm)	—	< 0.8	
Total of copper, nickel, lead, zinc (ppm)	25	< 10.2	
Iron (ppm)	20	< 3	N/A
Sulphide (ppm)	10	< 0.8	N/A
Ammoniacal Nitrogen (ppm)	10	< 1	N/A
Cyanide (ppm)	5	< 0.6	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 12

Chemical Waste Treatment Centre
Stabilised Materials Summary（June 1993）

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.23 – 12.68	12.15
% Solids (%)	30 (lower limit)	49.4 – 100.1	83.83
Toxic Metals：			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.1	
Total Chromium (ppm)	10	< 1	
Copper (ppm)	—	< 1	
Nickel (ppm)	—	< 1	
Lead (ppm)	—	< 1	
Zinc (ppm)	—	< 1	
Total of copper, nickel, lead, zinc (ppm)	25	< 4	
Iron (ppm)	20	< 5	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 1	N/A
Cyanide (ppm)	5	< 1	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 13

Chemical Waste Treatment Centre
Stabilised Materials Summary（July 1993）

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.73 – 12.56	12.39
% Solids (%)	30 (lower limit)	69.5 – 100.7	98.27
Toxic Metals：			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.1	
Total Chromium (ppm)	10	< 1	
Copper (ppm)	—	< 1	
Nickel (ppm)	—	< 1	
Lead (ppm)	—	< 3.4	
Zinc (ppm)	—	< 1	
Total of copper, nickel, lead, zinc (ppm)	25	< 4	
Iron (ppm)	20	< 5	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 1	N/A
Cyanide (ppm)	5	< 1	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 14

Chemical Waste Treatment Centre
Stabilised Materials Summary（August 1993）

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	10.9 – 12.56	12.09
% Solids (%)	30 (lower limit)	71.9 – 100.4	90.15
Toxic Metals：			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.1	
Total Chromium (ppm)	10	< 1	
Copper (ppm)	—	< 2.2	
Nickel (ppm)	—	< 2	
Lead (ppm)	—	< 1.5	
Zinc (ppm)	—	< 11	
Total of copper, nickel, lead, zinc (ppm)	25	< 15	
Iron (ppm)	20	< 5	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 1	N/A
Cyanide (ppm)	5	< 1	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

Table 15

Chemical Waste Treatment Centre
Stabilised Materials Summary（September 1993）

Parameters	Control Limits	Result	Mean
Section A			
pH (water)	8 (lower limit)	11.85 – 12.65	12.47
% Solids (%)	30 (lower limit)	61.9 – 100.9	96.00
Toxic Metals：			
Cadmium (ppm)	0.5	< 0.5	N/A
Mercury (ppm)	0.1	< 0.1	
Total Chromium (ppm)	10	< 1	
Copper (ppm)	—	< 1	
Nickel (ppm)	—	< 1	
Lead (ppm)	—	< 1.9	
Zinc (ppm)	—	< 1.1	
Total of copper, nickel, lead, zinc (ppm)	25	< 4	
Iron (ppm)	20	< 5	N/A
Sulphide (ppm)	10	< 1	N/A
Ammoniacal Nitrogen (ppm)	10	< 1	N/A
Cyanide (ppm)	5	< 1	N/A
Section B			
Volatile Organic Contents (ppm)	5000	< 15	N/A
Total Organic Halides (ppm)	10	< 2	N/A
Total Chloro Phenols (ppm)	2	< 2	N/A
Polychlorinated Biphenyls (ppm)	1	< 1	N/A
TCDD equivalent (ITEF method) (ppb)	1	< 1	N/A

III. SUMMARY OF WASTE COLLECTION VEHICLES TIME-TABLE

The time-table of the waste collection vehicles is summarized in Table 16. It is noted that:

(a) in general, there were 16 to 48 daily vehicular trips (to and from the CWTC) during the period of May – Oct 93.

(b) most collection vehicles (about 6 - 16 no.) departed from CWTC at around 9:31 am to 4:00 pm, in order to avoid the traffic peak.

(c) some collection services have been scheduled in the non-working hours upon agreement with the factory owners, in order to minimize impact to the traffic.

