Contents

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

This Project Profile is prepared for application for approval to apply directly for an Environmental Permit (EP) for the Temporary Trucking Scheme for MARPOL Waste (1) from the Container Terminal No. 9 to the Chemical Waste Treatment Centre under Section 5(10) of the *Environmental Impact Assessment Ordinance* (EIAO).

1 INTRODUCTION

The Container Terminal No. 9 (CT-9) development requires reclamation of seabed in front of the Chemical Waste Treatment Centre (CWTC) (see *Figure 1.1a*). Some of the existing CWTC facilities (including the MARPOL waste reception and Recycled Fuel Oil (2) (RFO) shipping facilities, cooling water system, etc) are affected and new facilities are to be provided at the new marine basin that forms part of the CT-9 development. The civil construction of the new marine basin will be completed before January 2004. In order to allow the CT-9 contractor to demolish the existing Jetty at CWTC earlier and start the reclamation in the area, where the foundation of the future Stonecutters Bridge will be located, before the fixed installations at the new marine basin and piping connections with CWTC are completed and commissioned, a temporary trucking transfer of MARPOL Waste and RFO between the new marine basin and CWTC is proposed.

Under the proposed temporary trucking scheme of MARPOL Waste and RFO, the MARPOL waste collected from ships will be pumped to road tankers for transportation to the CWTC, and vice versa for the RFO. The temporary trucking scheme is scheduled to be commissioned by January 2004 and will be operated for about 6 to 9 months until commissioning and acceptance of the new permanent MARPOL waste transferring system (3) between the new marine basin and CWTC by the Environmental Protection Department (EPD).

The EPD has confirmed that this proposal will constitute a Material Change to the CWTC, which is an Exempted Designated Project under the *EIAO*. As such, an EP will be required for the proposal.

This Project Profile serves to address the potential environmental impacts arising from the construction and operation of the proposed temporary trucking facility for application for permission to apply directly for an EP.

(1) MARPOL waste consists of 2 main types: MARPOL Annexes I and II. MARPOL Annex I waste includes all oil and petroleum derivatives, and also the low flash point compounds such as gasoline, jet fuels and naphtha. MARPOL Annex II waste includes all noxious substances listed in Appendix II of the Annex II MARPOL regulations and can be summarized as a large variety of organic and inorganic acids and alkalines and various organic compounds. All MARPOL Annex II waste is handled and treated as chemical waste in different process than MARPOL Annex I waste (see *Annex B*).

(2) Oil recycled from MARPOL Annex I waste.

(3) Under the permanent transfer scheme, the flexible hose will be connected manually to the coupling on the corresponding loading point at the new marine basin. The corresponding gate valves will be opened manually according to working procedures.

2 BASIC INFORMATION

2.1 PROJECT TITLE

Temporary Trucking Scheme for MARPOL Waste from Container Terminal No.9 to Chemical Waste Treatment Centre

2.2 NAME OF PROJECT PROPONENT

Hyundai – CCECC Joint Venture

2.3 NAME AND TELEPHONE NUMBERS OF CONTACT PERSONS

Mr. Malcolm I McGregor, Deputy Project Director
Tel: 2480 6920

2.4 PURPOSE AND NATURE OF THE PROJECT

This proposed Temporary Trucking Scheme will allow the CT-9 reclamation and reprovisioning of CWTC MARPOL waste reception facilities to be carried out in a more effective manner and shorten the work programme without compromising the continuity of MARPOL waste reception in a safe and efficient manner.

2.5 LOCATION OF PROJECT

The identification and selection of the proposed location has been a continuous process since the planning of the proposed temporary MARPOL waste reception arrangement commenced. The site selection exercise has considered 6 site options (see *Annex A*). The proposed location has been identified as the single preferred option because of its full accommodation of the operational / engineering constraints associated with the proposed facility. Other site options have physical constraints at varying levels, and hence are not considered as feasible alternatives.

Figure 2.5a shows the location of the new marine basin and the proposed temporary trucking scheme of MARPOL Waste at CT-9. The site is situated on reclaimed land at the southern end of the CT-9 reclamation site.

The existing environment is an urban industrial area (see *Figure 2.5a)*. There are oil depots to the east of the site and chemical factories and CT-9 to its north. Within 1 km of the site boundary of the trucking scheme, neither existing nor planned residential and institutional uses have been identified, with the closest being the residence hall of Hong Kong Institute of Vocational Education located and Rambler Crest at approximately 1.26 km and 1.4 km away, respectively from the site.

2.6 PROJECT DESCRIPTION

This section describes the construction and operational activities associated with the temporary trucking scheme for MARPOL waste from the new marine basin of CT-9 to the CWTC.

2.6.1 Construction

At the Temporary MARPOL Waste Reception Facility at the New Marine Basin

Figure 2.6a illustrates the schematic site layout of the proposed temporary MARPOL waste reception facility at the new marine basin. The proposed facility will be constructed on previously reclaimed land and therefore no site formation works will be required. Key facilities to be provided at this site include:

- An International Organization for Standardization (ISO) tanker (see *Figure 2.6b*) loading / unloading area comprising a sump pit (with a sump pump) and a rain shelter to accommodate a maximum of seven ISO tankers;
- A piping system, with leak prevention and collection measures, to connect the loading / unloading station with two barge mooring positions and the necessary inter-barge connections (this system is similar to that being used at the existing berth of the CWTC);
- Concrete slab for the docking, unloading and working areas;
- A temporary fire protection system;
- Two micro-motion flow meters;
- One screw pump for unloading RFO to barges;
- A temporary compressed air system and bottled nitrogen gas for the purging lines; water supply and temporary toilet; and
- A paved temporary road (1) linking the new marine basin and the CWTC for MARPOL trucking.

At the CWTC

Minor modification works at the CWTC will include (see *Figure 2.6c*):

- Construction of an ISO tanker loading / unloading station comprising a rain shelter and a sump pit (with a sump pump) a maximum of three ISO tankers;
- Provision of two screw pumps;

(1) This temporary road will be constructed within the site boundary of the CT-9.

- Relocation of two flow meters from previous jetty manifold to the ISO tanker loading / unloading station;
- A piping system for loading MARPOL waste from the ISO tankers to the existing storage tanks within CWTC; and
- Relocation of the online steam heaters (1) at the entry storage tank.

2.6.2 Operation

The proposed temporary trucking scheme of MARPOL waste, including the reception facility at the new marine basin, will be operated for the Hyundai-CCECC JV by Enviropace Limited, the operator of the CWTC. MARPOL waste reception and transfer operations will be conducted for a minimum of 16 hours per day (from 07:00 hrs to 23:00 hrs) (2) and 7 days per week at the new marine basin. CWTC operation staff will be present during the operating hours. EPD inspector will also be present for waste reception control and approval. Site security staff will be present 24 hours per day. The barge crew will also be present when the collection barges are moored at the jetty.

MARPOL waste will be pumped into dedicated ISO tankers (on truck / trailer combination) with a carrying capacity of 18 m^3, for transfer to the CWTC. RFO will also be transferred from the CWTC to the temporary reception facility by the same ISO tankers. Sufficient ISO tank containers and trailer trucks will be provided for transfer of MARPOL waste and RFO which will allow unloading of MARPOL waste from the collection barge to the ISO tankers or unloading of RFO from ISO tankers to the collection barge with minimum disruption. The ISO tankers will be unloaded at the new unloading station at the site boundary of the CWTC.

A small quantity of chemical waste (in drums) (3) will also be received at the temporary waste reception facility. These are usually the chemical wastes produced from the outlying islands where collection by road is not possible.

A small quantity of the MARPOL waste (less than 10% of the total number of deliveries) will be delivered to the temporary facility by other licensed marine-based collectors. This waste will be handled according to the standard procedures adopted by the Enviropace's barges.

A schematic representation of the MARPOL waste reception and transfer operations is presented in *Figure 2.6d.* The proposed trucking route between the temporary reception facility and CWTC is shown in *Figure 2.5a.* The estimated cycle time of a return trip is about 1 hour 15 minutes (4). Based on the numbers of ISO tankers

(1) This is a part of the existing process within the CWTC.

(2) If necessary, the temporary trucking scheme will operate on a 24-hour basis subject to approval of the EPD.

(3) Collected by both Enviropace barges and third party barges contracted by Enviropace Limited.

(4) Including the time for loading and unloading of the MARPOL at the new marine basin and the CWTC, respectively.

available, it is envisaged there will be a limited number of trucks travelling between the temporary facility and CWTC at any one time.

The estimated quantities of materials to be handled at the temporary waste reception facility are presented in *Table 2.6a*.

Table 2.6a Quantities of Materials to be handled at Temporary Reception Facility

Quantity	MARPOL Annex I Waste From Temporary Reception Facility to CWTC	RFO from CWTC to Temporary Reception Facility	MARPOL Annex II Waste or Chemical Waste From Temporary Reception Facility to CWTC	Overall /Maximum
Average quantity (tonnes per month)	3,800	1,500	16	5,300
Average transfer operating days (days per month)	30	8	2 to 3	30
Average transfer quantity (tonnes per day)	127	188	8	315
Average tanker loads (tankers per day)	8	11	2	21

Notes:

(a) Tank requirements: Eight ISO containers (18m^3 net content) on 20ft trailer chassis.
(b) Tractor truck requirements: Two for transfer between Temporary Reception Facility and the CWTC.
(c) MARPOL Annex II waste: bulk; 2 to 3 shipments per year, 50 tonnes per shipment.
(d) MARPOL Annex II waste: drums; 2 to 3 shipments per month; 16 tonnes per month.
(e) Chemical Waste from barges: drums; 2 to 3 shipments per month; 16 tonnes per month.
(f) MARPOL Annex I waste (flammable): bulk; 2 to 3 shipments per year.
(g) Payload of the CWTC's chemical waste collection tankers, suitable for transport of flammable materials (not the ISO tankers) is 6 tonnes per truck.
(h) Payload of the chemical waste collection vehicles, suitable for transport of chemical waste in drums is 6 tonnes per truck.
(i) Assuming the average density of MARPOL waste or RFO is 0.97 tonnes m^{-3}.

2.7 PROPOSED PROGRAMME

The proposed Temporary MARPOL Waste Reception Facility will be provided under the CT-9 development. The target completion dates for the key milestones are:

Site preparation and facility installation	December 2003
CWTC modification	December 2003
Commissioning of the proposed temporary trucking facility	January - March 2004
Commissioning of the permanent MARPOL waste reception facility and decommissioning of the temporary trucking facility at the CT-9 marine basin	June – September 2004

2.8 PROPOSED ADDITION, MODIFICATION AND ALTERATION

The proposed trucking scheme involves provisioning of a temporary road and MARPOL waste reception facility at the new marine basin (see *Section 2.5)* and minor modification works of the existing facility at CWTC. As a supplementary and supporting section, *Annex B* presents an overview of the MARPOL waste transfer system under existing waste reception operation at the CWTC jetty.

Table 2.8a presents a comparison of the CWTC existing scheme to the proposed temporary trucking scheme. The comparison indicates that there would be no changes in the MARPOL waste collection operations and the MARPOL waste handling capacity at the CWTC. The main differences would be the MARPOL waste reception facility at the new marine basin and the subsequent mode of transfer between the reception site and the CWTC.

