

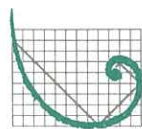
CHINA LIGHT AND POWER COMPANY, LIMITED

***DEMOLITION OF TSING YI POWER
STATION - NON-BLASTING OPTION:
VOLUME I - EXECUTIVE SUMMARY***

DECEMBER 1997

CONSULTING SERVICES BY ENVIRONMENTAL RESOURCES MANAGEMENT

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ERM

EIA 133 1B

EIA-133.VBC

10 January 1998

Environmental Protection Department Hong Kong
Urban Assessment Group
27/F Southorn Centre
130 Hennessy Road
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Hong Kong



Attn: Mrs Clara Yu, Environmental Protection Officer

Your ref: () in Annex (3) to EP2/N3/24 (Pt 3)

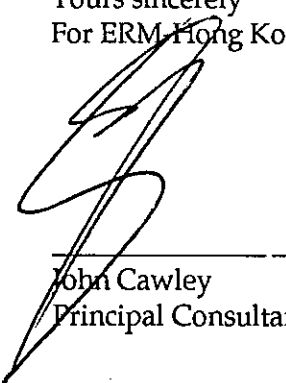
Our ref: C1674\77496\CONSULT

Dear Clara

***EIA for the Demolition of Tsing Yi Power Station
Final Revisions to EIA Report***

The revised report pages and the figures for your ACE Paper are enclosed, as requested in your fax of 9 January 1998.

Yours sincerely
For ERM Hong Kong, Ltd



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Moreover, CLP will appoint an environmental professional acceptable to EPD to design, implement and supervise the cleaning and backfilling of the underground structures. All the cleaning and backfilling activities shall comply with all prevailing environmental legislation (Air, Noise, Water and Waste) as well as not to cause any land contamination (e.g. underground structures may fail during the cleaning and backfilling operation and release contaminants to the adjacent soil).

INTRODUCTION

In this Section, recommendations for the environmental monitoring and audit (EM&A) programme for the demolition of the power station are outlined, taking account of the findings of the EIA. A more detailed, preliminary EM&A Programme, based on the recommendations of the *Generic Environmental Monitoring and Audit Manual, Environmental Protection Department, May 1996*, has been prepared as a separate Volume of this Report.

This EIA has identified that EM&A will be necessary for dust impacts. No potential noise or water quality impacts have been identified. Monitoring of the removal and disposal of contaminated materials, including the cleaning and backfilling of underground structures, will also be included in the EM&A Manual. The RAP will contain full details of the programme and methodology for the disposal of contaminated materials, including the cleaning and backfilling of underground structures, which will be incorporated into later versions of the EM&A Manual.

It is recommended that CLP should provide suitably qualified staff to carry out the recommended EM&A programme. CLP's and the Contractor's responsibilities will be related through the application of Event Contingency Plans (ECPs) to deal with any exceedance of the established criteria, either in the course of normal working or through unforeseen circumstances.

CLP will appoint an environmental professional acceptable to EPD to design, implement and supervise the cleaning and backfilling of the underground structures. All the cleaning and backfilling activities will comply with all prevailing environmental legislation (Air, Noise, Water and Waste) as well as not to cause any land contamination (eg underground structures may fail during the cleaning and backfilling operation and release contaminants to the adjacent soil).

ENVIRONMENTAL MONITORING AND AUDIT

The overall objectives of the EM&A programme which will be undertaken during the demolition of the power station are as follows:

- to monitor the performance of the project and to provide an early indication if any of the environmental mitigation measures, identified in this report and/or implemented by the Contractor, fail to meet the established standards and guidelines;
- to take remedial action if unexpected problems or unacceptable impacts arise;
- to provide data to enable an environmental audit to be undertaken;
- to provide a data base against which the short or long term environmental effects associated with the demolition works may be determined; and
- to verify the environmental impacts predicted in the EIA.

