

NEO Kim Teck Chairman

3 Jun 2011

Environmental Impact Assessment Ordinance Register Office 27/F, Southorn Centre 130 Hennessy Road Wanchai Hong Kong

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Our Ref: CPBEC/OTHS/ECPT/EPD/L/4847

Your Ref:

Dear Sir,

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Emission Control Project at the Castle Peak 'B' Power Station "B" Units Environmental Permit (No. EP-251/2006) Final EM&A Report - 2011

Pursuant to Condition 3.4 of the captioned Environmental Permit and according to your written endorsement to terminate the EM&A programme for the construction phase of the project, we are pleased to submit four hard copies and one electronic copy of the Final EM&A Report.

Please direct any inquires to our Mr. David Yip, Environmental Team Leader or Mr. Frank Wan, the Independent Environmental Checker.

Yours faithfully,

For and on behalf of Castle Peak Power Company Limited

Geoff McEntee Close-Out Manager

CPPS Emission Control Project

Encl.

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Emission Control Project at Castle Peak Power Station "B" Units





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Final Environmental Monitoring and Audit Summary Report

2011

Emissions Control Project at Castle Peak Power Station 'B' Units

Final Environmental Monitoring and Audit Summary Report

2011

	Certified by:	Verified by:	
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Position	Environmental Team Leader	Independent Environmental Checker	
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Date	2 JUNE 2011	3 June 2011	

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Executive Summary

This is the final Environmental Monitoring and Audit (EM&A) report for the Emissions Control Project at Castle Peak Power Station 'B' Units (EC Project) prepared by the Environmental Team (ET), with reference to the EPD's Environmental Monitoring and Audit – Guidelines for Development Projects in Hong Kong.

This report presents the summary of EM&A results over the entire construction phase of the Project as per the Project Environmental Impact Assessment (EIA) Report (EIAO Register No.: AEIAR-102/2006) and Environmental Permit (EP) No. EP-251/2006.

Key Project Works for the Project

The key project activities during the construction phase of the Project are summarized below:

- Demolition of some existing facilities at CPB including the Fuel Oil Day Tank, Fuel Oil Pump House and Dangerous Goods (DG) Store:
- Relocation or re-routing of existing facilities including Ash and Dust Control Room, Underground Pipeworks, Carbon Dioxide (CO₂) Storage Tank, Liquefied Petroleum Gas (LPG) Storage Tanks, Intermediate Pressure Reduction Station, Oil Interceptors, Oils Sump, Oil Sewer Manholes and Foul Water Pumping Station;
- Provision of Reagent and By-Product Handling and Storage Facilities including limestone store, limestone slurry tanks, gypsum dewatering and storage facilities;
- Installation of new emission control equipment and facilities for NOx and SO₂ control;
- Provision of additional berthing facilities for loading and unloading of the additional reagents and gypsum.

Environmental Monitoring

A summary of the Project EM&A programmes are listed below:

- Groundwater monitoring
 - With respect to the requirement specified in the Environmental Permit No. EP-251/2006, monitoring of the total petroleum hydrocarbon (TPH)

in the groundwater within the Project site during construction and operation of the Project is required. A Groundwater Monitoring Plan has been developed to define the groundwater monitoring locations, methodology for groundwater monitoring as well as the monitoring schedule.

- According to the Groundwater Monitoring Plan, three (3) groundwater monitoring well locations within the Project site, namely MW1 to MW3, have been installed for the groundwater monitoring, including:
 - MW1: located adjacent to the north-east corner of the existing Coal Plant Substation;
 - MW2: located north-west of the existing ACP Plant House; and
 - MW3: located adjacent to the north-east corner of the existing ACP Plant House
- Bi-weekly Groundwater Monitoring Programme for the initial period of three months after the commencement of major piling and foundation works was successfully concluded on 25 January 2008. The TPH monitoring results for the initial three-month period consistently remained well below the relevant Risk-based Remediation Goals (RBRGs) values, and therefore the remaining groundwater monitoring for 2008 was conducted on a quarterly basis in accordance with the Groundwater Monitoring Plan (Rev 4), which had been accepted by EPD.
- The Groundwater Monitoring Program for 2008 was completed in October 2008 with all results well within the Risk-Based Remediation Goals (RBRGs) stated in the EPD's Guidance Note for Contaminated Land Assessment and Remediation. In view of this, the groundwater monitoring frequency for 2009 is reduced to twice a year as per the email confirmation (dated 07 November 2008) from EPD to the Independent Environmental Checker.
- Two TPH measurements of the Groundwater Monitoring for 2009 were conducted and all results indicated that TPH levels continue to remain well below the relevant RBRGs value. Confirmation from EPD regarding the groundwater monitoring program for 2010 was received on 29 April 2010 and the groundwater monitoring frequency was reduced to once a year.
- The TPHs concentrations in all samples recorded over the construction phase of the Project were well below the RBRGs for groundwater for industrial area during the construction phase of the Project.

- Marine water quality monitoring
 - Baseline water quality monitoring programme was completed on 21
 December 2007 according to the schedule submitted to EPD on 6
 November 2007. The Baseline Water Quality Monitoring Report was
 revised to address EPD's comments on the first submission and resubmitted to EPD on 4 March 2008.
 - According to the EIA report, impact monitoring on marine water quality was carried out 3 days a week, at mid-flood and mid-ebb tides, during the dredging works at twelve monitoring stations (C1, C2, SR1 to SR8 and G1, G2). The impact monitoring on marine water quality was completed on 15th January 2010. All water quality monitoring results of the impact phase were evaluated against the Action and Limit levels stipulated in the Baseline Water Quality Monitoring Report and confirmed in full compliance.
 - According to the EIA report, post project monitoring on marine water quality was carried out 3 days a week, at mid-flood and mid-ebb tides, for at least 4 weeks after completion of the dredging works. The post project monitoring on marine water quality was commenced on 18 January 2009 at twelve monitoring stations (C1, C2, SR1 to SR8 and G1, G2) as per the EM&A requirement. Post project water quality monitoring programme was completed on 12 February 2010 and the Post Project Water Quality Monitoring Report was submitted to EPD on 24 February 2010. All water quality monitoring results with reference of the Post Project Monitoring Report were evaluated against the Action and Limit levels stipulated in the Baseline Water Quality Monitoring Report and confirmed in full compliance.
 - Water quality sampling was undertaken at the following designated 12 monitoring stations for three phases of water quality monitoring (baseline monitoring, impact monitoring and post-project monitoring):
 - C1 is a Control Station (during ebb tide) located to the north of the dredging area, which is not supposed to be influenced by the construction works;
 - C2 is a Control Station (during flood tide) located to the south of the dredging area with the same coordinates as EPD routine monitoring station NM3, which is not supposed to be influenced by the construction works;
 - **SR1** and **SR2** represent Lung Kwu Sheung Tan Beach and Lung Kwu Tan Beach respectively, located to the north of the dredging area;

- **SR3**, **SR4** and **SR5** represent the Castle Peak Power Station Intake, the Shiu Wing Steel Mill Intake and the EcoPark Intake, located to the south of the dredging area;
- **SR6**, **SR7** and **SR8** represent the eastern boundary of Sha Chau and Lung Kwu Chau Marine Park; and
- **G1**, and **G2** are regarded as a Gradient Station in-between the dredging area and the Marine Park, whereas G1 situates at the same location as EPD routine monitoring station NM5.

• Ecology monitoring

- According to the EIA report, visual cetaceans monitoring is required solely during underwater percussive piling works. A dolphin exclusion zone was identified within a radius of 500 m from the percussive piling works area. The exclusion zone around the work area was scanned for at least 30 minutes prior to the commencement of piling. If cetaceans were observed in the exclusion zone, underwater percussive piling would be delayed until they had left the area.
- There is no dolphin was spotted within the exclusion zone during the underwater percussive works over the construction period.

