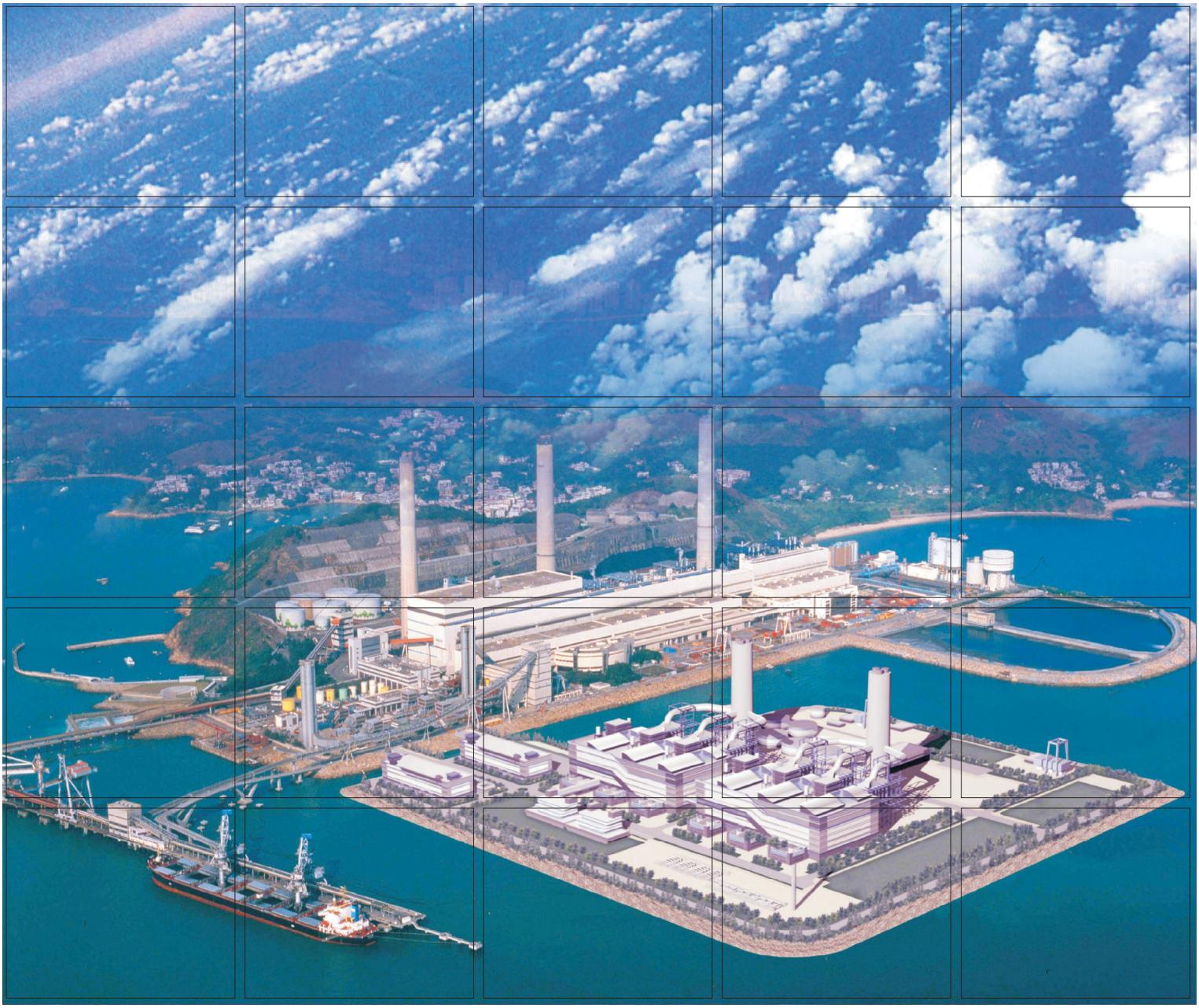

香港電燈有限公司
The Hongkong Electric Co., Ltd.

Lamma Power Station Units L4 & L5 Flue Gas Desulphurization Plant Retrofit Project
南丫發電廠第四及五號機組烟氣脫硫裝置加裝工程：

Executive Summary
行政摘要

February 2006
二零零六年二月

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EXECUTIVE SUMMARY
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For and on behalf of 代表 ERM-Hong Kong, Limited 香港環境資源管理顧問有限公司	
Approved by: 批核 :	鄧瑋庫 (Steven Duckworth)
Position: 職位 :	Deputy Managing Director 副董事總經理
Date: 日期 :	2 February 2006 二零零六年二月二日

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1 INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The Hongkong Electric Company, Limited (HEC) is planning to retrofit the two existing 350MW coal-fired generating Units L4 and L5 of Lamma Power Station with Flue Gas Desulphurisation (FGD) plant for reducing sulphur dioxide emissions in support of Government policy to improve the air quality of the Pearl River Delta.

