10 LAND CONTAMINATION, HAZARD TO LIFE AND FUEL SPILL RISK

10.1 Introduction

10.1.1 The EIA has recommended that EM&A for land contamination, hazard to life and environmental risk be undertaken during the design phase of the project. A design phase audit is recommended to ensure that the design of the PAFF, including the spill response plan, includes the necessary elements to control, detect, contain, clean up, handle and dispose any material that could lead to contaminated land or pose a risk to life or the environment.

10.2 Mitigation Measures

10.2.1 The Land Contamination, Hazard to Life and Fuel Spill Risk sections of the EIA have recommended a series of mitigation measures for integration into the design. All mitigation measures for these three parameters are based upon the need to minimise the likelihood of the loss of fuel from the system occurring, specify procedures to detect and contain a leak if it did occur and define methods for clean up and disposal. These measures include the following, which are also summarised in the environmental mitigation implementation schedules provided in Appendix A:

- ultimate bunding of all fuel storage areas to a level of up to 150% of largest individual tank in each compound;
- adherence to relevant design standards for storage tanks, pipework, containment and drainage;
- regular monthly plant inspections and maintenance;
- impermeable lining of tank pits;
- leak detection systems;
- controlled surface drainage and the provision of emergency shut off valves;
- emergency spill response plans;
- provision of spill control materials and equipment on site;
- run off from the roofs of site buildings and landscaped areas shall be conveyed in closed drains to the nearest storm water drain to prevent the generation of excessive quantities of surface water which may be polluted;
- suitable absorbent materials (e.g. sand or earth) shall be kept on site to deal with spills. Chemical dispersants shall not be employed;
- the facility shall be designed, constructed, operated and maintained in full accordance with the Code of Practice for Oil Installations, 1992;
- tank pressure testing shall be carried out routinely to check for possible tank leaks. Product inventory monitoring shall be integrated into site management procedures to check for any abnormal or unexpected product loss;
- tank overfill monitoring systems shall be installed and regularly tested. Inlet valves should automatically shutdown on exceedance of “high-high level” to prevent over-filling;
- pipe leakages shall be routinely checked for by means of a pressure sensitive leak detection system and routine inventory control;
- pipeline to be protected by armour layer;

- drainage from areas of hardstanding shall be treated by means of oil / water separators prior to discharge to storm drain. All surface drainage shall be fitted with closure valves to provided additional containment and facilitate clean up of any leaks;
- the delivery pipeline from the jetty and the supply line to the airport shall be fitted with pressure sensitive leak detectors.

10.2.2 The results of the spill modelling have shown that some key sensitive marine ecological receivers could be affected in the short term by a spill associated with the PAFF. As such it will be necessary to include contingencies to protect these resources in the spill response plan. The locations which should be protected by the rapid use of booms are as follows:

- Ma Wan fish culture zone;
- Lung Kwu Tan beach and horseshoe crab nursery area;
- Tai Ho Wan mangroves and seagrass stands and horseshoe crab nursery area;
- Tai O mangrove stand;
- gazetted beaches in Castle Peak Bay and along the coast to Sham Tseng;
- coastline of Lung Kwu Tan, Sha Chau and Tree Island;
- Sha Chau and Lung Kwu Chau Marine Park; and
- Tung Chung Bay/San Tau mangrove and seagrass stands and horseshoe crab nursery area.

10.2.3 The PAFF operator will maintain a readiness to react to any fuel spills in the Spill Response Plan procedure which will set out all necessary actions for preparedness, prevention and responses. The rationale for the spill response plan should be based around prevention and early detection and will be continuously developed before and after the commissioning of the PAFF. In particular, the spill response plan will define procedures to contain and clean up spills of various categories in order to reduce hazards to life and impacts to the environment. A Jetty Operation Manual will be prepared to specify the requirements for vessels to berth at the jetty including the compulsory use of pilots and tug boats. In addition, spill control equipment will be stored at the PAFF tank farm and the jetty and will include at least the following:

- sand bags;
- oil water separator;
- containment booms;
- oil skimmers with recovery containers;
- absorbent booms; and
- absorbent pads.

10.2.4 On the prevention side, the whole PAFF facility will be protected by impressed current cathodic protection system and monitoring by a leak detection system to prevent and manage the risk of fuel leakage. Routine inspections will be undertaken on a regularly basis (such as daily, weekly, monthly or quarterly basis) to ensure the proper functioning of the whole facility.