The monitoring will be undertaken by CLP site staff under the direction of a Senior Environmental Officer and will consist of:

- 1-hour and 24-hour TSP monitoring at two locations on the site boundary facing ASRs A1 and A3; and
- as appropriate, the removal and disposal of contaminated material, underground tank cleaning and backfilling.

In order that the environmental monitoring may be audited, CLP will establish strict procedures and protocols for carrying out, recording and reporting this work in the tender requirements.

7.3

EVENT CONTINGENCY PLANS

The purpose of the ECPs is to provide, in association with the monitoring and audit activities, procedures for ensuring that if any deterioration of environmental quality occurs as a result of the demolition works, either accidentally or through inadequate implementation of mitigation measures on the part of the contractor, that the cause of this is quickly identified and remedied, and that the risk of a similar event re-occurring is reduced.

The principle upon which the ECPs are based is the prescription of procedures and actions associated with the measurement of certain defined levels of pollution by environmental monitoring, established prior to the commencement of the works. These are:

- *Action Level*, beyond which appropriate remedial actions may be necessary to prevent environmental quality deteriorating further; and
- *Limit Level*, the limits stipulated in the relevant Hong Kong statutes and guidelines, if these are exceeded, works should not proceed without appropriate remedial action, including a critical review of plant and working methods.

7.4

REPORTING

A Monthly Report will be produced as part of the EM&A programme which may include a brief account of construction activities during the month, an interpretation of the significance of the monitoring results by verifying compliance and highlighting any failure to comply with the target levels and an account of any necessary remedial measures recommended by the CLP site staff and implemented by the Contractor.

CLP will appoint an environmental professional acceptable to EPD to design, implement and supervise the cleaning and backfilling of the underground structures. EM&A for dust is recommended at the site boundary to ensure that the dust criteria will not be exceeded. Monitoring of the cleaning and backfilling of underground structures and the removal of any contaminated materials identified in the RAP is also recommended.

Waste stream auditing should be undertaken against the Contractor's proposed waste management plan.



ANNEX A Location of Power Station


Date : Nov 97

Drawing No. /Contract/C1674/C1674_2

Sources:

Prepared by ERM's GIS & MAPPING Group

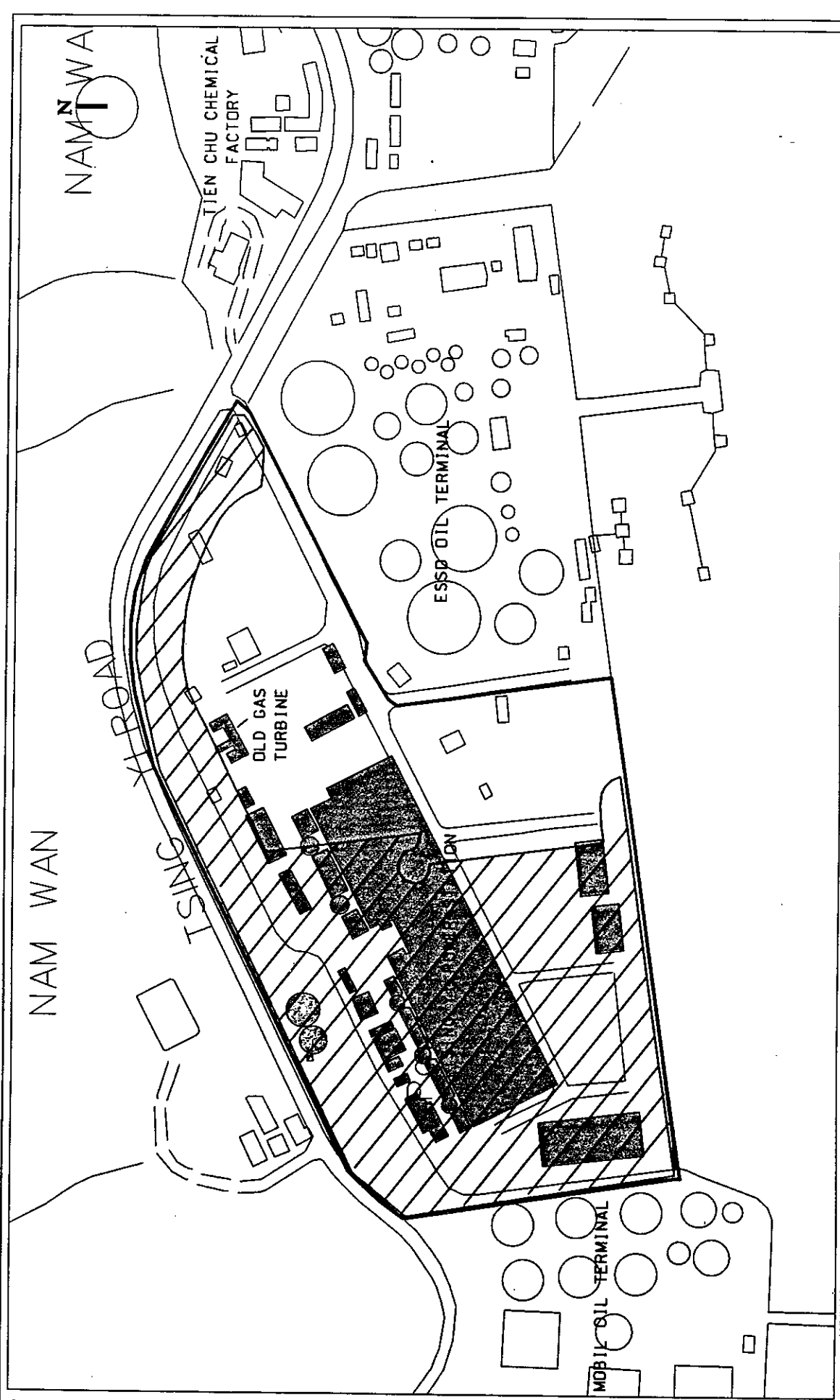
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 Power Station Site




