

7 WASTE MANAGEMENT

7.1 GENERAL

The container terminals will be built on reclaimed land extending south east from the Tsing Chau Tsai peninsula and Pennys Bay. The scale and extent of the proposed developments could potentially generate significant waste impacts on the surrounding marine environment. It will therefore be essential that 'Good Site Practice' (GSP) is actively employed during construction works and operation of the CT to ensure effective control and disposal of wastes.

The following sections identify the types of waste that could be generated and recommends arrangements for collection and proper disposal of these waste arisings. One area which has high potential for impact is the occurrence of accidental spillage, which can be part of normal operation even at well run sites. To reduce potential impact of accidental spills this section includes information on action plans which should be followed in the event of an incident.

7.2 ENVIRONMENTAL LEGISLATION AND GUIDELINES

The principal legislative framework for waste collection and disposal is the Waste Disposal Ordinance 1980 (Cap 354) which provides a licensing system for the collection and disposal of wastes. Under the terms of the Waste Disposal Ordinance construction waste is classified as trade waste and as such the Contractor will be responsible for their disposal. Regulations for chemical waste control are provided under a regulation of this Ordinance [Chemical Waste (General) Regulation 1992] and administer the possession, storage, collection, transport and disposal of chemical wastes.

MARPOL is an international agreement which covers wastes generated on board ship and specifies that these arisings should not be disposed of into the marine environment, but stored on board for appropriate disposal at port. Under this agreement ports are obliged to provide disposal facilities for collection and appropriate treatment of oily wastes, harmful substances, noxious liquids, general rubbish and sewage.

7.3 CONSTRUCTION PHASE

Wastes generated by CT construction works are likely to include;

- o general site wastes such as residues, packaging and containers;
- o workforce wastes from site offices, works canteen and approximately 2000 staff;
- o arisings from vehicles, plant equipment servicing and repair facility including wastes classified as Chemical Waste; and
- o arisings from accidental spillage.

There will be no road access to the CT works site until completion of the North Lantau Expressway, around 1997. In the initial stages of CT10 developments marine collection of wastes will be the only disposal route available from the site. Wastes generated by the

airport construction project at Chek Lap Kok are transferred by containerised barge to a strategic landfill. Disposal of wastes from the CT site will require a similar provision. A barge loading quay would be constructed as part of advance works and is likely to be located on the southern edge of these reclamations. Design of the container terminal works areas should include provision of a collection area where waste can be stored and loaded prior to removal from site. An enclosed and covered area is preferred to reduce the occurrence of 'wind blow' light material. If an open area is unavoidable for the storage or loading/unloading of wastes, then the area should be bunded and all the polluted surface run-off collected within this area should be diverted into sewers.

It is anticipated that inert material would be incorporated into the fill material while other wastes would be transported by barge to an appropriate strategic landfill. Loose transfer of waste would not be acceptable. Materials classified as chemical wastes will need special handling and storage arrangements before removal for appropriate treatment at the chemical waste treatment facility (CWTF) at Tsing Yi. Wherever possible opportunities should be taken to reuse and recycle materials.

7.3.1 GENERAL SITE AND WORKFORCE WASTES

Materials and equipment used on the site will produce packaging and container wastes. Residues may include materials that are classified as chemical wastes which require special disposal.

It is estimated that the number of workers on the site would be approximately 2000, they will generate refuse, food packaging and containers, scraps of food and similar wastes from canteen and site offices.

Rapid and effective collection of site wastes will be required to prevent waste materials being blown around by the wind, flushed or leached into the marine environment. Due to the size and exposed nature of the site a network of bins and waste receptacles and a dedicated waste disposal vehicle, should be provided. The location of these collection points will need to take account of the development of work sites to ensure adequate provision is maintained throughout the development phases of CT works. Suitable collection sites around site offices, service buildings and canteen will also be required.

It is recommended that for environmental hygiene reasons putrescible wastes are not stored for a period exceeding 48 hours, however, removal every 24 hours is preferable. The putrescible waste will not be suitable for incorporation into any reclamation works.

7.3.2 PLANT AND VEHICLE MAINTENANCE AND SERVICING

Vehicles and plant equipment will require regular servicing and maintenance. Workshops and maintenance facilities will be required throughout the project programme and it is envisaged that these would be built as part of the advance works programme.

It is anticipated that a service area will be built to provide maintenance services for the trucks, dozers and other plant equipment. Wastes generated by this facility would include oil and grease, spent oil and air filters, dirty lubricants, mechanical parts and tyres. It is anticipated that a service area would be located on the advance works platform with areas provided for a maintenance workshop, parking, refuelling and fuel storage.

