

China State Construction Engineering (Hong
Kong) Limited

Infrastructure for Penny's Bay
Development, Contract 2: *Monthly
Environmental Monitoring & Audit
Report for February 2003 (Revision 1)*

Environmental Resources Management

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MONTHLY ENVIRONMENTAL
MONITORING AND AUDIT REPORT

China State Construction Engineering (Hong
Kong) Limited

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Development, Contract 2: *Monthly
Environmental Monitoring and Audit
Report for February 2003 (Revision 1)*

Reference C2426

For and on behalf of Environmental Resources Management
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Date: <u>13 March 2003</u>

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EXECUTIVE SUMMARY

The construction works of Infrastructure for Penny's Bay Development Contract 2 (Contract CV/2001/10) was commenced on 4 October 2002. This monthly Environmental Monitoring and Audit (EM&A) report presents the EM&A works carried out during the period from 26 January 2003 to 25 February 2003 in accordance with the EM&A Manual.

Summary of construction works undertaken during this reporting period

The major construction works included filling work in Area 1; building demolition, excavation of contaminated soils in Area 2 and Area 3, backfilling of excavation pit in Area 2; solidification of metals-only contaminated soils; pre-drilling; borepiling, ground treatment; slope improvement work; rare species transplantation; box-culvert in Cheoy Lee Shipyard site (CLS) and transportation of contaminated soils, gas pipe installation for thermal desorption plant, commissioning of ventilation system of the storage shed and wastewater treatment plant in To Kau Wan site (TKW).

Environmental Monitoring and Audit Progress

A summary of the monitoring activities in this reporting period is listed below:

24-hour Total Suspended Particulates (TSP) monitoring at AM1	5 times
24-hour Total Suspended Particulates (TSP) monitoring at AM2	5 times
24-hour Total Suspended Particulates (TSP) monitoring at AM3	5 times
24-hour Dioxin monitoring at AM1	1 time
24-hour Dioxin monitoring at AM2	1 time
24-hour Dioxin monitoring at AM3	1 time
Joint environmental site auditing	5 times

Land Contamination

A total of 40,000 m³ of soil has been treated by solidification treatment starting from December 2002 until this reporting period. Samples have been taken and sent to laboratory for the testing. A total of 34,100 m³ of soil has passed the test for both TCLP and compressive strength and 5,900 m³ of soil is still pending for the testing result. No free product was skimmed out during soil excavation within this reporting month.

Air Quality

Five sets of 24-hour TSP monitoring were carried out at Penny's Bay Power Station (AM1), Toll Plaza Administration Building of North Lantau Expressway (AM2) and Dockyard Building next to TKW (AM3) during this reporting period.

Exceedances of A/L level of 24-hour TSP were recorded at AM1 on 27 January 2003, 14 and 20 February 2003 and the data was received by the ETL on 4, 20

and 25 February 2003, respectively. Notifications of exceedance together with the investigations of exceedances were issued to IEC and EPD immediately on 5, 21 and 26 February 2003. IEC has confirmed that the exceedances were unlikely to be due to the Project construction activities. No further follow-up corrective action is required in accordance with the Event/ Action Plan in EM&A Manual.

Exceedance of Action Level of 24-hour TSP was recorded at AM3 on 20 February 2003. The data was received by the ETL on 24 February 2003 and notification of exceedance together with investigation of the exceedance was issued to IEC and EPD immediately on 25 February 2003. IEC has confirmed that the exceedances were unlikely to be due to the Project construction activities on 20 February 2003. No further follow-up corrective action is required in accordance with the Event/ Action Plan in EM&A Manual.

24-hour dioxin monitoring were carried out at AM1, AM2 and AM3 on 27 January 2003 and the monitoring results are all below the action level.

Ecology

Transplantation of rare species and the wetland habitats from donor site (CLS) to the receptor site -Tai Tam Country Park- was completed. The monitoring of the rare species has been undertaken.

Construction Waste Management

In CLS, a 50 m³ of C&D wastes and 99 m³ of general refuse were produced during the reporting period. The C&D waste and the general refuse were disposed of at the WENT Landfill by a licensed waste collector. A total of 21,450 m³ Type A (metal) contaminated material was temporary stored in designated area in CLS; 238 m³ Type B (TPH/SVOCs) and 2,973 m³ and Type C (metals/TPH) contaminated materials were transported from CLS to TKW for storage; 10,209 m³ Type D contaminated material (dioxin/metals/TPH/SVOCs) was excavated and transported to TKW and stored in the shed. Samples of the waste have been taken for the laboratory testing to confirm the type of contamination. The disposal method follows the requirements stated in the Particular Specification.

In TKW, a total of 6 m³ of general refuses were produced and 36 m³ of C&D waste were produced during the reporting period and were disposed of at the WENT Landfill by a licensed waste collector.

Environmental Site Auditing

Five weekly joint environmental site audits were carried out by the representatives of the IEC, RE, CSCE and ET. Details of the audit findings and implementation status are presented in *Section 6*.

Environmental Non-conformance

There are totally three exceedance of 24-hour TSP Action Level and one exceedances of 24-hour TSP Limit Level were recorded in this reporting month. Investigations were carried out and were confirmed by the IEC that the exceedances were not due to the Contract 2 construction works.

No environmental complaints were received in this reporting period.

No environmental summons were received in this reporting period.

Future Key Issues

Area	Work to be taken
CLS	<ul style="list-style-type: none"> • Site clearance • Excavation of contaminated soils including Type A, Type B, C and D in Areas 2 and 3 ^(a) • Backfilling work in Areas 2 and 3 • Filling work in Area 1 • Solidification of metals-only contaminated soil • Borepiling & bridge work • Ground treatment (i.e. stone column and band drain) in adjacent to the CLS site • Slope improvement work • Box culvert • Decommissioned of solidification plant • Bridge work in Area 1 • Hydro-seeding in the newly created slope
TKW	<ul style="list-style-type: none"> • Transportation of contaminated soils from CLS to TKW • Thermal desorption plant installation • Biopiling operation
<p>Note: (a) Type A - metals; type B - TPH/SVOCs; type C - metals/TPH; type D - dioxin/metals/TPH/SVOCs.</p>	

Potential environmental impacts arising from the construction activities in the coming month are mainly associated with dust, site runoff, waste and transportation and storage of non-dioxin and dioxin contaminated soil.

ERM-Hong Kong, Limited (ERM) was appointed by the China State Construction Engineering (Hong Kong) Limited (CSCE) as the Environmental Team (ET) to implement the Environmental Monitoring and Audit (EM&A) programme for the Contract CV/2001/10 of Infrastructure for Penny's Bay Development Contract 2 (the Project).

1.1 PURPOSE OF THE REPORT

This is the fifth EM&A report which summarizes the impact monitoring results and audit findings for the EM&A programme during the reporting period from **26 January 2003** to **25 February 2003**.

1.2 STRUCTURE OF THE REPORT

The structure of the report is as follows:

Section 1 : **Introduction**

details the scope and structure of the report.

Section 2 : **Project Information**

summarizes background and scope of the project, site description, project organization and contact details, construction programme, the construction works undertaken and the status of Environmental Permits/Licenses during the reporting period.

Section 3 : **Environmental Monitoring Requirement**

summarizes the monitoring parameters, monitoring programmes, monitoring methodology, monitoring frequency, monitoring location, Action and Limit Levels, Event Action Plans, environmental mitigation measures as recommended in the EIA report and relevant environmental requirements.

Section 4 : **Implementation Status on Environmental Mitigation Measures**

summarizes the implementation of environmental protection measures during the reporting period.

Section 5 : **Monitoring Results**

summarizes the monitoring results obtained in the reporting period.

Section 6 : **Environmental Site Auditing**

summarizes the audit findings of the weekly site inspections undertaken within the reporting period.

Section 7 : **Environmental Non-conformance**

summarizes any monitoring exceedance, environmental complaints and environmental summons within the reporting period.

