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Project Profile for Material Change to an Exempted Designated Project under S 5 (10) of the Environmental Impact Assessment Ordinance for Application for Permission to Apply Directly for an Environmental Permit

1. INTRODUCTION

To achieve the objective of ensuring an adequate and reliable supply of electricity to the consumers, the Hongkong Electric Company Limited (HEC) is planning to increase the existing generation capacity of Unit 5 by 25MW to meet the maximum load ensuring the interim years before the commissioning of new gas-fired units at Lamma Extension. This is in accordance with HEC's generation development plan based on the latest forecast of maximum load growth.

After careful consideration on the technical, economic, environmental as well as timing factors pertinent to the best choice for increasing generating output to meet the projected demand in 2003, HEC proposed to upgrade Unit 5 to increase its output from 350MW to 375MW.

The proposed repowering work involves mainly modification of some of the turbine internal components of Unit 5 to boost up the generator output, while keeping the operation conditions within licence limits (Specified Process licence no. L-7-002(4) issued on 25/9/1998). The proposed repowering project is regarded as a Material Change to an Exempted Designated Project (the existing Lamma Power Station) according to the *Environmental Impact Assessment Ordinance*.

2. BASIC INFORMATION

2.1 PROJECT TITLE

Repowering of Unit 5 at Lamma Power Station

2.2 PURPOSE AND NATURE OF THE PROJECT

The proposed repowering work of Unit 5 will increase the rated capacity of Unit 5 from 350MW to 375MW. The work will rehabilitate the generating unit and utilise the built-in design margins to increase the efficiency and output in a cost-effective manner.

2.3 NAME OF PROJECT PROPONENT

The Hongkong Electric Company Limited (HEC).

2.4 LOCATION OF PROJECT

Figure 2.4a shows the location of Unit 5 within Lamma Power Station.

2.5 NAME AND TELEPHONE NUMBERS OF CONTACT PERSONS

2.6 PROPOSED ADDITION, MODIFICATION AND ALTERATION

The proposed repowering work involves refurbishment/replacement of some of the steam turbine internal components to enhance the turbine efficiency and increase the steam intake capacity to boost up the generator output.

The proposed repowering will involve the following modification works:

- a) Replacement of the turbine control stage nozzle blocks;
- b) Replacement of the seal fins of the high pressure (HP) and intermediate pressure (IP) turbine blade rings, glands and dummy rings;
- c) Replacement of the HP turbine Stage I to III and VII to X stationary blades.

Adjustment or replacement of the seal fins is a standard maintenance item to reduce the internal leakages inside the turbine and replacement of turbine blades is not uncommon in case of serious erosion, corrosion and cracking. No modification is required for the boiler as it has sufficient design margin to generate more steam flow to the turbine.

Figure 2.6a highlights the components within Unit 5 which will be modified.

2.7 PROPOSED PROGRAMME

All steam turbines of the existing coal-fired units are required to be stripped down for major overhaul every 4 years. The proposed repowering work will be carried out during the next scheduled overhaul of Unit 5 between January to April 2003.

3. POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 SCOPING OF ENVIRONMENTAL ISSUES

Table 3.1a identifies the potential environmental impacts which may arise from the construction and operation of the proposed repowering work. For the operation phase, it is assumed that the additional 25MW generating capacity from Unit 5 after repowering will normally be utilized at high load during daytime.

Table 3.1a Potential Sources of Environmental Impacts

Potential Impact	Construction Phase	Operation Phase
Gaseous Emissions	x	✓
Dust	x	x
Odour	x	x
Noise	x	x
Night-time Operations	x	x
Traffic Generation	x	x
Liquid Effluents, Discharges, or Contaminated Runoff	✓	✓
Generation of Waste or By-products	✓	✓
Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods, Hazardous Materials or Wastes	✓	x
Risk of accidents which would result in pollution or hazard	x	x
Disposal of Spoil Material, including potentially Contaminated Materials	x	x
Disruption of Water Movement or Bottom Sediment	x	x
Unightly Visual Appearance	x	x
Cultural & Heritage	x	x
Ecological Impacts:		
- Terrestrial	x	x
- Marine	x	x
Notes:		
✓ Possible		
x Not Expected		

4 GASEOUS EMISSIONS

4.1 EMISSION DURING CONSTRUCTION PHASE

All the activities will be carried out inside the turbine hall of Unit 5 and the majority of work are mechanical work, emissions to the external environment is not envisaged.

