

# The Hongkong Electric Co Ltd

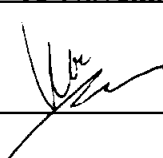
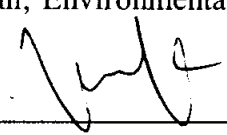
香港電燈有限公司



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) ORDINANCE, CAP. 499

ENVIRONMENTAL PERMIT NO. EP-071/2000/C

**LAMMA POWER STATION EXTENSION  
ENVIRONMENTAL MONITORING & AUDIT PROGRAMME  
AT OPERATIONAL PHASE**

Report Title	Environmental Monitoring and Audit Report (October 2006)
Date	10 November 2006
Certified by	 (Mr. IP Tat-Yan, Environmental Team Leader)
Verified by	 (Maunsell Environmental Management Consultants Ltd, Independent Environmental Checker)

## TABLE OF CONTENT

### EXECUTIVE SUMMARY

<b>1.</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Background	1
1.2	Project Organisation	2
1.3	Plant Availability during the Reporting Month	2
1.4	Summary of EM&A Requirements	2
<b>2.</b>	<b>AIR QUALITY.....</b>	<b>7</b>
2.1	Monitoring Requirements	7
2.2	Summary of Results And Observations	7
<b>3.</b>	<b>NOISE .....</b>	<b>8</b>
3.1	Monitoring Requirements	8
3.2	Summary of Results And Observations	8
<b>4.</b>	<b>WATER QUALITY.....</b>	<b>10</b>
4.1	Monitoring Requirements	10
4.2	Summary of Results And Observations	10
4.3	Implementation Status on Thermal Plume and Residual Chlorine Surveys	11
<b>5.</b>	<b>ENVIRONMENTAL AUDIT .....</b>	<b>12</b>
5.1	Review of Environmental Monitoring Procedures	12
5.2	Assessment of Environmental Monitoring Results	12
5.3	Status of Environmental Licensing and Permitting	13
5.4	Implementation Status of Environmental Mitigation Measures	14
5.5	Implementation Status of Event/Action Plans	14
5.6	Implementation Status of Environmental Complaint Handling Procedures	14
<b>6.</b>	<b>FUTURE KEY ISSUES.....</b>	<b>15</b>
6.1	Outage Plan for the coming 3 months	15
6.2	Key issues for the coming month	15
<b>7.</b>	<b>CONCLUSION .....</b>	<b>16</b>

### LIST OF TABLES

Table 2.1	Air Quality Monitoring Parameters and Frequency
Table 3.1	Noise Monitoring Parameter and Frequency
Table 4.1	Water Quality Monitoring Parameters and Frequencies
Table 5.1	Summary of Action/Limit Level Exceedances on Monitoring Parameters
Table 5.2	Summary of Environmental Licensing and Permit Status
Table 5.3	Environmental Complaints / Enquiries Received in October 2006
Table 5.4	Outstanding Environmental Complaints / Enquiries Carried Over

## **LIST OF FIGURES**

- Figure 1.1 Location of Lamma Power Station Extension
- Figure 1.2 Layout of Transmission System
- Figure 1.3 Layout of Gas Pipeline
- Figure 1.4 Organization Chart at Operational Phase
- Figure 3.1 Location of Noise Monitoring Station

## **APPENDIX**

- Appendix A Event/Action Plans
- Appendix B Action and Limit Levels for Air Quality, Noise and Water Quality Monitoring
- Appendix C Air Quality Monitoring Results
- Appendix D Noise Monitoring Results
- Appendix E Summary Results and Observations on Water Quality Monitoring
- Appendix F Summary of EMIS

## EXECUTIVE SUMMARY

The operational phase of Lamma Power Station Extension commenced in mid October 2006 following the completion of erection works and commissioning tests for Unit L9. This is the first monthly Environmental Monitoring and Audit (EM&A) report for the Project "Operation of Lamma Power Station Extension prepared by the Environmental Team (ET). This report presents the results of impact monitoring on air quality, noise, water quality and environmental audit for the operation of the said project in October 2006.

Air quality, noise and water quality monitoring were performed. The results were checked against the established Action/Limit (AL) levels. The implementation status of the environmental mitigation measures, Event/Action Plan and environmental complaint handling procedures were also checked.

### Plant Availability

Unit L9 was fully available from 15<sup>th</sup> October to the end of the reporting month.

### Environmental Monitoring Works

Environmental monitoring works, as mentioned in the EM&A manual (Operational phase), were performed during the operation of Lamma Power Station Extension in the reporting period.

#### *Air Quality*

No exceedance of Action and Limit levels on stack NO<sub>x</sub> was recorded in the reporting month.

#### *Noise*

No exceedance of Action and Limit levels for noise was recorded in the reporting month.

#### *Water Quality*

No exceedance of Action and Limit levels for water quality was recorded in the reporting month.

### Environmental Licensing and Permitting

Description	Permit / Licence No.	Valid Period		Issued To	Date of Issuance
		From	To		
Environmental Permit	EP-071/2000/C	18/05/2005	-	HEC	18/05/2005
Specified Processes Licence issued under APCO	L-7-002(6)	14/09/2006	31/12/2008	HEC	13/09/2006
WPCO discharge licence for L1-L9 and GT57	EP890/W2/XD008 (V.1)	29/06/2006	30/11/2009	HEC	29/06/2006

### **Implementation Status of Environmental Mitigation Measures**

Environmental mitigation measures were implemented in the reporting month.

### **Environmental Complaints**

No complaint against the Project was received in the reporting month.

### **Future key issues**

Key issues to be considered in the coming month include:

#### *Air Impact*

- To continuously monitor the stack NO<sub>x</sub> for Lamma Power Station Extension.

#### *Noise Impact*

- To continuously monitor the noise for Lamma Power Station Extension.

#### *Water Impact*

- To continuously carry out the water quality monitoring for Lamma Power Station Extension.

### **Concluding Remarks**

The environmental performance of the project was generally satisfactory.

## 1. INTRODUCTION

The operational phase Lamma Power Station Extension commenced in mid October 2006 following the completion of erection works and commissioning tests for Unit L9. The Environmental Team (hereinafter called the “ET”) was formed within The Hongkong Electric Co. Ltd (HEC) to undertake Environmental Monitoring and Audit for “Operation of Lamma Power Station Extension” (hereinafter called the “Project”). Under the requirements of Section 6 of Environmental Permit EP-071/2000/C, an EM&A programme for impact environmental monitoring set out in the EM&A Manual (Operational Phase) is required to be implemented. In accordance with the EM&A Manual, environmental monitoring of air quality, noise and water quality are required for the Project.