Section 8 : **Future Key Issues**

summarizes the impact forecast and monitoring schedule for the next three month (26 February 2003 - 25 May 2003).

Section 9 : **Recommendations and Conclusions**

2.1 BACKGROUND

The Project comprises of the following activities:

- Decommissioning of Cheoy Lee Shipyard and off-site treatment of contaminated soil at To Kau Wan;
- Construction of Water Recreation Centre (remaining part) (i.e., ancillary facilities of a flood storage pond of approximately 12 ha in size);
- Construction of Chok Ko Wan Link Road (remaining part) (i.e., 1.1 km of dual-3 lane carriageway of the Penny's Bay Section of Chok Ko Wan Link Road (CKWLR) which is an expressway); and
- Construction of Road P2 – Yam O to Penny's Bay (remaining part) (i.e., a 0.9 km of Road P2 which is a primary distributor at Penny's Bay).

The potential environmental impacts of the Project have been studied in the following Environmental Impact Assessment (EIA) Report:

- (i) *"Decommissioning of Cheoy Lee Shipyard in Penny's Bay"* (EIAO Register No: AEIAR-055/2002). The EIA was approved on 24 April 2002 under the *Environmental Impact Assessment Ordinance* (EIAO). An Environmental Permit (EP-116/2002/B) associated with the decommission works was also granted on 29 January 2003.
- (ii) *"Northshore Lantau Development Feasibility Study - Environmental Impact Assessment"* (EIAO Register No: AEIAR-031/2000). The EIA was approved on 28 April 2000 under the EIAO. An Environmental Permit (EP-138/2002/B) associated with the infrastructure works to be carried out under CV/2001/10 was granted on 24 January 2003.
- (iii) *"Construction of an International Theme Park in Penny's Bay of North Lantau together with its Essential Associated Infrastructures - Environmental Impact Assessment"* (EIAO Register No: AEIAR-032/2000). The EIA was approved on 28 April 2000 under the EIAO.

Air, noise and water quality sensitive receivers were identified in the above EIA studies and are shown in *Annex A*.

Construction works commenced on 4 October 2002 and are scheduled to be completed by September 2005.

2.2 SITE DESCRIPTION

The works areas in Cheoy Lee Shipyard (CLS) and To Kau Wan (TKW) are illustrated in *Annex B*.

2.3 PROJECT ORGANIZATION

The project organization chart and contact details are shown in *Annex C*.

2.4 CONSTRUCTION PROGRAMME

The construction programme for the Project is presented in *Annex D*. A summary of the major construction activities undertaken in this reporting period is shown in *Table 2.1*.

Table 2.1 *Summary of Construction Activities Undertaken from 26 January 2003 to 25 February 2003*

Area	Construction Activities Undertaken
Cheoy Lee Shipyard (CLS)	<ul style="list-style-type: none"> • Building demolition • Excavation of contaminated soils including Type A, B, C and D in Areas 2 and 3 • Backfilling of excavation pit in Area 2 • Filling work in Area 1 • Solidification of metals-only contaminated soils. • Pre-drilling and Borepiling • Ground treatment (i.e. stone column and band drain) in adjacent to the CLS site • Slope improvement work • Rare species transplantation • Box culvert in Area 3
To Kau Wan (TKW)	<ul style="list-style-type: none"> • Transportation of contaminated soils from CLS to TKW • Gas pipe installation for thermal desorption plant • Biopiling formation • Commissioning of ventilation system of the storage shed • Commissioning of wastewater treatment plant

2.5 STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS

A summary of the relevant permits, licences, and/or notifications on environmental protection for this Project as of February 2003 is presented in *Table 2.2*.

Table 2.2 *Summary of Environmental Licensing, Notification and Permit Status*

Permit/ Licenses/ Notification	Site	Reference	Validity Period	Remarks
Environmental Permits	CLS & TKW	EP-116/2002/B	Throughout the Contract	Issued on 29 January 2003
	CLS	EP-138/2002/B	Throughout the Contract	Issued on 24 January 2003
Notification of Construction Works under Air Pollution Control (Construction)	CLS	--	--	Notification on 12 August 2002

Permit/ Licenses/ Notification	Site	Reference	Validity Period	Remarks
Dust) Regulation				
Construction Noise Permits	CLS	GW-UW0245-02	16 Sep 02 to 15 Mar 03	Superseded by GW- UW0297-02
	CLS	GW-UW0297-02	21 Oct 02 to 12 Apr 03	--
	TKW	GW-UW0321-02	28 Oct 02 to 19 Apr 03	--
	TKW	GW-UW0277-02	13 Oct 02 to 12 Apr 03	--
	TKW	GW-UW0394-02	2 Jan 03 to 1 July 03	--
Water Discharge License	CLS	EP760/973/0078721	13 Jan 03 to 31 Aug 08	--
	TKW	EP760/974/0078491	23 Dec 02 to 31 Dec 07	--
Chemical Waste Producer Registration	CLS	5213-973-C1169-04	Throughout the Contract	--
	TKW	9210-974-L2568-01	--	--
Chemical Waste Collector License	CLS & TKW	9210-974-L2568-WC	29 Nov 02 to 29 Nov 04	--
Landfill allocation for C&D waste	CLS & TKW	EP195/01/24/0450 /2002	Throughout the Contract	EPD replied on 18 Sep 2002

3.1 LAND CONTAMINATION

3.1.1 Soil Excavation

Confirmation Sampling/Testing Requirements

Soil samples will be collected at the limits of excavation for laboratory analysis of contaminants with exceedance in action levels for soil remediation, as required by Particular Specification PS53.26(1) and EP116/2002/B Appendix A.

Confirmatory samples will generally be taken by hand within the excavations, either at the base or on the sidewall. Samples will be tested for either metals, TPH/SVOC, dioxin or combinations of these parameters depending on the type of materials being excavated.

For sampling the walls of a large excavation, an origin will be taken at 5m from the easternmost corner of the excavation and will proceed in a clockwise direction at 15m spacing, plus a lateral midpoint sample on any wall missed by the above. The floor of an excavation will have a grid spacing not greater than 15m x 15m, to give even coverage of the pit (i.e. spacing may vary).

The depth of the validation samples will coincide with the depth of the original Site Investigation (SI) sample result, which triggered the excavation in that sub-area. It may therefore be necessary to take more than one sample from the excavations if there were a number of trigger samples at varying depths within the sub area. Samples will be collected for each depth where a SI sample exceeded the site criteria. If there are any visible indications of contamination, additional samples shall be collected from the apparent impact zone(s) as directed by the Engineer. If there was no SI sample, which triggered excavation on a particular wall, one sample per wall will be taken at the lateral midpoint.

Compliance Assessment and Event/Action Plan

If the analytical results of the confirmation samples are below the concerned action levels for soil remediation, removal of the contaminated soil will be considered complete. If the analytical results exceed the relevant action levels, more soil will be excavated either laterally or vertically depending on whether the exceeding confirmation sample is from a sidewall or excavation base, and additional confirmation samples will be collected and analysed until all confirmation samples are below the relevant action levels. The event and action plan for confirmation sampling/testing for soil excavation is provided in **Table 3.1**.

Table 3.1 *Event/Action Plan for Confirmation Sampling/Testing for Soil Excavation*

Event	Action	Action Party
The concentration of the chemical(s) that triggered the excavation exceed the relevant action levels for soil remediation (as tabulated in <i>Table 3.2</i>).	1. More soil will be excavated either laterally or vertically depending on whether the exceeding confirmation sample is from a sidewall or excavation base.	Contractor
	2. Additional confirmation samples will be collected and analysed until all confirmation samples are below the relevant action levels.	Contractor

The primary Cleanup Targets identified for Soil Remediation and associated action levels for each target, are presented in *Table 3.2*. The soil excavation sampling has been conducted and the samples have been sent to laboratory for testing. The sampling location and the status of the samples are summarized in *Annex E*. The testing results will be presented in *Section 5.1*.