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KEY	
	Power Station Site
	Section to be Returned to Government
	Above Ground Structures to be Demolished

ANNEX B Tsing Yi Power Station Site	
Date : 14 July 1997	Drawing No. /Contract/C1674/C1674_1
Sources :	
Prepared by ERM's GIS & MAPPING Group	

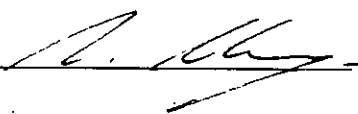
CHINA LIGHT AND POWER COMPANY, LIMITED

**DEMOLITION OF TSING YI POWER
STATION - NON-BLASTING OPTION:
VOLUME I - EXECUTIVE SUMMARY**

DECEMBER 1997

REFERENCE C1674/74380

For and on behalf of ERM-Hong Kong, Ltd

Approved by: 

Position: *Technical Director*

Date: *31 December 1997*

This report has been prepared by ERM-Hong Kong, Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and other in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

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INTRODUCTION

1.1

BACKGROUND TO THE ENVIRONMENTAL IMPACT ASSESSMENT

Tsing Yi Power Station is located on the south coast of Tsing Yi Island in an area of industrial developments, the nearest residential areas are some 2 km to the north and screened by a range of tall hills (see *Figure 1.1a*). The site of the Tsing Yi Power Station is currently under a land lease which originally expired on 27 June 1997, it has now been extended until June 2047. China Light & Power Company Ltd (CLP) have been requested by Government to return the site (in part) as soon as possible, whilst retaining the remaining section (see *Figure 1.1b*). Before the Government takes over the site, CLP are required to demolish all civil structures and reinstate the land to the satisfaction of the Government.

CLP, as the project proponent, submitted a project profile to the Environmental Protection Department (EPD) in March 1997 for the environmental review of the demolition project. It was identified through the Environmental Review that an Environmental Impact Assessment (EIA) was required and that the major concerns for the EIA were waste management, dust emissions, water quality impacts, asbestos control and land contamination.

