

This Project Profile is prepared in compliance with the requirements under Annex 2 of the *Technical Memorandum on Environmental Impact Assessment Process* (TM-EIAO) for application for approval to apply directly for an Environmental Permit (EP) for the ***Decommissioning of Gas Turbine Units Inside Castle Peak Power Station*** which is a Designated Project under Schedule 2 Part II (4) of the *Environmental Impact Assessment Ordinance* (EIAO).

Six Gas Turbines (GTs) located at CLPP Castle Peak Power Station (CPPS) had been used for peak-opping and emergency back-up generation purposes. As part of the Black Point deferral agreement reached with the Government in April 1997, the GTs (apart from one unit, CG2, kept for emergency black-start purpose) were disconnected from the system and put into preservation at the end of 1997.

In early 2000, CLP Power decided that the GT3 - GT6 units should be disposed of permanently. This Project Profile serves to address the potential environmental impacts arising from the dismantling and removal of these units for application for permission to apply directly for an EP.



## 2 *BASIC INFORMATION*

### 2.1 *PROJECT TITLE*

Decommissioning of Gas Turbine Units (GT3 - GT6) Inside Castle Peak Power Station

### 2.2 *PURPOSE AND NATURE OF THE PROJECT*

Demolish and remove all plant equipment and associated structures of the four gas turbine units.

### 2.3 *NAME OF PROJECT PROPONENT*

CLP Power, Generation Business Group.

### 2.4 *LOCATION AND SCALE OF PROJECT*

Gas turbine units are located within the Castle Peak Power Station in Tuen Mun, NT, and occupy a small area in the northwest part of CPPS site (see *Figure 2.1*). Four units, GT1 to GT4, denoted A5, A6, A7 and A8 in the *Figure* are to the east of the water treatment plant (EA5) while GT5 and GT6 (see A23, A24 in *Figure 2.1*) lie to the west of it. The two work areas comprising units GT3-GT4 and GT5-GT6 are shown in bold by the *Figure 2.1* and are of a total area of about 4,200 m<sup>2</sup>.

### 2.5 *SITE HISTORY*

The GT units occupy a site partially reclaimed from the sea during the construction of Castle Peak Power Station. No previous land use was identified for this portion of CPPS site prior to reclamation operations.

The GT1 to GT4 units were commissioned in 1981. GT5 and GT6, were originally installed in 1980 in Hok Un Power Station and then relocated to the CPPS site in 1992.

### 2.6 *CONTACT PERSON*

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### 3 **OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

The buyer or buyers of the equipment will be responsible for all the site work. No interactions with any other projects are envisaged.

#### 3.1 **BUYER RESPONSIBILITIES AND METHOD STATEMENT**

Since the turbines have a good maintenance record, instead of their disposal as scrap metal, CLP Power intends to sell them to an overseas buyer for re-use. A tender for sale of the first two units (GT5 & GT6) will be issued in the near future.

The buyer will perform all the necessary dismantling and removal work in accordance with a *Method Statement for the Work* issued by CLP Power. A method statement for dismantling and removal is presented in *Annex A*. The buyer will also be required to conform to CLPP's general *Specification for SHE & Site Requirement*, which is included in *Annex B* of this *Profile*.

#### 3.2 **FUTURE SITE UTILISATION**

After completion of this decommissioning project, the site will be retained by CLP Power.

#### 3.3 **PROJECT TIMETABLE**

As the GT units will be tendered in sets of two, with each set possibly sold to a different buyer, it is expected that following approval of this *Project Profile* and upon the successful application for an Environmental Permit, the works would be completed in two phases: demolition of the first two units (GT5 and GT6) within a year and the remaining two (GT3 and GT4) within the following year. Upon agreement of sale with the buyer, the works on each of the two GT sets would be undertaken within a six-month period.



#### 4.1 INTRODUCTION

Potential environmental impacts of this project are discussed below. It should be noted that this decommissioning would be similar in nature, but much smaller in scale than the demolition of the Tsing Yi Power Station (TYPs) that is also an oil-fired PS (see *Section 6*, item 1).

The following five areas of potential environmental impacts have been identified:

- ? Asbestos Containing Materials (ACM);
- ? Land Contamination;
- ? Air Quality;
- ? Water Quality; and,
- ? Waste Management.