Table 3.2 *Concerned Action Levels and Cleanup Targets for Soil Remediation*

Item	Parameter	Action Level (mg/kg or otherwise specified)	Cleanup Target (mg/kg or otherwise specified)
1	TPH	1000 (total)	1000 (total)
2	Arsenic	30	5 (mg/L as TCLP)
3	Barium	400	21 (mg/L as TCLP)
4	Cadmium	5	0.11 (mg/L as TCLP)
5	Chromium (total)	250	0.6 (mg/L as TCLP)
6	Cobalt	50	Not available
7	Copper	100	7.8 (mg/L as TCLP)
8	Lead	150	0.75 (mg/L as TCLP)
9	Nickel	100	11 (mg/L as TCLP)
10	Molybdenum	40	Not available
11	Tin	50	Not available
12	Zinc	500	4.3 (mg/L as TCLP)
13	Cyanide (total)	50	590 (mg/L as TCLP)
14	Phenol	1	1
15	Styrene	5	5
16	Naphthalene	5	5
17	Benzo(a)pyrene (1,2-benzopyrene)	1	1
18	Total PCB	1 (total)	1 (total)
19	Hexachlorobenzene	0.4	0.4
20	Benzo(a)anthracene	0.9	0.9
21	Bis(2-ethylhexyl)phthalate	46	46
22	Benzo(b)fluoranthene	0.9	0.9
23	Indeno(1,2,3-cd)pyrene	0.9	0.9
24	Dibenz(a,h)anthracene	0.09	0.09
25	Antimony	31	1.15 (mg/L as TCLP)
26	Hexavalent Chromium	270	Not available
27	Dioxins (2,3,7,8-TCDD equivalent)	0.001	0.001

3.1.2 *Removal of Free Product during Soil Excavation*

Monitoring and Confirmation Sampling/Testing Requirements

Where TPH free product is encountered at groundwater surface during excavation within CLS, the free product will be skimmed off from the excavation and disposed of as chemical waste. The skimmer could also be used in the on-site wastewater treatment plant pond if necessary. Any liquid collected will be disposed of as chemical waste. When the materials are separated, it will be containerised properly and collected by a licensed chemical waste collector for off-site disposal. Any oil impregnated solids generated during the skimming process, such as flotsam from the excavation (i.e., wood pieces) and absorbent material used to collect hydrocarbons, will also be disposed as chemical waste.

Skimming of TPH free product will be performed ongoing throughout the excavation process. It is proposed that confirmatory sampling for the free product will be performed once the TPH contaminated soil has been excavated. This would effectively remove potential sources of TPH free product and therefore no slow seepage should be possible.

Skimming of free product will continue until there is no detectable free product on the groundwater surface. An oil/water interface probe will be used to confirm that the oil has been removed from the excavation, measured to a tolerance of 1.5 mm. Where the surfaces area of the excavation is large, such that an interface probe may not accurately detect the presence of free-product, the removal of oil will be confirmed visually. A confirmation sample of groundwater in the pit will be collected at the surface of the groundwater and analysed for TPH by a laboratory accredited by the Hong Kong Laboratory Accreditation Scheme (HOKLAS) to demonstrate that the TPH concentration is 213 mg/l.

Compliance Assessment and Event/Action Plan

Removal of all encountered TPH free product will be considered complete when :

- (i) There is no detectable free product present on the surface of the groundwater where free product has been encountered; and
- (ii) The TPH concentration of the confirmation sample is below 213 mg/l (allowable TPH concentration derived from risk-based assessment in the EIA report).

Skimming of free product will be continued until all encountered free product has been removed. The event/action plan for the removal of encountered free product is given in *Table 3.3*.

Table 3.3 *Event/Action Plan for Confirmation Sampling/Testing for Free Product Encountered*

Event	Action	Action Party
1. Detectable free product is present on the surface of groundwater at excavated area(s) where free has been encountered during excavation (The usual detection limit of an oil/water interface probe is 1.5 mm).	1. Skimming of free product will be continued until no detectable free product is present on the groundwater surface.	Contractor
2. TPH concentration in the confirmation groundwater sample is higher than 213 mg/l (allowable TPH concentration derived from risk-based assessment in the EIA report).	2. Skimming of free product will be continued until the TPH concentration in the confirmation groundwater sample is below 213 mg/l.	Contractor

3.1.3 *Solidification Treatment*

Confirmation Sampling/Testing Requirements

Following solidification treatment for metal-contaminated soil and curing of the solidified soil, confirmation sampling/testing will be undertaken to ensure that the cleanup targets have been attained.

Confirmation samples will be collected with a sampling frequency of one sample per 100m³ of treated material. Each sample will be a composite sample collected at 5 locations throughout the treated soil pile, and the same volume of sample will be collected at each of the locations so that the composite sample is not biased.

Confirmation samples will be analysed in an HOKLAS accredited laboratory for the concerned soluble metals using Toxicity Characteristics Leaching Procedure (TCLP) in accordance with USEPA Method 1311.

In order to ensure the soil will be solidified in the solidification process, all the soil treated with solidification/stabilisation will be tested for unconfined compressive strength. All the treated soil will have an unconfined compressive strength of at least 1 Mpa, with reference to UCS testing for hazardous waste solidification requirement.

As the maximum grain size of filling material is 250mm, the solidified soil will be broken down to below this size before being used as filling materials. Whenever the treated soil is to be reused as filling material, the metals only solidified soil will be put below at least 1m of clean fill.

For dioxins/metal solidified soil containing dioxins at 1 ppb TEQ, they will be put below at least 3 m of clean fill to protect human health & below at least 2 m of clean soil for soil containing other chemicals to protect ecological receptors.

The amount of soil treated and details of laboratory testing are presented in *Section 5.1.3*.

Compliance Assessment and Event/Action Plan

The “Universal Treatment Standard” (UTS) will be used for interpretation of the TCLP test results to assess if the cleanup targets have been attained.

If either the cleanup targets or the target unconfined compressive strength have not been achieved, the treated material will be crushed and returned to the solidification process. The event and action plan for confirmation sampling/testing for solidification treatment is given in *Table 3.4*.

Table 3.4 *Event/Action Plan for Confirmation Sampling/Testing for Solidification Treatment*

Event	Action	Action Party
1. Respective cleanup targets (as tabulated in <i>Table 3.2</i>) of any confirmation samples have not been attained	1. The treated material will be crushed and returned to the solidification until the respective cleanup targets have been achieved	Contractor
2. Unconfined compressive strength of 1 MPa has not been attained for all confirmation samples	2. The treated material will be crushed and returned to the solidification until the respective cleanup targets have been achieved	Contractor

3.2 *AIR QUALITY*

3.2.1 *Monitoring Requirement*

Excavation works of the contaminated materials were carried out in CLS during this reporting period. Therefore 24-hour TSP monitoring were carried out at AM1 to AM3 to monitor the construction dust impact and 24-hour dioxin monitoring was carried out at AM1 to AM3 to monitor the ambient dioxin level in this reporting period. The detailed results of the 24-hour TSP monitoring at AM1 to AM3 and 24-hour dioxin monitoring at AM1 to AM3 will be presented in *Section 5.2*.

The established Action/Limit Levels for the 24-hour and 1-hour TSP monitoring works; and 24-hour Dioxin monitoring works are summarized in *Tables 3.5 to 3.7* respectively.

Table 3.5 *Action and Limit Level for 24-hours TSP Monitoring*

Monitoring Location	Description	Action Level (µgm⁻³)	Limit Level (µgm⁻³)
AM1	Penny’s Bay Power Station	172 (a)	260
AM2	Toll Plaza Administration Building of North Lantau Expressway	172 (b)	260
AM3	Dockyard Building next to TKW	161 (b)	260

Monitoring Location	Description	Action Level (μgm^{-3})	Limit Level (μgm^{-3})
Note:			
(a) The 24-hr TSP action level for AM1 is developed using the impact monitoring data from Contract No.CV/99/12 - EM&A of the Penny's Bay Reclamation Stage 1 – covering a three months period.			
(b) The action levels for AM2 and AM3 are developed based on the EP-116/2002/A baseline monitoring results.			