Environmental Mitigation Implementation Schedule

Environmental mitigation measures for the construction stage were implemented as per the EIA Report.

Event and Action Plan

The impact monitoring and the post project monitoring were carried out as per the EM&A requirement. All monitoring results were evaluated against the Action and Limit levels stipulated in the Baseline Water Quality Monitoring Report and confirmed in full compliance during the construction period.

Site Environmental Inspection

Joint site inspection was conducted by the ET and contractors on a weekly basis, and independent audit was conducted by the Independent Environmental Checker (IEC) on a bi-weekly basis. All required follow-up actions were completed by the relevant contractors and verified by the Integrated Project Environmental Team over the entire construction phase of the Project. There were no outstanding follow-up actions.

Environmental Complaint and Enquiries

No complaint or enquiries were received during the construction of the Project.

Environmental Monitoring and Audit Programmes

Construction of the Designated Project (DP) was completed on 31 March 2011, and therefore no further construction activities will be undertaken that may give rise to significant environmental impact.

1. Basic Project Information

1.1 Background

The Emissions Control Project at Castle Peak Power Station "B" Units (the Project) involves the installation of additional emissions control facilities to further reduce air emissions from the operation of these units. The emissions control facilities to be installed in the Castle Peak Power Station "B" Units (CPB) include NO_x reduction facilities and Limestone Flue Gas Desulphurisation (LS FGD) for SO₂ reduction. The location of the Site is presented in *Figure 1.1*. An overview of the Project Site general arrangement is presented in *Figure 1.2*.

1.2 Project Organisation

An Integrated Project Environmental Team has been set up to manage the environmental issues associated with the EC Project. The Project Environmental Team comprises the Project Environmental Team Leader (ETL), the Project Regulatory Compliance and Environmental Officer, and the Project Environmental Officer. The Project Environmental Team organisation is depicted in *Figure 1.3*.

1.3 Construction Activities and Project Programme

The construction of the Project involves demolition and relocation of certain existing facilities. While the existing generating units will remain in their current locations, some of the auxiliary and common facilities to the south of the generating units at CPB will be demolished or relocated to provide space for the emission control and related facilities. The scope of the Project is as follows:

- Demolition of some existing facilities at CPB including the Fuel Oil Day Tank, Fuel Oil Pump House and Dangerous Goods (DG) Store;
- Relocation or re-routing of existing facilities including Ash and Dust Control Room, Underground Pipeworks, Carbon Dioxide (CO₂) Storage Tank, Liquefied Petroleum Gas (LPG) Storage Tanks, Intermediate Pressure Reduction Station, Oil Interceptors, Oils Sump, Oil Sewer Manholes and Foul Water Pumping Station;
- Provision of Reagent and By-Product Handling and Storage Facilities including limestone store, limestone slurry tanks, gypsum dewatering and storage facilities;
- Installation of new emission control equipment and facilities for NOx and SO₂ control;
- Provision of additional berthing facilities for loading and unloading of the additional reagents and gypsum.

The civil works of the EC Project were commenced on 26 September 2007 and all construction works of the Designated Project (DP) was completed on 31 March 2011, and therefore no further construction activities will be undertaken that may give rise to significant environmental impact.

The termination of the EM&A programme had been justified by the ET Leader and verified by the IEC to the compliance with the requirements as set out in the EIA Report (Register No. AEIAR-102/2006). A letter notifying the completion of the construction works for the DP and proposing the termination of construction EM&A programme was sent to EPD on 1 April 2011 (CLP ref.: CPBEC/OTHS/ECPT/EPD/L/4736) for approval. A reply letter from EPD received on 13 April 2011 (EPD ref.: EP2/N4/D/90) for requesting further information and CAPCO's subsequent response to 2011 **EPD** sent on 29 April (CLP was CPBEC/OTHS/ECPT/EPD/L/4778). Termination of the EM&A Programme for the Project was approved by EPD on 2 June 2011 (EPD ref.: EP2/N4/D/90 Pt. 9).

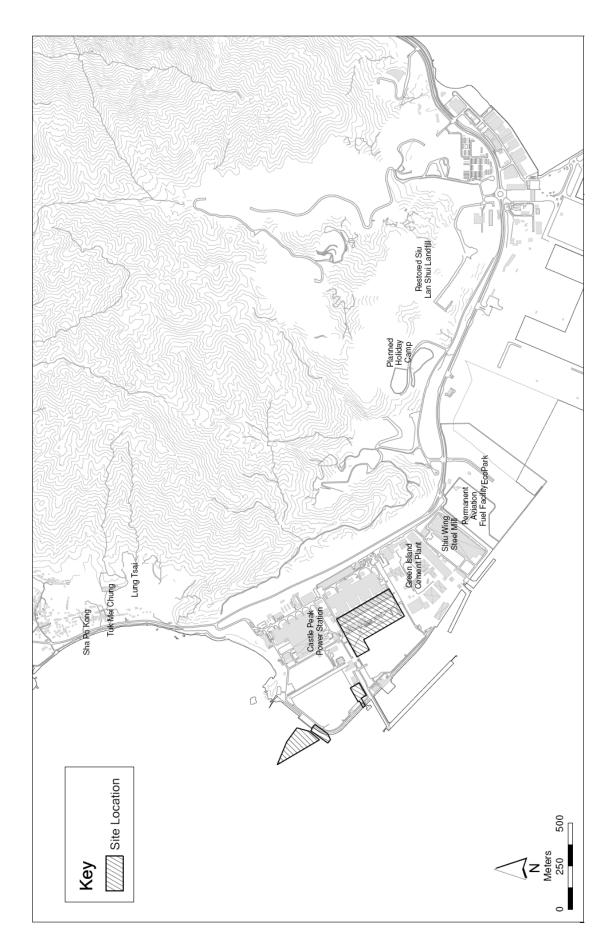
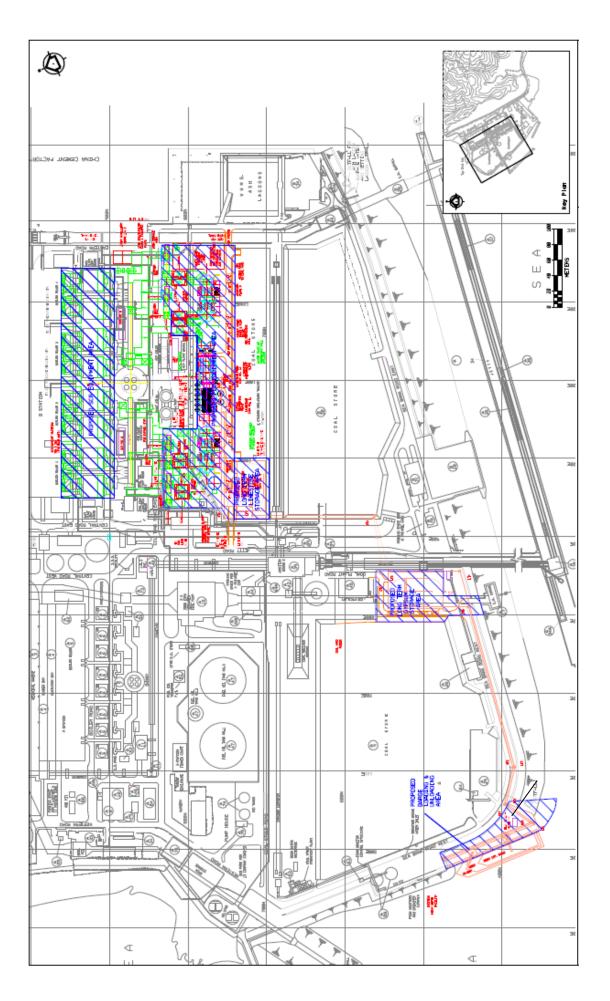