The EIA assessed the impacts of demolishing the structures using conventional manual techniques, without the use of explosives and identified that no adverse impacts would be caused by the demolition works provided that the identified mitigation measures were applied. Further work is required to confirm the exact extent of the small area of identified contaminated land, and this, and the removal of any remaining asbestos will be completed before demolition works commence. Environmental monitoring and audit will be undertaken during the demolition works to check the efficacy of dust control measures and to oversee the removal of waste, including any contaminated materials.

1.2

OBJECTIVES OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The purpose of the EIA is to provide information on the nature and extent of environmental impacts arising from the proposed project and all related activities taking place concurrently. This information will contribute to decisions on whether:

- the predicted levels of any environmental impacts that are likely to arise as a result of the power station demolition are within the established standards and guidelines;
- there are any specific conditions and requirements for environmental protection that should be applied to the demolition works; and
- any residual impacts identified in the EIA are within the established standards and guidelines after proposed mitigation measures are implemented.

STRUCTURE OF THE REPORT

The EIA comprises three volumes:

- *Volume I*, the Executive Summary briefly describes the background to the EIA and the findings of the Main Report, concentrating on the potential adverse impacts and proposed mitigation measures;
- *Volume II*, the Main Report, provides the findings of the EIA, identifying the environmental performance criteria applicable to the demolition of Tsing Yi Power Station, the likely impacts of the demolition works and appropriate mitigation measures to control any adverse impacts; and
- *Volume III*, the initial version of the Project Environmental Monitoring and Audit Manual.

After this introductory section, the remainder of Volume I of the EIA Report identifies and describes the impacts arising from the demolition of Tsing Yi Power Station and their magnitude and puts forward recommendations for suitable mitigation measures.

