

香港電燈有限公司
The Hongkong Electric Co., Ltd.



**Lamma Power Station Extension
Operational Phase
Monthly Environmental Monitoring & Audit Report**

December 2022

香港電燈有限公司
The Hongkong Electric Co., Ltd.



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) ORDINANCE, CAP. 499

ENVIRONMENTAL PERMIT NO. EP-071/2000/D

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


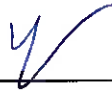
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| Report Title | <u>Monthly EM&A Report (December 2022)</u> |
| Date | <u>13 January 2023</u> |
| Certified by | <u></u> (Mr. CHAN Hon Yeung, Environmental Team Leader) |
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EXECUTIVE SUMMARY

This is the 195th 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 December 2022.

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

Units L9 and L11 were fully available in the reporting month. Unit L10 was out of service during the following period in the reporting month.

| Unit | Period | Remark |
|------|--------------------------------------|---------------|
| L10 | 01/12/2022 00:00 to 31/12/2022 23:59 | Unit overhaul |

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 for stack NO_x 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/D | 28/09/2020 | - | HK Electric | 28/09/2020 |
| Specified Processes Licence issued under APCO | L-7-002(13) | 18/10/2021 | 31/12/2022 | HK Electric | 18/10/2021 |
| WPCO Discharge Licence for L1-L11 and GT57 | WT00038713-2021 | 05/11/2021 | 30/11/2023 | HK Electric | 05/11/2021 |

Implementation Status of Environmental Mitigation Measures

Environmental mitigation measures were implemented in the reporting month.

Environmental Complaints

No complaint in relation to the environmental impact of 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_x 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. (HK Electric) 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/D, 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 December 2022.

1.1 Plant Availability

Units L9 and L11 were fully available in the reporting month. Unit L10 was out of service during the following period in the reporting month.

| | Period | Remark |
|-----|--------------------------------------|---------------|
| L10 | 01/12/2022 00:00 to 31/12/2022 23:59 | Unit overhaul |

1.2 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 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.

2. AIR QUALITY

2.1 Monitoring Requirements

In accordance with the EM&A Manual (Operational Phase) for Lamma Extension, stack NO_x is continuously monitored. Stack NO_x 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 Parameter and Frequency

| Parameter | Frequency |
|--------------------------------------|------------|
| Hourly Average Stack NO _x | Continuous |

2.2 Summary of Results and Observations

Monitoring of stack NO_x was conducted during the operation of Units L9, L10 and L11 in the reporting month. A monthly summary of monitoring data is shown in [Appendix C](#).

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

2.3 Implementation Status of Monitoring of Ammonia

Monitoring of ammonia for the use of Selective Catalytic Reduction System for NO_x control was conducted pursuant to the requirement of Specified Process (SP) licence under the Air Pollution Control Ordinance. No non-compliance of SP licence requirement on stack NH₃ emission was recorded in the reporting month. The relevant data would be submitted to EPD under a separate submission for the SP licence. To avoid duplication of effort, the monitoring and reporting requirements for ammonia under the SP licence will not be included in this EM&A programme.

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. Baseline noise levels are applied for correction to the noise monitoring data. The data after corrections 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 |

With the endorsement of the Independent Environmental Checker, the enhancement of calibration of sound level meter at the noise monitoring station was implemented. The monthly manual on-site calibration using sound level calibrator was replaced by the daily auto charge injection calibration function of the sound level meter. For additional quality assurance, manual on-site calibration is still conducted for the noise monitoring station once every 6 months. The manual on-site calibration was carried out in November 2022 and the next calibration was scheduled in May 2023. The verification of the sound level meter/calibrator by the manufacturer or an accredited laboratory biennially / annually remains unchanged.

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.