Figure 1.1 Location of the EC Project Site



gure 1.2 EC Project Site General Layout Arrangement

Integrated Project Environmental Team

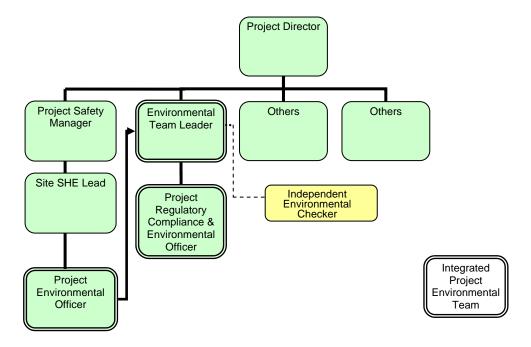


Figure 1.3 Integrated Project Environmental Team

2. Environmental Monitoring Requirements

2.1 Groundwater Monitoring

With respect to the requirement specified in the Environmental Permit No. EP-251/2006, monitoring of the total petroleum hydrocarbon (TPH) in the groundwater within the Project site during construction and operation of the Project is required. A Groundwater Monitoring Plan has been developed to define the groundwater monitoring locations, methodology for groundwater monitoring as well as the monitoring schedule.

2.1.1 Monitoring Location

According to the Groundwater Monitoring Plan, three (3) groundwater monitoring well locations within the Project site, namely MW1 to MW3, have been installed for the groundwater monitoring during the construction of the Project, including:

- MW1: located adjacent to the north-east corner of the existing Coal Plant Substation;
- MW2: located north-west of the existing ACP Plant House; and
- MW3: located adjacent to the north-east corner of the existing ACP Plant House.

The location of the groundwater monitoring wells is shown in *Figure 2.1*.

2.1.2 Monitoring Methodology

Purpose made HDPE slotted risers and blank pipes (50mm diameter) were used for installation the groundwater wells. Wells were purged (using new bailers) five times the volumes of the wells after installation to get rid of dirt or potential cross contamination during well installation, and purged three times the volumes of the wells before each sampling to ensure no stagnant groundwater was collected and that the representative samples from each well was collected.

After purging, groundwater was sampled from the monitoring wells using new disposable Teflon bailers for each sampling at each location to eliminate the risk of cross contamination. Any free-floating products in groundwater, if observed, were also collected for laboratory analysis.

The samples were then dispatched to an HOKLAS-accredited analytical laboratory for analysis as soon as practicable

following sampling. All samples were handled under chain of custody protocols and relinquished to the laboratory representative at the site.

The samples were analysed for TPHs, using United States Environmental Protection Agency (US EPA) Methods 8260 and 8015, by the HOKLAS-accredited analytical laboratory.

2.1.3 Monitoring Parameters and Frequency

With respect to the requirement specified in the Environmental Permit No. EP-251/2006, the groundwater samples were analyzed for Total Petroleum Hydrocarbons (TPHs) concentrations for all three monitoring locations.

Bi-weekly Groundwater Monitoring Programme for the initial period of three months after the commencement of major piling and foundation works was successfully concluded on 25 January 2008. The TPH monitoring results for the initial three-month period consistently remained well below the relevant Risk-based Remediation Goals (RBRGs) values, and therefore the remaining groundwater monitoring for 2008 was conducted on a quarterly basis in accordance with the Groundwater Monitoring Plan (Rev 4), which had been accepted by EPD.

The Groundwater Monitoring Program for 2008 was completed in October 2008 with all results well within the Risk-Based Remediation Goals (RBRGs) stated in the EPD's Guidance Note for Contaminated Land Assessment and Remediation. In view of this, the groundwater monitoring frequency for 2009 is reduced to twice a year as per the email confirmation (dated 07 November 2008) from EPD to the Independent Environmental Checker.

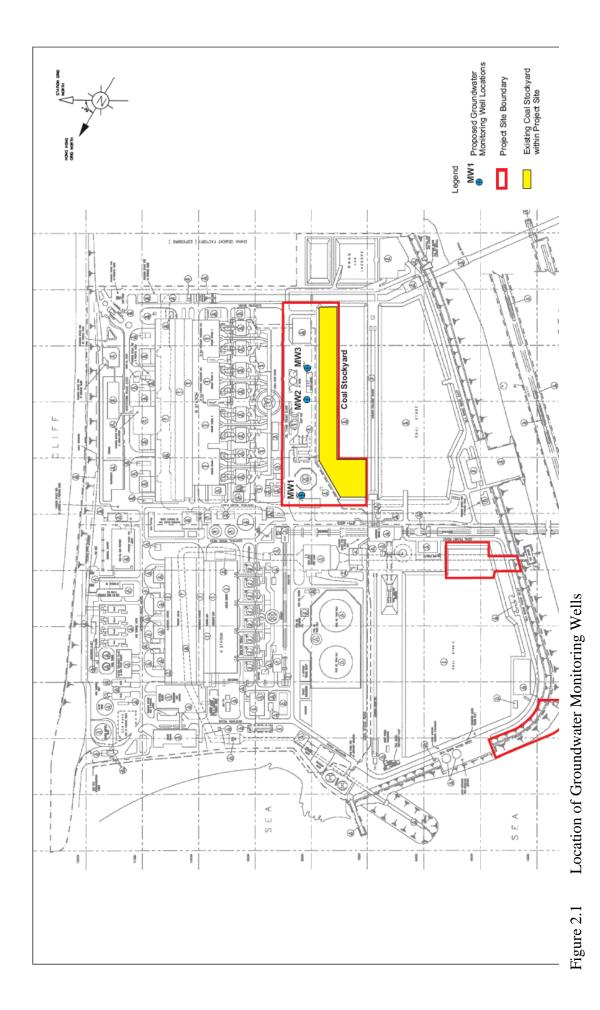
Two TPH measurements of the Groundwater Monitoring for 2009 were conducted and all results indicated that TPH levels continue to remain well below the relevant RBRGs value. Confirmation from EPD regarding the groundwater monitoring program for 2010 was received on 29 April 2010 and the groundwater monitoring frequency was reduced to once a year.

The Groundwater Monitoring Frequency are summarised in Table 2.1 below:

Table 2.1 Summary of Groundwater Monitoring Frequency

Groundwater Monitoring frequency over the construction
phase of the Project is listed below:

Oct 2007 – Jan 2008	Biweekly
Year 2008 (From 2 nd Quarter)	Quarterly
Year 2009	Twice a year
Year 2010	Yearly



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2.2 Marine Water Quality Monitoring

With respect to the requirement specified in the Environmental Permit No. EP-251/2006, monitoring of marine water quality during the construction phase is required to evaluate whether any impacts would be posed by the dredging operations on the surrounding waters during the construction period of the dredging works. Baseline monitoring (prior to the dredging works), impact monitoring (during any works related to the dredging works) and post-project monitoring (after completion of the dredging) shall be carried out according to the monitoring locations, monitoring parameters and frequency specified in the EIA Report.

2.2.1 Water Quality Monitoring Parameters

The Water Quality Monitoring Parameters are summarised in *Table 2.2* below:

Table 2.2 Summary of Water Quality Monitoring Parameters

Monitoring Parameters

The parameters measured *in situ* include:

- Dissolved oxygen (DO) (saturation and mg L⁻¹);
- Temperature;
- Turbidity (NTU); and
- Salinity (‰ or ppt).