Table 2.8a Comparison between Existing and Proposed Temporary Facility

	Existing Facility	**Proposed Temporary Facility**
MARPOL Collection	From ships by barges	From ships by barges
Reception Location	CWTC existing berth	Proposed temporary reception facility at the new marine basin at CT-9 (see *Section 2.5*)
Mode of Transfer		
- MARPOL Annex I Waste	Pipeline-based. From collection barges to CWTC storage facilities through 4 above ground pipelines of 70-100m each.	Road-based. From collection barges to road tankers and subsequently to CWTC storage facilities.
- MARPOL Annex I waste (flammable)	*Bulk* Pipeline-based. From collection barges to CWTC storage facilities.	*Bulk* Road-based. From collection barges to DG tankers currently used by CWTC for collection of flammable chemical waste.
- MARPOL Annex II waste - Chemical Waste (only drum based) collected by barges from outlying islands	*Drum-based.* The drums will be transferred from the collection barges by crane to existing jetty.	*Drum-based.* The drums will be transferred from the collection barges by crane onto the temporary reception facility, which will then be transported to CWTC by trucks.
- Recycled Fuel Oil	Sea-based. From CWTC storage facilities to users by barges.	Road- and sea-based. From CWTC storage facilities to the proposed temporary reception facility by road tankers for subsequent transfer to users by barges.
Handling Capacity	See *Table 2.6a*	Same as existing facility

3 POSSIBLE IMPACT ON THE ENVIRONMENT

Table 3.1a identifies the potential environmental impacts that may arise from the construction and operation of the proposed trucking scheme. The key potential impacts are water quality, potential land contamination and hazard to life in case of spillage during both loading / unloading operations and transfer of MARPOL waste to / from CWTC.

However, it is not expected that there will be any adverse environmental impacts due to operation of the proposed temporary reception facility provided that the proposed environmental pollution control measures are properly implemented. As CWTC is committed to a high standard of environmental and safety performance under contractual administration and monitoring by the EPD, it is considered that the control measures will be effective.

Table 3.1a Potential Sources of Environmental Impacts

Potential Impact	**Construction**	**Operation**
Gaseous Emissions	×	×
Dust	✓	×
Odour	×	×
Noise	×	×
Night-time Operations	×	✓
Traffic (Land & Marine)	×	×
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	×	✓
Hazard to Life in case of Spillage	×	✓
Landfill Gas Hazard	×	×
Disposal of Spoil Material, including potentially Contaminated Materials	×	✓
Disruption of Water Movement or Bottom Sediment	×	×
Unsightly Visual Appearance	×	×
Cultural & Heritage	×	×
Terrestrial Ecology	×	×
Marine Ecology	×	×
Cumulative Impacts	✓	✓

Notes:
✓ = Possible × = Not Expected

4 AIR QUALITY

4.1.1 Gaseous Emissions

Construction. Although emissions from construction equipment have the potential to cause air quality impact, the number of construction equipment to be used during construction is small given the relatively small size of the project and the nature of the construction works required. Thus, adverse air quality impact to the nearest air sensitive receiver (ASR) (i.e. the office of CRC Oil Depot, at about 60 m from the nearest point of the temporary road) is not envisaged.

Operation. During the loading of MARPOL waste or RFO to the ISO tankers, there is a potential for the volatile organic compounds to emit from the manhole at the top of the ISO tankers and causes odour and air quality impacts. However, the majority (>90%) of the MARPOL waste is MARPOL Annex I waste with a high flash point (>100^{o}C in 99% of the cases) and the RFO also has a high flash point. Hence, the air emissions during loading are considered negligible. As the nearest ASR (i.e. the site office of the CRC Oil Deport) is about 100m from the loading / unloading stations at the boundary of the CWTC and 340m from the temporary reception facility at the new marine basin, it is not envisaged that the loading operation will cause adverse odour and air quality impacts.

The quantity of MARPOL waste and RFO to be transferred from the temporary reception facility to CWTC is about 315m^{3} d^{-1}. With an effective carrying capacity of 18m^{3} for each ISO tanker, there will be a maximum of approximately 21 return trips per day for MARPOL waste and RFO transfer. The corresponding vehicle-kilometres travelled are approximately 20 vkt day^{-1}. It is considered that the vehicle emissions associated with the ISO tankers will be negligible.

4.1.2 Dust

Construction. No site formation will be required. As no major earthworks will be required for the construction of the temporary road and reception facility, no adverse construction dust impact is envisaged.

Operation. As the active working area and the temporary road will be paved and there will be no dust generating activities, operational dust impact is not anticipated at the identified ASR.

4.1.3 Odour

Construction. In the absence of odour pollution sources, no odour impact is envisaged.

Operation. As discussed in *Section 4.1.1*, no odour is envisaged during the operation of the temporary trucking scheme.

5 NOISE

Construction. The number of construction equipment to be used during construction is small given the relatively small size of the project and nature of the construction works. This, together with the absence of Noise Sensitive Receivers (NSRs) within 1 km from the proposed site boundary, indicates that no adverse construction noise impact is envisaged.

Operation. The MARPOL waste handling and transfer activities at the proposed facility are not expected to cause adverse noise impacts. Traffic noise impacts associated with the ISO tankers (a maximum 21 truck trips per day) are insignificant compared with the background industrial noise and the lack of NSRs in the vicinity. As such, no adverse impacts are expected.

6 NIGHT-TIME OPERATIONS

Construction. No night-time construction activities are envisaged.

Operation. Reception and transfer of MARPOL waste from the new marine basin to CWTC will normally operate from 07:00 hrs to 23:00 hrs but may be undertaken on a 24-hour basis, subject to the approval of the EPD. As no NSR are located within 1 km, no adverse night-time noise impact is expected.

As the proposed site is located next to the CT-9 and other industrial premises, it is not anticipated that the night-time operation of the facility will cause noticeable visual impact at distant visual receptors.

7 TRAFFIC (LAND AND MARINE)

About 2 to 3 barge trips per day will be required for marine transfer of MARPOL waste to the proposed temporary reception facility, which is located at the new marine basin. As the MARPOL waste will be delivered to the new marine basin, the marine traffic arrangements will be same as the permanent scheme. No adverse marine traffic impact is envisaged for the temporary trucking scheme.

A maximum of about 21 truck trips per day will be required for road transfer of MARPOL waste from the proposed temporary reception facility to the CWTC and RFO from CWTC to the proposed site. Given that the transfer route is not a public road and the traffic flow is very low, it is therefore not anticipated that road transfer of MARPOL waste and RFO between the proposed temporary reception facility to the CWTC will cause adverse traffic impact to local road network.

About 1 to 2 truck trip per day will be required for road transfer of MARPOL Annex II waste or chemical waste from the temporary reception facility to the CWTC. The trucks will travel on the temporary road, then on the public road (about 500m) to the CWTC via the main entrance. With respect to anticipated small truck trip per day

and the capacity of the Tsing Yi Road, it is not envisaged to have any adverse traffic impact on the Tsing Yi Road.

8 WATER QUALITY

Construction. No marine or reclamation works additional to those of the permanent scheme will be required for the temporary trucking scheme. Water Sensitive Receivers in the vicinity of the proposed facility are Rambler Channel, the cooling water intake of the CWTC, and the cooling water intake for Tsing Yi Sewage Treatment Works north of CT-9. As no major site formation works / earthworks will be required, potential water quality impacts due to suspended solids in surface runoff during the construction phase will be minimal. Standard surface runoff control measures (i.e. silt traps) will be adequate to prevent muddy runoff discharge from the site.

Portable toilets will be used and the sewage will be collected regularly by specialised contractor for off-site disposal at the sewage treatment works designated by the Drainage Services Department (DSD).

Operation. There is a potential for a spillage of MARPOL waste or RFO during the loading / unloading operations. The loading / unloading procedures will remain virtually the same irrespective of the locations of the reception facility. The design and management procedures at existing CWTC reception facility, which will be adopted at the temporary facility, have demonstrated that they are effective in preventing potential spillages.

The loading of MARPOL waste and unloading of RFO will be conducted at the loading / unloading station, which is paved. All operations will be manned by CWTC staff and closely monitored with flow control equipment. Any spillages will be intercepted by the collection drain and discharged into a sump pit. The wastewater / oily water collected will be delivered to the CWTC for treatment. This measure is considered to be effective to prevent any spillages from discharge into the sea.

The transfer of MARPOL waste will be via dedicated asphalt paved road (see *Figure 8.1a*). Site security will be provided to prevent unauthorised vehicles from using the temporary road while trucking of MARPOL is occurring. Temporary barriers will also be provided at the sides of the temporary road to prevent the CT-9 construction vehicles from running onto the temporary road. If any CT-9 vehicles require using of the road, Enviropace will temporarily suspend the MARPOL trucking operation and let the CT-9 vehicles use the road**.** Given that the frequency of truck trip associated with the transfer of MARPOL waste is low and only one to two trucks will be using the route at one time, spillage due to road accident would be negligible. To further reduce the possibility of spillage of MARPOL waste or RFO from the ISO tankers during transfer, double valves will be used for the inlet pipe. In addition, Enviropace staff will inspect the temporary road regularly to identify any dripping. Hence, contamination to storm runoff will be minimal. Notwithstanding this, a ditch underlain with 2 layers of impermeable polythene sheet will be provided at the

down-gradient side of the road. Sand will be filled in 300mm thick for entrapping the MARPOL in case of MARPOL spillage on the road. Sand contaminated by MARPOL will be dug out for thermal treatment at the CWTC. These measures will adequately prevent contaminated runoff from discharging into the sea.

Portable toilets will be used and sewage will be collected regularly by specialised contractor for off-site disposal at the sewage treatment works designated by the DSD. The contaminated runoff from the temporary reception facility and wastewater from showers will be collected in reservoir and subsequently delivered to the CWTC for disposal.

With the implementation of the proposed mitigation measures (see *Section 16*), adverse impacts to marine water quality are not anticipated.

9 ECOLOGY

No marine works additional to those of the permanent scheme will be required for the temporary trucking scheme. No ecological impacts, either terrestrial or marine, are anticipated given that the proposed temporary reception facility is located on reclaimed land and that no Marine Ecological Sensitive Receivers have been identified.

10 CULTURAL HERITAGE

No cultural heritage impacts are expected, as the proposed temporary reception facility will be constructed on reclaimed land.

11 LANDSCAPE & VISUAL

As the proposed temporary reception facility will be located in an industrial area and it does not include any massive structures, it will not cause visual intrusion to visual sensitive receptors located at far distance. The construction and operation will only last for about 6 to 9 months, therefore it is considered that the landscape and visual impact to be insignificant.

12 WASTE MANAGEMENT

Construction. As no major earthwork will be required for the construction of the proposed facility, a negligible quantity of construction and demolition (C&D) materials will be generated from the construction activities. With respect to the nature of the construction activities, the quantity of general refuse (including package materials for construction materials, wooden formworks, etc) to be generated will be minimal (in the order of 5 tonnes). Any surplus (not expected to be more than 10 m^3) inert C&D materials (public fill) will be segregated from general refuse. The public fill will be delivered to public filling areas or public filling barging points. The disposal of small quantities of public fill and general refuse to

public filling facilities and landfills, respectively will not cause adverse environmental and operational impacts to these facilities.

Operation. Negligible (in the order of 1 to 2 kg per day) solid waste will be generated from the operation of the proposed temporary trucking scheme. Any oily water collected by the sump pits will be delivered to the CWTC for treatment and disposal. No adverse environmental impacts are expected.

13 LAND CONTAMINATION

Construction. No potential for land contamination is expected.

Operation. All active working areas will be paved with concrete to prevent any spillage of MARPOL waste from permeating into the underneath soil. The loading and unloading of MARPOL waste on site has the potential to cause land contamination in case of accident or spillage. The potential areas for spillage will be the loading and unloading station, which is paved. All loading and unloading operations will be conducted by trained CWTC staff and closely monitored with flow control equipment. Any spillages will be attended to immediately and pumping operation will be stopped. Any spillages will be collected by the collection drain and discharged into the sump pit. The contaminated water will be pumped out and transfer to CWTC for treatment. Similar to the existing CWTC operation, all areas designated for routine waste handling will be underlain with an impermeable liner to prevent land contamination in the event of a spill.