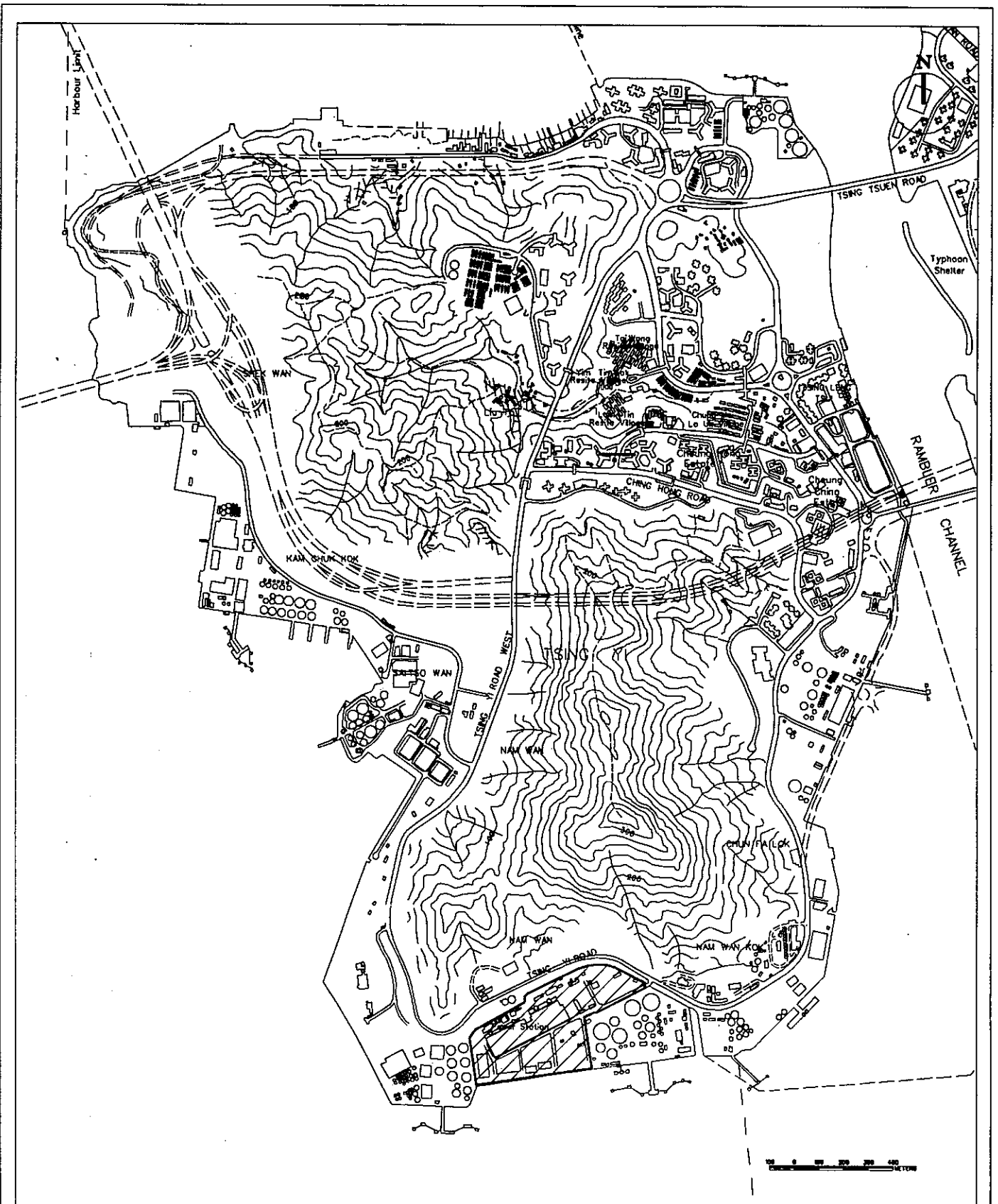



FIGURE 1.1a Location of Power Station

Date : Nov 97

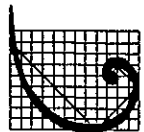
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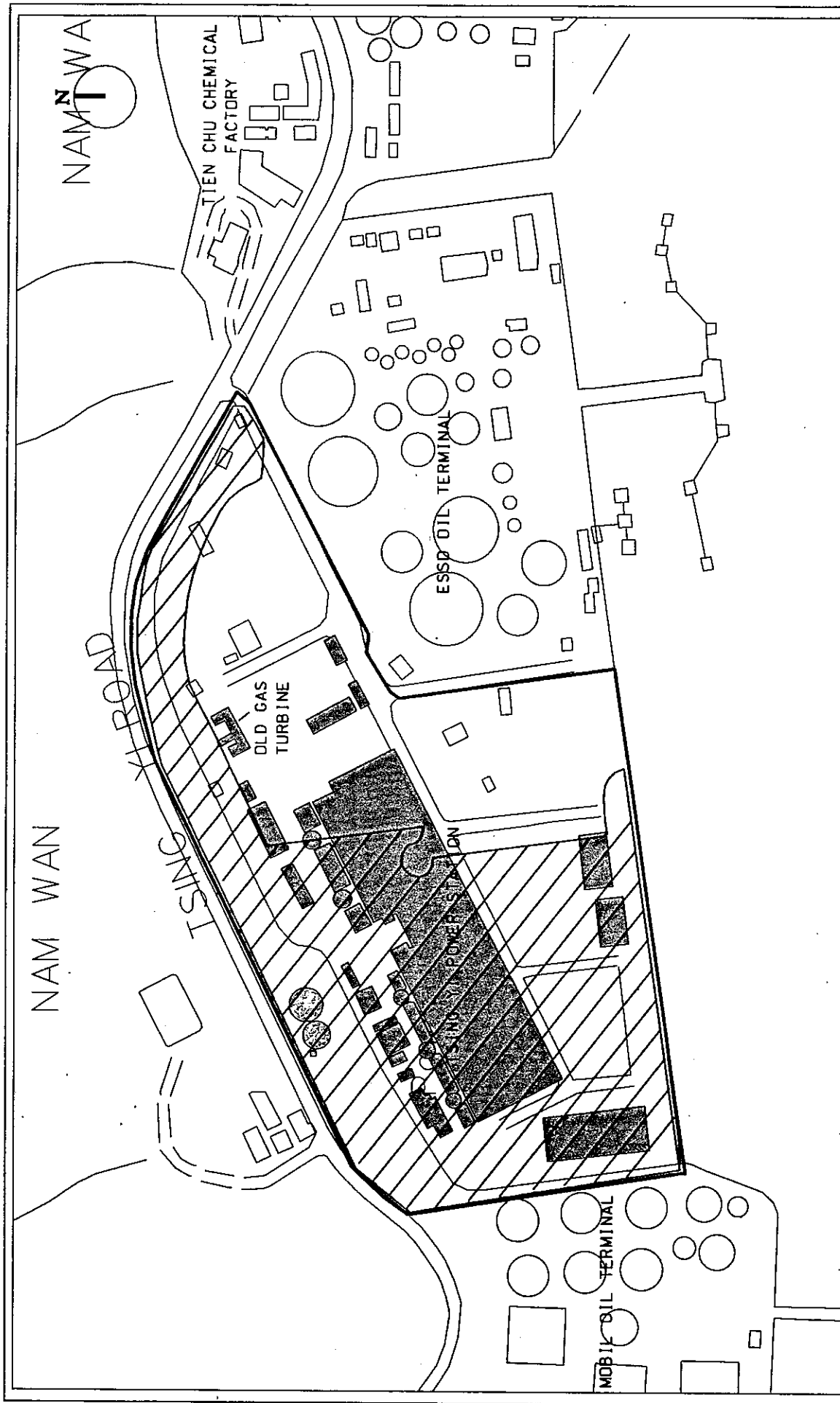
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 Hong Kong