The parameter measured in the laboratory include:

• Suspended solids (SS) (mg L⁻¹)

2.2.2 Monitoring Stations

Water quality sampling was undertaken at the following designated monitoring stations:

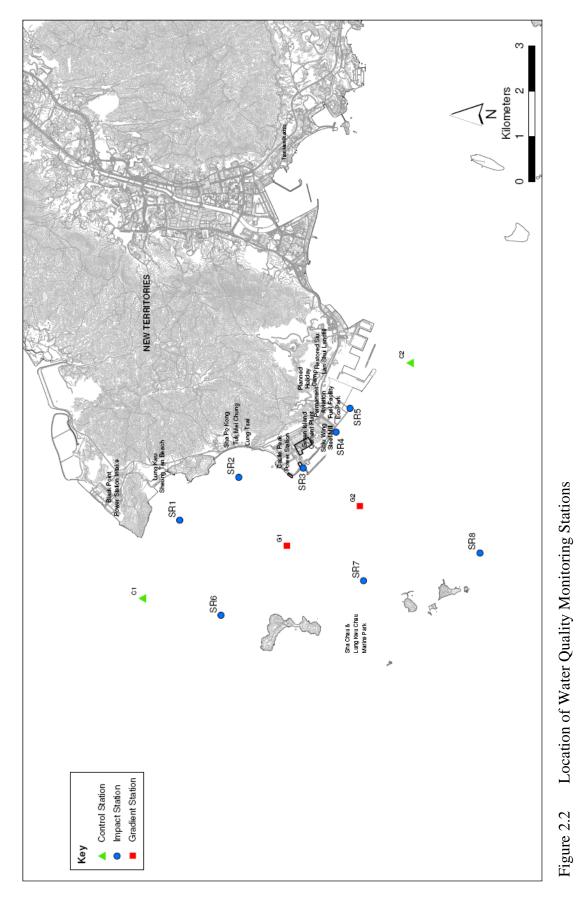
- C1 is a Control Station (during ebb tide) located to the north of the dredging area, which is not supposed to be influenced by the construction works;
- **C2** is a Control Station (during flood tide) located to the south of the dredging area with the same coordinates as EPD routine monitoring station NM3, which is not supposed to be influenced by the construction works;

- **SR1** and **SR2** represent Lung Kwu Sheung Tan Beach and Lung Kwu Tan Beach respectively, located to the north of the dredging area;
- SR3, SR4 and SR5 represent the Castle Peak Power Station Intake, the Shiu Wing Steel Mill Intake and the EcoPark Intake, located to the south of the dredging area;
- **SR6**, **SR7** and **SR8** represent the eastern boundary of Sha Chau and Lung Kwu Chau Marine Park; and
- **G1**, and **G2** are regarded as a Gradient Station in-between the dredging area and the Marine Park, whereas G1 situates at the same location as EPD routine monitoring station NM5.

The co-ordinates of these monitoring stations are listed in *Table 2.3*. and the locations are shown in *Figure 2.2*

Table 2.3 Co-ordinates of Baseline, Impact & Post Project Monitoring Stations (HK Grid)

Station	Easting	Northing	
C1	806561	829624	
C2	811762	823728	
SR1	808295	828795	
SR2	809242	827496	
SR3	809444	826076	
SR4	810241	825355	
SR5	810763	825047	
SR6	806198	827886	
SR7	806959	824749	
SR8	807571	822187	
G1	807729	826440	
G2	808608	824832	



Location of Water Quality Monitoring Stations

2.2.3 Monitoring Frequency

The baseline, impact and post-project monitoring were undertaken 3 days per week, at mid-flood and mid-ebb tides, with sampling / measurement at the designated stations. The intervals between 2 consecutive sets of monitoring was at least or more than 36 hours except where there were exceedances of Action and/or Limit Level, in which case monitoring frequency would be increased. The tidal range for each of the flood and ebb tide was at least or more than 0.5m.

The water quality sampling was undertaken within a 3-hour window of 1.5 hour before and 1.5 hour after mid flood and mid-ebb tides. The environmental contractor was responsible for liaison with the engineering contractor to confirm whether dredging works were being undertaken during the water quality sampling.

Each station was sampled and measurements were taken at three depths, 1 m below the sea surface, mid depth and 1m above the sea bed. For stations that are less than 3 m in depth, only the mid depth sample was taken.

Replicate *in-situ* measurements and sample collected from each independent sampling event were required for all parameters to ensure a robust statistically interpretable dataset.

2.2.4 Monitoring Equipment

Table 2.4 summarizes the equipment used in the water quality monitoring program. All the monitoring equipment complied with the requirements set out in the approved EIA Report.

Table 2.4 Water Quality Monitoring Equipment

Equipment	Model and Make	Qty.
Water Sampler	Kahlsico Water-Bottle Model 135DW 150	1
Multi-parameter Water Quality System	YSI 6820	2
Monitoring Position Equipment	"Magellan" Handheld GPS Model GPS-320	1

2.2.5 Action and Limit Levels

All water quality monitoring results were evaluated against the Action and Limit levels stipulated in the Baseline Water Quality Monitoring Report (*Table 2.5*).

2.2.6 Event and Action Plan

The Event and Action Plan for Water Quality is shown in *Appendix A* for reference.

Table 2.5 Action and Limit Levels for Water Quality Monitoring

Parameter		Action	Limit
DO (mg/L) h	Surface and Middle	6.0	5.5
(mg/L) b	Bottom	5.7	5.4
Turbidity (NTU) c	Depth average a	13.1 and 20% exceedance of value at any impact station compared with corresponding data from control stations at the same tide of the same day d, e,	and 30% exceedance of value at any impact station compared with corresponding data from control stations at the same tide of the same day d, e
SS (mg/L) c	Depth average a	34.3 and 20% exceedance of value at any impact station compared with corresponding data from control stations at the same tide of the same day d, e,	36.7 and 30% exceedance of value at any impact station compared with corresponding data from control stations at the same tide of the same day and specific sensitive receiver water quality requirements d, e, f

Note:

- (a) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depth.
- (b) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- (c) For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- (d) An exceedance of Action Level and Limit Level is defined as exceeding both criteria. The comparison of the results of impact stations and control stations will aid to determine then background influence to the water quality sensitive receivers.
- (e) C1 is regarded as the Control Station during ebb tide, whereas C2 is regarded as the Control Station during flood tide.
- (f) For WSD and Black Point/Castle Peak Power Station intakes (SR3), the specific SS criteria are not greater than 20 mg/L and 764 mg/L.

2.3 Ecology Monitoring

With respect to the requirement specified in the Environmental Permit No. EP-251/2006, visual cetacean monitoring should be conducted during the underwater percussive piling works to evaluate whether there have been any effects on the animals.

2.3.1 Monitoring Duration and Frequency

Daily visual cetaceans monitoring was conducted whenever there was underwater percussive piling works.

2.3.2 Monitoring Methodology

Dolphin Exclusion Zone

A dolphin exclusion zone was identified within a radius of 500 m from the percussive piling works area. The exclusion zone around the work area was scanned for at least 30 minutes prior to the commencement of piling. If cetaceans were observed in the exclusion zone, underwater percussive piling would be delayed until they had left the area.

Dolphin Observation

The observer was standing at a location on the piling barge that allows for an observation height of 4 to 5 m above water level at the observer's eye level and relatively unobstructed forward visibility. Observation by the observer was conducted by searching with Fujinon 7 x 50 marine binoculars, scanning the area with the naked eye and occasional binocular check. The observer was remained alert at all times during the entire observation period.