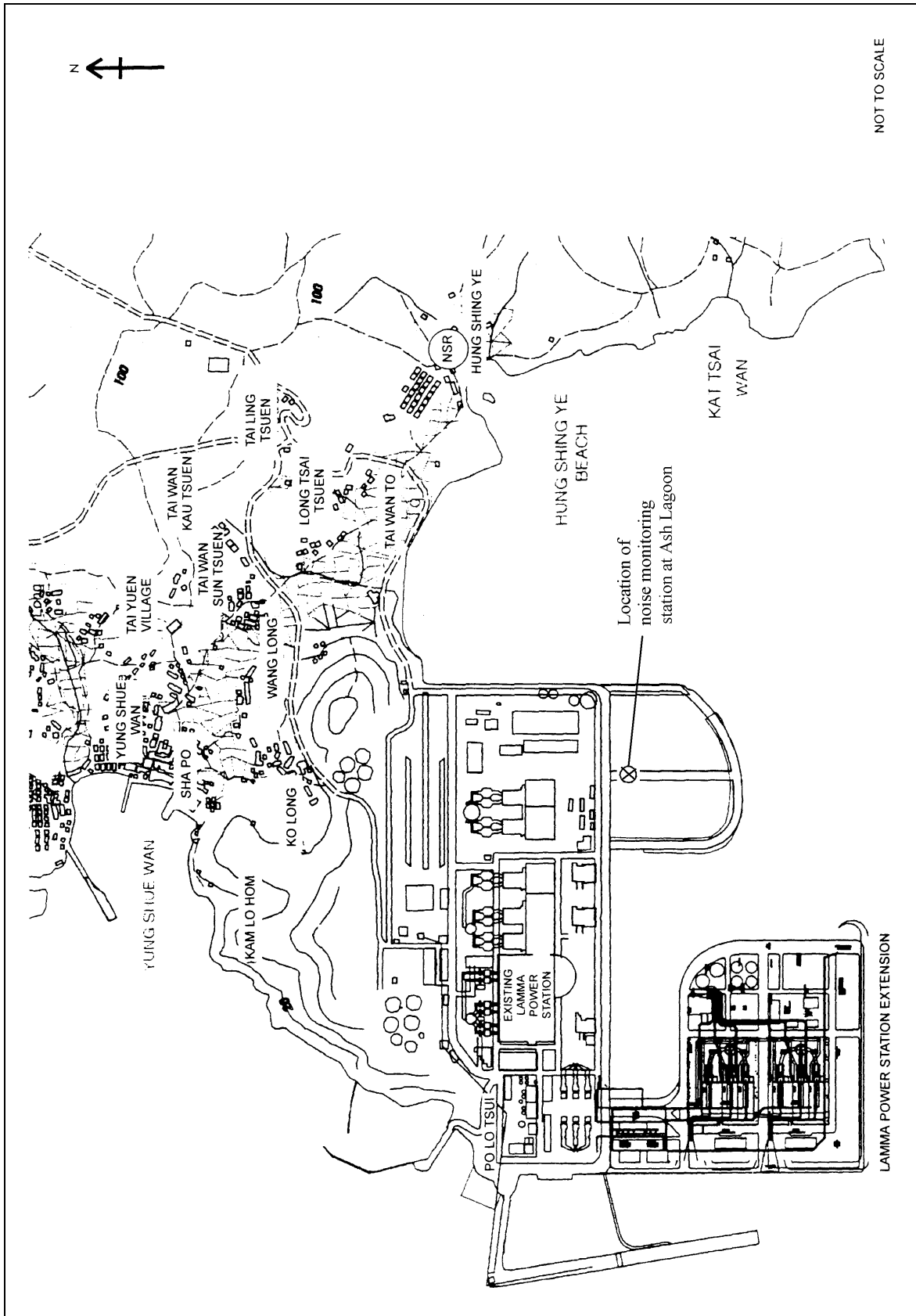


Figure 3.1 Location of Noise Monitoring Station

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-L11 & 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](#).