It is proposed to adopt the "Wet Limestone-Gypsum" process for the FGD plants, a technology which is already used in, and proved effective and reliable for the existing coal-fired units L6, L7 & L8.

The proposed FGD process involves directing the flue gas from the boilers of Units L4 and L5 to FGD plants, in which limestone slurry is introduced to react with flue gas for removal of SO_2, before discharging to the chimney. As a result, besides a significant reduction of the SO_2 concentration in the flue gas, the temperature of flue gas entering the chimney will be reduced, waste water from the FGD absorber will be produced and gypsum will also be produced as a by-product.

1.2 PURPOSE AND SCOPE OF THE EIA

The Project is classified under EIAO as a material change to an exempted designated project, the Lamma Power Station as a *Public Utility Electricity Power Plant* (Item D.1 Part I Schedule 2 of the EIAO Chapter 499), because of the changes induced by the FGD operations to the types and quantities of emissions, wastes and effluents. In addition, the demolition of two existing Light Oil Tanks is a designated project under item 16 Part II (*Decommissioning Projects*) Schedule 2 of EIAO (i.e. *a store for oil with a storage capacity exceeding 200 tonnes*).

The main objective of this Environmental Impact Assessment (EIA) study is to provide a detailed assessment of the nature and extent of potential environmental benefits and impacts arising from the construction and operation of the Project in relation to the issues specified in the *EIA Study Brief* (No. ESB-133/2005), including air quality, noise, water quality, waste, land contamination and landscape and visual impacts.

2 PROJECT DESCRIPTION

2.1 PURPOSE AND NATURE OF THE PROJECT

Lamma Power Station has an installed capacity of 3,420MW comprising 3x250MW and 5x350MW coal-fire units, 1x365MW oil-fired combined cycle unit, 1x55MW and 4x125MW oil-fired open cycle gas-turbine units. The latest three 350MW coal-fired units, Units L6, L7 & L8, are equipped with FGD plants. The proposed retrofit project will include the installation of FGD plants with flue gas desulphurization efficiency of 90% for the two 350MW coal-fired Units L4 & L5 to reduce the overall SO_2 emissions from Lamma Power Station.

2.2 PROPOSED ADDITIONS, MODIFICATIONS AND ALTERATIONS

At present, the flue gas from Units 4&5 Boilers is directly discharged to the atmosphere via a 210 m high chimney. The retrofit work will involve demolishing the existing Nos. 4 & 5 Light Oil Tanks (each of 250m^3 capacity) and relocating some of the pipeworks located in front of the respective boiler to provide areas for installing FGD plant for each of Units L4 & L5. *Figures 2.1* & *2.2* show the location and the schematic of the proposed FGD plants.

The flue gas from the boiler will be directed to the FGD absorber inside which removal of SO_2 will take place by reaction with limestone slurry. After passing through the absorber, the treated flue gas will be heated up by a gas-gas heater to over 80ºC at boiler rated capacity and directed back to the existing chimney for discharge to the atmosphere.

As majority of the existing common limestone powder/gypsum handling and storage facilities for Units L6, L7 & L8 FGD plants have spare capacity to cater for two more FGD units, the additional equipment required for Units L4 & L5 FGD retrofits will be limited to the extension of the existing gypsum dewatering system.

The equipment to be installed for the proposed retrofit project for Units L4 and L5 includes:

- Two sets of FGD absorbers and associated ductworks
- Two sets of booster fans
- Two sets of gas-gas heaters
- FGD Switchgear and Equipment Building
- Gypsum dewatering system comprising two sets of hydrocyclones and belt filters

2.3 PROJECT PROGRAMME

The targeted key dates for the proposed FGD retrofit project are as follows:

- Commencement of demolition of Light Oil Tanks April 2006
- Commencement of civil works September 2006
- Commencement of plant erection for L5 Unit October 2007
- Commencement of plant erection for L4 Unit August 2008
- Commercial operation of L5 FGD Plant July 2009
- Commercial operation of L4 FGD Plant April 2010