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	Power Station Site
	Above Ground Structures to be Demolished
	Section to be Returned to Government

FIGURE 1.1b Tsing Yi Power Station Site	
Date : 14 July 1997	Drawing No. /Contract/C1674/C1674..1
Sources :	
Prepared by ERM's GIS & MAPPING Group	

B-1

2.1

INTRODUCTION

A Project Profile for the proposed demolition was submitted to the EPD in March 1997. Through the review of the Project Profile, the EPD identified that an EIA was required and that the major concerns were waste management, dust emissions, water quality impacts, asbestos control and land contamination. The EIA was required to assess the impacts of demolishing the structures using conventional manual techniques, without the use of explosives.

2.2

SITE LOCATION AND DESCRIPTION

Land uses in the vicinity of the Tsing Yi Power Station are mainly industrial uses and open storage areas. The Mobil Oil Terminal is located to the west, and the ESSO oil terminal and Tien Chu Chemical Factory are located to the east. The Taikoo Paint Factory to the north has ceased production. No residential use has been identified in the immediate surroundings of the Power Station. Residential developments on Tsing Yi Island are confined to the northeast and segregated from the Power Plant by the natural ridge which runs down the island.

The Power Station Plant consists of several process areas and office block space. Various areas are sectioned off for specific processes, the main separation being between the turbine hall and the boiler house. All site buildings are of steel and concrete construction. The immediate environs of the Plant are currently quiet. The adjacent ancillary buildings are no longer active although a skeleton staff remains in all facilities on site.

2.3

*ASBESTOS CONTROL**Predicted Unmitigated Impacts*

The operation of the station has not given rise to any residual contamination of the buildings with asbestos containing materials (ACM) dust or fibre and no ACM dust and debris has accumulated or is likely to accumulate around the ACM components. However, the remaining ACM, primarily in the form of corrugated sheet, louvres and cladding, will need to be removed before the demolition works commence. These ACM will not be a hazard to the public or staff if undisturbed but they will need to be removed in an appropriate manner by a Registered Asbestos Consultant before the buildings are demolished.

Mitigation Measures

The ACM will be removed using methods in line with codes of practice for the *Safe Handling of Low Risk ACM or Asbestos Work Using Full Containment or Mini Containment Method*. These are discussed in detail in the *Tsing Yi Power Station Civil Demolition - Asbestos Investigation Report and Asbestos Action Plan, Hyder Environmental, September 1997*.