Table 4.1 Water Quality Monitoring Parameters and Frequencies

| Item | Parameters | Frequencies |
|------|---|-------------------------|
| 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 was carried out during the operation of Units L9, L10 and L11 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 in dry and wet seasons.

The surveys for L11 for neap and spring tides in wet season were carried out on 8 and 12 July 2022 respectively. The monitoring results of the surveys had been submitted to EPD through a

separate report. The surveys for L11 in dry season would be carried out in December 2022 / January 2023 tentatively.

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 December 2022 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 | 01/12/2022 31/12/2022 | 0 | 0 | |
| Noise | | | | | |
| 1 | Noise levels at the critical NSR at Hung Shing Ye calculated by the noise alarm monitoring system | 01/12/2022 31/12/2022 | 0 | 0 | |
| Water | | | | | |
| 1 | Cooling Water Temperature Rise | 01/12/2022 31/12/2022 | 0 | 0 | |
| 2 | Total Residual Chlorine | 01/12/2022 31/12/2022 | 0 | 0 | |
| 3 | Temperature of Blowdown Effluent | 01/12/2022 31/12/2022 | N.A. | N.A.* | |
| 4 | Suspended Solids from | 01/12/2022 31/12/2022 | N.A. | N.A.* | |

| Item | Parameter Monitored | Monitoring Period | No. of Exceedances In | | Event/Action Plan Implementation Status and Results |
|------|--|--------------------------|-----------------------|-------------|---|
| | | | Action Level | Limit Level | |
| | Blowdown Effluent | | | | |
| 5 | Grease & Oil from Blowdown Effluent | 01/12/2022 31/12/2022 | N.A. | N.A.* | |
| 6 | Inspection of Scum/Foam in ambient water | 01/12/2022 31/12/2022 | 0 | 0 | |

Note: * Monitoring was not scheduled in the reporting month

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 December 2022 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/D | 28/09/2020 | - | Valid |
| Specified Processes Licence issued under APCO* | L-7-002(13) | 18/10/2021 | 31/12/2022 | Valid |
| WPCO Discharge Licence for L1-L11 and GT57# | WT00038713-2021 | 05/11/2021 | 30/11/2023 | Valid |

Notes: * - The varied SP licence for L11 operation was issued on 18/10/2021.

- The varied WPCO discharge licence for L11 operation was issued on 05/11/2021.

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](#).

5.6 Implementation Status of Environmental Complaint Handling Procedures

In December 2022, no complaint in relation to the environmental impact of the Project was received.

Table 5.3 Environmental Complaints Received in December 2022

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

Table 5.4 Outstanding Environmental Complaints 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

| Unit | Time | Remark |
|------|--------------------------|---------------|
| L11 | 11/01/2023 to 26/03/2023 | Unit Overhaul |

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_x 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_x 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 was recorded in the reporting month.

Environmental mitigation measures recommended in the EM&A Manual for the operational activities were implemented in the reporting month. No complaint in relation to the environmental impact of 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 |
|---|---|--|---|
| Action Level | | | |
| 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. |
| Limit level | | | |
| 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 |
|---------------------|---|--|--|
| Action Level | 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. |
| Limit Level | 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 |
|---|--|---|--|
| Action Level | | | |
| 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. |
| Limit Level | | | |
| 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. |
| 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 | Provide feedback and advise ET Leader/Operations Engineers on the effectiveness of the remedial | Take immediate action to avoid further exceedance; Discuss with ET Leader on |

| Exceedance | ET Leader | IEC | Operations Engineer |
|-------------------|---|--|---|
| | 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. | actions proposed; Verify the implementation of the remedial measures. | 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

| Unit L9 | | | |
|--|------------|------------------------|------------------------|
| Parameter | Frequency | Action | Limit |
| Hourly Average Stack NO _x (Natural Gas) | Continuous | 81 mg/Nm ³ | 90 mg/Nm ³ |
| Hourly Average Stack NO _x (Light Oil) | Continuous | 135 mg/Nm ³ | 150 mg/Nm ³ |