4.2 EMISSION CHARACTERISTICS DURING OPERATIONAL PHASE

Unit 5, with a nominal rating of 350MW, can operate under emergency condition by isolating the top 2 feedwater heaters to generate an output of about 380MW. The existing operating licence condition under APCO have taken into account the emissions and discharge from these units operating conditions including the emergency output of 380MW. The repowering exercise is basically to increase the output of Unit 5 by 25MW under normal operating mode. After the proposed repowering of the Unit 5, the emissions from Unit 5 will still be less than the limits as specified in the Specified Process Licence issued under the *Air Pollution Control Ordinance*. The air quality modelling (both numerical and physical) conducted for the EIA of Lamma Power Station Extension¹ has been

(1) The Hongkong Electric Company Limited - Environmental Impact Assessment of a 1,800MW Gas-Fired Power Station at Lamma Extension (8 February 1999)

based on the licence limits of the existing power station. Since the actual emissions from Unit 5 will be less than that of the emission limits, no adverse air quality impact is envisaged from the repowering.

The emission of each coal-fired unit including Unit 5 will be closely monitored by in-situ monitoring equipment against the permitted emission limits as stipulated in the Specific Process Licences.

4.3 GREENHOUSE GAS EMISSION

To meet the electricity demand, the existing units are put into operation in priority of efficiency under system computer control until the total generating output meets the demand. Therefore, greenhouse gas emission is dependent on the system demand as well as the efficiency and the units being operated to meet such demand. Under normal operating conditions, the additional 25MW load generated by Unit 5 will be utilized in preference to the capacities of less efficient units and reduce the total greenhouse gas emission at Lamma Power Station. Based on the latest load forecast, the repowering exercise will reduce HEC's annual emission of greenhouse gas by approximately 0.1% in year 2003.

5. DUST

The proposed repowering will not involve any earthworks and hence no construction dust impact is envisaged.

The particulate emissions will be within the limits as stipulated by Specified Process Licence of Lamma Power Station and hence no adverse dust impacts is envisaged during the operations of the Unit 5 after repowering.

6. ODOUR

No odour impact is envisaged during both the construction and operation phase of the proposed project.

7. NOISE

All the modification works will be conducted within the enclosed turbine hall and hence no noise impacts is envisaged during the construction phase.

No new plant equipment will be installed for the proposed modification works and hence the sound levels from Unit 5 after the repowering is not expected to be greater than that prior to repowering.

HEC has a well-established noise monitoring network at boundary of the Lamma Power Station for continuous compliance checking of noise levels and providing an early indication of exceedance of limit levels at the nearby sensitive receivers.

8. NIGHT-TIME OPERATION

To meet the electricity demand, the existing units are put into operation in priority of efficiency under system computer control until the total generating output meets the demand. The increased capacity of Unit 5 would only be utilized at high load during daytime. It will not cause more units to be operated at night-time. Hence adverse noise impacts during night time operations is not envisaged.

9. TRAFFIC GENERATION

No land base traffic will be generated as the proposed site is located on Lamma Island. No additional marine traffic for transportation of coal is envisaged to arise from the proposed repowering.

10. LIQUID EFFLUENTS, DISCHARGES, OR CONTAMINATED RUNOFF

The effluent generated during the modification works will be typical of effluent generated by maintenance activities at Lamma Power Station which is collected and treated prior to discharge. No adverse water quality work is envisaged during the modification works.