Predicted Unmitigated Impacts

A Desktop Study was conducted of the Tsing Yi Power Plant to identify those areas potentially containing subsurface contamination. A *Field Assessment Study* was carried out during July and August 1997 and 60 soil and nine ground water samples were analysed for contamination. Only one of the areas sampled, the Old Gas Turbine Area (see *Figure 1.1b*), contained contaminated material constituents above the Netherlands intervention values. No contamination was identified in the remaining areas and there is a low probability of contamination in the areas not assessed.

It has been proposed that various subsurface structures be retained in place. Based on the Desktop Study and analytical results, there appears to be no recognizable environmental risk in leaving such structures in place as long as they are properly cleaned and backfilled.

Mitigation Measures

Following the endorsement of the EIA, an *Additional Contamination Assessment Plan* will be produced, within approximately two months, to determine the best approach to deal with the identified contaminated materials. Appropriate mitigation measures will be incorporated in to the *Remediation Action Plan* which will be approved by the EPD before any contaminated material is removed. Details are provided in the *Tsing Yi Power Station Land Contamination Assessment*, Exxon Biomedical Sciences Inc, September 1997.

CLP will appoint an environmental professional acceptable to EPD to design, implement and supervise the cleaning and backfilling of the underground structures. All the cleaning and backfilling activities will comply with all prevailing environmental legislation (Air, Noise, Water and Waste) as well as not to cause any land contamination (eg underground structures may fail during the cleaning and backfilling operation and release contaminants to the adjacent soil).

Predicted Unmitigated Impacts

Even without mitigation, the predicted dust levels at the nearest ASRs will be within the established criteria, therefore, dust exceedance during the demolition works are not expected. Dust levels beyond the site boundary are not predicted to exceed either the statutory 24-hour *Air Quality Objective* or the 1-hour criterion identified in the *Technical Memorandum on Environmental Impact Assessment Process*. However, worst case levels are predicted to be high and mitigation measures have been recommended to reduce the predicted dust levels.

Mitigation Measures

Mitigation measures to suppress the dust emissions from the site are not required, but are recommended as good site practice. These include:

- haul road watering and vehicle washing before leaving the site;

- careful handling and the containment or damping of dusty materials; and
- covering or damping exposed areas of ground.

EM&A for dust is recommended at the site boundary to ensure that the dust criteria will not be exceeded.

2.6

WATER QUALITY

Predicted Unmitigated Impacts

Tsing Yi Power Station falls within the Western Buffer Water Control Zone, the water quality of the northern part of the Western Buffer WCZ, is more influenced by development and land inputs than waters to the south, and thus shows higher levels of bacteria, inorganic nutrients and suspended solids.

Demolition run-off and drainage may cause physical, chemical and biological effects on the downstream water quality. Although potential impacts from demolition run-off are considered to be small (except under heavy storm conditions), water quality impacts will become significant if the run-off and drainage are allowed to discharge directly into the receiving water body without treatment.

General demolition activities have the potential to cause water pollution as a result of debris and rubbish, concrete dust and demolished materials, entering the water column and resulting in floating refuse in the vicinity of the site that reduces the aesthetic quality of any receiving water body. Spillages of liquids, such as oil and diesel for demolition equipment, could also result in water quality impacts if they enter the soil or nearby water bodies.

Sewage effluents will arise from sanitary facilities provided for the on-site workforce and also have the potential to cause water pollution.

Mitigation Measures

Mitigation measures to control waste water discharges should include:

- appropriate drainage facilities to control site runoff;
- proper site management to prevent debris and harmful materials from reaching drainage facilities; and
- the provision of adequate toilet facilities and proper disposal of sewage by a recognised waste disposal company.

2.7

WASTE

Predicted Unmitigated Impacts

Demolition activities will result in the generation of a variety of wastes which can be divided into distinct categories based on their constituents.