The trucking route, which will be paved with asphalt, will only be used by the ISO tankers during trucking of MARPOL waste. Given that the frequency of truck trip is low and only one to two trucks will be using the route at one time, spillage due to road accident would be negligible. To further reduce the possibility of spillage of MARPOL waste or RFO from the ISO tankers during transfer, double valves will be used for the inlet pipe. In addition, Enviropace staff will inspect the temporary road regularly to identify any dripping. In addition, a ditch underlain with 2 layers of impermeable polythene sheet will be provided at the down-gradient side of the road. Sand will be filled in 300mm thick for entrapping the MARPOL in case of MARPOL leakage. Sand contaminated by MARPOL will be dug out for thermal treatment in CWTC. Notwithstanding this, should a spill arise during transportation, the environmental protection measures in the Emergency Response Plan (see *Annex D*) will be activated to minimise release to the environment. Based on the stringent precautionary measures in place, the likelihood of a spillage occurring during trucking of MARPOL waste is therefore considered low. The potential of land contamination as a result of trucking of MARPOL waste is considered very low.

14 HAZARD TO LIFE

A quantitative risk assessment (QRA) has been carried out on the operations of the proposed temporary reception facility at the new marine basin and further transport

of the MARPOL Annex I waste to the CWTC via a dedicated internal road by ISO tankers. The MARPOL Annex I (flammable), Annex II and chemical wastes will be transported by the existing CWTC chemical waste collection tankers or trucks from the temporary reception area to the CWTC via the temporary road and a short section (about 500m) of the public road. The assessment also includes the transport of RFO from CWTC back to the proposed temporary reception facility.

As the proposed temporary trucking scheme will utilise the new marine basin, there will be no additional risk due to collision of the collection barge associated with the delivery of the MARPOL waste to the site comparing with the approved permanent scheme. The purpose-built marine basin will minimise the risk of collection barge from striking by other vessels or the collection barge striking the berth due to intensive wave. It should be noted that the concerned Government departments have accepted the reception of the collection barges at the new marine basin. The main hazards associated with the berth operations are failures due to failure of the loading and unloading hose or pipework resulting in spill and fire at the berth. However, the likelihood and consequence of these events are very low due to the high standard of operational control to avoid spillage and the low probability of ignition of MARPOL Annexes I and II wastes. Therefore the risks posed by these operations are acceptable in accordance with the Hong Kong Risk Guidelines. Although the ignition probability for MARPOL Annex I waste (flammable) is slight higher, there are very few operations in a year involving this waste. Hence the risks are acceptable.

The main hazard associated with road transport is a rupture or leak of the chemical waste collection tanker (MARPOL Annex I (flammable) and Annex II wastes) following an accident on public road. Again, the risks are acceptable due to the very low frequency ($< 1 \times 10^{-9}$ per year) of pool fire following rupture of the tanker and small pool spread on the road.

The maximum individual risk posed by the operations at the berth and road transport is less than 1×10^{-5} per year. The societal risk is also acceptable as the event frequencies are less than 1×10^{-9} per year.

Based on the above, it is concluded that the risks posed by the operations at the berth and further transport to and from CWTC are acceptable in accordance with the criteria set out in the *EIAO-TM*.

The detailed analysis is presented in *Annex C.*

15 CUMULATIVE IMPACTS

The reclamation work and construction of utilities and facilities at CT-9 will be undertaken concurrently during the operation of the temporary trucking scheme. The construction activities at CT-9 include reclamation, utilities laying work, construction of permanent facilities (such as internal road and seawater pumping station) and the demolition of the existing CWTC jetty. The environmental impacts of this activities associated with the CT-9 development have been addressed in the

EIA for *South-East Tsing Yi Port Development Planning and Engineering Feasibility Study for Container Terminal No.9*. The EIA concluded that no adverse environmental impacts would result from the construction of the CT-9.

Dust: No major site formation work is associated with the construction of the temporary trucking scheme. Hence, no adverse cumulative construction dust impact is anticipated. Since the operation of the temporary trucking scheme will be on paved road and the transfer of MARPOL waste is contained in a closed system, no adverse cumulative dust impact is anticipated.

Noise: No NSR has been identified in the close proximity of the project site. The operation of the trucking scheme will be associated with a maximum of 21 truck trips per day. Hence, no adverse cumulative noise impact is anticipated.

Water Quality: Any contaminated run-off in case of MARPOL spillage will be trapped by the sand at the ditches along the temporary road and sump pit at the reception facility at the new marine basin, which will be collected for treatment at the CWTC. Hence, no adverse cumulative water quality impact is anticipated.

Waste: Negligible solid waste will be generated from the operation of the temporary trucking scheme. Hence, no adverse cumulative impact in terms of solid waste management is anticipated.

16 MITIGATION MEASURES

Sections 4 to *14* indicate that the proposed temporary trucking scheme of MARPOL waste will not result in any adverse environmental impacts, with the implementation of the following good site management practices and mitigation measures.

Construction Phase

- All debris and materials shall be covered or stored in a sheltered debris collection area. Dust control measures such as water spaying on roads and dusty areas, covering of lorries by impervious sheets and controlling of the falling height of fill materials, shall be implemented in accordance with *Air Pollution Control Ordinance.*

- Public fill and general refuse should be segregated and stored separately for disposal. Waste should be properly stored at site and windblown litter and dust should be minimised during transportation by either covering trucks or transporting wastes in enclosed containers. Waste should be disposed of at licensed sites and a disposal permit shall be obtained from appropriate authorities, if required, in accordance with the *Waste Disposal Ordinance.*

- Effluent discharge from construction activities shall conform to relevant *ProPECC Note 1/94 Construction Site Drainage* requirements and comply with the *Technical Memorandum on Standards for Effluents Discharged into Drainage and*

Sewerage Systems, Inland and Coastal Waters under the *Water Pollution Control Ordinance.*

Operation Phase

- Similar to the existing CWTC operation, the ISO tanker loading and unloading station should be sheltered and installed with collection drains and a sump pit. This area should also be paved with an impermeable surface to prevent land contamination in the event of a spill.

- The loading and unloading operations shall be undertaken under the stringent supervision of the trained CWTC staff to reduce the prospects of a spill. In case of accidental spills, the existing CWTC Emergency Response Plan (see *Annex D*) should be implemented to confine the area affected, hence minimising potential impact on the marine environment. Should a spill arise:

  (a) Within the sheltered loading/unloading area: Spills shall be intercepted by the drainage system and collected in the sump pit. The contaminated wastewater should be transferred by the ISO tankers to CWTC for treatment.

  (b) During transportation: The environmental protection measures in the Emergency Response Plan will be activated to minimise release to the environment.

17 REFERENCE TO OTHER ENVIRONMENTAL ASSESSMENT REPORTS

Title:	South-East Tsing Yi Port Development Planning and Engineering Feasibility Study for Container Terminal No.9
Reference Number:	EIA-005/BC
Time of Endorsement:	EIA Report approved prior to 1 April 1998, listed under the EIAO Register
Endorsed by:	Director of Environmental Protection
Environmental Aspects Addressed:	General

Annex A

Site Selection

A1 INTRODUCTION

Hyundai and Enviropace took a boat trip around Tsing Yi/Kwai Chung on 10 October 2001 to inspect the potential sites for the temporary MARPOL waste reception facility. Five potential sites were identified and their locations are shown in *Figure A.la.* The option at the new marine basin at CT-9 was later identified. The characteristics of the potential sites are summarised in *Table A1.la.*

Table A1.1a Site Selection for Proposed Temporary MARPOL Waste Reception Facility

Site	Location	Characteristics	Comment
1	Tsing Yi Lot 46, Vertical seawall next to CLP's area	• Marine Department have pointed out that there is a problem with water depth at the western end of the seawall. • Good truck access to the site. • Rough wave action in southerly winds may impact on the safe operation of the MARPOL waste facility.	Not suitable due to unfavourable water depth. Allocation of this site for temporary MARPOL waste reception facility may prohibit other marine based users from using the remainder of the site.
2	Yiu Lian Ship Repair Yard	• Good water depth. • Reasonable truck access.	Difficult to share with other users.
3	Hong Kong United Dockyard	• Good water depth. • Landside is heavily used which may affect truck access to the berthing area.	Not suitable due to high level of activities at the site which may affect the access of trucks.
4	Disused Government Barge Unloading Point for Construction of Tsing Ma Bridge	• Reasonable water depth. • Large disused space on landside, but truck access has become constrained since the construction of the Tsing Ma Bridge and would likely to take a long time to resolve.	Not preferred due to unfavourable truck access.
5	Seawall of DLO's & EPD's sites at Kwai Chung	• Reasonable water depth. • On the edge of the Rambler Channel that is quite busy. • Need to use the seawalls of the DLO's and EPD's sites. • Good truck access.	Not preferred due to short duration of available land for use.
6	Permanent marine basin of CT-9	• Good water depth • In close proximity to CWTC • Can access to CWTC via a dedicated internal access road within the CT-9 site.	Preferred site with most favorable operational characteristics.

Annex B

The MARPOL Waste Transfer System

B1.1 BACKGROUND

At present, the following operations are performed at the CWTC.

- Unloading of MARPOL waste from barges into CWTC storage tanks; and
- Loading of Recycled Fuel Oil (RFO) from CWTC storage tank into barges.

Following the development of the CT-9 reclamation, reprovisioning of the existing facility is required to allow these procedures to continue in a safe and efficient manner:

MARPOL Waste

MARPOL waste collection services are provided to ships entering the Hong Kong SAR harbour. The quantity and nature of the MARPOL waste collected is highly variable. Whilst the treatment capacity at CWTC is fixed and limited, it is considered prudent that maximum flexibility and collection / storage capacity shall be available at all times.

Based on regulatory, health and safety and operational requirements, segregated handling of MARPOL waste is required for:

- MARPOL Annex I waste. This includes all oil and petroleum derivatives, also the low flash point compounds such as gasoline, jet fuels and naphtha.

- MARPOL Annex II waste. This includes all noxious substances listed in Appendix II of the Annex II MARPOL regulations and can be summarized as a large variety of organic and inorganic acids and alkalines and various organic compounds.

In principle, the CWTC does NOT collect flammable MARPOL Annex I waste and this is also communicated to the ship's owners or agents of the vessels from which CWTC collects MARPOL Annex I waste. During loading of MARPOL Annex I waste from the vessels, CWTC monitors for the presence of flammable substances to verify the absence. It however occurs sometimes that the transferred MARPOL Annex I waste is found to be flammable. In such a case, the transfer is immediately stopped and the tank of the barge, in which the flammable waste is unloaded and isolated. The flammable MARPOL Annex I waste is then separately unloaded and treated (by incineration) as a chemical waste.

At the temporary MARPOL waste reception facility, the eventual flammable MARPOL Annex I waste will also be handled separately as chemical waste. This means that it will be directly transferred from the barge into one of CWTC's chemical waste collection tankers, suitable for the transport of flammable materials (and NOT in the ISO tankers), for transfer to the CWTC. These tankers will be unloaded at the existing CWTC unloading location for flammable waste (and NOT at the ISO tanker unloading station).

The overall handling capacity of MARPOL waste is estimated to be:

- Average Quantity: ~ 3,800 tonnes per month or an average of about 127 tonnes per day

Recycled Fuel Oil (RFO)

Recycled (recovered) waste oil is periodically being transported from CWTC to the users by barge in batches about eight times per month.