| Unit L10, Unit L11 | | | |
|--|------------|---|---|
| Parameter | Frequency | Action | Limit |
| Hourly Average Stack NO _x (Natural Gas) | Continuous | 81 mg/Nm ³ (Loading ≤ 182 MW) | 90 mg/Nm ³ (Loading ≤ 182 MW) |
| | | 13.5 mg/Nm ³ (182MW ≤ Loading ≤ 266 MW) | 15 mg/Nm ³ (182MW ≤ Loading ≤ 266 MW) |
| | | 4.5 mg/Nm ³ (Loading ≥ 266 MW) | 5 mg/Nm ³ (Loading ≥ 266 MW) |
| Hourly Average Stack NO _x (Light Oil) | Continuous | 135 mg/Nm ³ | 150 mg/Nm ³ |

Note: Expressed as at 0°C, 101.325kPa, dry and corrected to 15% O₂ condition.

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 _{Aeq,30 min} (07:00-23:00 hrs) b. 50 dB(A) in L _{Aeq,30 min} (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 mg/L | 0.5 mg/L |
| 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 mg/L |
| | Grease & Oil | At least twice per year, when the combined cycle unit is operating | 20 mg/L | - | 20 mg/L |
| 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: December 2022

Monthly Summary of Stack NOx

| Date | Daily Maximum Stack NOx concentration (mg/Nm ³)# |
|------------|--|
| 1/12/2022 | 59 |
| 2/12/2022 | 61 |
| 3/12/2022 | 60 |
| 4/12/2022 | 60 |
| 5/12/2022 | 60 |
| 6/12/2022 | 65 |
| 7/12/2022 | 60 |
| 8/12/2022 | 60 |
| 9/12/2022 | 60 |
| 10/12/2022 | 64 |
| 11/12/2022 | 62 |
| 12/12/2022 | 61 |
| 13/12/2022 | 61 |
| 14/12/2022 | 57 |
| 15/12/2022 | 57 |
| 16/12/2022 | 56 |
| 17/12/2022 | 66 |
| 18/12/2022 | 70 |
| 19/12/2022 | 65 |
| 20/12/2022 | 61 |
| 21/12/2022 | 68 |

| Date | Daily Maximum Stack NO _x concentration (mg/Nm ³) [#] |
|------------|--|
| 22/12/2022 | 68 |
| 23/12/2022 | 68 |
| 24/12/2022 | 66 |
| 25/12/2022 | 65 |
| 26/12/2022 | 63 |
| 27/12/2022 | 63 |
| 28/12/2022 | 59 |
| 29/12/2022 | 60 |
| 30/12/2022 | 61 |
| 31/12/2022 | 64 |

Note: # - Hourly average value. Expressed as at 0°C, 101.325kPa, dry and corrected to 15% O₂ condition.

* - Unit L9 was not on load.

Site: Lamma Power Station – Unit L10

Month: December 2022

Monthly Summary of Stack NOx

| Date | Daily Maximum Stack NOx concentration (mg/Nm ³) [#] |
|------------|--|
| 1/12/2022 | * |
| 2/12/2022 | * |
| 3/12/2022 | * |
| 4/12/2022 | * |
| 5/12/2022 | * |
| 6/12/2022 | * |
| 7/12/2022 | * |
| 8/12/2022 | * |
| 9/12/2022 | * |
| 10/12/2022 | * |
| 11/12/2022 | * |
| 12/12/2022 | * |
| 13/12/2022 | * |
| 14/12/2022 | * |
| 15/12/2022 | * |
| 16/12/2022 | * |
| 17/12/2022 | * |
| 18/12/2022 | * |
| 19/12/2022 | * |
| 20/12/2022 | * |
| 21/12/2022 | * |
| 22/12/2022 | * |
| 23/12/2022 | * |

| Date | Daily Maximum Stack NO _x concentration (mg/Nm ³) [#] |
|------------|--|
| 24/12/2022 | * |
| 25/12/2022 | * |
| 26/12/2022 | * |
| 27/12/2022 | * |
| 28/12/2022 | * |
| 29/12/2022 | * |
| 30/12/2022 | * |
| 31/12/2022 | * |

The daily maximum stack NO_x concentration complies with the Action/Limit Level for all unit loading ranges.