These issues are addressed in the following sub-sections for this project concerning the dismantling and removal of gas turbines at the CPPS site. Additionally, the potential noise impacts are also discussed below. No other environmental impacts are expected for this project.

*Figure 4.1* shows the locations of Air Sensitive Receivers (ASR), Noise Sensitive Receivers (NSR) and Water Sensitive Receivers (WSR) closest to the works that is the residential areas of Sha Po Kong Village (ASR/NSR) and Lung Kwu Tan Beaches (WSR). Sensitive receivers have been selected in accordance with the *Technical Memorandum on Environmental Impact Assessment Process (EIAOTM)*.

#### 4.2 ASBESTOS CONTAINING MATERIALS (ACM)

##### 4.2.1 Introduction

CLP Power commissioned in 2000 an Asbestos Investigation Report (AIR) and AAP - Asbestos Abatement Plan (see *Section 6*, items 2 and 3) from Atkins China Ltd (ACL). As stated in the ACL letter to EPD (Ref: 2988/PD33/elt9958/OG070) of 27 October 2000, the GT5 and GT6 units contain no ACM requiring AIR & AAP, so their reports concerned units GT1 to GT4 only. Note that while AIR & AAP concern four units, only two of them (GT3 and GT4) will be demolished under this project, in its second stage. No ACM concerns are involved in the first stage of the project for the demolition of GT5 and GT6 units.

#### 4.2.2 *Summary of AIR and AAP reports*

The ACL AIR and AAP reports were endorsed by EPD on 14 March 2001 in a letter (Ref: (5) in EP/AC/A/17/410/28 pt II) to CLP Power. Their conclusions are summarised below.

- ? ACM have been identified at various locations in GT1-GT4 units, in particular in one floor penetration, seal on control cables and two joints on the exhaust ducts and gaskets.
- ? All parts of the GT facilities have been inspected during the survey and no other potential ACM identified.
- ? Due to the generally good physical condition, its location, the low likelihood of fibre release if left undisturbed, the restricted accessibility and lack of population in the immediate vicinity, the overall hazard is low.
- ? The asbestos abatement work will be performed by a Registered Asbestos Contractor (RAC) under supervision of a Registered Asbestos Consultant. A Registered Asbestos Laboratory will be responsible for airborne fibre monitoring. The RAC will employ a full time Registered Asbestos Supervisor to oversee the day-to-day abatement works.
- ? The asbestos removal strategy is presented in *Section 3* of AAP (*Annex D*).
- ? The abatement methodology, discussed in *Section 4* of AAP (*Annex D*), is in line with code of practice on *Asbestos Control for Asbestos Work using Full Containment*.
- ? The asbestos waste generated by the works is estimated at below 5 m<sup>3</sup> of Type 2 asbestos waste and below 10 m<sup>3</sup> of materials (e.g. plastic waste or construction materials) that may get contaminated with asbestos during the works. That waste will be disposed of in accordance with *the Code of Practice on the Handling, Transport and Disposal of Asbestos Wastes*. For more details see *Section 5* of AAP (*Annex D*).

#### 4.2.3 *Conclusion*

As stated above, the *Asbestos Abatement Plan* prepared for this project has been already endorsed by EPD. No adverse health impacts are expected, provided that all works are in agreement with AAP.

### 4.3 *LAND CONTAMINATION*

#### 4.3.1 *Potential Sources of Land Contamination*

The dismantling of some facilities of the GT units may cause spillage of fuel oil or lube oil, if not properly performed. Special care will be exercised during the dismantling work in order to identify and record any contamination detected for possible assessment and sampling related to any future developments on the site.



#### 4.3.2 *Purchaser Obligations*

It should be noted that, as required by the *Method Statement* (see *Annex A*), the Purchaser will be responsible to drain off all oil including but not limited to the fuel oil, lubrication oil, jacking oil and insulation oil before cutting of the pipes, tanks, oil filled cables and dismantling of the component or equipment of the gas turbine. The Purchaser will also be responsible for the disposal the waste oil and the associated contaminant in accordance with the Hong Kong ordinances and regulations and CLPP's SHE and General Site Work Requirements.

#### 4.3.3 *Facilities to Remain in Place*

The bulk fuel oil storage tank and fuel oil pump house, located between the GT1-4 and GT5-6 sites is not part of this project.

Similarly, as in the case of the decommissioning of TYPs, it is recommended that some of foundations and other underground facilities should remain in place.