This report summarizes the environmental monitoring and audit work for the Project for the month of October 2006.

### 1.1 Background

The Project involves the construction and operation of a gas-fired power station employing combined cycled gas turbine technology, forming an extension to the existing Lamma Power station. The following outlines the key elements of the Project including the new power station and its associated transmission system and submarine gas pipeline.

#### (a) The New Power Station

##### Combined Cycle Plant

Six 300 MW class gas-fired combined cycle units will be constructed on the Lamma Extension. Each unit will consist of a gas turbine, a heat recovery steam generator (HRSG), a steam turbine, a generator and a flue gas stack of about 110 m.

##### Gas Receiving Station

To receive natural gas delivered from a regional LNG terminal through a pipeline, a gas receiving station is required. Received natural gas is processed in the receiving station and subsequently delivered to the plant for combustion. Major components of the station include shut-off valves, pig receiver, filter, gas heaters, pressure regulator, metering device, stack and protection system to ensure safe operation.

The Project area for the operation of new power station is shown in Figure 1.1.

#### (b) Transmission System

The electricity generated from the Lamma Extension Project is transmitted via a new transmission system linking the Lamma Extension to load centres on Hong Kong Island

as shown in Figure 1.2.

(c) Gas Pipeline

Natural gas for the new power station is supplied via a submarine pipeline from a regional LNG terminal located at Cheng Tou Jiao in Shenzhen as shown in Figure 1.3.

## 1.2 Project Organisation

The management structure to oversee the Project includes the following:

- Environmental Protection Department (The Authority);
- General Manager (Projects) (The official contact person between HEC and EPD);
- Environmental Team Leader (ET);
- Independent Environmental Checker (IEC);
- Environmental Team (ET).

The organization chart for the Operation EM&A programme is shown in Figure 1.4.

## 1.3 Plant Availability during the Reporting Month

Unit L9 was fully available from 15<sup>th</sup> October to the end of the reporting month.

## 1.4 Summary of EM&A Requirements

The EM&A program requires environmental monitoring for air quality, noise and water quality. The EM&A monitoring work for air quality, noise and water quality are described in Sections 2, 3 and 4 respectively.

The following environmental audits are summarized in Section 5 of the report:

- Environmental monitoring results;
- The status of environmental licensing and permits for the Project;
- The implementation status of environmental protection and pollution control / mitigation measures.

The future key issues for the Project will be reported in Section 6 of this report.

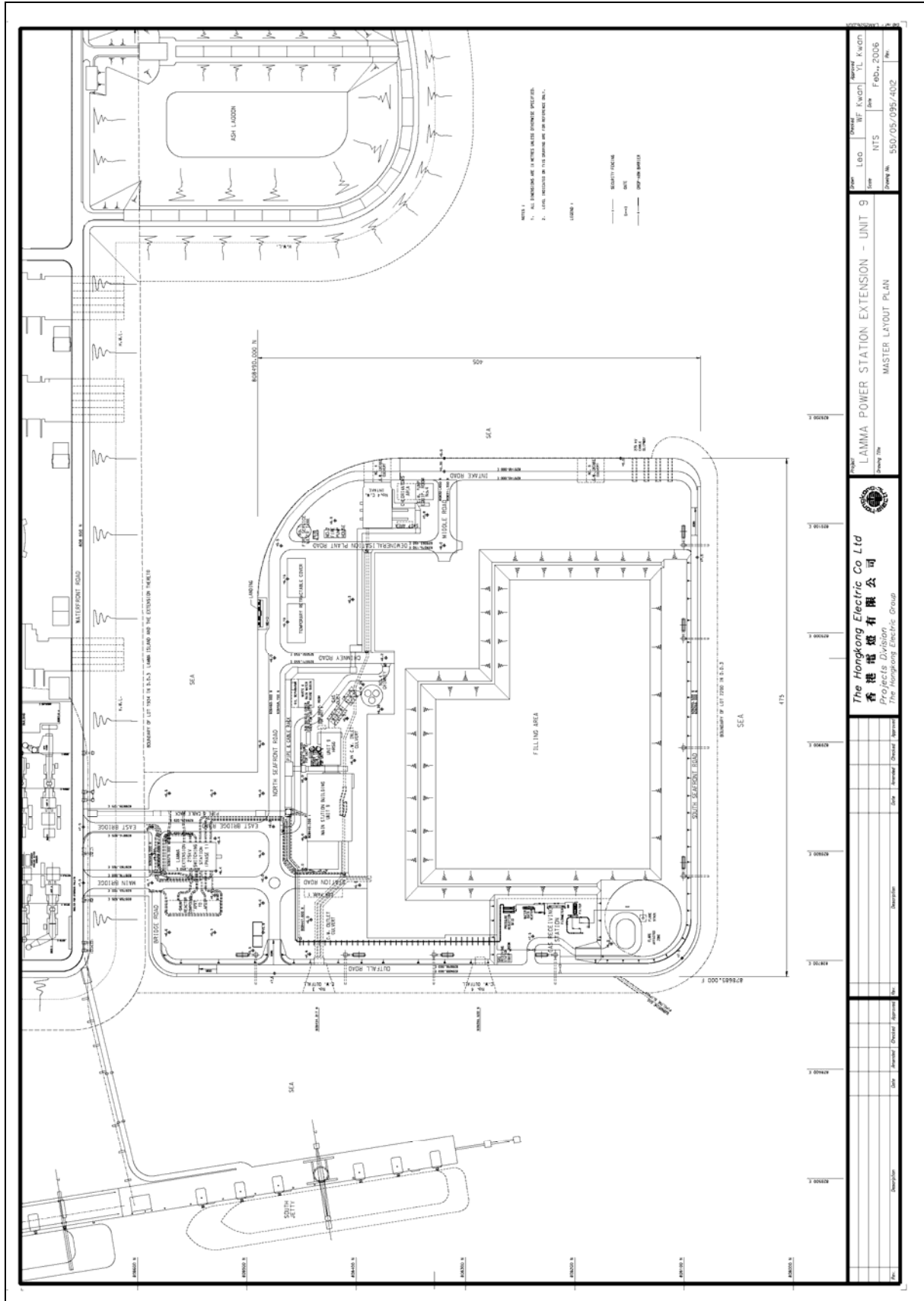
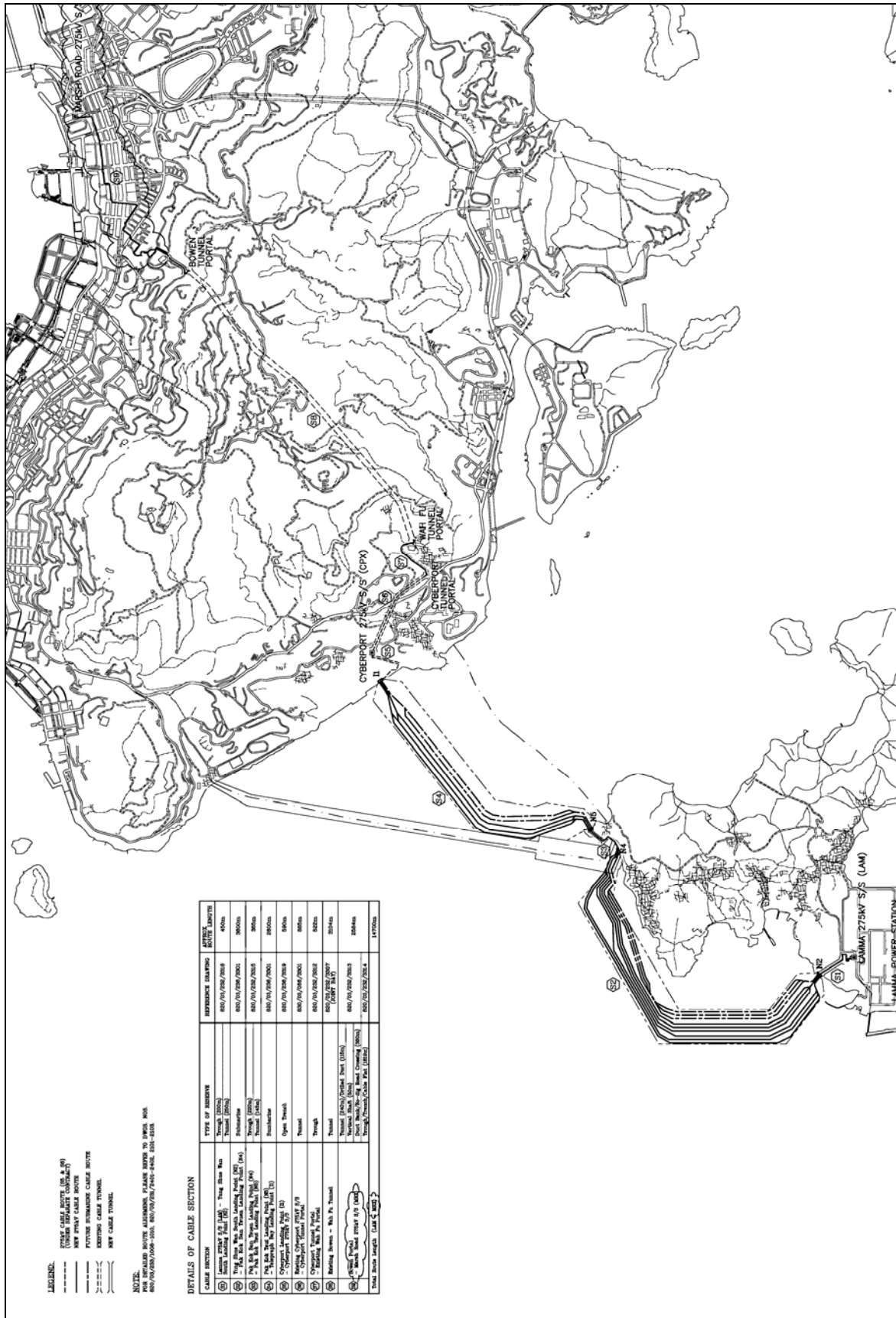