- Average quantity: ~1,500 m^3 per month

B1.2 EXISTING SCHEME

The MARPOL waste and RFO are transferred between the existing berth and CWTC storage tanks through four above ground pipelines, one for each of the following waste types:

- Oily waste;
- Organic waste;
- Acid wastes; and
- Alkali wastes.

These pipelines are between 70 to 100 m in length. The reception and transfer operations are undertaken within CWTC site boundary. The MARPOL waste is loaded into the CWTC reception and storage tanks by barge pump and, if required, through the heat exchanger at the berth.

Annex C

Hazard Assessment

C1.1 BACKGROUND

It is proposed that a temporary trucking scheme of MARPOL waste be provided for transfer of MARPOL waste between CWTC and the temporary reception facility at the new marine basin of Container Terminal 9 (CT-9) [1]. The MARPOL waste collected from ships will be delivered to the new marine basin and the MARPOL waste will be transferred (via flexible and fixed pipelines) from the collection barges to the ISO tankers for transportation to the CWTC by road. The temporary reception facility is scheduled to be commissioned by January 2004 and will be operated for about 6 to 9 months until the commissioning of the permanent MARPOL waste transferring system (which is a pipeline system) between the marine basin and CWTC.

C1.2 MARPOL WASTE

MARPOL Annex I waste includes all oil and petroleum derivatives, also the low flash point compounds such as gasoline, jet fuels and naphtha. MARPOL Annex II waste includes all noxious substances listed in Appendix II of the Annex II MARPOL regulations and can be summarised as a large variety of organic and inorganic acids and alkalines and various organic compounds. All MARPOL Annex II waste is handled and treated as chemical waste in different processes as compared to MARPOL Annex I waste.

In principle, the CWTC does NOT collect flammable MARPOL Annex I waste and this is also communicated to the ship's owners or agents of the vessels from which CWTC collects MARPOL Annex I waste. During loading of MARPOL Annex I waste from the vessels, CWTC monitors for the presence of flammable substances to verify the absence of those. It however occurs sometimes that the transferred MARPOL Annex I waste is found to be flammable. In such a case, the transfer is immediately stopped, in which the flammable waste is unloaded and isolated. The flammable MARPOL Annex I waste is then separately unloaded and treated (by incineration) as a chemical waste.

At the temporary MARPOL waste reception facility, the eventual flammable MARPOL Annex I waste will also be handled separately as chemical waste. This means that it will be directly transferred from the barge into one of CWTC's chemical waste collection tankers, suitable for the transport of flammable materials (and NOT in the ISO tankers), for transfer to the CWTC. These tankers will be unloaded at the existing CWTC unloading station for flammable waste (same as the existing arrangements, and NOT at the proposed ISO tanker unloading station to be developed as part of the temporary trucking scheme).

(1) As part of the CT-9 development, the CT-9 contractor has to re-provide a new marine basin for the berthing of the MARPOL waste collection barges and a pipeline system for the transfer of MARPOL waste from the new marine basin to the CWTC. The proposed temporary MARPOL waste trucking system will utilise the new marine basin for the reception of the collection barges. The marine reception of the collection barge will therefore be the same as that for the original approved scheme.

C1.3 DESCRIPTION OF PROPOSED OPERATIONS

CWTC receives about 3,800 tonnes of MARPOL waste and about 1,500 tonnes of Recycled Fuel Oil (RFO) per month. The proposed temporary reception facility will be opened for 16 hours per day (from 07:00 hrs to 23:00 hrs) and 7 days a week. However, if required it may operate on a 24 hour basis subject to the approval of the EPD. An EPD official will be present to approve the received waste tonnage.

C1.3.1 Reception of MARPOL Waste at the Temporary Reception Facility

MARPOL waste will be pumped into dedicated ISO tankers (on truck / trailer combination) with a carrying capacity of 18 m^3, for transfer to the CWTC. RFO will also be transferred from the CWTC to the temporary reception facility by the ISO tankers. A total of eight ISO containers and two trailer trucks will be used for the transfer of MARPOL waste and RFO. The ISO tankers will be unloaded at the proposed temporary unloading station at the CWTC.

A small quantity of chemical waste (in drums) will also be received at the temporary waste reception facility. These are usually chemical wastes produced from the outlying islands where collection by road is not possible.

The three collection barges are currently in use at CWTC's existing collection facility and are all certified to carry dangerous goods of Category 5, class 3 (Sludge oil) in the Hong Kong harbour. Details of the collection barges are given in *Table C1.3a*.

Table C1.3a Details of Collection Barges

Barge Name	License No.	Maximum Loading Capacity (m^3)	No. of Compartments
ENVIRO 1 (E1)	21490V	601	8
HOI HUNG NO. 1 (E3)	21521Y	680	8
HOI HUNG NO. 2 (E2)	21158Y	431.2	6

The barges are loaded by the pump of the vessel from which the MARPOL waste is collected. The waste loading time is determined by the capacity of the loading pump on the vessel. This can vary from about half an hour to 7 to 8 hours depending on the waste load and the vessel pump capacity.

Once the collection barges are moored at their respective mooring positions at the new marine basin, the MARPOL waste will be unloaded to the ISO containers using the two screw type pumps that are installed in the pump room of each barge at a normal unloading rate of 40m^3 hr^{-1}. The unloading rate and quantity is monitored by the micro-motion flow meter installed in the collection pipeline of each barge. Polypropylene reinforced flexible hoses, ranging in diameters from 2" to 6" will be utilised to load and unload the barges. Cam-lock connections will be utilised for connecting the flexible

hoses to fixed pipeworks on the berth. Fenders will be installed on the seawall at the new marine basin to protect the barges.

The docking area, unloading area and working area will be paved with concrete slab to prevent any organic waste that might permeate into the soil.

Chemical dispersants and oil boom will be used to arrest any oil spill.

C1.3.2 Road Tankers

The MARPOL waste will be pumped through a dispenser connected to the ISO tankers. The same ISO tankers will also transfer RFO from the CWTC to the new marine basin. A total of eight ISO containers and two trailer trucks will be required to assure the transfer of MARPOL waste and RFO. The tanker unloading station will include a sump pit, a sump pump and a rain shelter that will cover all the ISO tankers in the unloading position.

The loaded ISO containers will then travel along a temporary road within the CT-9 construction site to the CWTC and will be unloaded there for treatment. About one to two ISO tankers will be travelling on the temporary road at one time. The RFO will be loaded on the ISO tankers following a similar procedure as the loading operations at the CWTC and will be transported to the proposed temporary reception facility at the new marine basin.

MARPOL Annex II waste usually consists of chemicals and requires special procedures for loading. The collection barges receive prior notice if a shipment of MARPOL Annex II waste is to be loaded. The constitution of the MARPOL Annex II waste must be specified before loading so that adequate arrangements can be made. The quantities of this waste are usually quite small and are loaded in the barges. If the waste is unsuitable for loading in the barges, they are loaded in drums which are stored on the deck of the barge.

MARPOL Annex II waste, and also flammable MARPOL Annex I waste, in bulk will be unloaded directly from the collection barge into chemical waste collection tankers. These collection tankers are the same as used for collection of land-based chemical waste and suitable (approved) for Dangerous Goods transport for different types of chemical waste (such as acids, flammable waste, etc.). The MARPOL Annex II waste will be transported in chemical waste collection trucks to the CWTC and not in ISO tankers.

About 1 to 2 truck trips per day will be required for road transfer of MARPOL Annex II waste or chemical waste from the temporary reception facility to the CWTC. The trucks will travel on the temporary road (about 500m), then on the public road (about 500m) to the CWTC via the main entrance.

C1.4 HAZARD IDENTIFICATION

The main hazard from the operations of the proposed temporary reception facility is the loss of containment of the MARPOL Annex I and II wastes and subsequent ignition. Although the majority (>90%) of MARPOL waste is MARPOL Annex I waste with a high flash point (> 100^{o}C in 99% of the cases), which means that a significant amount of heat will be required to cause ignition, there still exists a potential for such an incident to occur. The following section identifies all the possible failure modes for loss of containment associated with the proposed temporary trucking scheme.

It should be noted that accidental spills from the collection barges during the collection operation is outside the scope of the study (as it is no different from the existing arrangement). Thus, only the hazards associated with the transfer operations at the proposed temporary reception facility and subsequent transport by road are considered.

The collection barges are tested every year to establish their suitability for carrying out the required operations. These tests include hydrotesting and thickness measurement to determine any loss due to corrosion. In view of these procedures, spontaneous failure of the barges is not considered to present a significant oil spill risk. In addition, the potential for a catastrophic rupture resulting in total loss of containment of the collection barges is considered to be remote. These failure modes are therefore not considered in the assessment.

The main failure modes are as follows:

- Failure of equipment;
- Failure due to external impact to the collection barge;
- Failure during loading / unloading operations; and
- Failures during road transport.

C1.4.1 Failure of Equipment

Failure of equipment such as ISO tankers, flexible hose and associated pipework and valves / pump on the berth can lead to an oil spill. The main causes for these failures are:

- corrosion;
- material defect;
- construction defect;
- design fault; and
- seal failure (in case of pumps on the barge / shore).

C1.4.2 Failures Due to External Factors

Impacts

The collection barges will travel to the new marine basin. As the routing of the collection barges to the new marine basin will be the same as that for the existing jetty at CWTC, there is no additional collision risk for MARPOL collection barge to travel to the new marine basin.

The new marine basin is specifically designed to provide a sheltered berthing area for the MARPOL waste collection barges and fenders will be installed on the seawall of the new marine basin. In such a situation, the potential for the barges to strike the berth and cause a spill is very low. It should be noted that there is no change to the berthing arrangement of the collection barge at the new marine basin for the proposed temporary trucking scheme comparing with the permanent scheme.

This failure mode is therefore not considered in the assessment.

Strikings

As described above the new marine basin is sheltered and away from major marine traffic, the potential for a passing ship to lose control and collide or strike a berthed barge is considered to be very low. It should be noted that there is no change to the berthing arrangement of the collection barge at the new marine basin for the proposed temporary trucking scheme comparing with the permanent scheme.

This failure mode is therefore not considered in the assessment.

C1.4.3 Spills During Loading/Unloading Operations

Flexible hoses are used to unload the MARPOL waste from the collection barge through a piping system which is installed on the berth of the new marine basin. The most likely event would be a spill during the loading / unloading operation from the flexible hose connection.

Flexible hose rupture can occur spontaneously due to sudden movement of the barge result from external impact due to collision with other vessels or inadvertent operation of other equipment such as lifting cranes.

A hose failure can also occur due to human error from failure to connect the hose correctly or premature disconnection of the hose.

Overfilling of the ISO tankers is another cause of oil spill which can be attributed to human error. All loading and unloading operations will be manned by CWTC staff and closely monitored with flow control equipment.

There is a manual shutdown button present at the control panel of the loading / unloading station to isolate any leak from the flexible hose or pipework.

These hazards are similar to those associated with loading and unloading to the ISO tankers (for MARPOL Annex I waste) and unloading from collection barges to the chemical waste collection tankers (for bulk transfer of MARPOL Annex I waste (flammable) and MARPOL Annex II waste). The spill quantity will be determined by the normal pumping flow rate and the amount of time taken to isolate such a leak.

C1.4.4 Failure During Transport to CWTC

The main hazard during this operation is a road traffic accident involving the tanker leading to spillage. The travelling speed of the ISO tankers and chemical waste collection tanker / truck on the temporary road and public road will be limited to 30 km hr^{-1}.

The ISO tankers will transport the MARPOL Annex I waste from the proposed temporary reception facility to the CWTC by an internal road within the CT-9 site. However, there will be one to two ISO tankers travelling on the temporary road at any one time and other traffic will be prevented from using the temporary road during this period.