Construction works

When dolphins were spotted within the exclusion zone, construction works would cease and would not resume until the observer confirmed that the zone has been continuously clear of dolphins for a period of 30 minutes (thereby adequately spanning the approximate maximum dive time of the dolphins of 4 minutes). Dolphin sighting position, data on sighting angle, distance to the group, group size and behaviour were recorded.

3. Implementation Status of EIA Recommendations

3.1 Environmental Mitigation Implementation Schedule

Environmental mitigation measures for the construction stage has implemented as per the EIA Report.

The Environmental Mitigation Implementation Schedule (EMIS) is presented in *Appendix B*.

3.2 Event and Action Plan

The impact monitoring and the post project monitoring were carried out as per the EM&A requirement. All monitoring results were evaluated against the Action and Limit levels stipulated in the Baseline Water Quality Monitoring Report and confirmed in full compliance during the construction period.

3.3 Site Environmental Inspection and Audit

Independent Environmental Checker (IEC) conducted bi-weekly site inspection to ensure proper implementation of environmental mitigation measures specified in the EIA report and compliance with environmental legislation over the entire construction phase of the Project. All the follow-up actions to respond to the IEC observations have been completed by the relevant contractors and verified in the subsequent site inspections by the Integrated Project Environmental Team. There were no outstanding follow-up actions.

Joint site audits were carried out by the Integrated Project Environmental Team (ET) with contractors on a weekly basis to monitor environmental issues at the construction sites to ensure that all mitigation measures were implemented timely and properly. All required follow-up actions were completed by the relevant contractors and verified by the Integrated Project Environmental Team over the entire construction phase of the Project. There were no outstanding follow-up actions.

3.4 Environmental Complaint and Enquires

No complaint or enquiries were received during the construction of the Project.

4. Summary of the EM&A Results

4.1 Groundwater Monitoring

Monitoring for total petroleum hydrocarbon (TPH) concentrations in groundwater within the Project Site has been conducted since October 2007 in accordance with Condition 3.1 of Environmental Permit No. EP-251/2006 and the Groundwater Monitoring Plan for the Project.

Bi-weekly Groundwater Monitoring Programme for the initial period of three months after the commencement of major piling and foundation works was successfully concluded on 25 January 2008. The TPH monitoring results for the initial three-month period consistently remained well below the relevant Risk-based Remediation Goals (RBRGs) values, and therefore the remaining groundwater monitoring for 2008 was conducted on a quarterly basis in accordance with the Groundwater Monitoring Plan (Rev 4), which had been accepted by EPD.

The Groundwater Monitoring Program for 2008 was completed in October 2008 with all results well within the Risk-Based Remediation Goals (RBRGs) stated in the EPD's Guidance Note for Contaminated Land Assessment and Remediation. In view of this, the groundwater monitoring frequency for 2009 is reduced to twice a year as per the email confirmation (dated 07 November 2008) from EPD to the Independent Environmental Checker.

The 2nd half-yearly Groundwater Monitoring for 2009 was conducted on 15 October 2009 for TPH measurement and all results indicated that TPH levels continue to remain well below the relevant RBRGs value.

Confirmation from EPD regarding the groundwater monitoring program for 2010 was received on 29 April 2010 and the groundwater monitoring frequency was reduced to once a year.

The yearly Groundwater Monitoring for 2010 was conducted on 13 October 2010 for TPH measurement and all results indicated that TPH levels continue to remain well below the relevant RBRGs value.

The Groundwater Monitoring results at the three designated sampling points for the construction phase of the Project are shown in *Appendix C*. The TPHs concentrations in all samples recorded since the commencement of the construction works were well below the RBRGs for groundwater for industrial area during the construction phase of the Project. The recommended mitigation measures in Section 10 of EIA report were implemented throughout the construction period and were considered effective.

4.2 Marine Water Quality Monitoring

Baseline water quality monitoring programme was completed on 21 December 2007 according to the schedule submitted to EPD on 6 November 2007. The Baseline Water Quality Monitoring Report was revised to address EPD's comments on the first submission and resubmitted to EPD on 4 March 2008.

The impact monitoring on marine water quality was completed on 15th January 2010.

Post project water quality monitoring programme was completed on 12 February 2010 and the Post Project Water Quality Monitoring Report was submitted to EPD on 24 February 2010.

The Post-Project monitoring graphical presentations of the monitoring results are shown in *Appendix D* with reference to Post Project Water Quality Monitoring Report for this Project and compared with baseline and impact monitoring results in Baseline and Impact Water Quality Monitoring Report submitted before.

The overall water quality after the completion of the dredging works in the Post Project Water Quality Monitoring Report was found to be similar to that before the commencement of the Project works. No Action/Limit Level exceedance was recorded during the Post-Project monitoring period. It is concluded that no deterioration of water quality was observed other than natural fluctuation or seasonal variation and hence the impact of the Project works on the water quality at the Project sites is considered to be negligible.

All water quality monitoring results recorded since the commencement of the construction works were full compliance against the Action and Limit levels stipulated in the Baseline Water Quality Monitoring Report. The recommended mitigation measures in Section 10 of EIA report were implemented throughout the construction period and were considered effective.

4.3 **Ecology Monitoring**

According to the EIA report, visual cetaceans monitoring is required solely during underwater percussive piling works. The underwater percussive piling works for Material Handling Berth construction were conducted from 1 September 2008 to 12 November 2009 and a total of 126 observations for the visual cetaceans monitoring was carried out in the period of underwater percussive works over the construction period of this Project.

No dolphin was spotted within the exclusion zone during the underwater percussive works over the construction period. The recommended mitigation measures in Section 10 of EIA report were

implemented throughout the construction period and were considered effective.

5. Conclusion

The final Environmental Monitoring and Audit (EM&A) report for the Emissions Control Project at Castle Peak Power Station 'B' Units (EC Project) presents the summary of EM&A results over the entire construction phase of the Project as per the Project Environmental Impact Assessment (EIA) Report (EIAO Register No.: AEIAR-102/2006) and Environmental Permit (EP) No. EP-251/2006.

The construction of the Designated Project (DP) was completed on 31 March 2011 and the construction phase EM&A programme was terminated since April 2011.

Groundwater, marine water quality and ecology monitoring had been undertaken during the construction phase of the Project in accordance with the Project Environmental Impact Assessment (EIA) Report (EIAO Register No.: AEIAR-102/2006) and Environmental Permit (EP) No. EP-251/2006. The monitoring programmes were considered effective as evident by no exceedances and no compliant was recorded. The monitoring results also provide support to the fact that the construction of the Project has not caused adverse impacts to the environment, which is in line with the prediction in the Project Environmental Impact Assessment (EIA) Report.

Weekly site inspections and bi-weekly site audits were carried out by ET and the Independent Environmental Checker (IEC), respectively, to monitor the implementation status of environmental mitigation measures over the construction phase of the Project. There were no outstanding environment issues in the Project from the findings of the weekly and bi-weekly site inspections. No follow-up actions will be required by the Contractor.

No complaint or enquiries were received during the construction of the Project.