EPD has conducted a traffic impact survey at the peak hours of the morning and afternoon sessions in Jan 94. The survey report is presented in Appendix I and the results are summarised below:

Observation in the morning peak hours (7:30am to 9:30am)

- Most collection vehicles from CWTC left Tsing Yi via the North Bridge. This further minimized the impact to nearby traffic.
- Of the 3803 vehicles were spotted for using the North Bridge bounding for Tsuen Wan during the period of 7:30 am to 9:30 am on 4th Jan 94, only 13 were of Enviropace, constituting a percentage of 0.34%. This small amount contributes an insignificant impact on the nearby traffic.
- Traffic jam in the North Bridge commenced at around 8:25 am to 9:30 am. Only one Enviropace vehicle had been seen using the North Bridge during this period. All the other vehicles of Enviropace used the North Bridge only before 8:21am.
- For the morning survey of 5th Jan 94, only a few Enviropace vehicles (9 out of 2008, i.e. 0.45%) were using the South Bridge. This should have insignificant impact on the traffic.

Observation in the afternoon

- Most Enviropace vehicles returned to Tsing Yi via the South Bridge.
- Of the 2249 vehicles were spotted for using the North Bridge bounding for Tsing Yi during the period of 4:00 pm to 6:00 pm on 4th Jan 94, only 4 were of Enviropace (0.18%).
- For the same survey period on 5th Jan 94, 1628 vehicles were spotted using the South Bridge bounding for Tsing Yi, only 10 of which were from the CWTC (0.61%).
- During the above survey periods, no traffic jams in the North or South Bridges were found. This indicates that Enviropace vehicles should have insignificant impact to the nearby traffic at Tsing Yi.

The above surveys re-affirm that Enviropace vehicles only contribute insignificant traffic impact for the Tsing Yi District. The time table for the collection

vehicles has been scheduled to avoid the peak hours of the traffic. In addition, Enviropace has been considering other collection means such as transferring the waste via barges from those producers with suitable embarking facilities. This arrangement will further alleviate the traffic impact for Tsing Yi.

Table 16

Time-table of the Enviropace Waste Collection Vehicles

Month	Daily average no. of vehicles leaving Tsing Yi (no.)				Total Daily Average (no.)
	7:30am to 9:30am	9:31am to 4:00pm	4:01pm to 7:00pm	After 7:00pm	
May 93	6	8	2	1	17
Jun 93	8	6	1	1	16
Jul 93	8	8	2	6	24
Aug 93	10	12	3	10	35
Sep 93	14	15	8	10	47
Oct 93	16	16	5	11	48

IV. SUMMARY OF EMERGENCY RESPONSE PLAN

Please refer to Appendix II.

V. SUBMISSION OF DOCUMENT

This Operation Report (No. 1) was tabled in the Environment and Planning Committee (EPC) of the Kwai Tsing District Board on 18th Feb 94 for the members' reference.

Appendix I

Tsing Yi Traffic Survey Report

In the preliminary traffic survey conducted by EPD on 30th Dec 93, it was found that 16 Enviropace vehicles left Tsing Yi for the period of 7:30 am to 9:30 am, 15 of which were using North Bridge before 8:28 am and 1 of which were using South Bridge at 8:04 am. A traffic jam was observed at the North Bridge between 8:40 am and 9:15 am.

To order to verify this preliminary traffic survey, EPD conducted another survey on 4th Jan 94 and 5th Jan 94 to investigate the impact on nearby traffic of the Tsing Yi District at peak hours.

The traffic survey on 4th Jan 94 covered the peak hours of 7:30am to 9:30am and 4:00pm to 6:00pm at North Bridge. A similar traffic survey covering the same period were conducted on 5th Jan 94 at South Bridge. The survey results are tabulated and presented below.

I. Leaving Tsing Yi via North Bridge

On 4th Jan 94, 3803 vehicles were spotted for the survey period of 7:30 am to 9:30 am, 13 of which were from Enviropace. Before the traffic jam, i.e. from 8:52 am to 9:30 am, 12 Enviropace vehicles had already left CWTC for the period of 8:06 am to 8:51 am (The drivers were required to report duty by 7:30 am). During the traffic jam, only 1 Enviropace vehicle used the North Bridge.

Of the 2289 vehicles were spotted for the afternoon survey from 4:00pm to 6:00pm, 2 were from Enviropace. No traffic jam was observed in that period.

II. Returning to Tsing Yi via North Bridge

On 4th Jan 94, 2292 vehicles were spotted in the morning survey for the period of 7:30am to 9:30am, none of which was of Enviropace. Of the 2249 vehicles were spotted in the afternoon survey for the period of 4:00pm to 6:00pm, 4 were from the CWTC for the period of 4:00pm to 5:00pm. No traffic jam was observed in the morning or afternoon.

III. Leaving Tsing Yi via South Bridge

On 5th Jan 94, 2008 vehicles were spotted in the morning survey for the period of 7:30 am to 9:30 am, 9 of which were from the CWTC for the period of 8:15 am to 9:00 am.