Note: # - Hourly average value. Expressed as at 0°C, 101.325kPa, dry and corrected to 15% O₂ condition.

* - Unit L10 was not on load.

Site: Lamma Power Station – Unit L11

Month: December 2022

Monthly Summary of Stack NOx

| Date | Daily Maximum Stack NOx concentration (mg/Nm ³)# |
|------------|--|
| 1/12/2022 | 5 |
| 2/12/2022 | 6 |
| 3/12/2022 | 4 |
| 4/12/2022 | 4 |
| 5/12/2022 | 4 |
| 6/12/2022 | 5 |
| 7/12/2022 | 4 |
| 8/12/2022 | 4 |
| 9/12/2022 | 4 |
| 10/12/2022 | 3 |
| 11/12/2022 | 3 |
| 12/12/2022 | 5 |
| 13/12/2022 | 4 |
| 14/12/2022 | 6 ^ |
| 15/12/2022 | 5 |
| 16/12/2022 | 4 |
| 17/12/2022 | 4 |
| 18/12/2022 | 4 |
| 19/12/2022 | 4 |
| 20/12/2022 | 6 ^ |
| 21/12/2022 | 4 |
| 22/12/2022 | 4 |
| 23/12/2022 | 5 |

| Date | Daily Maximum Stack NOx concentration (mg/Nm ³) [#] |
|------------|--|
| 24/12/2022 | 6 ^ |
| 25/12/2022 | 7 ^ |
| 26/12/2022 | 7 ^ |
| 27/12/2022 | 4 |
| 28/12/2022 | 6 |
| 29/12/2022 | 4 |
| 30/12/2022 | 5 |
| 31/12/2022 | 6 ^ |

The daily maximum stack NOx concentration complies with the Action/Limit Level for all unit loading ranges.

Note: # - Hourly average value. Expressed as at 0°C, 101.325kPa, dry and corrected to 15% O₂ condition.

* - Unit L11 was not on load.

^ - Unit L11 was operating with loading less than 266 MW.

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 | |
| 1/12/2022 | 07:00-23:00 | 28 | 28 | 60 |
| 1/12/2022 | 23:00-07:00 | 43 | 38 | 50 |
| 2/12/2022 | 07:00-23:00 | 29 | 28 | 60 |
| 2/12/2022 | 23:00-07:00 | 21 | 21 | 50 |
| 3/12/2022 | 07:00-23:00 | 34 | 32 | 60 |
| 3/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 4/12/2022 | 07:00-23:00 | 43 | 43 | 60 |
| 4/12/2022 | 23:00-07:00 | 38 | 38 | 50 |
| 5/12/2022 | 07:00-23:00 | 18 | 18 | 60 |
| 5/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 6/12/2022 | 07:00-23:00 | 40 | 37 | 60 |
| 6/12/2022 | 23:00-07:00 | 45 | 39 | 50 |
| 7/12/2022 | 07:00-23:00 | 43 | 39 | 60 |
| 7/12/2022 | 23:00-07:00 | 43 | 42 | 50 |
| 8/12/2022 | 07:00-23:00 | 50 | 47 | 60 |
| 8/12/2022 | 23:00-07:00 | 42 | 39 | 50 |
| 9/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 9/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 10/12/2022 | 07:00-23:00 | 45 | 42 | 60 |
| 10/12/2022 | 23:00-07:00 | 34 | 32 | 50 |
| 11/12/2022 | 07:00-23:00 | 34 | 34 | 60 |
| 11/12/2022 | 23:00-07:00 | 45 | 43 | 50 |
| 12/12/2022 | 07:00-23:00 | 31 | 31 | 60 |
| 12/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 13/12/2022 | 07:00-23:00 | 52 | 50 | 60 |
| 13/12/2022 | 23:00-07:00 | 33 | 31 | 50 |
| 14/12/2022 | 07:00-23:00 | 44 | 41 | 60 |
| 14/12/2022 | 23:00-07:00 | 29 | 29 | 50 |
| 15/12/2022 | 07:00-23:00 | 36 | 36 | 60 |
| 15/12/2022 | 23:00-07:00 | 29 | 29 | 50 |
| 16/12/2022 | 07:00-23:00 | 45 | 40 | 60 |
| 16/12/2022 | 23:00-07:00 | 45 | 40 | 50 |
| 17/12/2022 | 07:00-23:00 | 54 | 51 | 60 |
| 17/12/2022 | 23:00-07:00 | 47 | 43 | 50 |
| 18/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 18/12/2022 | 23:00-07:00 | 50 | 49 | 50 |