Table 3.6 *Action and Limit Level for 1-hour TSP Monitoring ^(a)*

Monitoring Location	Description	Action Level (μgm^{-3})	Limit Level (μgm^{-3})
AM1	Penny's Bay Power Station	339 ^(a)	500
AM2	Toll Plaza Administration Building of North Lantau Expressway	302 ^(a)	500
AM3	Dockyard Building next to TKW	299 ^(a)	500
Note:			
(a) The 1-hr TSP action levels are developed based on the EP-116/2002/A baseline monitoring results.			

Table 3.7 *Action and Limit Level for 24-hours Dioxin Monitoring*

Monitoring Location	Description	Action Level (pg I-TEQ m^{-3}) ^(a)	Limit Level
AM1	Penny's Bay Power Station	16.9	HPCL _{1-hr} of 33.6
AM2	Toll Plaza Administration Building of North Lantau Expressway	16.9	pg I-TEQ/ m^3
AM3	North Lantau Expressway	16.9	
Note:			
(a) The 24-hr dioxin action levels are developed based on the EP-116/2002/A baseline monitoring results.			

3.2.2 *Monitoring Parameters, Frequency and Programme*

The monitoring parameters and frequency are summarized in *Table 3.8*. The monitoring programme for the reporting period is shown in *Annex F*.

Table 3.8 *TSP and Dioxin Monitoring Parameter and Frequency*

Parameter	Frequency
• 24-hours TSP	• Once every 6 days
• 1-hour TSP ^(a)	• 3 times every 6 days
• 24-hours Dioxin	• Once every month for the first 6 month
	• After review of monitoring results and subject to the agreement of the IEC, the Engineer and EPD, then once every 3 months.
Note:	
(a) 1-hour TSP monitoring will be carried out in case of any air quality complaint due to Contract 2 works.	

3.2.3 *Monitoring Location*

In accordance with the EM&A Manual, three monitoring stations were selected. The locations of the three monitoring stations are listed in *Table 3.9* and are shown in *Annex G*.

Table 3.9 *Monitoring Locations*

Monitoring Location	Description
AM1	Penny's Bay Power Station
AM2	Toll Plaza Administration Building of North Lantau Expressway
AM3	Dockyard Building next to TKW

3.2.4 *Monitoring Equipment*

Continuous 24-hour and 1-hour TSP (in case of complaints received) monitoring were performed using High Volume Samplers (HVS) with appropriate sampling inlets installed, located at the designated monitoring station. The HVS composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with the standard method "Determination of Suspended Particulate Matter in the Atmosphere (High Volume Method)" as stipulated in *US EPA Standard Title 40, Cod of Federation Regulations Chapter 1 (Part 50 Appendix B)*. **Table 3.10** summarizes the equipment that was used in the 24-hour and 1-hour TSP monitoring programme.

Continuous 24-hour Dioxin monitoring was performed using PUF Samplers with the pre-treated quartz-fibre filter and PUF glass cartridge will be used for 24 hours to sample 325 to 400m³ ambient air. The PUF sampler composed of a motor, a PUF glass cartridge holder, a flow controller and a sampling inlet and its performance specification complies with the standard method *Title 40 of the Code of Federal Regulations of the USEPA and USEPA Method TO-9A*. **Table 3.11** summarizes the equipment that was used in the 24-hours Dioxin monitoring programme.

Table 3.10 *TSP Monitoring Equipment*

Monitoring Location	Equipment	Model
AM1	HVS Calibration Kit	GMWS 2310 HVS with TSP sampling inlet GMW-25
AM2	HVS Calibration Kit	ThermoAndersen model GV2360-80 HVS G2535 Calibration Kit
AM3	HVS Calibration Kit	ThermoAndersen model GV2360-80 HVS G2535 Calibration Kit

Table 3.11 *Dioxin Monitoring Equipment*

Monitoring Location	Equipment	Model
AM1	PUF Sampler Calibration Kit	ThermoAndersen model GPS1 G40 PUF Calibration Kit
AM2	PUF Sampler Calibration Kit	ThermoAndersen model GPS1 G40 PUF Calibration Kit
AM3	PUF Sampler Calibration Kit	ThermoAndersen model GPS1 G40 PUF Calibration Kit

Wind monitoring equipment was installed at the rooftop of the Dockyard Building next to TLW (AM3) on 12 February 2003 for logging wind speed and wind direction. The wind sensor was fixed on a 4m mast above the rooftop of the Dockyard Building which is above 9m high. For installation and operation of the wind data monitoring equipment, the following points will be observed:

- the wind sensors will be installed on masts at an elevated level 10 m above the ground, so that they are clear of obstructions or turbulence caused by building(s);
- the wind data will be captured by a data logger and be downloaded for processing at least once a month;
- the wind data monitoring equipment will be re-calibrated at least once every six months; and
- wind direction will be divided into 16 sectors of 22.5 degrees.

If exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the IEC and Engineer, and agreed with EPD.

3.2.5 *Monitoring Methodology and Calibration Details*

Installation

The HVS monitors were placed at the rooftop of a plant room of the Penny's Bay Power Station (about 3.5 m above ground) (AM1), rooftop of the Toll Plaza Administration Building of North Lantau Expressway (AM2) and rooftop of dockyard Building next to TKW (AM3), which was freestanding with no obstruction. The HVS was situated about 1.3 meters above the rooftop.

The PUF Samplers with PUF glass cartridge for dioxin monitoring was also installed beside the HVS monitors at AM1, AM2 and AM3.

The following criteria were considered in the installation of the HVS and PUF Sampler:

- a horizontal platform with appropriate support to secure the samplers against gusty wind was provided;
- the distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS;
- a minimum of 2 metres separation from walls, parapets and penthouses was required for rooftop samplers;
- no furnace or incinerator flues were nearby;

- airflow around the sampler was unrestricted; and
- permission was obtained to set up the samplers and to obtain access to the monitoring stations.

Preparation of Filter Papers for TSP Monitoring

- glass fibre filters were labeled and sufficient filters that were clean and without pinholes were selected;
- all filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ± 3 °C; the relative humidity (RH) was < 50% and not variable by more than ± 5 %. A convenient working RH was 40%; and
- two HOKLAS accredited laboratories, *Wellab Ltd* and *Hong Kong Productivity Council (HKPC)* have comprehensive quality assurance and quality control programmes.

Preparation of PUF Cartridge for Dioxin Monitoring

- Pre-treated quartz fibre filter and PUF glass cartridge were prepared;
- *HKPC*, a HOKLAS accredited laboratory, has comprehensive quality assurance and quality control programmes.

Field Monitoring for TSP

- the power supply was checked to ensure the HVS worked properly;
- the filter holder and the area surrounding the filter were cleaned;
- the filter holder was removed by loosening the fowl bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully;
- the filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter;
- the swing bolts were fastened to hold the filter holder down to the frame. The pressure applied should be sufficient to avoid air leakage at the edges;
- then the shelter lid was closed and secured with the aluminum strip;
- the HVS was warmed-up for about 5 minutes to establish run-temperature conditions;
- a new flowrate record sheet was set into the flow recorder;
- the flow rate of the HVS was checked and adjust at around 1.1 m³/min. The range specified in the EM&A Manual was between 0.6 – 1.7 m³/min;

- the programmable timer was set for a sampling period of 24 hours \pm 1 hour, and the starting time, weather condition and the filter number were recorded;
- the initial elapsed time was recorded;
- at the end of sampling, the sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact;
- it was then placed in a clean plastic envelope and sealed;
- all monitoring information was recorded on a standard data sheet; and
- filters were sent to *Wellab Ltd* for analysis.