##### *Oil Pipes Trenches*

All oil piping is located within concrete trenches. Owing to the containment within trench, it is unlikely they will have caused any land contamination. After disconnecting and emptying, the trenches can be filled and remain in place.

##### *Equipment Plinths*

It is recommended by the Method Statement for the Work to leave the foundations of the gas turbines intact and build bund walls with bricks to a height of approximately 24 inches at the edges of the foundations. The space inside the bund wall will be back filled with soil and planted as a flower bed.

#### 4.3.4 *Conclusions*

In order to avoid the potential for land contamination during GT dismantling, the contractor will be required to submit the detailed dismantling methodology for CLPP approval and establish appropriate adequate control and routine checking during the works.

An emergency plan is also required to deal with any spillage and leakage during emergency conditions.

All chemical waste arising during the cleanup and dismantling activities should be handled and disposed of under the *Chemical Waste Regulation*.

#### 4.4 AIR QUALITY

##### 4.4.1 Potential Impacts

The project is likely to generate limited dust emissions during dismantling of plant structures, material transfer, filling activities and chimney demolition. No other air quality impacts are expected.

Since there are no Air Sensitive Receivers in the direct vicinity of the site (the nearest being Sha Po Kong village, about 750 m away) and the buildings are of prefabricated metal construction, with the only concrete structures being floors and culverts, no adverse air quality impacts are expected, provided that the dust suppression measures stipulated under the *Air Pollution Control (Construction Dust) Regulation* as well as those listed in the *Method Statement* (see *Annex A*) are adhered to where applicable.

##### 4.4.2 Mitigation Measures

The following mitigation measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* should be incorporated in the Contract Specifications and implemented to minimise dust nuisance.

###### *General Requirement*

- ? where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4 m high from ground level shall be provided along the entire length of that portion of the site boundary except for a site entrance or exit;
- ? every main haul road shall be sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet;
- ? the portion of any road leading only to a construction site that is within 30 m of a discernible or designated vehicle entrance or exit shall be kept clear of dusty materials;
- ? exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen or other suitable surface stabilizer within 6 months after the last construction activity on the construction site;
- ? any stockpile of dusty material shall be covered entirely by impervious sheeting or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet;
- ? all dusty materials shall be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet;

- ? where a vehicle leaving the works site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and
- ? the working area of any excavation or earth moving operation shall be sprayed with water or a dust suppression chemical immediately after the operation so as to maintain the entire surface wet.

#### *Demolition of a Building*

- ? the area at which demolition work takes place should be sprayed with water immediately prior to, during and immediately after the demolition activities so as to maintain the entire surface wet;
- ? for any wall of the building to be demolished that abuts or fronts upon a street, service lane or other open area accessible to the public, impervious dust screens or sheeting should be used to enclose the whole wall to a height of at least 1m higher than the highest level of the structure being demolished;
- ? any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads or streets; and
- ? all demolished items that may dislodge dust particles should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition.

## 4.5 NOISE

### 4.5.1 *Potential Impacts*

The demolition process will involve the use of Powered Mechanical Equipment (PME) which have the potential to cause elevated noise levels in the close vicinity of the works. However, adverse noise impact is not envisaged based on the following considerations:

- ? ***Distant Noise Sensitive Receivers (NSR):*** The premises beside the Castle Peak Power Station (CPPS) are cement works and steel mills, which are industrial in nature. The closest NSRs are the village houses in Sha Po Kong along the Long Kwu Tan Road, located about 750 m from the works.
- ? ***Small-scale demolition works:*** The area involved is small and the demolition works will apply simple methodology. The decommissioned parts are kept in good condition and the plinths of the gas turbines and chimneys are to be left in place, therefore no extensive structure-breaking activity will be required.
- ? ***Small number of PME:*** The expected plant inventory and their noise levels are presented in *Table 4.1* below:

**Table 4.1 Proposed Plant Inventory**

| <b>Plant</b>               | <b>TM Ref. No</b> | <b>Unit</b> | <b>SWL/unit</b>  | <b>Sub-SWL</b> |
|----------------------------|-------------------|-------------|------------------|----------------|
| Mobile Crane               | CNP 048           | 1           | 112              | 112            |
| Lorry                      | CNP 141           | 2           | 112              | 115            |
| Breaker, excavator mounted | CNP 027           | 1           | 122              | 122            |
|                            |                   |             | <b>Total SWL</b> | <b>123</b>     |

Based on the above plant inventory, the predicted noise levels at 750m from the works would be  $L_{eq, 30 \text{ min}} 61\text{dB(A)}$ , i.e. well within the daytime construction noise criteria of 75dB(A). Therefore, no adverse construction noise impact is expected during the decommissioning of the gas turbine generating units.