Wastes generated by the repair facilities would include spent filters, batteries, brake/clutch linings, oils, dirty lubricants, hydraulic and cooling oils. These materials are

classified as chemical wastes and will require special handling, including separation from other wastes. They should be directed for appropriate treatment at the chemical waste treatment facility at Tsing Yi operated by Enviropace.

Potential for accidental spillage and leaks from the repair and refuelling facilities should be minimised to prevent soil, surface water and ground water contamination. Isolation and confinement of service, maintenance and refuelling areas by provision of bunded areas and hard standings with drainage systems, grease traps and petrol interceptors are the most appropriate form of mitigation. Interceptors will need to be examined and cleaned as part of a consistent maintenance programme to ensure efficiency, fuel lines and valves should also be regularly checked for leakages.

The implementation of standard operation, maintenance and inspection programmes for plant equipment, and vehicles would reduce the potential leakage and accidental spills.

7.3.3 INFRASTRUCTURE

On completion of reclamation and construction works, site buildings and facilities will be demobilised and removed from site including many site features which could and usually are dismantled for reuse and recycling.

Demobilisation of infrastructure and site clearance will generate construction wastes, scrap metal and material residues which will require disposal. Certain elements may need to be disposed to landfill but recyclable materials would be salvaged for reuse, inert waste utilised as fill.

7.3.4 ACCIDENTAL SPILLAGE

The provision of refuelling and mechanical servicing facilities will involve the storage and use of potentially hazardous materials. The intensity of activity at the CT10 and CT11 project sites could give rise to significant spillage of fuel oil from the fleet of reclamation vehicles. Without effective management, the use and disposal of these substances could contaminate the air, ground and marine environment.

7.3.5 OIL/FUEL TRANSPORT AND STORAGE

It is proposed that a refuelling facility is provided on the advance works platform. During the end tipping phase of CT reclamations it is anticipated that trucks, dozers and other site vehicles, will be operating on a 16 hour basis. Sufficient quantities of fuel oil will be delivered and stored at the refuelling facility and maintenance workshops. No further information is available on the details of fuel transport and the nature of the refuelling station, however, it is assumed that fuel will be delivered by barge and transferred to storage tanks located on the advanced works platform.

The method of fuel oil delivery is a significant waste management issue as increased handling raises the risk of accidental spillage. It is envisaged that fuel oil will be delivered by dedicated fuel tanker vehicles, transported to the CT works site by ferry and driven to the refuelling station. If this methodology is adopted the amount of rehandling is kept to a minimum and significantly reduces the risk of spillage during barge transfer and transport to storage tanks. An alternative method would be to deliver fuel in drums. With the quantity of fuel required, the additional handling at the barging point and transfer into storage tanks, this method would have a significantly greater impact potential.

In the event of spillage into the marine environment during off loading or accidental discharge a rapid and efficient response will be essential. Once a spill has occurred it is imperative that the oil is first contained and the sea surface is cleansed of the contaminant. It is likely that the barge loading station will be located at the southern edge of the advanced works platform, containment of a spill could be achieved through the placement of a boom around the spill to prevent further spread of oil. The oil can then be removed from the sea surface by absorbent materials and suction pumps for appropriate treatment and disposal.

Spillage from storage tanks and drums should be controlled by the provision of a bunded area designed to accommodate 110% of the tanks capacity in case of a major rupture. All storage tanks should be fitted with level alarms and leak detector systems. Drainage from the bunded area should be directed by a sump to oil interceptors with sufficient capacity to retain a major spill, provision of a stoplogs or sluiceways and a rapid response to an incident could maintain the spill within the bunded area. Fuel retained within the bund can then be pumped out and removed to another facility as appropriate. Regular maintenance of the oil interceptor and sump will be essential to ensure effective cover should a spill occur.

Minor but regular spillage during refuelling may become significant and should therefore be carried out on areas equipped with appropriate facilities including hard-standings, sumps and oil interceptors. Parking areas are also a potential source of minor but regular spillage from leaking vehicles. Provision of similar spillage control arrangements are recommended, again regular maintenance is essential to maintain efficiency. Clean up of fuel spills from other areas of the project site can be achieved through use of absorbent materials, which should be available on site for this purpose.

7.3.6 MAINTENANCE FACILITIES

Vehicle and equipment maintenance activities will involve the use of a variety of chemicals, oil and lubricants, including heavy duty cleaners, organic solvents, degreasers, brake fluids, battery acid and soldering fluids. The cumulative effect of potentially large number of small spillage during maintenance operations by faulty equipment, accidents, carelessness and deliberate discharge to drain may be significant.

The service shop and minor maintenance facility should be located on hard standings within a bunded area, sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakages and spillage should only be undertaken within the areas appropriately equipped to control these discharges.