Appendices

Appendix A Event and Action Plan for Water Quality

EVENT		ACTIO	ON	
EVENT	ET	IEC C	CAPCO	Contractor
Action Level being exceeded by one sampling day	 Repeat <i>in-situ</i> measurement to confirm findings; Identify source(s) of impact; Inform the IEC and the Contractor and CAPCO; Check monitoring data, all plant, equipment and the Contractor's working methods; Discuss mitigation measures with the IEC and the Contractor. 	and the Contractor on the mitigation measures;	Discuss with the IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented.	 Inform the CAPCO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with the ET and the IEC and propose mitigation measures to the IEC and the CAPCO; Implement the agreed mitigation measures.
Action Level being exceeded by more than one consecutive sampling days	 Repeat <i>in-situ</i> measurement to confirm findings; Identify source(s) of impact; Inform the IEC and the Contractor and CAPCO; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with the IEC and the Contractor; Ensure mitigation measures are implemented. 	ET and the Contractor on the mitigation measures; 2. Review proposals on mitigation measures	Discuss with the IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess effectiveness of the implemented mitigation measures.	 Inform the CAPCO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with the ET and the IEC and propose mitigation measures to the IEC and CAPCO within 3 working days; Implement the agreed mitigation measures.

EVENT		ACT	TION	
EVENI	ET	IEC	CAPCO	Contractor
Limit Level being exceeded by one consecutive sampling day	 Repeat <i>in-situ</i> measurement to confirm findings; Identify source(s) of impact; Inform the IEC, the Contractor and the DEP; Check monitoring data, all plant, equipment and the Contractor's working methods; Discuss mitigation measures with the IEC, the CAPCO and the Contractor; Ensure mitigation measures are implemented. 	 Discuss with the ET / Contractor on the mitigation measures; Review proposals on mitigation measures submitted by the Contractor and advise the CAPCO accordingly; Assess the effectiveness of the implemented mitigation measures. 	 Discuss with the IEC, the ET and the Contractor on the proposed mitigation measures; Request the Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures. 	 Inform the Engineer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with the ET, the IEC and the CAPCO and propose mitigation measures to the IEC and the CAPCO within 3 working days; Implement the agreed mitigation measures.
Limit Level being exceeded by more than one consecutive sampling days	 Repeat <i>in-situ</i> measurement to confirm findings; Identify source(s) of impact; Inform the IEC, the Contractor and DEP; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with the IEC, the CAPCO and the Contractor; Ensure mitigation measures are implemented. 	 Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by the Contractor and advise the CAPCO accordingly; Assess the effectiveness of the implemented mitigation measures. 	 Discuss with the IEC, the ET and the Contractor on the proposed mitigation measures; Request Contractor to critically review working methods; Make agreement on the mitigation measures to be implemented; Assess effectiveness of the implemented mitigation measures; Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level. 	 Inform the CAPCO and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with the ET, the IEC and the CAPCO and propose mitigation measures to the IEC and the CAPCO within 3 working days; Implement the agreed mitigation measures; As directed by the CAPCO, slow down or stop all or part of the construction activities.

Appendix B Construction Phase - Environmental Mitigation Implementation Schedule

N/A - Not Applicable

NC - Not complied

• The falling height of fill materials should be controlled.

• Silt curtains should be deployed around the closed grab dredger to

Legends:

EIA

S3.6.1

EP Con

Water Quality

C - Complied

Ref. **Environmental Protection Measures** Location/Duration of **Implementation Implementation Stage Implementation Status** Measures/Timing of Agent **Completion of Measures** Design Construction Air Quality EIA Within the construction Contractor • The area at which demolition work takes place should be sprayed S3.6.1 site/Throughout the with water prior to, during and immediately after the demolition construction period activities so as to maintain the entire surface wet Within the construction EIA • Dust screens or sheeting should be provided to enclose the structure Contractor C S3.6.1 to be demolished to a height of at least 1 m higher than the highest site/Throughout the construction period level of the structure: \mathbf{C} EIA Within the construction Contractor Any dusty materials should be wetted with water to avoid any S3.6.1 site/Throughout the fugitive dust emission; construction period EIA Within the construction Contractor • All temporary stockpiles should be wetted or covered by tarpaulin S3.6.1 site/Throughout the sheet to prevent fugitive emissions; construction period C EIA Within the construction Contractor • All the dusty areas and roads should be wetted with water; S3.6.1 site/Throughout the construction period EIA • All the dusty materials transported by lorries should be covered Within the construction Contractor S3.6.1 site/Throughout the entirely by impervious sheet to avoid any leakage; and construction period

Within the construction

Within the construction

site/Throughout the construction period

Contractor

Contractor

C

C

Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage		Implementation Status
				Design	Construction	
2.14, EIA S5.8.1	contain suspended solids within the construction site during dredging.	site/Throughout the construction period				
EP Cons 2.13 & 2.15, EIA S5.8.1	• A daily dredging rate of a closed grab dredger (with a minimum grab size of 8 m ³) should be less than 5,200 m ³ day ⁻¹ , with reference to the maximum rate for dredging, which was derived in the EIA.	Within the construction site/Throughout the construction period	Contractor		✓	С
EP Con 2.16, EIA S5.8.1	Barges or hoppers should have tight fitting seals to their bottom openings to prevent leakage of material.	Within the construction site/Throughout the construction period	Contractor		✓	С
EP Con 2.9	Any groundwater arising from the decommissioning and construction of the Project shall be collected and recharged back to the site of the Project. No groundwater shall be used for any industrial or domestic purposes.	Within the construction site/Throughout the construction period	Contractor		✓	С
EP Con 2.10	All wastewater or effluent arising from the stockpiling, transportation and treatment of the excavated contaminated materials shall be properly collected and treated.	Within the construction site/Throughout the construction period	Contractor		✓	С
EP Con 2.11	Surface run-off from the construction site shall be directed into sand/silt removal facilities such as sand/silt traps and sediment basins before discharge. The sand/silt removal facilities shall be adequately designed and properly operated and maintained.	Within the construction site/Throughout the construction period	Contractor		✓	С
EP Con 2.12, EIA S5.8.2	All exposed earth areas should be completed as soon as possible after earthworks have been completed, or alternatively, within 14 days of the cessation of earthworks, where practicable. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or by other means.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.1	Mechanical grabs should be designed and maintained to avoid spillage and should seal tightly while being lifted.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA	Loading of barges or hoppers should be controlled to prevent	Within the construction	Contractor		✓	С

Ref.			Implementation	Implemen	tation Stage	Implementation Status
		Completion of Measures	Agent	Design	Construction	
S5.8.1	splashing of dredged material to the surrounding water.	site/Throughout the construction period				
EIA S5.8.1	Barges or hoppers should not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.1	Excess material should be cleaned from the decks and exposed fittings of barges or hoppers before the vessel is moved.	Within the construction site/Throughout the construction period	Contractor		*	С
EIA S5.8.1	Adequate freeboard should be maintained on barges to reduce the likelihood of decks being washed by wave action.	Within the construction site/Throughout the construction period	Contractor		1	С
EIA S5.8.1	All vessels should be sized such that adequate clearance is maintained between vessels and the seabed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.1	The works should not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.2	• At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed and internal drainage works and erosion and sedimentation control facilities implemented. Channels, earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of efficient silt removal facilities should be based on the guidelines in <i>Appendix A1</i> of <i>ProPECC PN 1/94</i> .	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.2	All the surface runoff or extracted ground water contaminated by silt and suspended solids should be collected by the on-site drainage system and diverted through the silt traps prior to discharge into storm drain.	Within the construction site/Throughout the construction period	Contractor		1	С

Ref.	Environmental Protection Measures		Implementation	Implementation Stage		Implementation Status
		Measures/Timing of Completion of Measures	Agent	Design	Construction	
EIA S5.8.2	All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.2	Measures should be taken to reduce the ingress of site drainage into excavations. If the excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.2	Open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than 50 m³ should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.	Within the construction site/Throughout the construction period	Contractor		~	С
EIA S5.8.2	Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA \$5.8.2	• Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in <i>Appendix A2</i> of <i>ProPECC PN 1/94</i> . Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.	Within the construction site/Throughout the construction period	Contractor		✓	С