Figure 1.1 Layout of Lamma Power Station Extension





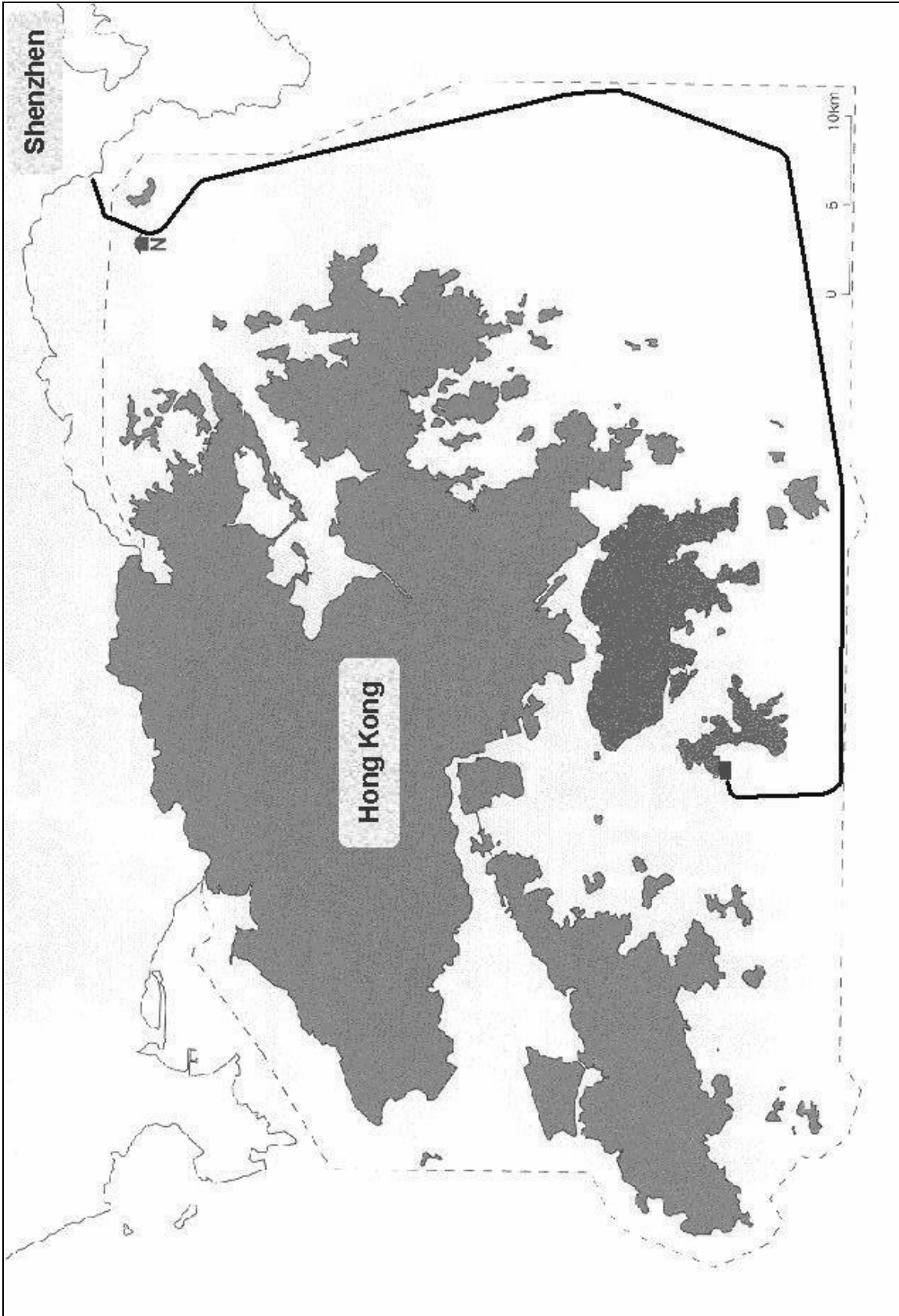


Figure 1.3 Layout of Gas Pipeline

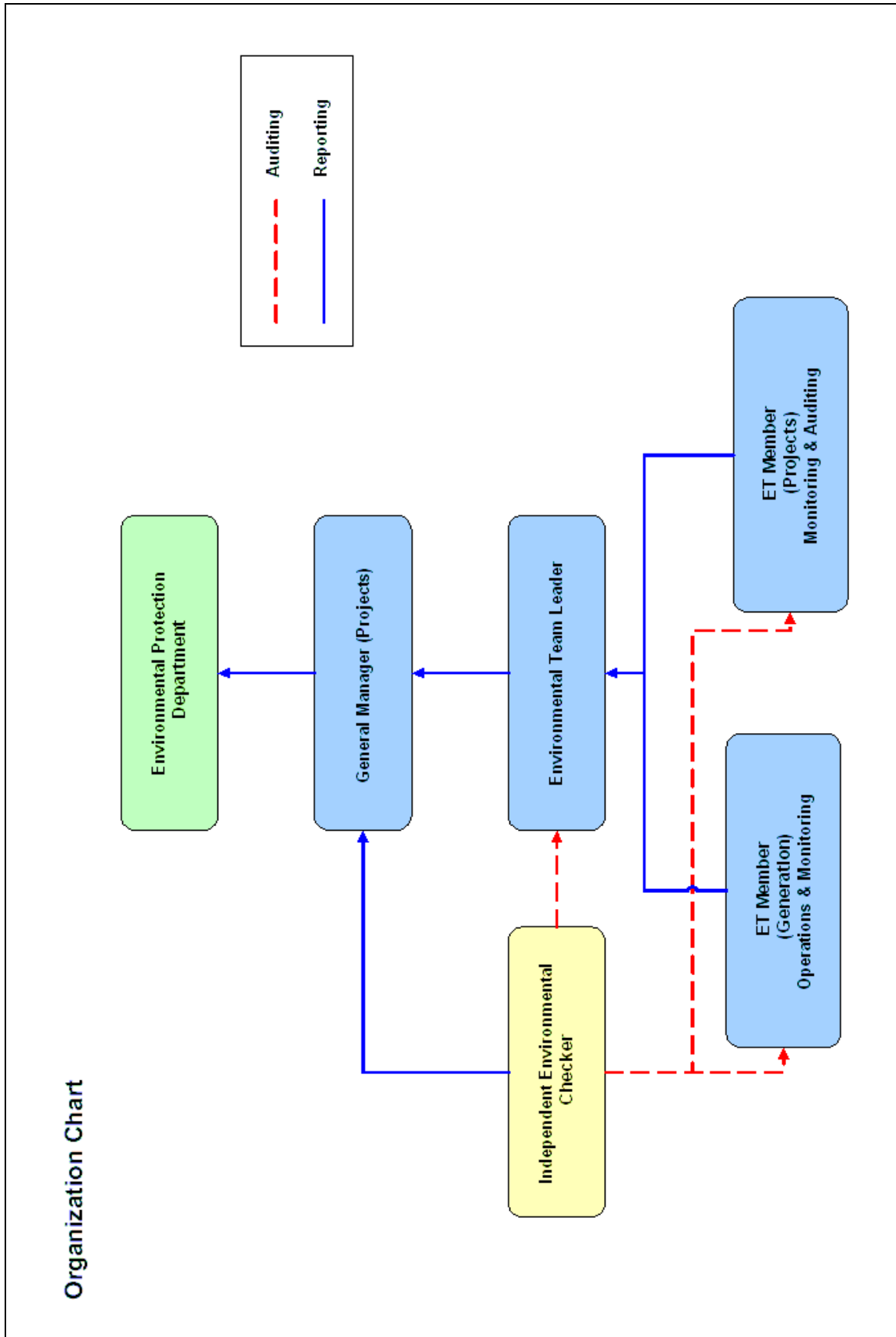


Figure 1.4 Organization Structure at Operational Phase of Lamma Power Station Extension

## 2. AIR QUALITY

### 2.1 Monitoring Requirements

In accordance with the EM&A manual (Operational Phase) for Lamma Extension, stack NO<sub>x</sub> is continuously monitored. Stack NO<sub>x</sub> monitoring data would be checked against the Action/Limit Levels stated in the EM&A manual. The monitoring frequency is shown in Table 2.1 below:

Table 2.1 Air Quality Monitoring Parameters and Frequency

Parameter	Frequency
Hourly Average Stack NO <sub>x</sub>	Continuous

### 2.2 Summary of Results and Observations

Monitoring of stack NO<sub>x</sub> was conducted during the operation of Unit L9 in the reporting month. A monthly summary of monitoring data is shown in Appendix C.

No Action/Limit Level exceedance on stack NO<sub>x</sub> was recorded in the reporting month.

### 3. NOISE

#### 3.1 Monitoring Requirements

In accordance with the EM&A Manual for Lamma Extension (Operational Phase), continuous noise monitoring at Ash Lagoon is carried out to calculate the noise arising from the operation of Lamma Extension at the critical NSR at Hung Shing Ye. The noise monitoring data would be checked against the Limit Levels specified in the EM&A Manual.