#### 4.5.2 Mitigation Measures

Good site practice and noise management can further reduce the noise impact on the identified NSRs. To reduce noise impacts, the following measures should be followed during the demolition works:

- ? only well-maintained plant should be operated on-site and plant should be serviced regularly during the demolition works;
- ? machines and plant that are in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- ? silencers or mufflers on demolition equipment should be utilised and should be properly maintained during the demolition; and
- ? where necessary, mobile noise barriers should be positioned within a few metres of noisy plant items.

## 4.6 WATER QUALITY

### 4.6.1 Water Sensitive Receivers

CPPS falls within the North Western Water Control Zone and effluents would be discharged into Urmston Road, a part of NW WCZ. Nearby water sensitive receivers include Lung Kwu Tan Beaches, located about 2 km from the main discharge points of the Power Station.

### 4.6.2 Potential Sources of Impact

The demolition of GT units may result in the following:

- ? demolition run-off and erosion from site surfaces, drainage channels, etc.;
- ? spillage and leakage of fuel and lubricating oil during emergency conditions; and,
- ? sewage generated by the workforce.

### 4.6.3 *Evaluation of Impacts*

#### *Demolition Site Run-off and Surface Water Drainage*

Run-off and drainage from the site may contain increased loads of suspended solids (SS) and contaminants. Potential sources of water pollution from site run-off include:

- ? run-off and erosion from site surfaces, drainage channels, earth working area and demolition stockpiles;
- ? wash water from dust suppression sprays and wheel washing facilities; and,
- ? fuel, oil and lubricants from maintenance of on-site vehicles and equipment.

Since the GT buildings are of prefabricated metal construction, most equipment is to be sold and removed from the site and due to the generally small scale of project, the demolition run-off is expected to be small (except under heavy storm conditions), and no significant water quality impacts are envisaged.

#### *General Demolition Activities*

Spillages of liquids, such as oil and diesel from demolition equipment, could in sufficient quantity result in water quality impacts if they enter the soil or nearby water bodies. However, due to the small scale of the works and that all oils and lubricants will be drained off prior to dismantling, no adverse impact is expected. Details of the proposed handling of demolition wastes are prescribed in *Section 4.7*.

#### *Sewage Effluents*

While no kitchen sewage will be generated on site, effluents arising from sanitary facilities provided for the on-site workforce (estimated at about 20 persons or less) have the potential to cause water pollution. Sewage is characterized by high levels of bio-chemical oxygen demand (BOD), ammonia and *E. coli* counts.

However, the sewage discharges from the site facilities are connected to the existing sewer and sewage treatment facilities, so no adverse impacts are expected.

### 4.6.4 *Mitigation Measures*

Despite the small scale of this project, it is important that appropriate measures are implemented to control run-off and drainage and, thereby, prevent high loadings of SS from entering the North Western WCZ and causing impacts on the identified WSRs. Proper site management is proposed to minimise surface water run-off, soil erosion and the impacts of sewage effluents.

Site run-off and drainage impacts will be prevented in accordance with the guidelines stipulated in the EPD's *Practice Note for Professional Persons, Construction Site Drainage* (ProPECC PN 1/94). The implementation of good housekeeping and stormwater best management practices will ensure that WPCO standards are met and that no unacceptable impacts on the WSRs arise due to the demolition works.

#### *Demolition Site Run-off and Surface Water Drainage*

Exposed soil areas are expected to be minimal and with limited potential for siltation, contamination of run-off, and erosion. Run-off related impacts associated with demolition work and other general activities can be all readily controlled through the use of appropriate mitigation measures, which include:

- ? the use of sediment traps, where appropriate; and
- ? the adequate maintenance of the existing CPPS drainage system to prevent flooding and overflow.

All existing drainage pipes and culverts provided to facilitate run-off discharge from CPPS have been adequately designed for the controlled release of storm flows. Sediment traps are regularly cleaned and maintained, and the oil interception facilities are regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages.