Ref.			Implementation	Implement	ation Stage	Implementation Status
		Measures/Timing of Completion of Measures	Agent	Design	Construction	
EIA S5.8.2	Oil interceptors should be provided in the drainage system and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain.	Within the construction site/Throughout the construction period	Contractor		~	N/A
EIA \$5.8.2	All temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge should be adequately designed for the controlled release of storm flows. All sediment traps should be regularly cleaned and maintained. The temporary diverted drainage should be reinstated to the original condition when the construction work has finished or the temporary diversion is no longer required.	Within the construction site/Throughout the construction period	Contractor		~	С
EIA S5.8.2	Sewage from toilets should be collected by a licensed waste collector.	Within the construction site/Throughout the construction period	Contractor		V	С
EIA S5.8.2	Vehicle and plant servicing areas, vehicle wash bays and lubrication bays should, as far as possible, be located within roofed areas. The drainage in these covered areas should be connected to foul sewers via a petrol interceptor.	Within the construction site/Throughout the construction period	Contractor		*	С
EIA S5.8.2	Oil leakage or spillage should be contained and cleaned up immediately. Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.2	Waste streams classifiable as chemical wastes should be properly stored, collected and treated for compliance with Waste Disposal Ordinance or Disposal (Chemical Waste) (General) Regulation requirements.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.2	The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil, fuel and chemicals from reaching the receiving waters.	Within the construction site/Throughout the construction period	Contractor		✓	С

Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation	Implementation Stage		Implementation Status
			Agent	Design	Construction	
EIA S5.8.2	The Contractors should prepare guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S5.8.2	Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.	Within the construction site/Throughout the construction period	Contractor		*	С
Waste Mai	nagement					
EP Con 2.19	No wastes, spoil or excavated materials or materials alike arising from the demolition and/or decommissioning and construction works of the Project shall be dumped in any environmentally sensitive areas, including but not limited to Sites of Special Scientific Interest, coastal protection areas, conservation areas and agricultural land.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S6.6.1	Dredged sediments should be disposed of only at designated disposal sites allocated by the Marine Fill Committee (MFC) based on the findings of further sediment quality tests. A dumping licence should also be obtained from EPD prior to the commencement of the dredging works.	Within designated disposal site/prior to commencement of the dredging works	Contractor		✓	С
EIA S6.6.1	 Regardless of the disposal method and site, the Contractor should: Dredge the sediments using closed grabs; Use split barges of not less than 750 m³ capacity when transporting the sediment to the disposal site; Regularly maintain the barge hoppers to ensure that they are capable of rapid opening and discharge at the designated disposal site; and Monitor the barge load against loss of materials during transportation. 	Within the dredging area /Throughout the dredging works period	Contractor		✓	С

Ref.	Environmental Protection Measures		Implementation	Implementation Stage		Implementation Status
		Measures/Timing of Completion of Measures	Agent	Design	Construction	
EIA S6.6.3	The contractor should open a billing account with EPD in accordance with the Waste Disposal (Charges for Disposal of Construction Waste) Regulation for the payment of disposal charges. Every waste load transferred to government waste disposal facilities such as public fill, sorting facilities, landfills or transfer station would required a valid "chit" which contain the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A tripticket system should also be established in accordance with Works Bureau Technical Circular No. 21/2002 to monitor the disposal of solid wastes at transfer station/landfills, and to control fly-tipping. The billing "chit" and trip-ticket system should be included as one of the contractual requirements and implemented by the contractor.		Contractor		✓	С
EIA S6.6.3	A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) should be established during the construction stage.	Within the construction site/Throughout the construction period	Contractor		✓	С

Ref.	Environmental Protection Measures		Implementation Agent	Implementation Stage		Implementation Status
				Design	Construction	
EIA S6.6.3	 Measures for the Reduction of C&DM Generation during Planning and Design Stages The various waste management options can be categorized in terms of preference from an environmental viewpoint. The options considered to be more preferable have the least impacts and are more sustainable in the long term. Hence, the waste management hierarchy is as follows: Avoidance and minimization, that is, reduction of waste generation through changing or improving practices and design; Reuse of materials, thus avoiding disposal (generally with only limited reprocessing); Recovery and recycling, thus avoiding disposal (although reprocessing may be required); and Treatment and disposal, according to relevant law, regulations, guidelines and good practice. This hierarchy should be used to evaluate the waste management options, thus allowing maximum waste reduction and reduced disposal costs. Records of quantities of wastes generated, recycled and disposed (locations) should be kept. 	Within the construction site/Throughout the construction period	Contractor	✓		С

Ref.	Environmental Protection Measures		Implementation Agent	Implementa	tion Stage	Implementation Status
		Completion of Measures	Agent	Design	Construction	
EIA \$6.6.3	 Measures for the Reduction of C&DM Generation during Construction C&D materials will be reused as far as possible within the Project. Public fill and construction waste should be segregated and stored in different containers or skips to facilitate reuse or recycling of materials and their proper disposal of construction waste. Specific areas of the work site should be designated for such segregation and temporary storage if immediate use is not practicable. The construction waste should be collected by Contractor and transported to landfills for disposal. The use of wooden hoardings should not be allowed. An alternative material, which can be reused or recycled, for example, metal (aluminium, alloy, etc) should be used. To reduce the potential dust impact, C&D materials should be wetted as quickly as possible during excavation works. 	Within the construction site/Throughout the construction period	Contractor		•	С
EIA S6.6.4	 Containers used for storage of chemical wastes should: be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 L unless the specifications have been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in <i>Schedule 2</i> of the <i>Regulations</i> 	Within the construction site/Throughout the construction period	Contractor		✓	С

Ref.			Implementation Agent	Implementa	tion Stage	Implementation Status
		Completion of Measures	Agent	Design	Construction	
EIA S6.6.4	 The storage area for chemical wastes should: be clearly labelled and used solely for the storage of chemical waste; be enclosed on at least 3 sides; have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest; have adequate ventilation; be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and be arranged so that incompatible materials are appropriately separated. 	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S6.6.4	Disposal of chemical waste should be: • via a licensed waste collector; and • to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S6.6.5	The sewage sludge from the portable toilet should be collected by a reputable collector on a regular basic.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S6.6.6	General refuse should be stored in enclosed bins or compaction units separately from construction and chemical wastes.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S6.6.6	General refuse should be removed from the site, separately from construction and chemical wastes, on a daily basis to minimise odour, pest and litter impacts.	Within the construction site/Throughout the construction period	Contractor		✓	С

Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of	Implementation Agent	Implementa	ation Stage	Implementation Status
		Completion of Measures	Agent	Design	Construction	
EIA S6.6.6	Burning of refuse on construction site is prohibited by law.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S6.6.6	Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. As such, separate, labelled bins for their deposit should be provided if feasible. Materials recovered will be re-used on site or sold for recycling.	Within the construction site/Throughout the construction period	Contractor		✓	С
EIA S6.6.7	Training should be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling at the beginning of the Contract.	Within the construction site/Throughout the construction period	Contractor		✓	С
Land Conte	ramination			•	•	
EP Con 2.5	The oil tanks shall be properly cleaned before their demolition. All wastes and effluent arising from the cleaning of the oil tanks shall be properly collected, stored, treated and disposed of.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EP Con 2.6	No contaminated soil arising from the demolition and/or decommissioning works shall be stockpiled, treated or disposed of outside the Castle Peak Power Station.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EP Con 2.7	The excavated soil arising from the demolition and/or decommissioning works shall be properly contained in container(s) during storage and transportation to avoid any discharge or leakage.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EP Con 2.8	The contaminated soil arising from the demolition and/or decommissioning works shall be decontaminated within the Castle Peak Power Station in accordance with the Land Contamination Remediation Action Plan contained in the EIA report (Register No. AEIAR-102/2006). Bio-remediation methods shall be used to remedy the petroleum hydrocarbon contamination in the excavated materials.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	Potentially contaminated soil should be treated in accordance with the remediation actions specified in the Remediation Action Plan (RAP) of this EIA Report and the treated soil should be reused within the Project Site as far as possible.	Within the contaminated area /Throughout the construction period	Contractor		1	С