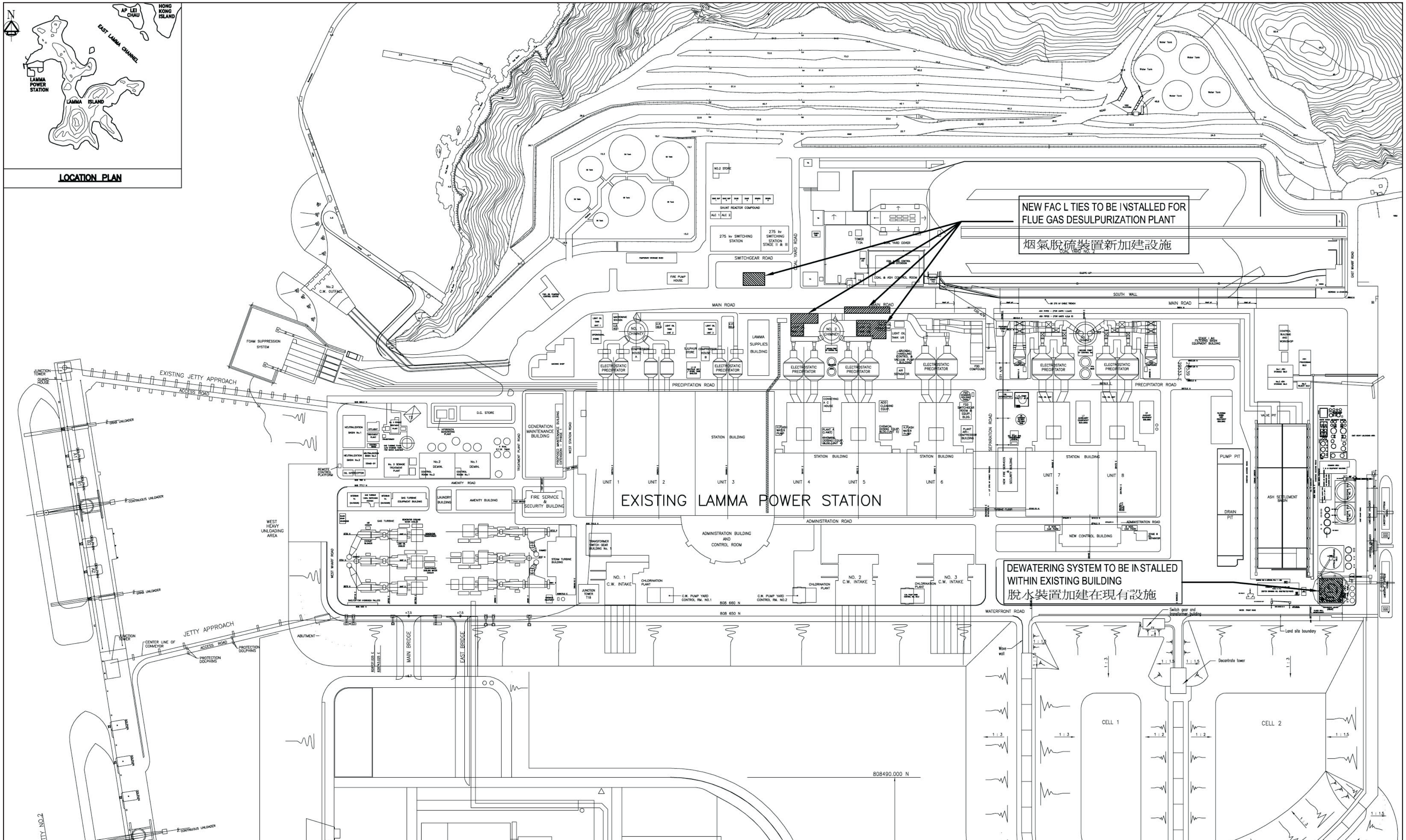

Figure 2.1

Location of Proposed New Facilities for L4 & L5 FGD Plant

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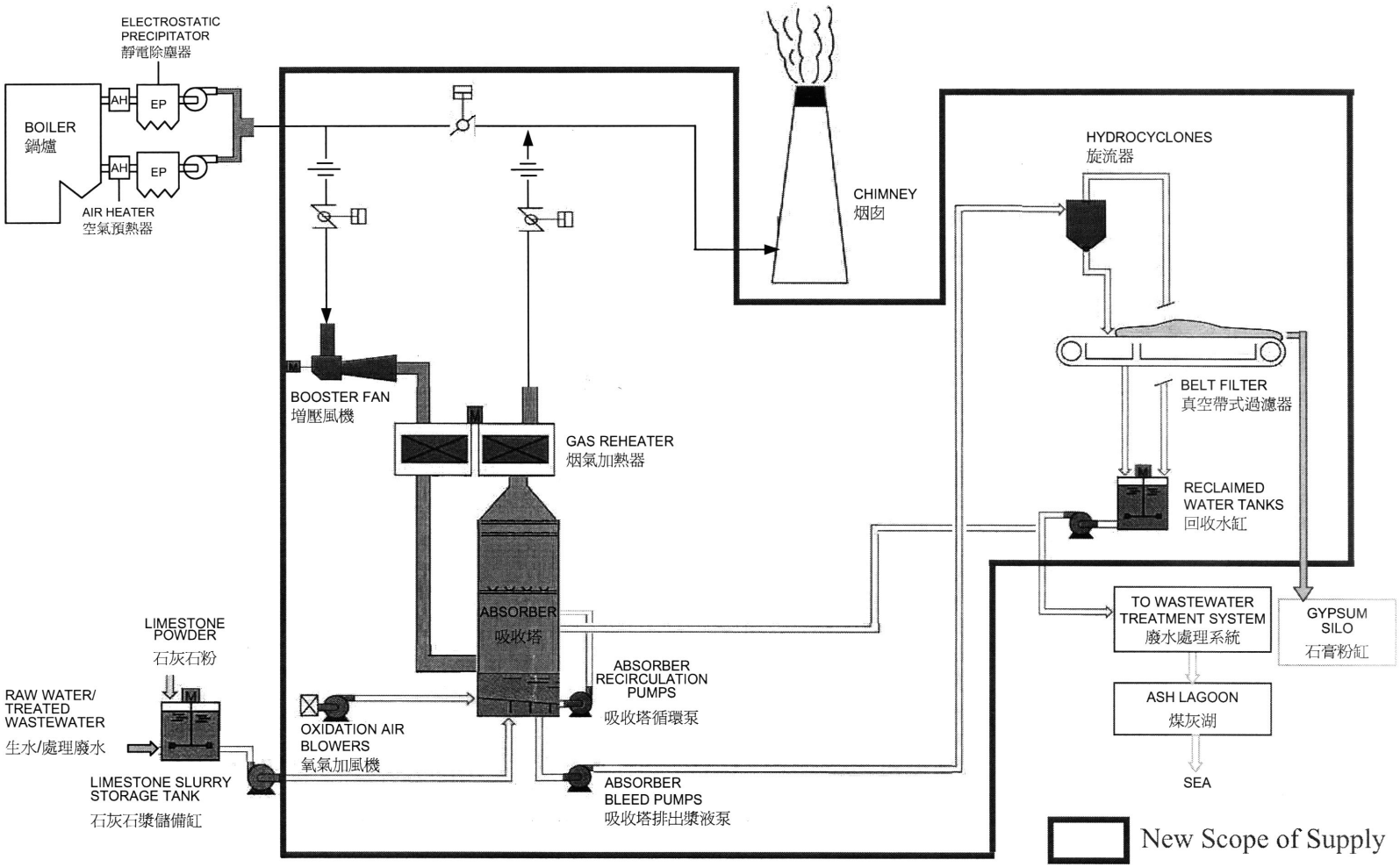

Figure 2.2

Schematic Diagram of Proposed FGD Plant

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3 ENVIRONMENTAL IMPACTS

The nature and extent of the environmental impacts associated with the construction and operation phases of the Project are summarised below.

3.1 LAND CONTAMINATION

For installation of the FGD plants, two above ground oil storage tanks (No. 4 and No. 5 Light Oil Tanks) with associated pipelines and one oil separation sump are to be demolished to provide space for installation of the FGD plants. Contamination Assessment Plan (CAP) has been prepared and approved by the EPD in November 2005 and site investigation (SI) was conducted in the area adjacent to the tanks and oil separation sump. The SI results indicated that total petroleum hydrocarbon (TPH) was detected at one soil samples and five groundwater samples exceeding Dutch B guideline for mineral oil. Results of the SI and recommendations have been reported in the Contamination Assessment Report (CAR) and the Remedial Action Plan (RAP) (see Annex of the EIA Report). Therefore, remedial measures and procedure for TPH contamination are recommended in the RAP.

With the implementation of the remedial measures in RAP, no land contamination would be anticipated.

3.2 AIR QUALITY

Dust nuisance is the key concern during the construction of the Project. Demolition of the existing Nos 4 and 5 Light Oil tanks with each of 250m^3 storage capacity, civil works of the retrofitting of FGD Plants to two existing 350MW coal-fired Units L4 & L5 are the major construction works of the Project. Due to small scale of the Project and with the implementation of the recommended dust suppression measures stated in the *Air Pollution Control (Construction Dust) Regulation*, no dust impact is anticipated. In addition, only limited number of diesel-driven equipment will be operated on site, therefore, impact from construction equipment is not expected.