7.4 OPERATION PHASE

The main activities associated with the operation of a container port are the reception, storage and movement of containers. Wastes generated by operation of the container terminal are likely to include:

- o General site and workforce wastes from administrative offices and works canteen;
- o Ship wastes including MARPOL wastes; and
- o Arising from accidental spillage.

7.4.1 GENERAL SITE AND WORKFORCE WASTES

As ships cargoes handled at the terminals are containerised, operations at CT10 and CT11 are not expected to generate significant quantities of general wastes. General and commercial wastes are anticipated to include materials such as paper, plastic, food packaging and containers, scraps of food and similar wastes from canteen and administrative offices.

It is envisaged that waste generated by the Lantau Port Development (LPD) would be collected by private refuse contractors and transported to the North Lantau Refuse Transfer Station by road haulage. Provision of a network of suitable bins and receptacles around the terminal, administration offices and service building are recommended. Frequent collection of waste, preferably every 24 hours, to a covered central transfer facility for collection by refuse disposal vehicles will be required to reduce environmental nuisance from putrescible wastes.

Approximately 2000 people will be working at CT10 and CT11, estimates made for the Waste Disposal Plan for Hong Kong (EPD 1989) indicate that employee arisings for privately collected wastes in the year 2001 would be approximately 2.2 kg/day giving a total of 4,400 kg/day of general wastes on completion of CT10 and CT11.

7.4.2 "MARPOL" WASTES

Wastes generated by ships are required by the convention to be stored on board ship for disposal on arrival at port. Ship board wastes include fuel oil, oily bilge water and ballast from bunker fuel tanks, (MARPOL Annex 1), noxious liquids (MARPOL Annex II) and general rubbish (MARPOL Annex V). As an international container terminal, CT10 will be required to provide facilities for the reception, storage and transfer of MARPOL wastes for appropriate treatment. Annex I and II substances would be classified as chemical wastes and would therefore require appropriate treatment at the chemical waste treatment centre at Tsing Yi. It is understood that the facility includes storage capacity for 5000 tonnes of MARPOL Annex I wastes.

At present wastes from vessels entering Hong Kong ports are collected by private 'dumb' barges for disposal at CWTF or to China for recycling, or directly by the CWTF barges as appropriate, it is understood that this practice will continue. A dedicated pumping station with connection to the public foul sewer in Container Port Road should be provided for sewage disposal and treatment.

7.4.3 ACCIDENTAL SPILLAGE

During operation of the Port there are occasions where, even with the strictest environmental control and operating procedures there will be accidental spillage of potentially environmentally harmful material. This impact could be from a ship at or close to a berth. Sources of material include oily MARPOL material (tank washings, dirty ballast, bilge water and cargo leftovers) rupture of refuelling lines, rupture of ships hulls due to collision (which could involve spillage of toxic wastes) and on land the rupture and leakage from transfer containers and the operation of vehicles. The impact of a spill will be dependant on quantity and type of material, climatic and sea conditions, availability of spill control equipment, speed of response and management and skill of the cleanup team. Fuel supplies should be stored in a bunded area and refuelling facilities and maintenance facilities should be located on hard standings with drainage systems including grease traps and petrol interceptors.

In the event of damage and rupture to containers during transfer operations material could be deposited within the terminal and be washed through the storm drain system, or fall directly into the adjacent waters. Containment and absorption would be applicable in both cases, provisions for emergency action plan by a quick response team will need to be in place. If a spill is quickly contained and acted upon, the impact can be effectively removed or minimised. The use of bunds to contain potential spills, and containment booms for deployment as part of a spill response mechanism will need to be available on site. Following containment and collection the contaminated sorbents containing oils and chemicals will require disposal. This disposal may include recycling of spill material, disposal to the Chemical Waste Treatment Facility (CWTF), Tsing Yi, or disposal of solids to landfill.

7.5 RECOMMENDATION FOR WASTE MANAGEMENT

Container terminal developments are not expected to generate significant waste management related impacts, provided good site practice (GSP) is adhered to. Recommendations for GSP for wastes include:

- o Nomination of a site manager to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the terminal.
- o Training of site personnel in proper waste management and chemical handling procedures.
- o The reuse and recycling of materials wherever possible.
- o Provision of sufficient waste disposal points and regular collection for disposal.
- o Provision of an enclosed transfer facility for storage and containment.
- o Separation of chemical wastes for special handling and appropriate treatment at the chemical waste treatment facility at Tsing Yi.
- o Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.
- o Preparation for accidental spill and emergency action plans, including details for communications and alarm systems, evacuation procedures, fire control equipment, water supply and containment procedures and materials.