Ref.			Implementation	Implemen	tation Stage	Implementation Status
		Completion of Measures	Agent	Design	Construction	
EIA Annex E	The temporary stockpile of excavated potentially contaminated materials should be contained in a container covered by HDPE sheet on top	Within the contaminated area /Throughout the construction period	Contractor		*	С
EIA Annex E	Bioremediation by applying nutrient to the soil should be employed for the on-site treatment of excavated materials potentially contaminated by TPH.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	If disposal of the treated excavated soil to the public fill bank is required, vehicles containing any excavated materials should be suitably covered to limit potential dust emissions or wastewater run-off, and truck bodies and tailgates will be sealed to minimise the risk of a discharge during transportation or during wet conditions.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	Records of the quantities of soil generated for off-site disposal will be maintained.	Within the contaminated area /Throughout the construction period	Contractor		*	С
EP Con 2.9, EIA Annex E	As groundwater is not used for either domestic or industrial purposes at the site or in the adjacent areas, remediation of groundwater is not considered to be necessary for the Project to proceed. If groundwater is encountered during the construction of foundations, the groundwater abstracted or collected will be recharged back to the site.	Within the contaminated area /Throughout the construction period	Contractor		√	С
EIA Annex E	The FODT and the oil separator serving it should be cleaned prior to demolition.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	Oily water and sludge collected from the cleaning should be treated at the on-site wastewater treatment facility. Oily water and sludge collected from the cleaning should be collected and disposed of as chemical waste at Government chemical waste treatment facility.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	Only licensed waste contractors should be used to collect and transport any chemical waste. The necessary waste disposal permits will be obtained, as required, from the appropriate authorities, in accordance with the <i>Waste Disposal Ordinance (Cap 354)</i> and <i>Waste Disposal (Chemical Waste) (General) Regulation (Cap 354C)</i> , as required.	Within the contaminated area /Throughout the construction period	Contractor		✓	С

Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of	Implementation	Implemen	tation Stage	Implementation Status
		Completion of Measures	Agent	Design	Construction	
EIA Annex E	Prior to commence any remediation work, a health and safety risk assessment should be performed for the remediation work to identify potential work related hazards and prepare appropriate control measures.	Within the contaminated area /Throughout the construction period	Contractor		1	С
EIA Annex E	Appropriate Personal Protective Equipment (PPE) such as safety hat, chemical protective gloves, masks (for both dust and vapour), eye goggles, protective clothing and protective footwear should be provided to staff who would be involved in the tank cleaning and contaminated area (FODT and TP3) remediation works. No works should be allowed without the suitable PPE.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	The workers should inspect and check their PPE before, during and after use. In cases where any of the PPE is impaired, the workers should stop work immediately and inform their supervisor. The workers should not be allowed to re-start their work until the impaired PPE is replaced.	Within the contaminated area /Throughout the construction period	Contractor		*	С
EIA Annex E	The workers should always maintain basic hygiene standard (e.g. hand wash before leaving the contaminated work area). The workers should also be responsible for cleaning and storing their own PPE in a secure place before leaving the site.	Within the contaminated area /Throughout the construction period	Contractor		*	С
EIA Annex E	Eating, drinking and smoking should be strictly prohibited within the contaminated site area.	Within the contaminated area /Throughout the construction period	Contractor		1	С
EIA Annex E	The designated site management representatives must be informed if any workers feel uncomfortable physically or mentally during the remediation works. All workers should leave the work areas and the work should be temporarily suspended until the reason for the uncomfortable feeling has been identified.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	The works should be stopped or discontinued when Typhoon Signal No. 3 or Rainstorm Warning signals are hoisted. All stockpile materials (if any) should be covered immediately by tarpaulin or other similar protective and waterproof materials.	Within the contaminated area /Throughout the construction period	Contractor		✓	С
EIA Annex E	Bulk earth-moving excavator equipment should be used to minimise construction workers' potential contact with contaminated materials.	Within the contaminated area /Throughout the construction period	Contractor		*	С

Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage		Implementation Status
				Design	Construction	
Ecological	– Marine Mammal			•	•	,
EP Con 2.17, EIA S8.9	To limit potential impacts to cetaceans from underwater percussive piling, the following steps should be taken: • Only hydraulic hammers should be used;	/Throughout the construction period	Contractor		*	С
	An exclusion zone of 500 m radius should be scanned around the work area for at least 30 minutes prior to the start of piling. If cetaceans are observed in the exclusion zone, piling should be delayed until they have left the area; and,					
	Acoustic decoupling of noisy equipment on work barges should be undertaken. These techniques include the use of a soft sling to retain the pile driving hammer, rubber tyred air compressor for bubble jacket/curtain, rubber pads on barge leaders and guides, and an air curtain around the pile barge.					
EP Con 2.18	To minimize potential construction and operation impacts on dolphins and porpoises, no dumping of rubbish, food, oil, or chemicals from the marine vessels shall be allowed.	Within the dredging area /Throughout the construction period	Contractor		✓	С
EIA S8.9	 The following recommendations should be considered to minimize potential construction impacts on dolphins and porpoises. All vessel operators working on the Project construction should be given a briefing, alerting them to the possible presence of dolphins in the area, and the guidelines for safe vessel operation in the presence of cetaceans. If high speed vessels are used, they should be required to slow to 10 knots when passing through a high density dolphin area (west Lantau, Sha Chau and Lung Kwu Chau); The vessel operators should be required to use predefined and regular routes, as these will become known to dolphins using these waters; The vessel operators should be required to control and manage all 	Within the marine works area /Throughout the construction period of the additional berthing facility	Contractor / CLP Power (as CAPCO operator)		✓	С
	effluent from vessels; • A policy of no dumping of rubbish, food, oil, or chemicals should be					

]	Ref.	Environmental Protection Measures		Implementation Agent	Implementation Stage		Implementation Status
					Design	Construction	
		strictly enforced. This should also be covered in the contractor briefings; • Every attempt should be made to minimize the effects of construction					
,	\$9.3.5	of the Project on the water quality of the area; The new structures associated with the Project, including those of the additional conveyor systems, should be painted in a colour scheme that	New structures associated with the Project	Contractor		✓	С
		complements the surrounding industrial setting of the existing CPPS.	J				

Appendix C Summary of Groundwater Monitoring Results

Sampling	Total Petroleum		Sampling I		**RBRGs	
Date	Hydrocarbons	MW1	MW1a*	MW2	MW3	for
	(TPHs)	μg/L	μg/L	μg/L	μg/L	Groundwater
		. 0	10	. 0		(Industrial)
						μg/L
05/10/2007	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
16/11/2007	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
30/11/2007	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
14/12/2007	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
28/12/2007	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
11/01/2008	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
25/01/2008	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
18/04/2008	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
11/07/2008	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
10/10/2008	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
09/04/2009	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
15/10/2009	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05
13/10/2010	C6-C8	<20	<20	<20	<20	1.15E+06
	C9-C16	<100	<100	<100	<100	9.98E+06
	C17-C35	<150	<150	<150	<150	1.78E+05

Appendix D Post-Project Monitoring Graphical Presentations Results

(with reference to Post Project Water Quality Monitoring Report)