Of the 1743 vehicles were spotted in the afternoon survey, none was from the CWTC.

IV. Returning to Tsing Yi via South Bridge

On 5th Jan 94, 2152 vehicles were spotted in the morning survey, none of which was from Enviropace.

Of the 1628 vehicles were spotted in the afternoon survey, 10 were of Enviropace for the period of 5:15 pm to 5:45 pm.

No traffic jam was observed in the morning or afternoon.

On the whole, the survey results match the previous preliminary survey i.e. the Enviropace collection vehicles do not impose additional traffic burden on Tsing Yi District.

Traffic Survey

Date: 4th Jan 94
Location: Tsing Yi North Bridge
Direction: Tsuen Wan bound

Duration	Type of Enviropace collection vehicles (no.)						Total no. of vehicles passing (no.)
	Tanker	5-T Truck	15-T Truck	Hooklift Truck	Other	Subtotal	
07:30 – 07:51						0	518
07:51 – 08:06						0	476
08:06 – 08:21		2	4			6	556
08:21 – 08:36	1	1		1		3	549
08:36 – 08:51			2		1	3	485
08:51 – 09:06						0	436
09:06 – 09:21				1		1	386
09:21 – 09:30						0	397
					Total	13	3803

16:00 – 16:15				1		1	272
16:15 – 16:30						0	253
16:30 – 16:45						0	261
16:45 – 17:00						0	288
17:00 – 17:15						0	293
17:15 – 17:30						0	295
17:30 – 17:45						0	325
17:45 – 18:00					1	1	302
					Total	2	2289

Traffic Survey

Date: 4th Jan 94
Location: Tsing Yi North Bridge
Direction: Tsing Yi bound

Duration	Type of Enviropace collection vehicles (no.)						Total no. of vehicles passing (no.)
	Tanker	5-T Truck	15-T Truck	Hooklift Truck	Other	Subtotal	
07:30 – 07:45						0	330
07:45 – 08:00						0	356
08:00 – 08:15						0	326
08:15 – 08:30						0	293
08:30 – 08:45						0	245
08:45 – 09:00						0	273
09:00 – 09:15						0	234
09:15 – 09:30						0	235
					Total	0	2292

16:00 – 16:15			2			2	278
16:15 – 16:30			1			1	300
16:30 – 16:45						0	295
16:45 – 17:00			1			1	257
17:00 – 17:15						0	269
17:15 – 17:30						0	297
17:30 – 17:45						0	297
17:45 – 18:00						0	256
					Total	4	2249

Traffic Survey

Date: 5th Jan 94
Location: Tsing Yi South Bridge
Direction: Kwai Fong bound

Duration	Type of Enviropace collection vehicles (no.)						Total no. of vehicles passing (no.)
	Tanker	5-T Truck	15-T Truck	Hooklift Truck	Other	Subtotal	
07:30 – 07:45						0	271
07:45 – 08:00						0	250
08:00 – 08:15						0	267
08:15 – 08:30		2	2			4	255
08:30 – 08:45			4			4	232
08:45 – 09:00		1				1	252
09:00 – 09:15						0	255
09:15 – 09:30						0	226
					Total	9	2008

16:00 – 16:15						0	177
16:15 – 16:30						0	209
16:30 – 16:45						0	209
16:45 – 17:00						0	235
17:00 – 17:15						0	243
17:15 – 17:30						0	232
17:30 – 17:45						0	204
17:45 – 18:00						0	234
					Total	0	1743

Traffic Survey

Date: 5th Jan 94
Location: Tsing Yi South Bridge
Direction: Tsing Yi bound

Duration	Type of Enviropace collection vehicles (no.)						Total no. of vehicles passing (no.)
	Tanker	5-T Truck	15-T Truck	Hooklift Truck	Other	Subtotal	
07:30 – 07:51						0	253
07:51 – 08:06						0	308
08:06 – 08:21						0	307
08:21 – 08:36						0	279
08:36 – 08:51						0	278
08:51 – 09:06						0	242
09:06 – 09:21						0	196
09:21 – 09:30						0	289
					Total	0	2152

16:00 – 16:15		1	1			2	200
16:15 – 16:30			1			1	203
16:30 – 16:45						0	203
16:45 – 17:00						0	189
17:00 – 17:15						0	205
17:15 – 17:30			2	2		4	194
17:30 – 17:45		2	1			3	197
17:45 – 18:00						0	237
					Total	10	1628

Appendix II

Summary of Emergency Response Plan

(Translation of this document is being processed
and will be submitted to EPC when available)