The noise monitoring location is shown in Figure 3.1. The monitoring parameter and frequency are shown in Table 3.1 below:

Table 3.1 Noise Monitoring Parameter and Frequency

Parameter	Frequency	Time Period
30-min $L_{Aeq}$	continuous	0700-2300 hrs and 2300-0700 hrs of next day

#### 3.2 Summary of Results and Observations

Continuous noise monitoring was conducted at the monitoring station at Ash Lagoon. The monitoring results are shown in Appendix D.

No Action/Limit Level exceedance on noise was recorded in the reporting month.

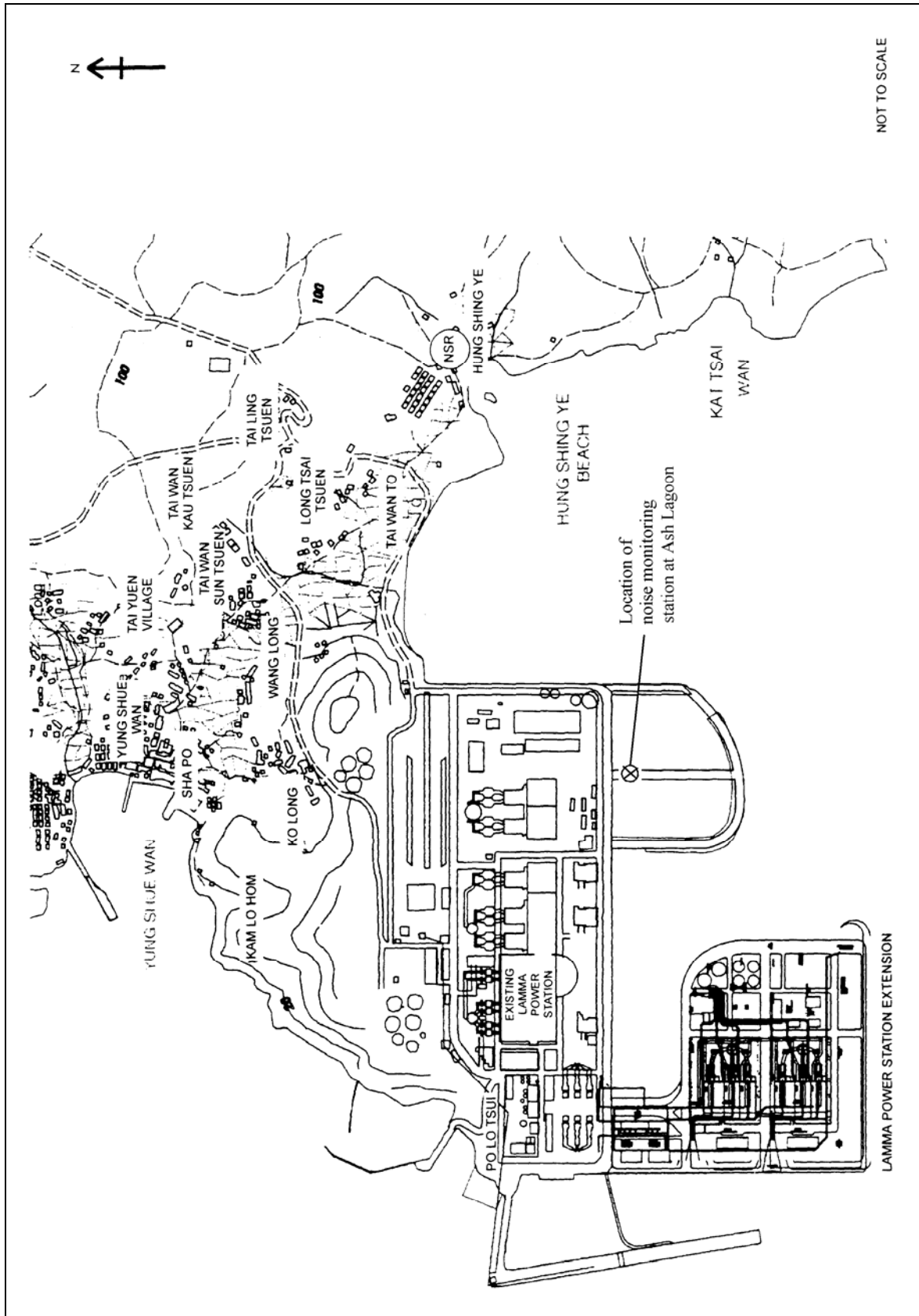


Figure 3.1 Location of Noise Monitoring Station

## 4. WATER QUALITY

### 4.1 Monitoring Requirements

In accordance with the EM&A manual for Lamma Extension (Operational Phase), the monitoring requirements for the EM&A work should strictly follow the discharge licence for L1-L9 & GT57 issued under the Water Pollution Control Ordinance (WPCO).

The parameters as stated in Table 4.1 were monitored and checked against the Action/Limit Levels as given in Appendix B. Pursuant to the WPCO discharge licence, the oil free drain of Unit L9 is transferred back to the existing Effluent Treatment Plant at Lamma Power Station for treatment. There is no oil free drain discharged at the Lamma Extension.

Table 4.1 Water Quality Monitoring Parameters and Frequencies

Item	Parameters	Frequency
1	Cooling Water Temperature Rise	Daily
2	Total Residual Chlorine	Bi-weekly
3	Temperature of Blowdown Effluent	At least twice per year
4	Suspended Solids from Blowdown Effluent	At least twice per year
5	Grease & Oil from Blowdown Effluent	At least twice per year
6	Scum of foam in ambient water	Daily

### 4.2 Summary of Results and Observations

Monitoring of various parameters as listed in Table 4.1 above were carried out during the operation of Unit L9 in the reporting month. A monthly summary of the data is shown in Appendix E.

The data recorded for the monitoring parameters were all below their corresponding Action/Limit Levels. No Action/Limit level exceedance was recorded in the reporting month. There was no foam present within 500 meters of Hung Sing Ye Beach in the reporting month. Details of the foam observation report are also given in Appendix E. The effluent quality was generally satisfactory.

### **4.3 Implementation Status on Thermal Plume and Residual Chlorine Surveys**

One survey for thermal plume and residual chlorine concentration at the seawater around the discharges from the Lamma Power Station and Lamma Power Station Extension shall be carried out after the commissioning of each of the generating units for the Project. The first survey would be tentatively conducted in the summer of 2007 for the first gas-fired combined cycle unit L9.

No survey was carried out in the reporting month.



## 5. ENVIRONMENTAL AUDIT

### 5.1 Review of Environmental Monitoring Procedures

The environmental monitoring procedures were regularly reviewed by the Environmental Team. No modification to the existing monitoring procedures was recommended.