Provided the existing CPPS surface run-off and drainage are effectively managed and controlled, adverse water quality impacts can be avoided.

#### *General Demolition Activities*

Debris and rubbish on site will be collected, handled and disposed of properly to prevent such material from entering the water column and causing water quality impacts. The solid waste management requirements are discussed in *Section 4.7*.

Any temporary fuel storage will be small owing to the small number of PME required for the works. This will be provided with lock and be sited on a sealed area, within bunding of a capacity equal to 110% of the storage capacity of the largest container to control spilt fuel oils.

The effects on water quality from these demolition activities are likely to be minimal, provided that works are well maintained and good site practice is observed to ensure that litter and fuels are managed, stored and handled properly.

#### *Sewage Effluents*

As the foul sewer will be utilized throughout the demolition works, no adverse water quality impacts should arise from the demolition workforce sewage.

#### 4.6.5 *Conclusions*

No significant adverse water quality impacts are likely to result from the decommissioning of the gas turbines provided that:

- ? all the recommended mitigation measures including appropriate drainage and silty run-off collection facilities are incorporated in accordance with the recommendations of *ProPECC PN 1/94*;
- ? all demolition workforce sewage is discharged to the CPPS Sewage Treatment Plant;
- ? all temporary drainage diversions will be reinstated to the original condition after the demolition works are completed and implemented properly, in accordance with the recommendations of *ProPECC PN 1/94*; and
- ? all demolition works area discharges comply with the TM standards of the WPCO. It is considered that controls on discharges from land based demolition activities and proper site management procedures, as referenced above, will minimise residual water quality impacts to the acceptable levels stipulated in the WPCO criteria.

#### 4.7 *WASTE MANAGEMENT*

Since most of the GT plant and equipment will be sold to the buyer, it is expected that only small amounts of solid waste will be generated.

##### 4.7.1 *Potential Sources of Impact*

###### *General*

The demolition activities will result in generation of a variety of wastes which can be divided into distinct categories based on their constituents, as follows:

- ? construction and demolition (C&D) waste;
- ? chemical waste; and
- ? general refuse.

###### *Construction and Demolition Waste*

Construction and demolition waste comprises materials torn down during demolition works, including concrete and structural steels. The bulk of the C&D waste will be generated from the demolition of buildings and chimneys. The C&D waste will comprise different types of materials, as shown in *Table 4.2*:

**Table 4.2 Solid Waste Categories from Demolition Works**

| Category  | To be disposed of at public filling facilities | For recycling | To be disposed of at landfills |
|---|--|---------------|--------------------------------|
| Mass concrete   | Y  |               |                                |
| Reinforced concrete   | Y  |               |                                |
| Plaster (from drywall)  | Y  |               |                                |
| Steel   |  | Y             |                                |
| Other metal (eg aluminium frame)  |  | Y             |                                |
| Sheet plastics (eg protective covers)   |  |               | Y                              |
| Other plastics (eg pipes, stair handles, scaffolding ties)                        |  |               | Y                              |
| Glass (eg window, doors)  |  |               | Y                              |
| Wiring  |  | Y             |                                |
| Fixtures (various material types)   |  |               | Y                              |
| Fibre (from insulation)   |  |               | Y                              |
| Chemical waste (eg oil contaminated pipes or oil stained concrete) <sup>(a)</sup> |  |               |                                |

Note (a): To be disposed of at the Chemical Waste Treatment Facility at Tsing Yi

As noted above, the works will proceed in two stages, each lasting about six months and involving demolition of two GT units. The amounts of major C&D waste categories generated from this project can be estimated as follows:

*Concrete:* The main source of concrete waste will be from the demolition of bund walls of generator and unit transformers, foundations of the control cabin/battery rooms and lube oil cooler. With the total unit floor area at around 100 m<sup>2</sup>, the total concrete waste to be disposed of at public filling facilities is estimated at below 50 m<sup>3</sup> per unit, ie less than 200 m<sup>3</sup> in total, requiring approximately 30 lorry trips to the public filling area, that is 15 trips for each six month stage of the demolition works.