Field Monitoring for Dioxin

- the power supply was checked to ensure the PUF Sampler worked properly;
- the PUF glass cartridge holder and the area surrounding the holder were cleaned;
- the PUF Sampler was warmed-up for about 5 minutes to establish run-temperature conditions;
- a new flowrate record sheet was set into the flow recorder;
- the flow rate of the PUF Sampler was checked and adjusted at 8 standard cubic feet per minute (scfm) (0.225 std m³/min) to obtain a total sample volume of greater than 325 scm over a 24-hours period;
- the programmable timer was set for a sampling period of 24 hours \pm 1 hour, and the starting time, weather condition and the filter number were recorded;
- the initial elapsed time was recorded;
- at the end of sampling, the sampled PUF glass cartridge was removed carefully and covered with another quartz filter;
- the whole glass cartridge is then wrapped with the original aluminum foil, capped with Teflon end caps, placed back into the original shipping containers, identified, and shipped to the analytical laboratory for sample processing and analysis by HRGC-HRMs.

Maintenance and Calibration for TSP Monitor

- the HVS and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply;

- the flow rate of each HVS with mass flow controller were calibrated using an orifice calibrator. Initial calibrations of the dust monitoring equipments were conducted upon installation and prior to commissioning. Five-point calibration was carried out for ThermoAndersens GMWS-2310 HVS using GMW-25 Calibration Kit every two months for AM1; and for AM2 and AM3; five point calibration were carried out for ThermoAndersens GV2360-80 HVS using G2535 Calibration Kit every month.

Maintenance and Calibration for Dioxin Monitor

- the PUF sampling system and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply;
- initial calibration of the dioxin monitoring equipments were conducted upon installation and prior to commissioning. Five-point calibration was carried out for ThermoAndersens GPS1 PUF using G40 PUF Calibration Kit once every six months.
- The calibration record for both High Volume Sampler for TSP and PUF Sampler for Dioxin are shown in *Annex H*.

3.2.6 *Event Action Plans*

The Event and Action Plan (EAP) for air quality monitoring is presented in *Annex I*.

3.3 *WATER QUALITY MONITORING*

Wastewater treatment facilities were in operation in both CLS and TKW, the treated water was re-used on site and no effluent discharge during this reporting period. Water sample was taken in both CLS and TKW at the end of February and the result is pending and will be presented in the next monitoring report.

3.4 *ECOLOGICAL MONITORING*

Transplantation of rare species and wetland habitats from donor site (CLS) to the receptor site, Tai Tam Country Park, was completed. All mitigation measures implemented for rice fish and rare/restricted plants are summarized in *Annex J1*.

3.5 *WASTE MANAGEMENT*

Wastes generated from this Project included construction and demolition (C&D) materials including C&D wastes and public fill, excavated materials, chemical waste and general refuse. The Waste Management Plan has

recommended procedures for handling of C&D materials, excavated materials, chemical waste and general refuse.

Based on the information provided by CSCE with respect to relevant handling records and trip tickets of this Project, the quantities of different types of waste are summarized in *Table 3.12*. Detailed breakdown of the contaminated soils in Area 1, 2 and 3 in CLS are summarized in *Table 3.13*.

Table 3.12 *Quantities of C&D Materials and Chemical Waste Generated*

Site	Quantities (m ³)				
	C&D Waste ^(a)	Public Fill ^(b)	General Refuse	Chemical Waste ^(c)	Recyclable ^(d)
CLS	50	--	99	--	--
TLW	36	--	6	--	--
Total	86	--	105	--	--

Notes

(a) C&D wastes included vegetated materials and wood
(b) Public fill included bricks, rubble and concrete
(c) Oily wastewater from SI decontamination work
(d) Metal

Table 3.13 *Quantity of Different Types of Contaminated Soil Generated in Areas 1, 2 and 3 in CLS*

Area	Quantity of Contaminated Soil Excavated (m ³)			
	Type A ^(a)	Type B ^(b)	Type C ^(c)	Type D ^(d)
1	-	-	-	-
2	1,846	238	2,202	-
3	19,604	-	771	10,209
Total	21,450^(e)	238^(f)	2,973^(f)	10,209

Notes:

(a) Type A : Metals
(b) Type B : TPH/SVOCs
(c) Type C : Metals/TPH
(d) Type D : Dioxin/metals/TPH/SVOCs
(e) End of this reporting month, Type A contaminated soil was temporary stored in Building R and V for solidification treatment.
(f) End of this reporting month, all the Type B and C contaminated soil were transported to TKW from CLS.

The C&D wastes were disposed of at the WENT landfill and the Public Fill materials were disposed of at the Tuen Mun Area 38 Public Filling Area. The scrubbed material are temporary stored in TKW for storage and the chemical waste, which was generated from the site investigation and building decontamination are stored in TKW and will be collected by waste collector. Type A contaminated soil will be temporary stored in Building R for solidification treatment; Type B and C contaminated soil were transported from CLS to TKW for storage; Type D contaminated soil was transported to TKW and temporary stored in a shed for decontamination treatment. The potential non-dioxin contaminated materials samples have been taken and

sent to the laboratory for the contamination confirmation test. The disposal method will be according to EP-116/2002/B and summarized in **Table 3.14**. The excavation of dioxin contaminated soils was complied with EP-116/2002/B which is limited to 200 m³/hr. The hourly excavation rates are summarized in **Annex E1**.

Table 3.14 Remediation Method for Contaminated Soil

Contaminated Soil Type	Soil Content	Remediation Method
A	Metals	Cement solidification
B	TPH/SVOCs only	Biopiling
C	TPH/SVOCs and Metals	Biopiling followed by cement solidification
D	Dioxins and other Contaminants	Thermal desorption alone or followed by cement solidification

IMPLEMENTATION STATUS ON ENVIRONMENTAL PROTECTION REQUIREMENTS

The Contract has implemented all environmental mitigation measures and requirements as stated in the EIA Report, Environmental Permits and EM&A Manual. The implementation status during the reporting period is summarized in *Annexes J1 and J2*.

5 MONITORING RESULTS

5.1 LAND CONTAMINATION

5.1.1 Soil Excavation

Samples have been taken for laboratory testing to confirm the extent of the removal of contaminated soil required. The laboratory testing results are summarized in *Annex E2*.

5.1.2 Removal of Free Product during Soil Excavation

No free product was skimmed out during soil excavation within this reporting period.

5.1.3 Solidification Treatment

A total of 40,000 m³ of soil has been treated starting from December 2002 until this reporting period. Samples have been taken and sent to laboratory for the testing. A total of 34,100 m³ of soil has passed the test for both TCLP and compressive strength and 5,900 m³ of soil is still pending for the testing result and will be presented in the next monitoring report.

5.2 AIR QUALITY

The TSP monitoring data at AM1 are provided by MEMCL – CED’s EM&A Consultant for Penny’ Bay Reclamation Stage 1 Project and AM2 and AM3 TSP monitoring are undertaken by ERM. Five TSP monitoring events of AM1, AM2 and AM3 were undertaken in this reporting period. In addition, one dioxin monitoring at AM1, AM2 and AM3 were carried out by ERM during this reporting month. The TSP monitoring data together with wind data are summarized in *Annex K1* and graphical presentations of the TSP monitoring results are presented in *Annex K2*. In addition, the dioxin monitoring data are presented in *Annex K3* and the graphical presentations are presented in *Annex K4*. A disk containing monitoring results is also attached in *Annex K1*. The monitoring results could also be found in the Contract 2 web-site, i.e., www.pennysbaycontract2.com.