MARPOL Annex I waste (flammable) and MARPOL Annex II waste will be transported using standard chemical waste collection tankers. This material carries a greater fire hazard than MARPOL Annex I waste.

MARPOL Annex II waste and chemical waste will also be transported to the CWTC in drums by the chemical waste collection trucks.

The chemical waste collection tanker and trucks will travel on the temporary road then on the public road (Tsing Sheung Road and Tsing Yi Road) to the CWTC via the main entrance.

C1.5 FREQUENCY ANALYSIS

Frequency analysis involves the estimation of frequency of failures resulting in loss of containment. The frequency for the initiating events which lead to each major hazard events has been estimated using generic data suitably modified to reflect local conditions.

C1.5.1 Frequency of Failures Due to Loading/Unloading Operations

Flexible Hose Failure

The failure rate for a flexible hose has been taken as 2×10^{-6} per operation, following the Safety Case undertaken by ERM for the Caltex Oil Terminal (1) and Mobil Oil Terminal (1).

It is estimated that about 368 deliveries per month (2) on the ISO tankers are made to and from the CWTC for loading of MARPOL waste and unloading of

(1) ERM Hong Kong, LPG Safety Case: Safety Case Report, Caltex Oil Hong Kong Ltd, 1993.

RFO at the berth and at the boundary of the CWTC. This translates to 2 x 368 x 12 = 8,832 operations per year.

Hence, frequency of failure of the flexible hose = 8,832 x (2×10^{-6}) per year
= 1.77×10^{-2} per year [3]

Similarly, for bulk transfer of MARPOL Annex I (flammable) and Annex II wastes, the number of unloading operations per year = 2 x 3 x 9 = 54 [4], and hence the resultant failure frequency for each of these wastes = 54 x (2×10^{-6}) = 1.08×10^{-4} per year.

C1.5.2 Frequency of Road Transport Events

Generic Road Accident Data

The frequency of road traffic accidents involving the transport of MARPOL is estimated based on Transport Department data for road accidents involving heavy / medium goods vehicles. Involvement means "a vehicle involved in an accident" and will be one or more per accident, i.e. a crash between two vehicles will be recorded as 1 accident but two involvements. The Transport Department Report for 1997 [5] indicates that there were 1,330 medium and heavy goods vehicle involvements for 2,288 million vehicle-kms. This gives an involvement rate of 0.58×10^{-6} per vehicle-km.

Road Accident Frequency

For transportation of MARPOL Annex I (flammable) and Annex II wastes, the journey length is approximately 1,000m (500 m within the CT-9 site and 500m on public road). Based on this data the number of vehicle-km can be calculated as follows:

Vehicle-kilometres travelled per year = 54 trips [6] per year x 1km per trip = 54 vehicle-km per year

Therefore, the accident rate for chemical waste collection tanker
= (0.58×10^{-6}) x 54 = 3.13×10^{-5} per year

The vehicle involvement rate of the ISO tanker will be smaller than the statistic data due to the ISO tanker will be travelling on a dedicated internal road (about 500 m long) within the CT-9 site, and at most two ISO tankers will be present at one time. It is therefore assumed that the vehicle involvement rate will be an order of magnitude lower than that of public road.

(1) ERM Hong Kong, LPG Safety Case: Safety Case Report, Mobil Oil Hong Kong Ltd, 1996.

(2) Based on 3,800 tonnes of MARPOL Annex I waste and 1,500 tonnes of RFO per month and an average density of 0.8 tonne per m^3. No. of deliveries per month = {(3,800 + 1,500) / 0.8} / 18 = 368. There will be loading and unloading operations at the boundary of the CWTC and the berth of the new marine basin.

(3) 8.83×10^{-3} per year at the temporary reception facility and 8.83×10^{-3} per year at the loading / unloading station at the boundary of the CWTC.

(4) There are 2 to 3 deliveries per year. Each delivery is about 50 tonnes. The payload for the chemical waste collection tanker is 6 tonnes.

(5) Conveyance of Dangerous Goods by Vehicles: UN Class 4 to 9, ERM Hong Kong 1999.

(6) 27 trips per year for MARPOL Annex I (flammable) waste and 27 trips per year for MARPOL Annex II waste.

The accident rate for ISO tankers = 368 trips per month x 12 months x 0.5 km per trip x (0.58×10^{-7}) = 1.28×10^{-4} per year

The accident rate for chemical waste collection trucks for transportation of MARPOL Annex II waste and chemical waste in drums = 2 x 3 trips per month [1] x 12 months x 1km per trip x (0.58×10^{-7}) = 4.18×10^{-6} per year.

Leak Probability

Following a road accident involving a chemical waste collection tanker or ISO tanker, the probability of a leak was estimated. The following leak probabilities were assumed in previous studies carried out for transport of hydrocarbons, LPG and naphtha in Hong Kong.

Leak Probability for transport of LPG and Naphtha:	0.18 [2]
Leak Probability for transport of Hydrocarbons:	0.30 [3]

The probability was modified for ISO tankers, which are constructed differently and have more robust protection against accident impacts. The ISO tankers have a steel frame around the tank for protection against impact (see *Figure 2.6b*), hence the leak probability following an accident will be smaller than the ones associated with traditional DG tankers. In the light of this, a leak probability of 0.05 has been assumed for the analysis.

Therefore, the frequency of spill for MARPOL Annex I waste and RFO on ISO tanker = (1.28×10^{-4}) x 0.05 = 6.4×10^{-6} per year.

The frequency of spill for MARPOL Annex I (flammable) and Annex II wastes on chemical waste collection tanker = (3.13×10^{-5}) x 0.3 = 9.39×10^{-6} per year.

Pipework Failure

The failure frequency for the associated pipework for unloading / loading operations at the berth of the new marine basin are taken from the Mobil Oil Terminal QRA[4] . This value (for rupture of pipework) is assumed to be 5×10^{-5} per year.

C1.5.3 Frequency of Selected Events

The events selected for further assessment are listed in *Table C1.5a* along with their frequencies.

(1) There are about 16 tonnes per month for MARPOL Annex II waste (in drums) and 16 tonnes per month for chemical waste. The payload of the chemical waste collection truck is 6 tonnes. There are about 2 to 3 shipments per month for each waste (i.e. about 3 truck trips per month).

(2) QRA of Transport of LPG and Naphtha in Hong Kong, Methodology Report, DNV, 1996

(3) QRA for Risk Assessment of Transport of Hydrocarbons in Hong Kong, DNV, 1996

(4) ERM Hong Kong, LPG Safety Case: Safety Case Report, Mobil Oil Hong Kong Ltd, 1996

Table C1.5a Frequency of Selected Events

Scenario	Frequency per year of spill (MARPOL Annex I waste)	Frequency per year of spill (MARPOL Annex I waste (flammable))	Frequency per year of spill (MARPOL Annex II waste)
Spill from Flexible Hose	1.77×10^{-2}	1.08×10^{-4}	1.08×10^{-4}
Spill from Pipework Failure	5×10^{-5}	5×10^{-5}	5×10^{-5}
Frequency of Spill from ISO Tanker	6.4×10^{-6}	N / A	N / A
Frequency of Spill from Chemical Waste Collection Tankers	N / A	4.7×10^{-6}	4.7×10^{-6}

C1.6 SCENARIO DEVELOPMENT

An event tree was developed in order to describe the events leading to hazardous outcomes. The values obtained from the previous section were used in the event tree to obtain the frequencies for the outcome scenarios for the various release events.

For releases from flexible hoses, only full ruptures are assumed which are equivalent to a 2" release.

The following values [1] were used to estimate the allocation of the different leak sizes of the ISO tanker or the chemical waste collection tanker.

Leak - 90%
Rupture - 10%

The ignition probability for the spills is assumed to be 0.01. This value is assumed due to the composition of MARPOL Annex I waste and MARPOL Annex II waste, of which 99% has a high flash point above 100°C. For MARPOL Annex I waste (flammable), this value is assumed to be 5 times greater (0.05), due to the lower flash point.

Based on these values, the frequencies of outcome scenarios are calculated and presented in *Table C1.6a*.

(1) ERM-Hong Kong, Limited, LPG / White Oil Transport Study: QRA of Pipeline & LPG Road Tanker Transport. Pilipinas Shell, 1997.

Table C1.6a Frequencies of Outcome Scenarios

Scenario	Size	Outcome Event	Frequency per year (MARPOL Annex I waste)	Frequency per year (MARPOL Annex I waste (flammable)	Frequency per year (MARPOL Annex II waste)
Flexible hose at the berth	Rupture	Pool fire on sea	8.8×10^{-5}	5.4×10^{-6}	1.08×10^{-6}
Flexible hose at the loading / unloading stations at CWTC	Rupture	Pool fire on land	8.8×10^{-5}	5.4×10^{-6}	1.08×10^{-6}
Pipework Failure at the berth	Rupture	Pool fire on sea	5.0×10^{-7}	2.5×10^{-6}	5.0×10^{-7}
ISO Tanker	• Leak	Pool fire on road	5.8×10^{-8}	N / A	N / A
	• Rupture	Pool fire on road	6.4×10^{-9}	N / A	N / A
Chemical Waste Collection Tanker	• Leak	Pool fire on road	N / A	3.5×10^{-9}	7.0×10^{-10}
	• Rupture	Pool fire on road	N / A	3.9×10^{-10}	7.8×10^{-11}

C1.7 CONSEQUENCE ASSESSMENT

The main consequence from the hazards at the berth is an oil spill, which can lead to a pool fire upon ignition. It must however be noted that 90% of the MARPOL waste consists of Annex I type which has a high flash point (>100^{o}C in over 99% of the cases). Consequently, the spilt MARPOL (MARPOL Annex I waste and MARPOL Annex II waste) will require a significant amount of heating before it can ignite.

Fire due to small spills on the berth will be dealt with a portable foam skid located on the berth. For larger fires, the Fire Services Department will be contacted to deal with the incident.

Based on a review of the hazards, the following representative outcomes has been modelled:

- spill from flexible hose / pipework to pipe dispenser during loading of ISO tankers; and
- spill during transport to CWTC.

C1.7.1 Spill Size Assessment

For spills from flexible hoses and associated pipework on the berth, the size has been estimated based on the normal pumping rate of the operation and time taken to isolate the spill.

For example, the normal unloading rate from the collection barge to the ISO tanker is 40m^3 hr^{-1} which is approximately 0.67m^3 $minute^{-1}$. Assuming the operator takes 5 minutes to detect and isolate the leak this gives a spill quantity of approximately 0.67m^3 $minute^{-1}$ x 5 minutes = 3.35m^3 or 2,680kg (based on an average density of 800kg m^{-3}).

Similar calculations for releases during loading ISO tankers result in the following values presented in *Table C1.7a*.

Table C1.7a Sources and Quantities of Spill

Source	Quantity (kg)	Cause
Flexible hose / pipework (unloading from collection barge onto ISO tankers)	2,680	Misconnection / rupture
Spill from ISO tanker	14,400	Rupture following accident
Spill from chemical waste collection tanker	6,000	Rupturing following accident

C1.7.2 Pool Fire Modelling

A pool fire is a fire fuelled by liquid pool of hydrocarbons, which can occur following a release. Although, MARPOL Annex I waste consists of heavy oils with a high flash point, these have been modelled as kerosene. Hence, the consequence modelling is very conservative. MARPOL Annex I waste (flammable) and MARPOL Annex II waste have all been modelled as kerosene.

The pool diameter may be expressed in terms of the average thickness as

$$D = \sqrt{\frac{4M}{\pi t \rho}}$$

where,

D = pool diameter (m)
M = release mass (tonnes)
ρ = density (tonnes m^{-3})
t = average pool thickness (m)

For modelling pool fires, an average thickness of 10mm is used in this study. The density for kerosene is used in the assessment, which is 0.8 tonnes m^{-3}.