### 5.2 Assessment of Environmental Monitoring Results

#### *Monitoring results for Air Quality, Noise and Water Quality*

The environmental monitoring results for air quality, noise and water quality in October 2006 presented in Sections 2, 3 and 4 respectively are summarized in Table 5.1.

Table 5.1 Summary of Action/Limit Level Exceedances on Monitoring Parameters

Item	Parameter Monitored	Monitoring Period	No. of Exceedances In		Event/Action Plan Implementation Status and Results
			Action Level	Limit Level	
Air					
1	Stack NOx	15/10/06-31/10/06	0	0	
Noise					
1	Noise levels at the critical NSR at Hung Shing Ye calculated by the noise alarm monitoring system	15/10/06-31/10/06	0	0	
Water					
1	Cooling Water Temperature Rise	15/10/06-31/10/06	0	0	
2	Total Residual Chlorine	15/10/06-31/10/06	0	0	
3	Temperature of Blowdown Effluent	15/10/06-31/10/06	N/A	0	

Item	Parameter Monitored	Monitoring Period	No. of Exceedances In		Event/Action Plan Implementation Status and Results
			Action Level	Limit Level	
4	Suspended Solids from Blowdown Effluent	15/10/06-31/10/06	N/A	0	
5	Grease & Oil from Blowdown Effluent	15/10/06-31/10/06	N/A	0	
6	Inspection of Scum/Foam in ambient water	15/10/06-31/10/06	0	0	

#### *Land Contamination*

There was no land contamination incident happened in the reporting month.

#### *Waste Management*

Waste management practice was properly implemented for operation of the project as outlined in the Waste Management Plan for Lamma Power Station Extension. There was no unacceptable environmental impact on waste management in the reporting month.

### **5.3 Status of Environmental Licensing and Permitting**

All permits/licenses obtained as of October 2006 are summarised in Table 5.2.

Table 5.2 Summary of Environmental Licensing and Permit Status

Description	Permit / Licence No.	Valid Period		Status
		From	To	
Environmental Permit	EP-071/2000/C	18/05/2005	-	Valid
Specified Processes Licence issued under APCO	L-7-002(6)	14/09/2006	31/12/2008	Valid
WPCO discharge licence for L1-L9 and GT57	EP890/W2/XD008 (V.1)	29/06/2006	30/11/2009	Valid

#### 5.4 Implementation Status of Environmental Mitigation Measures

Mitigation measures detailed in the permits and the EM&A Manual (Operational Phase) are required to be implemented. An updated summary of the Environmental Mitigation Implementation Schedule (EMIS) is presented in Appendix F.

#### 5.5 Implementation Status of Event/Action Plans

The Event/Action Plans for air quality, noise and water quality extracted from the EM&A Manual (Operational Phase) are presented in Appendix A.

As no Action/Limit level exceedance was recorded, no action has been devised.

#### 5.6 Implementation Status of Environmental Complaint Handling Procedures

In October 2006, no complaint against the Project was received.

Table 5.3 Environmental Complaints / Enquiries Received in October 2006

Case Reference / Date, Time Received / Date, Time Concerned	Descriptions / Actions Taken	Conclusion / Status
Nil	N/A	N/A

Table 5.4 Outstanding Environmental Complaints / Enquiries Carried Over

Case Reference / Date, Time Received / Date, Time Concerned	Descriptions / Actions Taken	Conclusion / Status
Nil	N/A	N/A

## **6. FUTURE KEY ISSUES**

### **6.1 Outage Plan for the coming 3 months**

No major outage plan for the next 3 months.

### **6.2 Key issues for the coming month**

Key issues to be considered in the coming month include:

#### *Air Impact*

- To continuously monitor the stack NO<sub>x</sub> for Lamma Power Station Extension.

#### *Noise Impact*

- To continuously monitor the noise for Lamma Power Station Extension.

#### *Water Impact*

- To continuously carry out the water quality monitoring for Lamma Power Station Extension.

## 7. CONCLUSION

Environmental monitoring was performed as required in the reporting month. All monitoring results were checked and reviewed.

No Action/Limit level exceedance on stack NO<sub>x</sub> was recorded in the reporting month.

No Action/Limit level exceedance on noise was recorded in the reporting month.

No Action/Limit level exceedance on water quality parameters were recorded in the reporting month.

Environmental mitigation measures recommended in the Project Profile were implemented in the reporting month. No complaint against the Project was received in the reporting month. No prosecution was received for this Project in the reporting period.

The environmental performance of the Project was generally satisfactory.

## Appendix A Event/Action Plans

Table A.1 Event/Action Plan for Air Quality

Exceedance	ET Leader	IEC	Operations Engineer
<b>Action Level</b>			
Exceedance of one sample	Identify source; Inform IEC verbally; Repeat measurement to confirm finding.	Check monitoring data submitted by ET Leader and advise ET Leader for any finding.	Rectify any unacceptable practice; Amend any working methods if appropriate.
Exceedance of two or more consecutive samples	Identify source; Inform IEC verbally; Repeat measurement to confirm finding; Increase monitoring frequency; Discuss with Operations Engineers on remedial actions required; If exceedance stops, discontinue additional monitoring.	Check monitoring data submitted by ET Leader and advise ET Leader for any finding; Verify the implementation of the remedial measures;	Discuss with ET Leader on remedial actions required; Implement the agreed remedial actions.
<b>Limit level</b>			
Exceedance of one sample	Repeat measurement to confirm finding; Identify the source(s) of the impact. Verbally inform IEC and EPD of the exceedance as soon as practicable; Discuss with Operations Engineers on remedial actions required; Increase monitoring frequency; Assess the effectiveness of the remedial actions and keep IEC and EPD informed of the results.	Check monitoring data submitted by ET Leader and advise ET Leader of any finding; Verify the implementation of the remedial measures.	Take immediate action to avoid further exceedances; Discuss with ET Leader on remedial actions required; Implement the agreed remedial actions.
Exceedance of two or more consecutive samples	Identify source; Identify the source(s) of the impact. Verbally inform IEC and EPD of the exceedance as soon as practicable; Repeat measurement to confirm finding; Increase monitoring frequency; Carry out analysis on existing control procedures to determine possible mitigation to be implemented; Discuss with Operations Engineers on the remedial actions to be taken; If exceedance stops, discontinue additional monitoring.	Provide feedback and advise ET Leader/Operations Engineers on the effectiveness of the remedial actions proposed by them; Verify the implementation of the remedial measures.	Take immediate action to avoid further exceedance; Discuss with ET Leader on remedial actions required; Implement the agreed remedial actions; Check the suspected defective parts if the problem still does not come under control.