10.2.5 The key features which should be included in the spill response procedures are summarised below and an outline Fuel Spill Contingency Plan is provided in Appendix J3 of the EIA Report:

- ♦ organization of the spill response team and the responsibilities of each member.
- ♦ response procedures to be adopted in the case of a spill, including:
  - identification of the source of spill;
  - reporting to relevant Authorities;
  - containment of leaking fuel;
  - recovery and processing of free fuel;
  - clean up methodology; and
  - handling and disposal protocols; and
  - at sea surveys and beach surveys for dolphins to look for stranded animals and include the need to liaise with Ocean Park specialists to get their assistance in rehabilitation of any dolphins that might be affected by the spill.
- ♦ establishment of an emergency control centre on the PAFF site;
- ♦ establishment of effective communication emergency mechanisms and a 24-hour emergency contact list;
- ♦ training and competence level requirement of PAFF staff; suitable and regular spill response training to be provided to the operating personnel and regular spill response drills to be conducted to test and exercise the responses;
- ♦ provision and maintenance of spill equipment at the PAFF land site, on the PAFF jetty at the Sha Chau reception point and at the HKIA site;
- ♦ drills and exercise requirements; and
- ♦ follow-up procedures and post spill recordings.

10.3 Design Phase Audit

10.3.1 The measures proposed within the EIA to mitigate for land contamination and risk to life and the environment should be embodied into the detailed design drawings and contract documents. Designs should be checked to ensure that the measures are fully incorporated and that potential conflicts with civil engineering, geo-technical, structural, lighting, signage, drainage, underground utility and operational requirements are resolved prior to construction.

10.3.2 The design phase EM&A requirements for land contamination and risk to life and the environment comprise the audit of the integrated fuel spill control, detection and containment detailed design specifications to be prepared during the detailed design. Monitoring of design works against the recommendations within the EIA should be

undertaken as and when the designs are produced to ensure that they fulfil the intentions of the mitigation measures. The design items for audit will include:

- land and marine spill response plan;
- pipeline leak detection and automatic shut-off system;
- pipeline rock armour protection;
- tank high level shut-off;
- tank bunding;
- tank leak drainage isolation and containment system;
- on-site fire fighting equipment;
- jetty protection; and
- emergency shut down valves for fuel delivery.

10.3.3 Detailed design of the facility will extend into the construction period and as such EM&A for the Design Phase refers to audit of the design as and when it is completed and not necessary pre-construction. As such, the design audit shall be undertaken as and when the relevant design aspects are produced and liaise with the design engineer to ensure all measures have been incorporated in the design in a format that can be specified to the Contractor for implementation. In the event of a non conformity, the Event/Action plan as detailed in Table 10.1 below should be followed.

Table 10.1 Event / Action Plan for Design Phase

Action Level	Auditor	Franchisee's Site Respresentative (FSR)	Design Engineer (DE)
Non Conformity (with Design Standards and Specification)	• Identify Source • Inform FSR and DE • Discuss remedial actions with FSR, DE • Verify remedial actions when complete.	• Discuss remedial actions with DE • Ensure remedial designs are fully incorporated	• Amend designs • Discuss remedial actions with FSR

10.4 Operational Impact Monitoring

10.4.1 Much of the prevention for the risks to human life, leakages and spillages, on land and in the sea, are based upon the design and construction of PAFF following the latest technology, standards and guidelines. In order to ensure that the required design measures are taken into account during the planning and design for the future tank development, a review of the EIA report will be undertaken at the planning stage for the future expansion (around 2025 as required). The review is required only if the latest technology, standards and statutory requirements are deemed to have changed by that time. The review should be undertaken by an environmental specialist appointed by the Franchisee at that time.

10.4.2 In addition, the following regular inspections and audits will be undertaken by the Franchisee during the operational phase of the facility:

- two inspections every year of the tank farm, jetty and pipelines including one undertaken pursuant to the Joint Inspection Group (JIG) explained above;
- inspection of the whole sub sea pipelines every 5 to 10 years;
- Health, Safety and Environmental audit of the facility once every 3 years; and
- inspection of the structural integrity of the tanks once per year.

10.4.3 Also, in order to ensure the on-going adequacy of the fuel spill contingency plan and that it is being implemented as required, it is proposed that an Environmental Management System be set up for the operational phase of the project to allow regular audits of the systems/mitigation measures incorporated in the project and the fuel spill contingency plan. The Environmental Management System shall be developed with 3 months of the commencement of the operation of the PAFF and it is recommended that audits are undertaken at least every 24 months and the audits should be undertaken by an environmental specialist appointed by the Franchisee.

10.4.4 In addition, it is recommended that the Franchisee undertake some routine monitoring of water quality in the vicinity of the PAFF site to check the effectiveness of the proposed precautionary measures implemented for on-site spill control. The details of the monitoring to be undertaken, including the parameters, frequency and monitoring locations, will be prepared by the Franchisee as part of the PAFF Operations Manual and the details will be agreed with the relevant authorities within 3 months of the commencement of operation of the PAFF. However, the monitoring should include but not be limited to the parameters of TPH and PAH and reference should be made to the existing monitoring programme undertaken for the fuel tank farm on the HKIA platform. As such, the details of this monitoring are not specified in this Manual.