Exceedance of A/L Level of 24-hour TSP were recorded at Penny’s Bay Power Station (AM1) on 27 January 2003, 14 and 20 February 2003. The data were received by the ETL on 4, 20 and 25 February 2003, respectively and notifications of exceedance together with investigations of exceedances were issued to EPD and IEC immediately on 5, 21 and 26 February 2003. Summary of the investigation of the exceedance was presented in *Section 7.1*. The IEC has confirmed that the exceedances were unlikely to be due to the Project construction activities. Therefore, no further corrective action is required in accordance with the Event/ Action Plan in EM&A Manual.

Exceedance of Action Level of 24-hour TSP was recorded at AM3 on 20 February 2003. The data was received by the ETL on 24 February 2003 and notification of exceedance together with investigation of exceedance was issued to IEC and EPD immediately. Investigations of the exceedance were undertaken. IEC has confirmed that the exceedances were unlikely to be due to the Project construction activities on 20 February 2003. No further follow-up corrective action is required in accordance with the Event/ Action Plan in EM&A Manual.

24-hour dioxin monitoring were carried out at AM1, AM2 and AM3 on 27 January 2003 and the monitoring results are all below the action level.

Weekly site inspections were carried out by representatives of the IEC, the Engineer, CSCE and the ET. Five site inspections were conducted on 27 January, 4, 10, 17 and 24 February 2003. The major findings are summarized as follows:

Empty Containers and Oil Drums

In CLS

- Empty engine oil containers outside Building T in CLS were observed on 27 January 2003 and 4 February 2003. The contractor should dispose these containers in a designated area to prevent any contamination. No empty oil containers outside Building T were found during the site inspection on 10 February 2003.
- Engine oil containers were observed outside Area 3 on 4 February 2003 without proper storage. The contractor should store it in a proper location in order to prevent any leakage. No engine oil containers were observed during the site inspection on 10 February 2003 in Area 3
- Two oil tanks without covers were observed in Area 2 on February 4, 2003. The main contractor should remind their sub-contractor to cover all the oil tanks in order to prevent any accidental spillage. Two oil tanks were covered during the site inspection 10 February 2003.
- 3 oil tanks without drip trays in Area 2 of CLS were observed on 10 and 17 February 2003. The Contractor should ensure all oil tanks are located within drip tray. The Contractor has arranged to remove the drums or provide them with drip trays and this mitigation measures were observed during the site inspection on 24 February 2003.

In TKW

- 2 oil tanks without drip trays in TKW were observed on 10 and 17 February 2003. The Contractor should ensure all oil tanks are located within drip tray. The Contractor has arranged to provide them with drip trays and this mitigation measures were observed during the site inspection on 24 February 2003.

Vehicle Movement

In CLS

- On 27 January, 10 and 17 February 2003, the Contractor was reminded that sufficient time should be given when the trucks pass through the automatic wheel washing facility in Area 3 of CLS.

- Two loaded trucks transporting dioxin contaminated soils without undertaking decontamination measures such as wheel washing were observed in Area 2 (D3) of CLS on 4 February 2003. It is prohibited to leave the decontamination area without carrying out decontamination measures. Decontamination pad/units should be provided at every exit of the contaminated zone for vehicles and all trucks carrying contaminated soil should be decontaminated before leaving the site. CSCE agreed to require the sub-contractor to undertake decontamination measure such as wheel wash to the loaded trucks transporting dioxin contaminated soils and the implementation date will be confirmed later.
- Not all trucks were observed to be well labeled to indicate the type of contaminated soil transporting on 27 January and 4 February 2003 in CLS. Clear labeling indicated different types of soils should be put on the truck transporting the contaminated soil. Clear labeling indicated different types of soil was observed during the site inspection on 10 February 2003.
- No flashing light was observed on 4 February 2003 on one escort vehicle in CLS. The sub-contractor should alert their driver to turn on the flashing siren light in order to improve safety and visibility. The Contractor agreed to alert their sub-contractor to remind the driver to turn on the flashing light on the escort vehicle and flashing light on the escort vehicles was on during the site inspection on 10 February 2003.
- One truck without covering the tarpaulin sheet was observed in Area 3 of CLS on 10 February 2003. The Contractor/sub-contractor should ensure that all trucks were covered entirely by tarpaulin sheet. The sub-contractor has been reminded in writing and no truck without covering the tarpaulin sheet was observed in Area 3 on 17 February 2003.
- Few trucks carrying the contaminated soil did not pass through the wheel washing bay in CLS was observed on 10 February and 17 February 2003. The Contractor/sub-contractor should alert their driver to pass through the wheel-washing bay before leaving the site. The contractor has been given a written reminder to their sub-contractor of the necessary requirement.
- No de-contamination pad and manual wheel washing were operating in Area 2 (Building S) during the site audit on 24 February 2003. The Contractor should ensure the de-contamination pad and wheel washing facility is in normal operation condition and ensure all the loaded trucks should pass the de-contamination pad and wheel washing facility before leaving CLS.

In TKW

- Trucks were observed on 27 January 2003 to be overloaded with contaminated soil at both CLS and TKW. The Contractor should remind their sub-contractors that loaded trucks should not be overloaded with contaminated soil in order to prevent any contaminated soil spilling out.

- Partial coverage of load on trucks at both CLS and TKW was observed on 27 January and 4 February 2003. The Contractor should provide suitable sized tarpaulin sheets to ensure that loads are covered entirely. The situation has been improved and most of the loaded trucks were fully covered with tarpaulin sheets during the site inspection on 10 February 2003
- The haul road and track access road beside the biopiling area in TKW was too dry on 27 January 2003. These areas should be watered more frequently to minimize dust impact. Watering activities were observed during the site inspection on 4 February 2003
- Truck was observed on 10 February 2003 to be drive too fast when passing the wheel washing bay and spill out the wastewater in TKW. The contractor/sub contractor should alert their driver to drive slowly when passing the wheel-washing bay in both TKW and CLS.

Waste

In CLS

- No sufficient skip was provided on CLS was observed on 10 February 2003. The contractor should ensure sufficient waste skips were provided onsite in order to keep the site as clean as possible.
- General waste was observed on CLS on 17 February 2003; and around the Area 3 of CLS on February 2003. The contractor should ensure sufficient waste skips were provided in order to keep the site as clean as possible. Also, the contractor should ensure that the C&D waste, general refuse and chemical waste should be sorted and disposal to a designated area.
- Skip in Area 2 was observed to be too full on 24 February 2003. The contractor was advised to clean up the skip more frequently in order to keep the site clean.

Dust

In CLS

- Area 2 was observed to be dusty on 10 February 2003 during demolition work. The Contractor/sub-contractor should increase the watering frequency. The sub-contractor has been reminded in writing of this necessary requirement and the improvement was observed during the site inspection on 24 February 2003.

Others

In CLS

- No clear fencing or indicators to separate D3 and A40 in CLS was observed on 10 February 2003. Therefore, the contractor/sub-contractor

should provide a fencing or indicator between the sub-area in order to show a worker what kind of personal protection equipment that they should wear.

- Some workers did not wear appropriate personal protection equipment during site remediation in Area 2 (Building S) and Area 3 in CLS was observed on 24 February 2003. The contractor/sub-contractor should ensure their workers to wear appropriate personal protection equipment.

In TKW

- Fencing used to separate the biopile area and the shed storing the Type D soil in TKW was not erected properly on 27 January 2003. The Contractor should ask their sub-contractor to erect the fencing properly to separate the two different zones. Fencing was erected properly and was observed during the site inspection on 4 February 2003.
- Out-dated Environmental Permit was found at TKW on 24 February 2003. The Contractor should ensure to place updated EPs and CNPs at the entrance of the site.

7.1 SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE

Two exceedances of 24-hour TSP Action level were recorded at AM1 on 27 January and 14 February 2003; and one exceedances of 24 hour TSP Limit level were recorded at AM1 on 20 February 2003 in this reporting period. The data were received by the ETL on 4, 20 and 25 February 2003 and notifications of exceedance were issued immediately on 5, 21 and 26 February 2003, respectively. Investigations of the exceedance were undertaken.