Table A.2 Event/Action Plan for Noise

Exceedance	ET Leader	IEC	Operations Engineer
<b>Action Level</b>	If the complaint against Lamma Extension operation is valid, identify the source(s) of the noise and propose remedial measures if necessary;	Verify the implementation of the remedial measures.	Discuss with ET Leader on remedial actions required;  Implement the agreed remedial actions.
<b>Limit Level</b>	Check monitoring data to confirm findings;  Identify the source(s) of the impact. If the exceedance is found to be valid and due to the Lamma Extension operation, verbally inform IEC and EPD of the exceedance as soon as practicable;  Discuss with Operations Engineers on remedial actions required.	Check monitoring data submitted by ET Leader and advise ET Leader of any finding;  Verify the implementation of the remedial measures.	Take action to avoid further exceedance;  Discuss with ET Leader on the remedial actions required;  Implement the agreed remedial actions.

Table A.3 Event/Action Plan for Water Quality

Exceedance	ET Leader	IEC	Operations Engineer
<b>Action Level</b>			
Exceedance on one sampling day	Identify source(s) of impact; Verbally inform IEC.	Check monitoring data submitted by ET Leader and advise ET Leader for any findings.	Rectify unacceptable practice; Amend any working methods if appropriate.
Exceedances on more than one consecutive sampling day	Identify source(s) of impact; Verbally inform IEC; Repeat in-situ measurements to confirm findings; Discuss with Operations Engineers on remedial actions required; Increase monitoring frequency; If exceedance stops, discontinue additional monitoring.	Check monitoring data submitted by ET Leader and advise ET Leader for any finding; Verify the implementation of the remedial measures.	Discuss with ET Leader on remedial actions required; Implement the agreed remedial actions.
<b>Limit Level</b>			
Exceedance on one sampling day	Identify the source(s) of impact; Verbally inform IEC and EPD of the exceedance, as soon as practicable; Repeat measurement to confirm finding; Discuss with Operations Engineers on remedial actions required; Increase monitoring frequency; Assess the effectiveness of the remedial actions and keep IEC and EPD informed of the results.	Check monitoring data submitted by ET Leader and advise ET Leader for any finding; Verify the implementation of the remedial measures.	Take immediate action to avoid further exceedance; Discuss with ET Leader on remedial actions required; Implement the agreed remedial actions.

<b>Exceedance</b>	<b>ET Leader</b>	<b>IEC</b>	<b>Operations Engineer</b>
Exceedances on more than one consecutive sampling day	Identify the source(s) of impact; Verbally inform IEC and EPD of the exceedance as soon as practicable; Repeat measurement to confirm finding; Discuss with Operations Engineers on remedial actions required; Increase monitoring frequency; Carry out analysis on existing control procedures to determine possible mitigation to be implemented; If exceedance stops, discontinue additional monitoring.	Provide feedback and advise ET Leader/Operations Engineers on the effectiveness of the remedial actions proposed; Verify the implementation of the remedial measures.	Take immediate action to avoid further exceedance; Discuss with ET Leader on remedial actions required; Implement the agreed remedial actions; Check the suspected defective parts if the problem still does not come under control.



## Appendix B Action and Limit Levels for Air Quality, Noise and Water Quality Monitoring

### B.1 Air

Parameter	Frequency	Action	Limit
Hourly Average Stack NOx	Continuous	81 mg/Nm <sup>3</sup>	90 mg/Nm <sup>3</sup>

### B.2. Noise

Parameter	Frequency	Action	Limit
Noise Levels at the critical NSR at Hung Shing Ye calculated by the noise alarm monitoring system	Continuous	When more than one complaint is received within two weeks, which are concerning the same event or location	a. 60 dB(A) in L <sub>Aeq,30 min</sub> (07:00-23:00 hrs) b. 50 dB(A) in L <sub>Aeq,30 min</sub> (23:00-07:00 hrs on next day)

### B.3 Water

Monitoring Area / Location	Parameters to be Monitored	Frequency	Concentration Not to Be Exceeded	Action	Limit
Trade Effluent Cooling Water	Temperature	Daily, when the combined cycle unit is operating	Temperature at outfall should not exceed that at intake by > 10°C	9.5°C	+10°C above intake
	Total Residual Chlorine	Bi-weekly, when the combined cycle unit is operating	0.5mg/L	0.47	0.5
Trade Effluent Boiler Blowdown	Temperature	At least twice per year, when the combined cycle unit is operating	40°C	-	40°C
	Suspended Solids	At least twice per year, when the combined cycle unit is operating	30 mg/L	-	30
	Grease & Oil	At least twice per year, when the combined cycle unit is operating	20 mg/L	-	20
Marine waters cooling water outfall	Scum of foam in ambient water	Daily, when the combined cycle unit is operating	No scum within 500 m of Hung Shing Ye Beach	When scum passes the station south-west corner and north-west corner	No scum within 500 m of Hung Shing Ye Beach

## Appendix C Air Quality Monitoring Results

**Site: Lamma Power Station – Unit L9**

**Month: October 2006**

### Monthly Summary of Stack NOx

Date	Daily Maximum Stack NOx concentration (mg/Nm <sup>3</sup> *)
15/10/2006	49
16/10/2006	51
17/10/2006	51
18/10/2006	51
19/10/2006	54
20/10/2006	53
21/10/2006	54
22/10/2006	53
23/10/2006	50
24/10/2006	53
25/10/2006	54
26/10/2006	57
27/10/2006	57
28/10/2006	58
29/10/2006	58
30/10/2006	57
31/10/2006	60

Note: \* - Hourly average value. Expressed as at 0°C, 101.325kPa, dry and corrected to 15% O<sub>2</sub> condition.