During the operation phase, the increased generating capacity will result in higher steam production at full load conditions. It is not anticipated that volume of the cooling water will increase but a small temperature increase will be resulted from the increased steam production after repowering. It is estimated that a 25MW increase in power output out of 2,500MW of the coal-fired units represents an increase in thermal discharge of around 1%, which is considered to be insignificant. It should also be noted that this small temperature increase will only occur at peak load conditions when all coal-fired units are operating at full load and is not envisaged to cause the limits as stipulated in the discharge licence under the Water Pollution Control Ordinance (WPCO) to be exceeded.

11. GENERATION OF WASTE AND BY-PRODUCTS

Waste arising from the proposed modification works will be typical of normal maintenance activities, provided that these wastes are properly segregated, recycled as far as possible, and disposed of in accordance with relevant regulations and guidelines, no adverse waste impacts are envisaged.

Under normal operating conditions, the additional 25MW load generated by Unit 5 will be utilized in preference to the capacities of less efficient units and reduce the combustion products at Lamma Power Station. Based on the latest load forecast, the repowering exercise will reduce HEC's ash generation by approximately 0.1% in year 2003.

12. MANUFACTURING, STORAGE, USE, HANDLING, TRANSPORT, OR DISPOSAL OF DANGEROUS GOODS, HAZARDOUS MATERIALS OR WASTES

All chemical (which are typical of chemicals used during the routine overhaul) to be used during the modification works will be handled in accordance with the current practices at Lamma Power Station.

13. RISK OF ACCIDENTS WHICH WOULD RESULT IN POLLUTION OR HAZARD

The operations of Unit 5 after repowering will not be different from the operations prior to the repowering and hence the risk of accidents which would result in pollution or hazard is minimal.

14. DISPOSAL OF SPOIL MATERIALS

There will not be any earthworks associated with the proposed modifications and hence no spoil materials is envisaged.

15. DISRUPTION OF WATER MOVEMENT OR BOTTOM SEDIMENT

As no reclamation will be required, no impacts to hydrodynamics and disruption of bottom sediment are anticipated.

16. VISUAL & LANDSCAPE

The proposed works will involve only modifications to the internal components of Unit 5, which is housed in the turbine hall, and hence no visual and landscape impacts are anticipated.

17. CULTURAL & HERITAGE

The proposed works will involve only modifications to the internal components of Unit 5 and hence no cultural and heritage impacts are anticipated.

18. ECOLOGICAL IMPACTS

18.1 TERRESTRIAL ECOLOGY

The proposed works will involve only modifications to the internal components of Unit 5 and hence no terrestrial ecology impacts are anticipated.

18.2 MARINE ECOLOGY

As indicated in Section 10, a small temperature increase in the cooling water is anticipated at peak demand when all coal fired units are operating at full load conditions. However, it is not expected that the thermal plume will exceed the limits as stipulated in the WPCO discharge licence and hence no adverse to the marine ecology is envisaged.

19. DESCRIPTION OF MITIGATION MEASURES

Based on the above assessment, the construction and operation of the proposed repowering of Unit 5 is not envisaged to cause any adverse environmental impacts and hence no mitigation measures is anticipated.

20. USE OF PREVIOUSLY APPROVED EIA REPORTS

This Project Profile has made reference to the following EIA Report:

Reference 1

Title: The Hongkong Electric Company Limited - Environmental Impact Assessment of a 1,800MW Gas-Fired Power Station at Lamma Extension (8 February 1999)