*Scrap Metal:* The prefabricated-metal walls and roofs of each turbine house have a total area of about 1250 m<sup>2</sup>. Each steel chimney is 65 m high and has a diameter of 4.6 m. Assuming the thickness of both the prefabricated-metal walls and the steel chimney elements at 5 mm, the total amount of scrap metal to be recycled should not exceed about 11 m<sup>3</sup> per unit, 44 m<sup>3</sup> in total, that would result in a total of less than 20 lorry trips to the scrap yard.

*Other C&D Waste:* Detailed estimation of other C&D waste would be difficult, but the volume of waste requiring disposal to landfill will be minimised by material recovery practices, such as waste metals being segregated and sold for scrap, inert waste being directed to public filling facilities etc. It is believed that due to the small scale of the project and prefabricated metal construction of the buildings, the total amount of C&D waste to be disposed of at landfills will not exceed 5 m<sup>3</sup> per unit, 20 m<sup>3</sup> in total, resulting in a total of about 4 lorry trips to the landfill.



### *Chemical Waste*

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*.

Chemical waste expected from these demolition works include lead-acid batteries used for turbine start-up (a total of about 2 m<sup>3</sup> per unit), oil drained from the plant piping (about 100 litre per unit), and oil-contaminated pipes (about 30 m in length). Minor quantities of hydraulic and lubricating oils from machines involved in the demolition may also be generated.

Units GT3 and GT4 that are to be demolished in the second stage of this project also contain Asbestos Containing Materials (ACMs) and their handling is discussed separately in *Section 4.2*

It should be noted that the transformers contained in each of GT units are part of the equipment intended for re-use and, being part of the sale, will be drained on-site and then removed by the Contractor. The drained transformer oil, about 35 tonnes per unit, will also be re-used by the Contractor.

### *General Refuse*

Demolition works with even a moderate number of workers will result in the generation of a variety of general refuse materials that will require disposal. General refuse may include food wastes and packaging as well as waste paper.

Since it is expected that no more than 20 workers will be employed at any time, assuming a waste generation of 0.65 kg per worker, the general refuse generated during this project will be in the order of 13 kg per day.

## **4.7.2 Evaluation of Impacts**

### *Construction and Demolition Waste*

To conserve void space at landfill sites, C&D waste containing more than 30% of inert material should not be disposed of at landfills. As wastes will be segregate scrap metals recovered for recycling, the amount of waste to be disposed of at landfills will be minimised.

Due to the small scale of the project, sell-off of the equipment and a large proportion of the inert and recyclable waste in the total waste to be generated, no adverse waste impact is expected.

### *Chemical Waste*

In general, chemical wastes may pose serious environmental and health and safety hazards if not stored and disposed of in an appropriate manner as outlined in the *Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste, A Guide*

to the Chemical Waste Control Scheme and the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. These hazards include:

- ? toxic effects to workers;
- ? adverse effects on air, water and land from spills;
- ? fire hazards; and,
- ? disruption to sewage treatment works where waste enters the sewage system through damage to the sewage biological treatment systems.

Apart from ACM (units GT3 and GT4 only), which are separately discussed in Section 4.2, the chemical waste generated during the demolition of GT units will include lead-acid batteries, some oil-contaminated piping and some small quantity of oil-stained concrete. However, due to the small scale of the project the amount of chemical wastes (see Section 4.7.1) is unlikely to generate adverse impact on the existing treatment facilities. It should be noted that BTM (halon) materials from the fire-fighting equipment, do not constitute chemical waste, as they will be retained by CLP Power.

#### General Refuse

The general refuse arising from the workforce (20 workers or less) will be collected daily and disposed together with the CPPS generated refuse via the existing means of refuse collection. No adverse impacts are therefore expected.

#### Summary

The environmental impacts from the various waste types are summarised in Table 4.3.

**Table 4.3** *Summary of Waste Management Impacts*

| Waste Type     | General Evaluation   |
|----------------|--|
| C&D Waste      | The total quantities of C&D wastes generated will be small, of which major parts comprising inert materials will be diverted to public filling areas (inert materials, about 200 m <sup>3</sup> in total) or recycled (scrap metal, about 44 m <sup>3</sup> ). The C&D waste disposed of at landfills will not exceed 20 m <sup>3</sup> . Due to the inert nature of most C&D waste, its disposal is not likely to raise long-term environmental concerns. The C&D Waste disposal would result in a total of about 54 lorry trips over two six month work periods.             |
| Chemical Waste | As discussed in Section 4.2, Asbestos Containing Materials contained in units GT3 and GT4 must be handled according to <i>Asbestos Abatement Plan</i> , which has already been endorsed by EPD. Other chemical waste, including lead-acid batteries (8 m <sup>3</sup> ) and oil contaminated piping (120 m) and will be handled and disposed of according to pertinent Government regulations. Due to the small scale of the project, the amount of chemical wastes that may be generated would not be sufficient to cause adverse impact on the existing treatment facilities |
| General Refuse | As the workforce will not exceed 20 persons and good practice will be adhered to, no adverse impacts are expected.   |