## Appendix D Noise Monitoring Results

Site: Lamma Power Station Extension  
 Measurement Location: Ash Lagoon  
 Measurement Parameter: 30-min Leq (07:00-23:00 hrs and 23:00-07:00 hrs on next day)

Date	Time	Calculated Noise Level at NSR at Hung Shing Ye (dB(A))		Limit Noise Level (dB(A))
		Max	Avg	
15/10/2006	00:00-07:00	---	---	50
15/10/2006	07:00-23:00	---	---	60
15/10/2006	23:00-07:00	---	---	50
16/10/2006	07:00-23:00	---	---	60
16/10/2006	23:00-07:00	---	---	50
17/10/2006	07:00-23:00	---	---	60
17/10/2006	23:00-07:00	---	---	50
18/10/2006	07:00-23:00	---	---	60
18/10/2006	23:00-07:00	---	---	50
19/10/2006	07:00-23:00	---	---	60
19/10/2006	23:00-07:00	29	29	50
20/10/2006	07:00-23:00	21	21	60
20/10/2006	23:00-07:00	13	13	50
21/10/2006	07:00-23:00	43	42	60
21/10/2006	23:00-07:00	---	---	50
22/10/2006	07:00-23:00	---	---	60
22/10/2006	23:00-07:00	29	26	50
23/10/2006	07:00-23:00	15	15	60
23/10/2006	23:00-07:00	---	---	50
24/10/2006	07:00-23:00	45	42	60
24/10/2006	23:00-07:00	---	---	50
25/10/2006	07:00-23:00	---	---	60
25/10/2006	23:00-07:00	---	---	50
26/10/2006	07:00-23:00	---	---	60
26/10/2006	23:00-07:00	---	---	50
27/10/2006	07:00-23:00	---	---	60
27/10/2006	23:00-07:00	22	22	50
28/10/2006	07:00-23:00	---	---	60
28/10/2006	23:00-07:00	---	---	50
29/10/2006	07:00-23:00	---	---	60

Date	Time	Calculated Noise Level at NSR at Hung Shing Ye (dB(A))		Limit Noise Level (dB(A))
		Max	Avg	
29/10/2006	23:00-07:00	---	---	50
30/10/2006	07:00-23:00	---	---	60
30/10/2006	23:00-07:00	30	30	50
31/10/2006	07:00-23:00	45	44	60
31/10/2006	23:00-07:00	32	29	50

Note: “--- “ represents the measured noise monitoring data lower than the established notional background level/discarded under strong wind.

## **Appendix E Summary Results and Observations on Water Quality Monitoring**

### **Maximum Outlet Temperature Rise (Deg. Celsius) of Cooling Water at C.W. Outfall No.3 Serving L9 Condensers**

#### **Weighted by Flowrates of Individual Streams (October 2006)**

<b>Date</b>	<b>Maximum Outlet Temperature Rise (Deg. Celsius)</b>
15/10/2006	8.9
16/10/2006	9.0
17/10/2006	9.0
18/10/2006	8.6
19/10/2006	8.6
20/10/2006	8.6
21/10/2006	9.0
22/10/2006	8.7
23/10/2006	9.0
24/10/2006	9.0
25/10/2006	9.1
26/10/2006	9.0
27/10/2006	9.1
28/10/2006	9.1
29/10/2006	8.8
30/10/2006	9.2
31/10/2006	9.1

#### **Total Residual Chlorine Level at C.W. Outfall No. 3 (October 2006)**

Date of sampling	25/10
Total Residual Chlorine, mg/L	0.25

### **Blowdown from Unit L9 Steam Turbine and HRSG to C.W. Outfall No. 3 (October 2006)**

Date of sampling	October
Suspended Solid, mg/L	N/A*
Grease & Oil, mg/L	N/A*
Temperature, Deg. Celsius	N/A*

Remark:

1. \*Measurement will be carried out at least twice per year.

### **Observation of Scum Formation in Marine Waters Mixing Zone at Lamma Power Station Extension (October 2006)**

<b>Date</b>	<b>Observation</b>
15/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
16/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
17/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
18/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
19/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
20/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
21/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
22/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
23/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
24/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
25/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
26/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
27/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
28/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
29/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
30/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3
31/10	No scum within 500m of HSY Beach, NW/SW corner of the Station & CW Outfall No.3

## Appendix F Summary of EMIS

EM&A Log Ref.	Mitigation Measures	Implementation Status
	<b>AIR QUALITY</b>	
A1	Implement the gas-fired units as base-load units. For the existing power station, the more efficient units incorporating FGD and low NOx systems shall be operated first under normal situation to meet system demand. In case of any deviations from this, EPD shall be notified of the details and circumstances for the deviation.	Complied
A2	HEC shall undertake annual revisions and update of its GHG emissions inventory, which covers all HEC existing facilities and new extension, for at least the six GHGs specified under the Kyoto Protocol (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> ). The inventory shall be established and maintained in accordance with the latest IPCC Guidelines or any other guidelines issued by Government, with details documented for regular reviews and updates. The inventory shall be reported on an annual basis, including actual figures and targets for the previous and current years, as well as the next year's forecast. Discrepancies for actual versus target figures and actions for improvement or enhancement shall be discussed. HEC shall update the inventory according to the figures of the electricity load forecast, upon every subsequent review by the Government. This shall also be reported in the annual report.  (The annual report of GHG emissions inventory shall be deposited with the Director of Environmental Protection within three months after the end of the reporting period.)	Complied
	<b>WATER QUALITY</b>	
B1	No further mitigation measures were found to be necessary provided the discharge of cooling water and residual chlorine are kept below the rates assumed in the water quality assessment*.  *All discharges of effluent/wastewater shall be controlled through licensing under the <i>Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems. Inland and Coastal Waters</i> , issued under Section 21 of the <i>Water Pollution Control Ordinance</i> .	Complied
	<b>NOISE</b>	
C1	HEC shall implement the gas-fired units for based-load operation to minimize the noise generated from the existing units.	Complied
	<b>LANDSCAPE &amp; VISUAL IMPACTS</b>	
D1	No mitigation measures were considered necessary.	N.A.
	<b>LAND CONTAMINATION AND WASTE MANAGEMENT</b>	



EM&A Log Ref.	Mitigation Measures	Implementation Status
E1	HEC shall maintain records of the following items: <ul style="list-style-type: none"> <li>- integrity testing of light oil tanks*;</li> <li>- daily inspection of the light oil tanks and bunded areas*;</li> <li>- quantities of oily waste and sludge generated from oil interceptors and chemical waste generated from operation of the power station;</li> <li>- disposal oil oily waste/sludge and chemical waste to licenced site;</li> <li>- quantities of chemical and chemical waste;</li> <li>- incident of spillage and remediation actions; and</li> <li>- emergency response training and drills.</li> </ul> * As the Light Gas Oil (LGO) for Lamma Extension is supplied from the existing LGO storage tanks located at Lamma Power Station, there is no LGO storage tank at Lamma Extension.	Complied
<b>MARINE ECOLOGY</b>		
F1	No mitigation measures were considered necessary.	N.A.
<b>FISHERIES</b>		
G1	No mitigation measures were considered necessary.	N.A.
<b>RISK ASSESSMENT</b>		
H1	No mitigation measures were considered necessary.	N.A.