| Date | Time | Calculated Noise Level at NSR at Hung Shing Ye (dB(A)) | | Limit Noise Level (dB(A)) |
|------------|-------------|--|-----|---------------------------|
| | | Max | Avg | |
| 19/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 19/12/2022 | 23:00-07:00 | 40 | 38 | 50 |
| 20/12/2022 | 07:00-23:00 | 47 | 47 | 60 |
| 20/12/2022 | 23:00-07:00 | 37 | 35 | 50 |
| 21/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 21/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 22/12/2022 | 07:00-23:00 | 39 | 39 | 60 |
| 22/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 23/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 23/12/2022 | 23:00-07:00 | 48 | 46 | 50 |
| 24/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 24/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 25/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 25/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 26/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 26/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 27/12/2022 | 07:00-23:00 | 50 | 45 | 60 |
| 27/12/2022 | 23:00-07:00 | 44 | 43 | 50 |
| 28/12/2022 | 07:00-23:00 | --- | --- | 60 |
| 28/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 29/12/2022 | 07:00-23:00 | 19 | 19 | 60 |
| 29/12/2022 | 23:00-07:00 | --- | --- | 50 |
| 30/12/2022 | 07:00-23:00 | 38 | 38 | 60 |
| 30/12/2022 | 23:00-07:00 | 26 | 26 | 50 |
| 31/12/2022 | 07:00-23:00 | 52 | 52 | 60 |
| 31/12/2022 | 23:00-07:00 | 36 | 36 | 50 |

- Note: 1. “---“represents the measured noise monitoring data lower than the established notional background level/discarded under strong wind.
2. Pursuant to the EM&A Manual (Operational Phase), the corrections for accounting the differences of barrier attenuations and atmospheric absorption attenuations for the noise monitoring station and noise sensitive receiver are 5 dB(A) and 2 dB(A) respectively.

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, L10 & L11 Condensers

Weighted by Flowrates of Individual Streams (December 2022)

| Date | Maximum Outlet Temperature Rise (Deg. Celsius) |
|------------|---|
| 1/12/2022 | 6.7 |
| 2/12/2022 | 6.8 |
| 3/12/2022 | 6.8 |
| 4/12/2022 | 6.5 |
| 5/12/2022 | 6.8 |
| 6/12/2022 | 7.0 |
| 7/12/2022 | 6.8 |
| 8/12/2022 | 6.9 |
| 9/12/2022 | 6.9 |
| 10/12/2022 | 6.8 |
| 11/12/2022 | 6.4 |
| 12/12/2022 | 6.8 |
| 13/12/2022 | 6.8 |
| 14/12/2022 | 6.8 |
| 15/12/2022 | 6.9 |
| 16/12/2022 | 6.9 |
| 17/12/2022 | 6.8 |
| 18/12/2022 | 6.3 |
| 19/12/2022 | 6.8 |
| 20/12/2022 | 6.9 |
| 21/12/2022 | 6.9 |
| 22/12/2022 | 6.9 |
| 23/12/2022 | 6.9 |
| 24/12/2022 | 6.8 |
| 25/12/2022 | 6.4 |
| 26/12/2022 | 6.4 |
| 27/12/2022 | 6.4 |
| 28/12/2022 | 6.9 |
| 29/12/2022 | 6.8 |
| 30/12/2022 | 6.8 |
| 31/12/2022 | 6.8 |