### 4.7.3 *Mitigation Measures*

#### *Introduction*

This section sets out recycling, storage, transportation and disposal measures which are recommended to avoid or minimise potential adverse impacts associated with waste arising from the decommissioning of GT units.

The Contractor will be required to incorporate these recommendations into a comprehensive on-site waste management plan. Such a waste management plan should incorporate site-specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.

#### *Waste Management Hierarchy*

The various waste management options can be categorised in terms of preference from an environmental viewpoint. The options considered to be more preferable have the least impacts and are more sustainable in a long-term context. Hence, the hierarchy is as follows:

- ? avoidance and minimisation, ie not generating waste through changing practices;
- ? 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 laws, guidelines and good practice.

The Waste Disposal Authority should be consulted by the Contractor on the final disposal of wastes.

This hierarchy should be used to evaluate waste management options, thus allowing maximum waste reduction and often reducing costs.

#### *C&D Waste*

Only small quantities of demolition waste will arise at the GT demolition site, of which only a small portion would require disposal at landfills. In order to minimise waste arising and keep environmental impacts within acceptable levels, the mitigation measures described below should be adopted. Small quantities of oil stained concrete may also be generated, these will be treated as chemical waste for disposal purposes.

Careful design, planning and good site management will minimise waste generated. Proper segregation of wastes on site will increase the feasibility of recycling certain components of the waste stream, such as the steel being sold as scrap for reuse by the steel mills.

In accordance with the *New Disposal Arrangements for Construction Waste, Environmental Protection Department and Civil Engineering Department, 1992*, most of the demolition waste will be disposed of as inert materials at a public filling area, with the remaining part going to a specified landfill.

#### *Chemical Waste*

Apart from ACM, only small amounts of chemical waste as defined by *Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation*, are likely to be produced. These will include lead-acid batteries and possibly minor amounts of other chemical wastes. These wastes will be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes* as follows:

The Contractor will be required to ensure that containers used for the 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 Schedule 2 of the Regulations.

Chemical wastes will be stored and handled by the Contractor, except for ACM for which CLPP will provide an area for temporary storage.

#### *General Refuse*

General refuse generated on-site will be stored in enclosed bins and collected by existing CPPS waste collector on a daily basis.

*CONCLUSION*

The potential environmental impacts of the decommissioning works of gas turbine units have been discussed and appropriate and straightforward mitigation measures are proposed for the contractor to adopt during the execution of the works to ensure the works will not cause adverse environmental impact.

As the Project Proponent will require the Contractor to undertake the works in accordance with the Project Profile and in adherence to pertinent HK SAR Ordinances and Regulations as well as CLPP's SHE Specifications, no adverse environmental impacts are expected.

Therefore, it is recommended that the nature of the project warrants an approval to apply directly for an Environmental Permit (EP).



This Project Profile has made reference to the following environmental assessments and other reports:

1. ERM Hong Kong Ltd: **Demolition of Tsing Yi Power Station - Non-Blasting Option, EIA**. December 1997. *Endorsed prior to 1 April 1998, listed under the Register: <http://www.epd.gov.hk/epd/eia/register/main.htm>, Ref. Number EIA-133/BC*
2. Atkins China Ltd: **Removal of ACM at Castle Peak Gas Turbines 1-4. Asbestos Investigation Report**, October 2000. Ref. Number 2988-OR029-01. *Endorsed by EPD on 14 March 2001, (5) in EP/AC/A/17/410/28 pt II*
3. Atkins China Ltd: **Removal of ACM at Castle Peak Gas Turbines 1-4. Revised Asbestos Abatement Plan**, March 2001. Ref. Number 2988-OR030-02. *Endorsed by EPD on 14 March 2001, (5) in EP/AC/A/17/410/28 pt II*

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