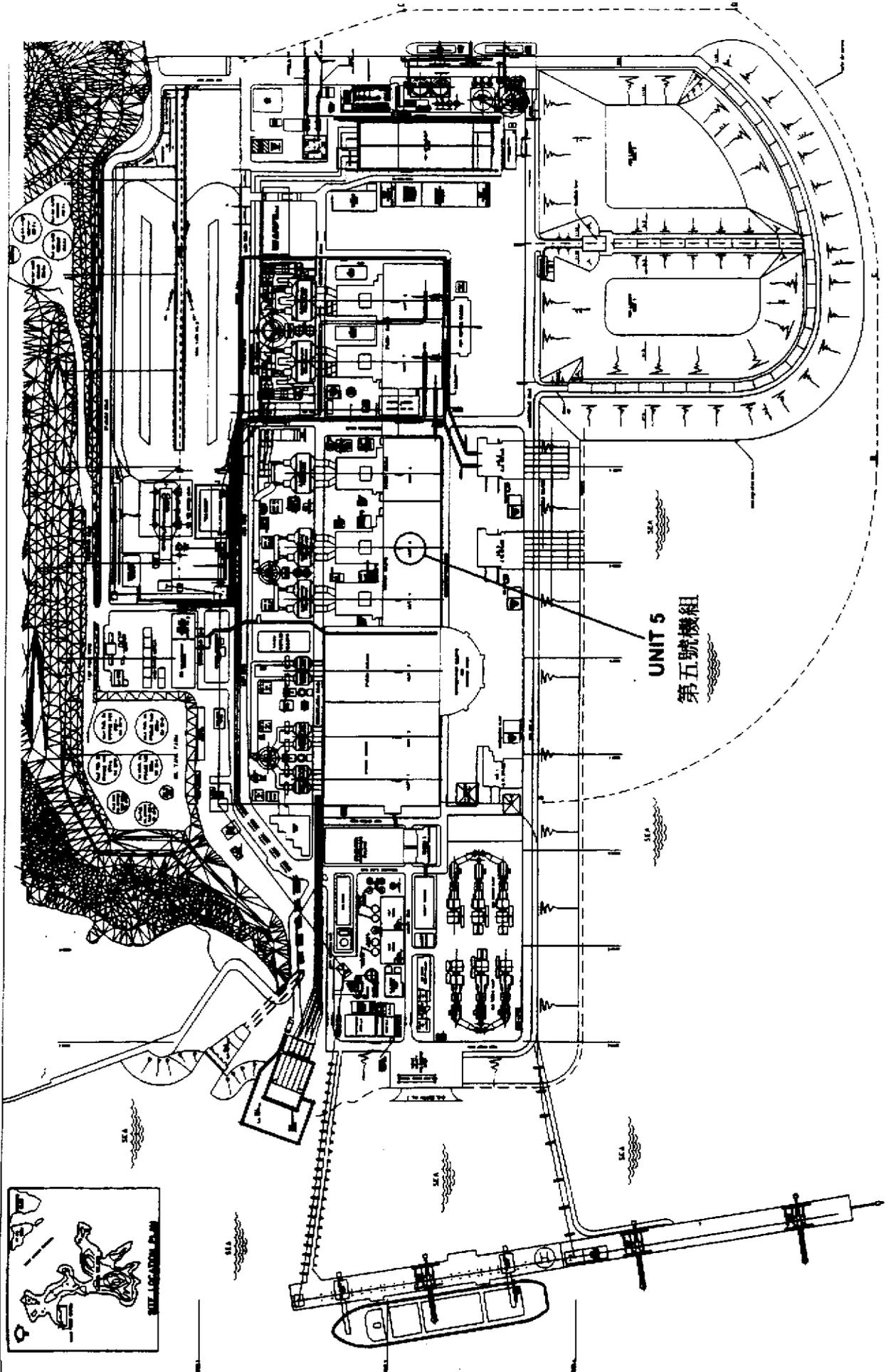
Reference Number: AEIAR-010/1999

Time of Approval: 5th May 1999

Approval by: Director of Environmental Protection

Environmental

<i>Aspects Addressed:</i>	Air quality	Ecology
	Water quality	Fisheries
	Noise	Landscape and visual
	Waste management	Hazard to life
	Land contamination	