Table C1.7b Diameter of Pool Fires from Different Scenarios

Scenario	Mass (tonnes)	Diameter (m)
Flexible hose / pipework rupture (unloading from collection barge to ISO tanker)	2.68	21
ISO tanker rupture on road	14.4	48
Chemical waste collection tanker rupture on road	6.0	31

C1.7.3 Radiation From Pool Fires

Thermal radiation from pool fires has been calculated using the *BP CIRRUS* Consequence modelling software package (1).

The hazard distances to 4kW m^{-2} and 12.5kW m^{-2} are shown in *Table C1.7c.*

Table C1.7c Pool Fire Radiation Hazard Distances

Scenario	Pool Fire Diameter (m)	Distance (m) to 12.5kW m^{-2}	Distance (m) to 4kW m^{-2}
Flexible hose / pipework rupture (unloading from collection barge onto the ISO tankers)	21	49	63
ISO tanker rupture on road	48	70	103
Chemical waste collection tanker rupture on road	31	59	81

C1.7.4 Probability of Death from Radiation

The Eisenberg Probit equation is used to estimate the probability of death from thermal radiation.

Probit = $-14.3 + 2.56\ln(tI^{4/3})$, where

t = exposure time in seconds
I = thermal intensity in kW m^{-2}

An average escape time of 30 seconds is assumed for people affected by the thermal radiation. This corresponds to a fatality probability of 1% for exposure to 12.5 kW m^{-2}.

An alternative impact criteria has been used in previous studies (2) which uses a value of 37.5 kW m^{-2} and assumes a 100% probability of death to exposed population within 3 metres of the pool fire radius. It is also known that the larger the pool fire the lower the maximum thermal radiation, therefore this distance will be lower for larger pool fires. Considering the above, the estimated hazard distances in *Table 1.7c* is conservative.

(1) BP Cirrus Consequence Modelling Software Package Version 6.0, 2001.
(2) QRA of Transport of LPG and Naphtha in Hong Kong, EMSD, DNV Technica, 1996.

C1.8 POPULATION ESTIMATION

C1.8.1 Road Population

The assessment considers only off-site population as required by the *EIAO-TM*. All personnel involved in the berth operations will therefore not be included in this assessment.

Transportation of MARPOL Annex I waste by ISO tanker is confined within the CT-9 site boundary. However, it could be argued that population within the CT-9 boundary would be regarded as "off-site" public as they are not directly involved in the waste handling / transport operations. The frequency of any rupture incident is so low (6.4×10^{-9} as per *Table C1.6c*) that the risk would be within the acceptable region.

Only the chemical waste collection tanker / truck will travel off-site. After leaving the site, the vehicles will travel along the Tsing Sheung Road via Tsing Yi Road to the CWTC. Tsing Sheung Road currently is a dead-end road with negligible traffic. From the *Annual Traffic Census 2002*, the annual average daily traffic (AADT) value for the Tsing Yi Road is 16,260.

The road population is estimated as follows:

$$\frac{\text{AADT (vehicles / day)} \times \text{length of road affected (km)} \times \text{vehicle occupancy}}{24\text{hrs} \times \text{vehicle speed km hr}^{-1}}$$

For rupture of chemical waste collection tanker the pool diameter is about 31m and distance to 12.5kW m^{-2} is 59m. Therefore, the length of road affected is taken as 59m.

The following assumptions are made:

- Average vehicle speed = 30 km hr^{-1}
- Average vehicle occupancy = 3.3 per vehicle

Based on this the exposed population at Tsing Yi Road = 5 persons

The average journey length is 0.5 km (public road section) of which about 40% is on Tsing Sheung Road and 60% on Tsing Yi Road. Therefore an average road population is estimated = 0.6 x 5 = 3 persons.

The pool diameter following a rupture of the chemical waste collection tanker on the road is calculated as 31m, which is conservative as in actual case, the spilled MARPOL Annex I (flammable) waste will flow through the storm drains on the road thus restricting the actual pool size.

C1.9 RISK SUMMATION

To rationalise the frequency of hazardous events identified in the study with the consequences, it is necessary to relate the two. In QRA terminology, this is known as Risk Summation and involves combining the estimates of the

consequences of an event with the event probabilities to give an estimate of the resulting frequency of varying levels of fatalities.

For this study, the following measures of risk are evaluated:

Individual risk, which express the risk to a single person present in a specific location 100% of the time; and

Societal risk, which expresses the risk to the population as a whole, independent of geographical location.

C1.9.1 Estimation of Fatalities

From the hazard ranges presented in *Table 1.7c,* it can be seen that not all events have the potential to cause harm. This is mainly due to the fact that there is no exposed population around the proposed temporary reception facility. For example, all release events from the flexible hose during loading and unloading of the barges will not cause any fatality as the maximum hazard range does not extend beyond 49m. In contrast, any event resulting in a pool fire on the road during transit has the potential to cause fatality due to the continuous presence of road users.

Rupture of the chemical waste collection tanker on road due to an accident may cause fatalities on road due to radiation. The 1% fatality contour extends to about 59m. It is assumed that the pool fire and radiation effects within this range will be significant enough to cause one fatality. There is also the potential for MARPOL waste spilled on the road to affect the road users as this may cause other vehicles to skid and may result in further accidents. This effect is, however, not modelled in this analysis.

Therefore, the estimated number of fatalities for the outcome events are as presented in *Table 1.9a.* The consequences from MARPOL Annex I (flammable) waste release and MARPOL Annex II waste release are assumed to be the same in terms of number of fatalities. The only difference is in the ignition probability which has been explained earlier in *Section C1.6.*

Table 1.9a Estimated Fatalities from Outcome Scenarios

Scenario	Location of Fatalities	Frequency per year	Estimated Fatalities
Pool fire following rupture of chemical waste collection tanker	On Road	3.9×10^{-10} (a)	1

Note:
(a) See *Table C1.6a.*

C1.9.2 Risk Results

Individual Risk

The proposed temporary reception facility is about 340m away from the site office of the CRC Oil Depot. As shown in *Table C1.7c,* the hazard range to 1%

fatality is at most 49m. Given that the distance to 1% fatality is much lower than the separation distance between the proposed temporary reception facility and the closest off-site population and the estimated outcome frequencies are low (see *Table C1.6a*), the individual risk of off-site population is lower than the Individual Risk Criteria of 1×10^{-5} per year set out in *Annex 4* of the *EIAO-TM* and therefore acceptable.

The individual risk on the road will be far lower as the road user population is temporary and the amount of time spent by a road user at a particular spot is very low. Hence, the individual risk to the road user is expected to be much lower than the criteria.

Societal Risk

The frequency of pool fire following rupture of the chemical waste collection tanker is less than 1×10^{-9} per year. Hence the potential risks to off-site public are acceptable.

C1.10 CONCLUSIONS

A quantitative risk assessment (QRA) has been carried out on the operations of the proposed temporary reception facility at the new marine basin and further transport of the MARPOL Annex I waste to the CWTC via a dedicated internal road by ISO tankers; and transport of the MARPOL Annex I (flammable) waste and Annex II waste via the internal road and then the public road to the CWTC. The assessment also includes the transport of RFO by ISO tankers from CWTC back to the proposed temporary reception facility via a dedicated internal road.

As the proposed temporary trucking scheme will utilise the new marine basin, there will be no additional risk due to collision of the collection barge associated with the delivery of the MARPOL waste to the site comparing with the approved permanent scheme. The purpose-built marine basin will minimise the risk of collection barge from striking by other vessels or the collection barge striking the berth due to intensive wave. The main hazards associated with the berth operations are failures due to failure of the loading and unloading hose or pipework resulting in spill and fire at the berth. However, the likelihood and consequence of these events are very low due to high standard of operational control to avoid spillage and the low probability of ignition of the MARPOL Annexes I and II wastes. Therefore the risks posed by these operations are acceptable in accordance with the Hong Kong Risk Guidelines. Although the ignition probability for MARPOL Annex I waste (flammable) is slightly higher, there are very few operations in a year involving this waste. Hence the risks are acceptable.

The main hazard associated with road transport is a rupture or leak of the chemical waste collection tanker (MARPOL Annex I (flammable) and Annex II wastes) following an accident on public road. Again, the risks are acceptable due to the very low frequency ($< 1 \times 10^{-9}$ per year) of pool fire following rupture of the tanker and small pool spread on the road.

The maximum individual risk posed by the operations at the berth and road transport is less than 1×10^{-5} per year. The societal risk is also acceptable as the event frequencies are less than 1×10^{-9} per year.

Based on the above, it is concluded that the risks posed by the operations at the berth and further transport to and from CWTC are acceptable in accordance with the criteria set out in the *EIAO-TM*.

Annex D

Emergency Response Plan

D1: Fire

- Foam Skid
- Fire Fighting Procedures
- Fire Appliances on Barge

D2: Spill

- Spill Response Procedures
- Clean-up Activities
- Transportation
- Notification and Reporting
- Channel of Communications

D1 FIRE

The following is a brief description of the foam skid:

The foam skid is an automatic fire extinguishing system, especially for oil fire. In the event of a fire, the foam skid will be started automatically by a pressure drop in the fire water line. For Enviropace Ltd, the foam skids are located in the following areas:

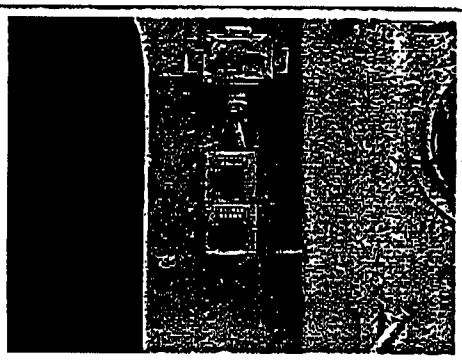
1. PWR Building
2. Area near sea water pump station
3. Entrance of jetty

Emergency Procedures for Barge E1
E1的緊急應變程序

1) 當發現火警或其它危險發生,應立即打破玻璃響動警鐘,並於甲板面高呼“火警”三聲通知其他同事.

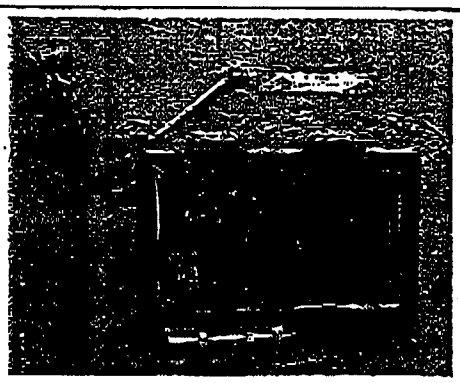
2) 若火源細小，可使用手提滅火筒救火。

3) 當你聽到火警鐘響起,你應跟從下列程序:-
   a) 保特鎮靜.
   b) 放下你的工作,
   c) 在可許的情況下,關掉你正在操作的設備如油泵，油閥等(圖一).
   d) 不可留下收拾個人物件.
   e) 向當值組長報到.