For the operational air quality assessment, the re-assessment of the previous wind tunnel modelling data has confirmed that the FGD retrofit project at units L4 and L5 of the Lamma Power Station will lead to significant reductions of the worst-case hourly SO_2 concentrations for most ASRs throughout the area studied.

Other environmental benefit of the FGD retrofit includes the reduction of the particulate matter (PM) emissions resulted from the wet scrubbing process of the FGD plant.

The NO_x emissions will not be reduced nor increased by the project, however changing of the stack exhaust parameters may result in a re-distribution of NO_x in the vicinity of the power station. The cumulative concentrations of

NO_2 after the retrofit have been estimated and their AQO compliance demonstrated for at all ASR locations.

Based on the impact assessment, the current monitoring programme for the Lamma Power Station can cover the Project and no additional EM&A measures are required.

3.3 WATER QUALITY

Construction runoff and sewage effluents generated from the workforce are the potential sources of water quality impacts during construction. Assessment results indicate that no unacceptable water quality impacts will arise from the construction activities provided that the recommended mitigation measures are implemented.

Potential source of impacts to water quality from the operation of the FGD plants are as a result of filtrate generated from the dewatering of gypsum slurry. Since the existing WWTP has spare capacity to cater for the additional wastewater produced from the proposed retrofit project, it is expected that effluent from the WWTP to the Ash Lagoon will meet the requirements in the *WPCO* licence for the Ash Lagoon Decantrate Tower. Thus, no water quality impact arising from the operation of the FGD plants are anticipated.

Based on the impact assessment, the current monitoring programme for the Lamma Power Station can cover the Project and no additional EM&A measures are required.

3.4 WASTE MANAGEMENT

The key potential impacts during the construction phase are related to management of demolition materials, excavated materials and construction waste. With the implementation of the mitigation measures recommended, the potential environmental impacts arising from storage, handling, collection, transport and disposal of wastes should be able to meet the criteria specified in the *EIAO-TM*. Hence, no unacceptable waste management impact is anticipated.

All the additional gypsum (about 46,000 tonnes per year) and sludge (about 1,200 tonnes per year) will be generated and reused in Hong Kong and/or in Mainland China and no disposal is required. With the implementation of the recommended mitigation measures, the potential environmental impacts associated with the storage, handling, collection, transport and disposal of a small quantity of industrial and chemical wastes arising from the operation of the two new FGD units will meet the criteria specified in the *EIAO-TM* and no unacceptable waste management impact is anticipated.

3.5 NOISE

The proposed Project is in small scale. Additionally, in the view that the residential developments are shielded from construction noise to varying degrees by the intervening hill (Kam Lo Hom) and the existing plants, and considerable separation distance between the NSR and the Project, the noise generated during the construction stage is not expected to be a concern. . However, in order to ensure that the construction noise levels at the NSRs controlled within the relevant criteria, good site practice and noise management is recommended during the construction phase.

Based on a worst-case scenario, the operational noise levels due to additional equipment will comply with the noise criterion and will have insignificant contribution to the cumulative operational noise of the Lamma Power Station. Therefore, the plant noise associated with the retrofit plant is not expected to give rise to unacceptable environmental impacts.

In addition, most of the noise sources associated with the retrofit project will be housed within individual acoustic enclosure to minimise the noise impact to the environment.

In view of the anticipated insignificant noise impact in both construction and operational phases, additional noise monitoring work for this Project is considered not necessary.

3.6 PROJECT VISIBILITY

The proposed retrofit works will not have any negative impact on the surrounding landscape, and will have a very low visibility for the following reasons:

- The location for the proposed retrofit works is within a large existing industrial facility;
- There will be no impacts on the surrounding landscape area;
- The new infrastructure will be finished to complement the existing industrial surroundings;
- The relatively small scale of the retrofit works within the existing facility means that the works will have a low visibility.

The Project will result in significant reductions of the SO_2 and particulate emissions which will lead to improvements of the local and regional air quality.

The detailed impact assessment concluded that both during the construction and operational phases, no adverse environmental impacts are envisaged in the areas of air quality, water quality, waste management, noise, landscape and visual impacts.

Planned demolition of two above ground oil storage tanks with associated pipelines and one oil separation sump raised concerns of possible land contamination issues. Their investigation is separately reported in the Contamination Assessment Plan (CAP), Contamination Assessment Report (CAR) and Remediation Action Plan (RAP) that are included in Annexes to the EIA Report.