Demolition waste comprises materials torn down during demolition, including concrete and structural steels, materials which have been over ordered or are

surplus to requirements for the demolition process and materials which have been used and discarded. A total of some 60,000 m³ of demolition waste is expected to be generated during the demolition works. Daily quantities of demolition waste will be about 200 m³ which will require only 2-3 trucks per hour for the removal of the waste from the site.

Chemical Waste, as defined under the *Waste Disposal (Chemical Waste)(General) Regulation*, includes any substance being scrap material, or unwanted substances specified under *Schedule 1* of the *Regulation*. A total of about 250 m³ of asbestos containing material will be removed during this stage of the works and in addition, on average, only a few kilograms of other chemical wastes will be produced each day.

The presence of a demolition site with large numbers of workers will result in the generation of a variety of general refuse materials requiring disposal. General refuse may include food wastes and packaging, together with waste paper. Up to 45 kg of general waste may be generated each day.

The potential for the uncontrolled disposal of wastes arising from the demolition works to generate adverse impacts has been identified in the EIA, however, observance of the relevant legislation will prevent such effects.

Waste materials will be removed from the sites by truck, or preferably by barge and impacts will be limited to the effects associated with increases in vehicle movements.

Mitigation Measures

Inert excavated material and demolition waste can either be reused on site, taken to other reclamation or construction projects, or sent to a public fill site. Materials containing no more than 20% by volume of inert material would be sent for disposal at a landfill, whilst the inert fraction should be delivered to public filling areas or other reclamation sites. Other waste, including general refuse, should also be disposed of in a responsible manner and not give rise to adverse impacts.

Mitigation measures will include:

- the implementation of general good housekeeping practices;
- sorting and segregation of wastes for reuse and disposal;
- observing the requirements of the disposal permits; and
- meeting the requirements of the *Waste Disposal Ordinance*.

2.8

ENVIRONMENTAL MONITORING AND AUDIT

The EIA has identified that during the demolition works, monitoring will be necessary for air quality and the removal of contaminated material, including cleaning and backfilling of underground structures. Auditing of waste management practices will also be required.

CLP will undertake the EM&A work required during the demolition of the power station. CLP's and the Contractor's responsibilities will be related through the application of Event Contingency Plans to deal with any exceedance of the established criteria, either in the course of normal working or through unforeseen circumstances.

Moreover, CLP will appoint an environmental professional acceptable to EPD to design, implement and supervise the cleaning and backfilling of the underground structures. All the cleaning and backfilling activities shall comply with all prevailing environmental legislation (Air, Noise, Water and Waste) as well as not to cause any land contamination (e.g. underground structures may fail during the cleaning and backfilling operation and release contaminants to the adjacent soil).

CONCLUSIONS

3.1

CONCLUSIONS

This EIA has identified that, in general, no unmitigated environmental impacts, generating exceedances of the established criteria, have been predicted to arise as a result from the demolition of Tsing Yi Power Station. Where potentially adverse impacts have been identified the EIA has shown that these can be avoided or reduced to acceptable levels by the implementation of appropriate mitigation measures.

The recommended mitigation indicates the type of measures which may be employed to ensure compliance with the statutory requirements, Government guidelines and other environmental standards agreed with EPD. In addition, the EM&A programme which will be adopted during the demolition works will help ensure compliance whatever means of mitigation are used.

3.2

RECOMMENDATIONS

CLP contracts should require the contractor to reassess the likely impacts in the light of his proposed works programme and timetable and design an Environmental Management Plan, which will incorporate sufficient mitigation measures to ensure that any impacts from the contractor's works do not exceed the criteria identified in the EIA Report.

The EM&A procedure will control potential impacts from the effects of dust emissions and possibly the removal of contaminated materials, including cleaning and backfilling of underground structures. The EM&A requirements are outlined in the initial version of the EM&A Manual (*Volume III* of this Report) and should be set out in the relevant engineering contracts.

The recommended EM&A programme should be used to confirm the accuracy of the EIA findings and to ensure compliance with regulatory environmental requirements, related guidelines and/or recommended control levels. Regular EM&A reports should be submitted to the EPD for information.