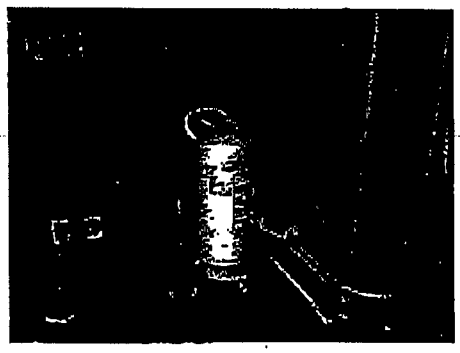
(圖一) 位於機房入口的緊急停機制

4) 若泵房或機房發生火警:
   a) 關上其房間的入口及通風閘.
   b) 啓動二氧化碳滅火系統 (圖二).
      二氧化氮滅火系統操作程序:
      i) 打開或打破二氧化氮滅火系統之手動警報器控制箱。
      ii) 警號立刻長鳴，紅燈閃亮。
      iii) 確定所有人員已離開泵房及機房,並關閉所有通風系統
      iv) 拉動適當的二氧化碳滅火系統手制救火。



(圖二) 位於機房入口的二氧化碳滅火系統拉手

5) 若油倉發生火警:
   a) 在可許的情況下啓動泡沫消防設備滅火(圖三).操作程序:
      i) 關閉油泵.
      ii) 關閉油倉的出入喉閥門
      iii) 站在上風位,與倉口保持安全距離(最少一米).
      iv) 打開泡沫滅火筒的壓縮氣樽閥門.
      v) 把泡沫噴嘴指向倉內並拉動手柄噴射泡沫救火.



(圖三)

Emergency Procedures for Barge E1
E1的緊急應變程序

6) 消防泵及消防喉操作程序：

a) 電動消防泵操作程序：

i) 接駁岸上電源或開動發電機.

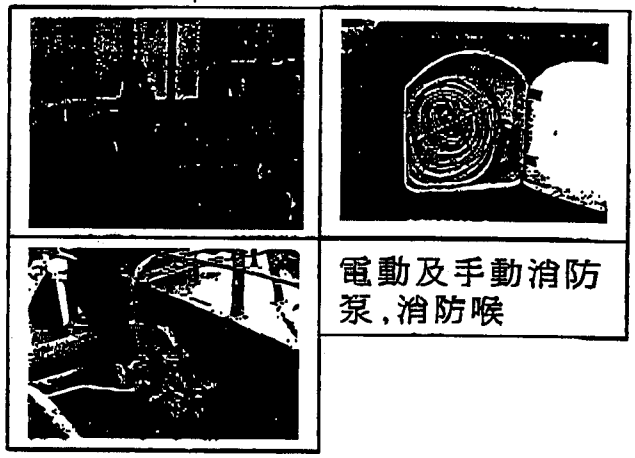
ii) 於消防泵房內打開消防泵之入水水閥(A)。

iii) 打開消防泵之出水閥(B)。

iv) 於火警現場之消防栓上接駁消防喉及噴嘴

v) 於消防泵嵌板上按下“START”開泵。

vi) 打開消防栓之閥門進行救火。



電動及手動消防泵,消防喉

b)手動消防泵操作程序：

i) 打開手搖泵之入水閥(C)。

ii) 打開手搖泵之出水閥(D)。

iii) 於火警現場之消防栓上接駁消防喉及噴嘴。

iv) 搖動手搖泵之板手(E)。

v) 打開消防栓之閥門進行救火。

7) 棄船措施：

a)點齊人數

b)穿上救生衣

c)報告公司控制棄船位置

d)放救生圈及救生艇下海

e)棄船逃生

備註：

1-滅火筒祇能撲救細小的火源.

2-當機房起火時,可拉動緊急停機制,停止發動機運作(圖四).

(圖四)位於機房入口的緊急停機制

SLUDGE OIL ONLY

NOTE: Uncontaminated diesel oil is NOT allowed to be carried in cargo tanks, cofferdam, fore & aft peak of this vessel.

File No.: SD/L-6803
D.G. No.: 569

船舶及港口管制條例
（第 313 章）
商船（雜類航行器）規例
船隻適合於運載散裝石油產品的聲明
SHIPPING AND PORT CONTROL ORDINANCE
(Chapter 313)
MERCHANT SHIPPING (MISCELLANEOUS CRAFT) REGULATIONS
DECLARATION OF FITNESS FOR VESSEL TO CARRY PETROLEUM PRODUCT IN BULK

船隻名稱 Name of Vessel: ENVIRO 1

擁有人姓名或名稱 Name of Owner: ENVIROPACE LIMITED

註冊長度 Registered Length: 38.79M

地址 Address: 51 Tsing Yi Road South, Tsing Yi, N.T.

註冊寬度 Registered Breadth: 9.13M

總噸位 Gross Tonnage: 466.780

淨噸位 Nett Tonnage: 326.740

担數 Piculage: 7935.000

船上消防裝置的數目及類型
No. and type of Fire Appliances on board:

1 power fire pump, 1 emergency fire hand pump, 4 x 16 M fire hose with nozzles, 1 x 45 litre foam, 6 x 9 litre foam & 2 x 4.5 kg CO2 fire extinguishers, 2 x 26.8kg CO2 cylinder for Engine Room and Pump Room flooding, 2 fireman outfits, 1 x 2 cu. ft. of sand in box with scoop, 3 fire buckets with lanyards.

船上救生裝置的數目及類型
No. and type of Life Saving Appliances on board:

1 lifejacket per each person on board, 6 lifebuoys (where 2 with life line 27.5 m)

本證書有效的最低燃點
Lowest flash point for which this certificate is valid: 66°C (Cat. 5, Class 3)

船上獲允許的人數
No. of Persons permitted on board:

本證書所施加的限制
Limitations imposed by this certificate: The licensing conditions and requirements see overleaf.

本人，以下簽署的驗船師，已於 09/03/2001 檢查 ENVIRO 1 牌照號碼為 21490V 的現證明本人信納船隻的船體、機械（如有裝配的話）及裝備，就擬作的服務而言均屬足夠，並且狀況良好，而主甲板內所有孔口均有艙口圍板或圍壁作有效防護，並可作水密式封閉。

I, the undersigned Surveyor of Ships, having inspected the ENVIRO 1 Licence No. 21490V on 09/03/2001 certify that I am satisfied the hull, machinery (where fitted) and equipment are sufficient for the service intended and are in good condition, and that all openings in the main deck are efficiently protected by coamings or casings and are capable of being closed watertight.

本證書有效期為 6 月，由 09/03/2001 起計，但船上須有上述的消防及救生裝備，而該等裝備須屬狀況良好，並可供即時使用者。

This certificate is valid for a period of 6 months from 09/03/2001 to 03/04/2002 provided that the Fire and Life Saving equipment described above is on board in good condition, and ready for instant use.

收據號碼 Receipt No. 6222A/#6/2001

This certificate should be securely framed and exhibited at all time in some conspicuous part of the vessel

for (K.T. HO)
驗船師 Surveyor of Ships

香港特別行政區海事處 MARINE DEPARTMENT

日期 Date: 09/03/2001

香港特別行政區海事處
Marine Department, HKSAR

MD 601(8)

File No.: SD/L-3783
D.N. No.: 19224

船舶及港口管制條例
（第 313 章）
商船（雜類航行器）規例
檢查證書（西式船隻）

SHIPPING AND PORT CONTROL ORDINANCE
(Chapter 313)
MERCHANT SHIPPING (MISCELLANEOUS CRAFT) REGULATIONS
CERTIFICATE OF INSPECTION (WESTERN TYPE VESSEL)

Note : Uncontaminated diesel oil Not allowed to be carried in cargo tank, cofferdam, fore and aft peaks.

重指油淤渣
(液壓艙、隔離艙、船首艙、後尖艙均不准裝載未受污染的柴油)

船隻名稱 Name of Vessel: HOI HUNG NO. 1
香港牌照號碼 Hong Kong Licence No.: 21521Y

現證明名稱如上的船隻的船體、櫂、管道和所有其他裝配及裝備，經本處的驗船師檢查，並被認定在 ..... 期間內適合用於擬作的用途。

THIS IS TO CERTIFY that the hull, tanks, piping, all other fittings and equipment on the above-named vessel, have been inspected by a Surveyor of this Department, and found to be fit for the service intended for the period from 11.10.2001 to 9.10.2002

船上須載有並保持狀況良好以備使用的消防裝置的數目及類型
Number and type of Fire Appliances to be carried on board and kept in good condition ready for use: 9 x 2 gallon foam, 7 x 5 lbs. dry powder & 1 x 5 lbs. CO_2 fire extinguishers; two fire pumps, (1 by power & 1 by manual); 4 fire hoses, 3 jet & 1 spray nozzles, one foam making branch pipe and fitting, 2 - portable tanks and each tank containing 20 litres foam concentrate; 2 x 45 Kg. CO_2 fixed system to pump room; 4 fire boxes with scoops and 1 set "RACAL" fireman outfit; 200 sheets of sorbent pads.

引擎類型及數目及總馬力
Type and Number of Engines and Total Horsepower: 76 HP 'Gardner' Diesel engine 1 x 5 cyl., 60 BHP for anchorage; - 1 x 2 cyl. "12GFC28" Diesel engine, 16 HP, for generator; total horse power

引擎出廠號碼
Maker's Engine Number: 182439, 950095

推進器數目
Number of Propellers: NIL

燃油種類或等級
Type or Grade of Fuel: DIESEL

燃油櫃總容量
Total Capacity of Fuel Tanks: 0.75 ton in 1 tank

輪機員姓名
Name of Engineer: N.A.

輪機員證書號碼
Certificate No. of Engineer: N.A.

收據號碼
Receipt No.: 5858A/2020/2001

(C.K. WONG)
for 驗船師 Surveyor of Ships

日期 Date: 11.10.2001

香港特別行政區海事處 MARINE DEPARTMENT, HKSAR

船上須設有的救生裝置的數目及類型
Number and type of Life Saving Appliances required on board: 6 lifebuoys and 1 lifejacket for each crew on board

船上獲允許的船員總人數
Total number of crew permitted on board: -

船上獲允許的乘客總人數
Total number of passengers permitted on board: -

This Certificate includes inspection of Life-Saving Appliances and Lights and Sound Signals

高級海事主任(牌照部) Senior Marine Officer (Licensing Office)

日期 Date:

香港特別行政區海事處
Marine Department, HKSAR

MO 602(S)

File No. : SD/L-4865
D.G. No. : 556

Note: Uncontaminated diesel oil is N allowed to be carried in cargo tank, cofferdam, fore & after peak of this vessel.

船舶及港口管制條例
（第 313 章）
商船（雜類航行器）規例
船隻適合於運載散裝石油產品的聲明

SHIPPING AND PORT CONTROL ORDINANCE
(Chapter 313)
MERCHANT SHIPPING (MISCELLANEOUS CRAFT) REGULATIONS
DECLARATION OF FITNESS FOR VESSEL TO CARRY PETROLEUM PRODUCT IN BULK

船隻名稱 Name of Vessel: HOI HUNG NO. 2

擁有人姓名或名稱 Name of Owner: ENVIROPACE LIMITED

註冊長度 Registered Length: 92 ft.

地址 Address: 51, Tsing Yi Road, South, Tsing Yi, N.T.

註冊寬度 Registered Breadth: 33 ft.

總噸位 Gross Tonnage: 341.470

淨噸位 Nett Tonnage: 239.020

担數 Piculage: 5805.000

船上消防裝置的數目及類型
No. and type of Fire Appliances on board: 9 x 2 gallon foam, 7 x 5 lbs. dry powder & 1x5 lbs. CO_2 fire extinguishers; two fire pumps, (1 by power & 1 by manual); 4 fire hoses, 3 jets & 1 spray nozzle, one foam making branch pipe and fitting, 2-portable tanks and each tank containing 20 litres foam concentrate; 2 x 45kg CO_2 fixed system to pump room; 4 fire boxes with scoops and 1 set "RACAL" fireman outfit; 200 sheets of sorbent pads.