LOCATION OF UNIT 5
第五號機組位置

FIGURE 2.4a

圖 2.4a

高壓 1 至 3, 7 至 10 靜葉片

HP#1-3, #7-10 stationary blade

控制級噴嘴組件

Control stage nozzle block

Seal Fins
密封片

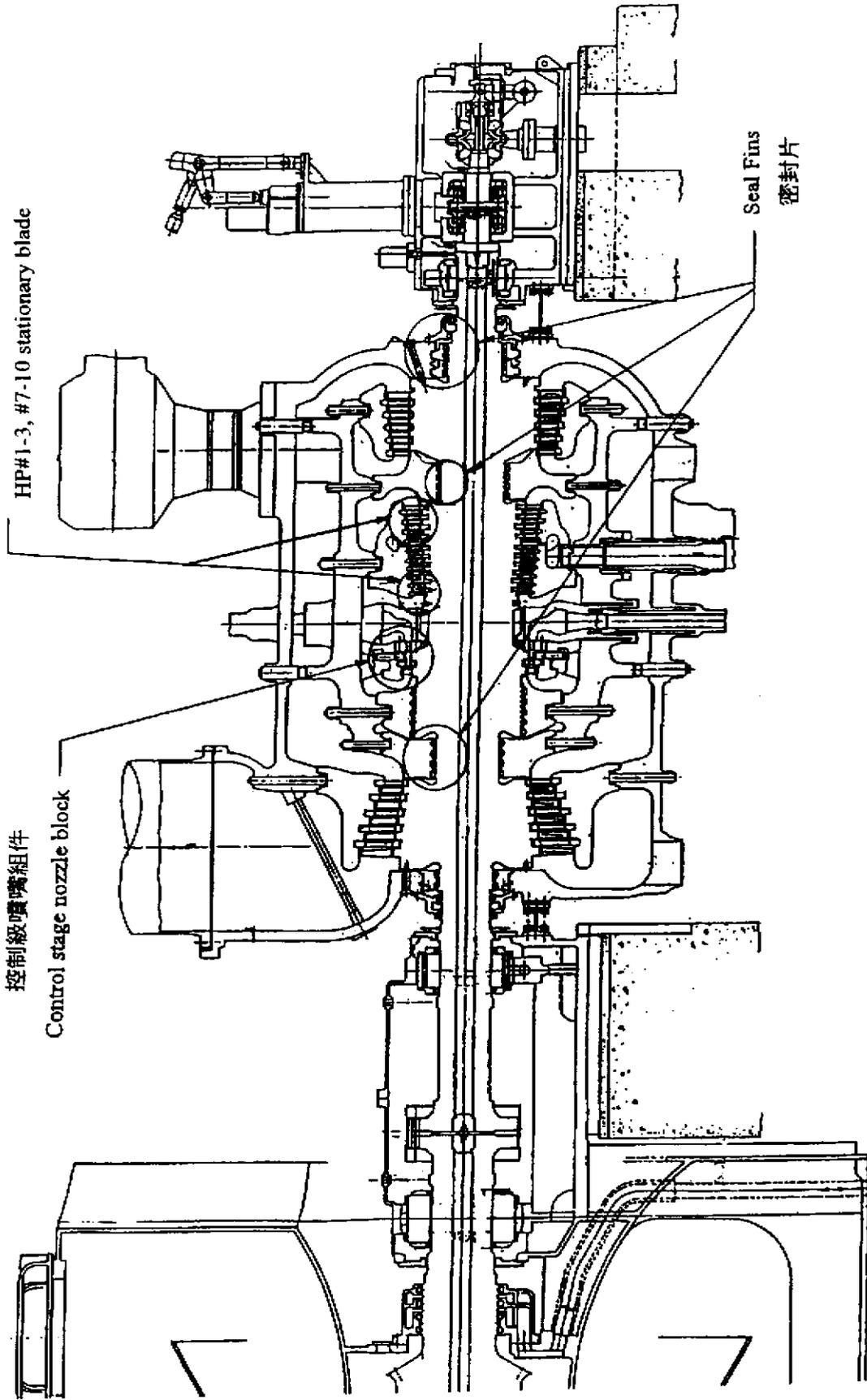


FIGURE 2.6a

圖 2.6a

COMPONENTS WITHIN UNIT 5 TO BE MODIFIED

第五號機組內將會改裝的組件

F.R.E. C22026
DATE 18/05/01