One exceedance of 24-hour TSP Action level were recorded at AM3 on 20 February 2003 in this reporting period. The data were received on 24 February 2003 and notifications of exceedance were issued immediately on 25 February 2003, respectively. A summary of non-compliance recorded in this reporting period are presented in *Table 7.1*.

Table 7.1 *Table 7.1 Summary of Environmental Non-Compliance*

Reporting Period	Nature	No. of Exceedance	
		Action Level	Limit Level
04/10/02 - 25/10/02	24-hour TSP	1	-
	24-hour Dioxin	-	-
26/10/02 - 25/11/02	24-hour TSP	2	-
	24-hour Dioxin	-	-
26/11/02 - 25/12/02	24-hour TSP	2	-
	24-hour Dioxin	-	-
26/12/02 - 25/1/03	24-hour TSP	5	2
	24-hour Dioxin	-	-
26/1/03 - 25/2/03	24-hour TSP	3	1
	24-hour Dioxin	-	-

7.1.1 Investigation Report on Exceedances

In CLS --- AM1

On 27 January 2003, pile cap construction, borehole predrilling, sandfilling and compaction, excavation of contaminated materials, slope excavation, installation of soil nail are the major construction works in Area 1. Excavation of contaminated materials and installation of band drain are the major construction activities in Area 2 respectively. Erection of formworks for box culvert and drainage pipe, installation of stone column and excavation of contaminated materials are the major construction work in Area 3. The works area of Areas 1 and 2 are located far away from the AM1 (more than 350 m) and the works area of Area 3 is located at 120 m from AM1. In accordance with the weather data measured at Tsing Yi, Chek Lap Kok and Cheung Chau weather stations, the wind was blown mainly from northerly and north-westerly and the AM1 is located at the southeast of the CLS. With

the large separation of CLS area 1 & 2 to AM1, the construction works carried out would not be the major source causing exceedance. Although area 3 is located close to AM1, the limited dust emission from construction works would not also be the major dust source causing exceedance. Besides, the large surcharge with more than 4m high was found to be located between Area 3 and AM1. All the stockpiles have been covered by tarpaulin sheet, trucks transporting contaminated soils were totally enclosed and wheel wash trough is provided in CLS. Therefore, with the large separation of area 1 and 2, limited dust emission from construction works in area 3, obstruction by surcharge and with incorporation of dust control measures, it is, therefore, concluded that the exceedance of AM1 was not caused by the construction works of Contract 2. The IEC has confirmed that the exceedance was unlikely to be due to the Project construction activities. Therefore, no further corrective action is required in accordance with the Event/Action in EM&A Manual. However, to minimize the cumulative dust impact in the vicinity, it is recommended to increase the frequency of watering on haul road and limit the speed of vehicle within the Contract 2 works area.

On 14 February 2003, borepiling, slope improvement work, soil nail installation and pile-cap works are the major construction activities in Area 1. Erection of falsework for box culvert, stone column, band drain, slope work, soil nail installation, excavation and solidification works are the major construction activities in Area 2. Installation of pipe work and excavation work in Area 3 are the major construction works for the captioned project in CLS. The works area of Areas 1 and 2 are located far away from the AM1 (more than 350 m) and the works area of Area 3 is located close to AM1 (120 m). In accordance with the weather data measured at Tsing Yi, Chek Lap Kok and Cheung Chau weather stations, the wind was blown mainly from easterly and south-easterly and the AM1 is located at the southeast of the CLS. With the large separation of CLS area 1 & 2 to AM1, the construction works carried out would not be the major source causing exceedance. Although area 3 is located beside the AM1, due to the opposite wind blown, the exceedance would not be caused by the construction works in area 3. In addition, all the stockpiles have been covered by tarpaulin sheet, trucks transporting contaminated soils were totally enclosed and wheel wash trough is provided in CLS. Therefore, with the large separation of area 1 and 2, opposite wind direction and with the incorporation of dust control measures, it is, therefore, concluded that the exceedance of AM1 was not caused by the construction works of Contract 2. The IEC has confirmed that the exceedance was unlikely to be due to the Project construction activities. Therefore, no further corrective action is required in accordance with the Event/Action in EM&A Manual. However, to minimize the cumulative dust impact in the vicinity, it is recommended to increase the frequency of watering on haul road and limit the speed of vehicle within the Contract 2 works area.

On 20 February 2003, construction of pile cap and column, installation of borepile and soil nail, and formation of surcharge in Area 1; installation of soil nail, formation of surcharge, excavation of contaminated material and solidification work in Area 2; and excavation of contaminated material and

erection formwork for box culvert in Area 3 are the major construction activities. The works area of Areas 1 and 2 are located far away from the AM1 (more than 350 m) and the works area of Area 3 is located close to AM1 (120 m). In accordance with the weather data measured at Tsing Yi, Chek Lap Kok and Cheung Chau weather stations, the wind was blown mainly from easterly and south-easterly and the AM1 is located at the southeast of the CLS. With the large separation of CLS area 1 & 2 to AM1, the construction works carried out would not be the major source causing exceedance. Due to the opposite wind blown, the exceedance would not be caused by the construction works in area 3. In addition, all the stockpiles in area 3 have been covered by tarpaulin sheet, trucks transporting contaminated soils were totally enclosed, the main haul road is watered to keep wet all the time and wheel wash trough has been provided in area 3. Therefore, with the large separation of area 1 and 2, opposite wind direction and with the incorporation of dust control measures, it is, therefore, concluded that the exceedance of AM1 was not caused by the construction works of Contract 2. It is envisaged that the exceedance may be more likely due to the fugitive dust emission during vehicle movement on the Contract 1 main haul road which is located immediately beside the AM1. The IEC has confirmed that the exceedance was unlikely to be due to the Project construction activities. Therefore, no further corrective action is required in accordance with the Event/ Action in EM&A Manual.

In TKW --- AM3

During the TSP monitoring for AM3 on 20 February 2003, transportation of contaminated soils from CLS to TKW for stockpiling at the storage shed was the major work undertaking for the captioned project in TKW. In accordance with the weather data measured at Tsing Yi, Chek Lap Kok and Cheung Chau weather stations, the wind was blown mainly from easterly and south-easterly. The AM3 is located at the roof top of the Dockyard Building which is at the south of the TKW site. Also, all the stockpiles have been covered by tarpaulin sheet, trucks transporting contaminated soils were totally enclosed and wheel wash trough is provided. The main haul road was watered to keep wet all the time. Other activities outside TKW site such as laying of Town Gas pipeline and trucks movement on the road going to Yam O MTRC site were identified to be carried out during the TSP monitoring and it is expected that these activities may contribute to the exceedance due to its close proximity to AM3. Hence, it could be concluded that the small exceedance was likely due to the outside construction activities, the wind erosion of the exposed area and fugitive dust emission from the vehicle movement on exposed area in TKW. The Contractor has been advised to increase the frequency of watering on the exposed area of TKW. The Contractor has also alerted the drivers to limit the speed within TKW site. The IEC has confirmed that the exceedance was unlikely to be due to the Project construction activities. Therefore, no further corrective action is required in accordance with the Event/ Action in EM&A Manual. However, to minimize the cumulative dust impact in the vicinity, it is recommended to increase the

frequency of watering on haul road and limit the speed of vehicle within the Contract 2 works area.

7.2 SUMMARY OF ENVIRONMENTAL COMPLAINT

No environmental complaint was received in this reporting period. A statistical summary of environmental complaints since project commencement is presented in *Table 7.2*.

Table 7.2 Statistical Summary of Environmental Complaints

Reporting Period	Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
04/10/02 - 25/10/02	0	0	0
26/10/02 - 25/11/02	0	0	0
26/11/02 - 25/12/02	0	0	0
26/12/02 - 25/01/03	1	1	Dust
26/01/03 - 25/02/03	0	0	0

7.3 SUMMARY OF ENVIRONMENTAL SUMMONS

No summons was received in this reporting period. A statistical summary of legal proceeding since project commencement is presented in *Table 7.3*.