Total Residual Chlorine Level at C.W. Outfall No. 3 (December 2022)

| | | |
|-------------------------------|-------|-------|
| Date of sampling | 08/12 | 23/12 |
| Total Residual Chlorine, mg/L | 0.40 | 0.40 |

Blowdown from Units L9, L10 and L11 Steam Turbine and HSRG to C.W. Outfall No. 3 (December 2022)

| Source of discharge | Unit L9 HSRG | Unit L9 Steam Turbine | Unit L10 HSRG | Unit L10 Steam Turbine | Unit L11 HSRG | Unit L11 Steam Turbine |
|---------------------------|--------------|-----------------------|---------------|------------------------|---------------|------------------------|
| Date of sampling | # | # | # | # | # | # |
| Suspended Solid, mg/L | # | # | # | # | # | # |
| Grease & Oil, mg/L | # | # | # | # | # | # |
| Temperature, Deg. Celsius | # | # | # | # | # | # |

Note: # Monitoring was not scheduled in the reporting month. The last monitoring was carried out in September 2022.

Observation of Scum Formation in Marine Waters Mixing Zone at Lamma Power Station Extension (December 2022)

| Date | Observation |
|------------|---|
| 1/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 2/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 3/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 4/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 5/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 6/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 7/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 8/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 9/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 10/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 11/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 12/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 13/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |

| Date | Observation |
|------------|---|
| 14/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 15/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 16/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 17/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 18/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 19/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 20/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 21/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 22/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 23/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 24/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 25/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 26/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 27/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 28/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 29/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 30/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |
| 31/12/2022 | No scum within 500m of HSY Beach & NW/SW corner of the Station & CW Outfall |

Appendix F Summary of EMIS

| EM&A Log Ref. | Mitigation Measures | Implementation Status |
|--------------------------|--|------------------------------|
| | AIR QUALITY | |
| 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 | HK Electric shall undertake annual revisions and update of its GHG emissions inventory, which covers all HK Electric existing facilities and new extension, for at least the six GHGs specified under the Kyoto Protocol (CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆). 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. HK Electric 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 |
| | WATER QUALITY | |
| 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 |
| | NOISE | |
| C1 | HK Electric shall implement the gas-fired units for based-load operation to minimize the noise generated from the existing units. | Complied |
| | LANDSCAPE & VISUAL IMPACTS | |
| D1 | No mitigation measures were considered necessary. | N/A |

| EM&A Log Ref. | Mitigation Measures | Implementation Status |
|--------------------------|--|------------------------------|
| | LAND CONTAMINATION AND WASTE MANAGEMENT | |
| E1 | HK Electric shall maintain records of the following items: <ul style="list-style-type: none"> - integrity testing of light oil tanks; - daily inspection of the light oil tanks and bunded areas; - quantities of oily waste and sludge generated from oil interceptors and chemical waste generated from operation of the power station; - deposal oil oily waste/sludge and chemical waste to licenced site; - quantities of chemical and chemical waste; - incident of spillage and remediation actions; and - emergency response training and drills. | Complied |
| | MARINE ECOLOGY | |
| F1 | No mitigation measures were considered necessary. | N/A |
| | | |
| | FISHERIES | |
| G1 | No mitigation measures were considered necessary. | N/A |
| | | |
| | RISK ASSESSMENT | |
| H1 | No mitigation measures were considered necessary. | N/A |