船上救生裝置的數目及類型
No. and type of Life Saving Appliances on board: 6 lifebuoys and 1 lifejacket for each crew on board

本證書有效的最低燃點
Lowest flash point for which this certificate is valid: Category 5, Class 3 (Sludge Oil)

船上獲允許的人數
No. of Persons permitted on board:

本證書所施加的限制
Limitations imposed by this certificate: The licensing conditions and requirements imposed by the Planning and Local Services and Port Services Divisions of this Department are to be complied with. (See Overleaf)

本人，以下簽署的驗船師，已於 ..... 檢查牌照號碼為 ..... 的 ..... 現證明本人信納船隻的船體、機械（如有裝配的話）及裝備，就擬作的服務而言均屬足夠，並且狀況良好，而主甲板內所有孔口均有艙口圍板或圍壁作有效防護，並可作水密式封閉。

I, the undersigned Surveyor of Ships, having inspected the HOI HUNG NO. 2 Licence No. 21158Y on 2.5.2001 certify that I am satisfied the hull, machinery (where fitted) and equipment, are sufficient for the service intended and are in good condition, and that all openings in the main deck are efficiently protected by coamings or casings and are capable of being closed watertight.

本證書有效期為 ..... 起計，但船上須有上述的消防及救生裝備，而該等裝備須屬妥善好狀並可供即時使用者。

This certificate is valid for a period of ..... from 2.5.2001 to 30.4.2002 provided that the Fire and Life Saving equipment described above is [illegible] good condition, and ready for instant use.

收據號碼 Receipt No.: 1837A/#6/2001

This certificate should be securely framed and exhibited at all time in some conspicuous part of the vessel.

for (K.Y. CHAN)
for 驗船師 Surveyor of Ships

日期 Date: 2.5.2001

香港特別行政區海事處
Marine Department, HKSAR

MO 601(S)

7.5.6 Response To The Spill

7.5.6.1 It is imperative that the response to the spill/incident scene be quick and effective. In order to facilitate quick response to the scene, arrangements will be made with the FSD, Marine Department and RHKPF in relevant geographic areas, to respond to the incident at the same time as site personnel are notified of the incident. These agencies will assist in securing the incident site/location, thus reducing the possibility of exposure by the public.

7.5.6.2 At least two (2) Enviropace employees will go to the scene and assist in the response activities. These on-scene employees are responsible for keeping the ERC advised of the situations. They will also coordinate our activities with those agencies on the scene.

7.5.6.3 The five primary components of the response to the scene are as follows:

a. Stop the spill if safe to do so
b. Assist in containing any spilled material
c. Assist in packaging any spilled material
d. Collect/remove waste materials to approved disposal site
e. Assist in decontaminating site and equipment

Response to the Spill During Marine Based - MARPOL Waste Collection

7.5.6.4 When there is a minor leakage on board during MARPOL waste collection, the collection process will be immediately halted and cleanup commenced by using absorbents and drum to collect the leakage. In the case of spill at sea, retainer boom will be used to create a wrap around the barge and the contaminated areas. Absorbents will be used to absorb the waste in the confined area. The loading/unloading process should not be allowed to continue unless the cleanup has been completed, the faulty equipment repaired and replaced, and all the used absorbents and the waste collected have been packed properly in the labelled drums for disposal at CWTC. Then, the Marine Supervisor of Enviropace shall decide the "go ahead" direction.

7.5.7 Clean-up Activities

7.5.7.1 As soon as possible after the immediate emergency situation is brought under control, the removal and disposal of spilled material should be planned and initiated. The clean up of the various material collected at the scene will be directed by the appropriate governmental agency at the scene. Disposal of the materials collected will depend on the type of material collected, nature of the spill, government directives and Enviropace's capability. The decision on cleanup will be made by the ERC in conjunction with the Special Waste Group of EPD. ERC has to consider the following when planning for a cleanup activity:

- Location of disposal facility
- Availability of containers to package the waste
- The weather conditions
- Enviropace capabilities
- The hazards involved in various handling methods

- Traffic condition, the time and the date

7.5.8 Transportation

7.5.8.1 During the response to any spill, ERC has to consider the following factors before selecting a carrier.

- Type of unit needed (i.e.: dump, tank, van, etc.)
- Availability and location of Enviropace equipment
- The cost and expertise of locally available carriers

7.5.8.2 In case a non-Enviropace carrier is required, the Emergency Response Coordinator must assure that the carrier has been approved by the appropriate authority either in writing or verbally. Each vehicle or vessel must be inspected prior to loading.

7.5.8.3 Prior to moving any material away from the scene, the material must be properly classified in accordance with the requirements or directions of the EPD. All materials must be properly packaged, labelled, marked, and described on a Trip Ticket in accordance of the Waste Disposal (Chemical Waste) (General) Regulation.

7.5.9 Notification And Reporting

7.5.9.1 Hong Kong EPD - to be made by the ERC

Notify by phone the Waste and Water Management Group (WMG) and Special Waste Facilities Group (SWG) of EPD where and when the spill has occurred followed by written notification. For incidents happening outside office hours, only the Special Waste Facilities Group needs to be called. A copy of the incident report will be posted and faxed to the Waste and Water Management Group of EPD not exceeding 72 hours.

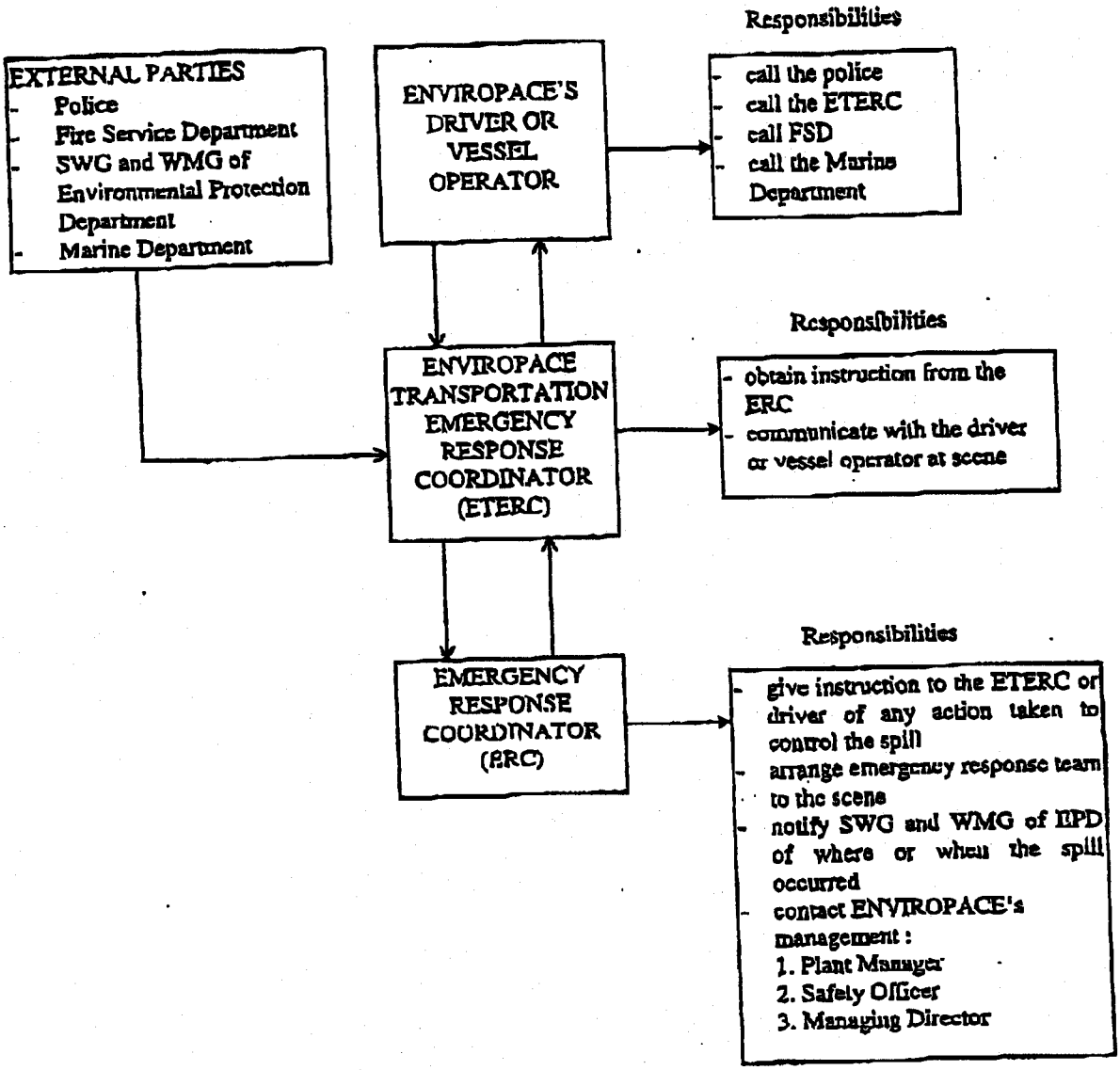
7.5.9.2 Local Notification - to be made by the operator of Enviropace

Notify the ETERC, local police, Fire Service Department and Marine Department.

7.5.9.3 Enviropace Notification - to be made by ETERC

Report to the ERC of when and where the spill has occurred.

7.5.9.4 EMERGENCY RESPONSE COMMUNICATION FLOW CHART



1. PURPOSE

To define the emergency procedure for waste spill handling.

II. SCOPE

This procedure is applicable to all operations.

III. DEFINITIONS

Spill - the chemicals run over the side of the container or the release is uncontrolled.

IV. WASTE SPILL CONTROL PROCEDURE

A. General Staff

1. Get away and alert their colleagues
2. Identify what they saw, such as the type of the chemical, the location or the size of the spilled area.
3. Call the supervisors/emergency team and provide the information about the label/symbol, the status of the spill (e.g. foam, fume), the fire situation (If there is fire) and the amount of spilled waste
4. Seal off the area and alert other colleagues
5. Look for injuries

B. Supervisors/Emergency Team

1. Identify hazard
   - 1.1 Collect Material Safety Data Sheet (MSDS)
   - 1.2 Get information from the colleagues
   - 1.3 Check the label or symbol

2. Plan actions
   - 2.1 Determine if we need to get help from the relevant sections (e.g. Environmental Department, Maintenance Department, policeman, fireman or hospital service).
   - 2.2 Determine what safety protective equipment should be used (e.g. breathing apparatus, half or full face mask, cartridge)
   - 2.3 Determine if the ventilation system should be adjusted (e.g. shutdown the air condition, open the windows).
   - 2.4 Determine the methods to control the spill.
   - 2.5 Determine the methods to clean-up the spilled waste
   - 2.6 Determine what clean-up material should be used

3. Control the spill by blocking, cooling, neutralizing or decanting

4. Contain the spill

5. Clean-up the spill

6. Investigate the causes of the spill after it is controlled

V. EVACUATION PROCEDURE FOR WASTE SPILL

When the employees are informed of evacuation due to waste spill, they should follow the following procedure:

1. Do not panic
2. Stop their work. If possible, switch off any machine or equiment that you are using
3. Do not stay to collect personal belonging
4. Leave by the nearest (available and safe) escape route immediately. Do not use the lifts.
5. Close all door but never lockup the door
6. Do not block the staircase
7. Gather at the assembly point near the (guard house/emergency gate) and wait for head counts
8. Queue by rows according to department names.
9. When all the staff and visitors gather at the assembly point, head count will be taken by each department representative.
10. Do not return to the office for any reasons until authorized to do so.
11. Each department representative will report the result of head count to the Environmental Department Representative.
12. If any body is missing, the Environmental Department Representative should report to Fire Service Department for searching.
13. When every staff is confirmed safe and hazard was over. The Safety Engineer/Shift Superintendent will make an announcement on PA system.

VI Training

A. Provide the emergency plan training to all staffs
B. Provide special training to the members of emergency team
C. Run the emergency drill quarterly
D. Provider refresher training once every two year