Table 7.3 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons		
	Frequency	Cumulative	Complaint Nature
4/10/02 - 25/10/02	0	0	0
26/10/02 - 25/11/02	0	0	0
26/11/02 - 25/12/02	0	0	0
26/12/02 - 25/01/03	0	0	0
26/01/03 - 25/02/03	0	0	0

8.1 KEY ISSUES FOR THE COMING MONTH

Works to be taken for the coming monitoring period are summarized in *Table 8.1*:

Table 8.1 Construction Works to be taken in the Coming Reporting Month

Area	Work to be taken
CLS	<ul style="list-style-type: none"> • Site clearance • Excavation of contaminated soils including Type A, Type B, C and D in Areas 2 and 3 ^(a) • Backfilling work in Area 2s and 3 • Filling work in Area 1 • Solidification of metals-only contaminated soil • Borepiling & bridge work • Ground treatment (i.e. stone column and band drain) in adjacent to the CLS site • Slope improvement work • Box culvert • Decommissioned of solidification plant • Bridge work in Area 1 • Hydro-seeding in the newly created slope
TKW	<ul style="list-style-type: none"> • Transportation of contaminated soils from CLS to TKW • Thermal desorption plant installation • Biopiling operation
Note:	
(a) Type A - metals; type B - TPH/SVOCs; type C - metals/TPH; type D - dioxin/metals/TPH/SVOCs.	

Potential environmental impacts arising from the above construction activities are mainly associated with dust, site runoff, waste and impacts associated with the excavation of contamination soil. With the implementation of the following mitigation measures, potential impacts could be minimized:

Construction Dust

- Frequent watering of haul road and exposed areas;
- Prohibition of open burning;
- Covering stockpile of the contaminated materials with tarpaulin and provision of bottom liner to the stockpile;
- Covering load on truck when leaving the site; and
- Provision and operation of vehicle washing facilities.

Construction Site Runoff

- Identification of sources of wastewater generated from the site;
- Removal of silt/sand/mud from drain to avoid overflow during raining period; and

- Treatment of wastewater during excavation of the contaminated area prior to disposal.

Construction Waste Management

- Provision of sufficient skips for the temporary storage of general refuse;
- Sorting of C&D materials and other wastes including steel, general refuse or machines/equipment;
- Avoidance of accumulation of waste materials or rubbish on site; and
- Regular removal of waste materials or general refuses on site.

Transportation of non-dioxin and dioxin contaminated soil

- All trucks used for transportation on non-dioxin contaminated soil shall be lined with impermeable sheet to prevent spills and leakage; and run on the designated route. In addition, the non-dioxin-contaminated soil shall be fully covered with impermeable sheet; and
- All dioxin contaminated soils shall be transported in enclosed, sealed containers securely attached to the transportation vehicle. The trucks delivering dioxin-contaminated soils from the CLS site to TKW site should be escorted by two other vehicles, one in the front and the other at the back. In addition, the vehicle for escorting shall be equipped with equipment for handling and clean-up of spillage of dioxin contaminated soil;
- Decontaminated pads/units should be provided and maintained at every exit of the contaminated zone for vehicles at both CLS & TKW sites.

Storage of non-dioxin and dioxin contaminated soil

- Excavated soils shall be loaded directly onto vehicles for transportation of contaminated soils at the point of excavation to avoid stockpiling of contaminated soils and minimize double handling and any associated loss;
- Handling process of contaminated soils should as screening and crushing shall be conducted in a roofed and sheltered environment which shall be bottom lined with concrete or impermeable sheet;
- All storage facilities for dioxin-contaminated soils shall be enclosed and bottom lined with concrete to prevent generation of contaminated runoff. A leachate sump shall be installed at each facility to collect any leachate from the soil stack. All leachate collected shall be directed to the wastewater treatment facilities.

Biopiling

- All leachate collected shall be treated in the wastewater treatment facilities.
- Biopiles after formation shall be covered by anchored impermeable geotextiles to prevent contaminated runoff.
- All biopiles shall be at all times covered by impermeable sheeting to control air and water pollution.

- Emission characterization study for biopiling process shall be conducted to determine parameters of the emission control system of the biopiling process for identifying exact concentration of individual species of Volatile Organic Compounds (VOCs)
- All gases generated in the biopiling process shall be collected and treated through carbon absorber with at least 99% removal efficiency of Total Organic Compounds (TOC).

8.2 *MONITORING SCHEDULE FOR THE COMING MONTHS*

The tentative schedules for 24-hour TSP monitoring at all air monitoring stations (AM1 – AM3) from 26 February 2003 to 25 May 2003 are presented in *Annex L*. The schedule for 24-hour dioxin monitoring at AM1 to AM3 for the next three months are on 27 February 2003, 27 March 2003 and 27 April 2003.

8.3 *CONSTRUCTION PROGRAMME FOR THE NEXT THREE MONTHS*

The construction programme for the next three months are presented in *Annex D*.

9.1 CONCLUSIONS

The Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken during the period from 26 January 2003 to 25 February 2003 in accordance with EM&A Manual and the requirement under EP-116/2002/B and EP-138/2002/B.

Land Contamination

A total of 40,000 m³ of soil has been treated by solidification treatment starting from December 2002 until this reporting period. Samples have been taken and sent to laboratory for the testing. A total of 34,100 m³ of soil has passed the test for both TCLP and compressive strength and 5,900 m³ of soil is still pending for the testing result. No free product was skimmed out during soil excavation within this reporting month.

Air Quality

Five sets of 24-hour TSP monitoring were carried out at Penny's Bay Power Station (AM1), Toll Plaza Administration Building of North Lantau Expressway (AM2) and the Dockyard Building next to TKW (AM3) during this reporting period. Exceedances of A/L level of 24-hour TSP were reported at AM1 on 27 January 2003, 14 and 20 February 2003; and at AM3 on 20 February 2003. Notifications of Exceedance were submitted to IEC and EPD.

24-hour Dioxin monitoring were carried out at AM1, AM2 and AM3 on 27 January 2003 and the monitoring results are below the action level.

No environmental complaint and summons/prosecutions were received during the reporting period since the commencement of the Project.

Ecology

Transplantation of rare species and the wetland habitats from donor site (CLS) to the receptor site -Tai Tam Country Park- was completed.

Construction Waste Management

In CLS, a total of 50 m³ of C&D wastes and 99 m³ of general refuse were produced during the reporting period. In TKW, a total of 6 m³ of general refuses and 36 m³ of C&D wastes were produced during the reporting period.

A total of 21,450 m³ Type A (metal) contaminated material was temporary stored in designated area in CLS; 238 m³ Type B (TPH/SVOCs) and 2,973 m³ and Type C (metals/TPH) contaminated materials were transported from CLS to TKW for storage; 10,209 m³ Type D contaminated material

(dioxin/metals/TPH/SVOCs) was excavated and transported to TKW and stored in the shed.

9.2

RECOMMENDATIONS

In accordance with the environmental site audits undertaken during the report month, the following recommendations are made:

- Main haul road and exposed area should be watered frequently;
- Stockpile of contaminated materials should be covered and impervious sheet should also be provided as bottom line and well separate;
- Clear labeling should be provided for each stockpile to indicate 1) where the materials come from; 2) what type of contamination; and 3) what kind of materials;
- Watering frequency should be increased during the dust generating activities;
- Different types of waste should be segregated properly and general refuse should not be mixed with chemical waste
- Decontamination pad/ units should be provided at every exit of the contaminated zone for vehicles and ensure all trucks carrying contaminated soils are decontaminated before leaving the site;
- Fuel drums and engine oil containers should be stored in a designated area with a clear labeling;
- The load of trucks should be fully covered;
- Drip trays should be used for storing the fuel drum and it should be cleaned up to avoid the accumulation of wastewater.

The ET will keep track on the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.