



**Government of Jamaica / Inter  
American Development Bank  
Component C1**

**Siting Study for Waste Reception  
Facilities for the Port of Kingston  
Final Report**

November 24, 2004

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# 1 Introduction

As a signatory to the MARPOL 73/78 Convention, Jamaica is obligated to establish port reception facilities for ship generated waste. As an initial step Jamaica is considering the establishment of such a facility for the Port of Kingston. This report will focus on the selection of a suitable site for a treatment facility for ship generated waste collected at Waste Reception Facilities (WRFs) at the Port of Kingston. To this end, four options suggested in a feasibility study conducted in 1999 will be analysed.

## 1.1 Vulnerability of the wider Caribbean region to marine pollution

At present, many countries in the Wider Caribbean Region (WCR) that are parties to the MARPOL Convention lack port waste reception facilities leaving the countries vulnerable to pollution from solid and oily wastes that may be disposed of at sea. These wastes are transported by wind and currents to shore often in locations distant from the original source, causing serious pollution.

### *Oily waste*

The WCR is one of the large oil producing areas of the world. The main oil producing countries are Colombia, Mexico, Trinidad and Tobago, USA, and Venezuela. Most of the oil produced within the WCR is shipped within the region resulting in an intricate network of distribution routes. The sites most vulnerable for accidents are areas where tankers move through restricted channels and in the vicinity of ports. In addition to tankers, a number of tank barges also operate in the region in support of extensive oil refineries and petrochemical industries. In spite of regulations established in *Annex I* of MARPOL 73/78, tankers and barges do not always use port facilities for the disposal of bilge and tank washing and wastes, and a significant amount of oil is discharged into the coastal areas of the WCR region this way. This deliberate release far exceeds the amount of oil entering the sea from accidental oil spills.

The impact of oil pollution on the ecology of coastal and marine ecosystems and the species that inhabit them is particularly destructive following massive oil spills caused by maritime accidents. It is also believed that repeated long-term oil discharges into the coastal marine environment of the WCR have adverse impacts. In enclosed bays where surface wave action is minimal, anaerobic conditions may occur from oxygen depletion when water is covered with oil. Corals die from being smothered with oil which adheres to its surface and oil slicks affect sea birds and other marine animals. In addition, tar accumulation on beaches reduces the tourism potential of coastal areas.

### ***Solid waste and marine debris***

Solid waste dumped at sea comes from shipping, commercial fisheries, and other offshore activities. Ship generated wastes account for approximately 80% of solid wastes in the coastal areas; the other 20% originating from land based sources.

Solid waste and debris in the marine environment impacts negatively on fisheries that provide food and a livelihood for many persons. It also pollutes beaches which are used for recreation and when beaches are no longer clean or attractive it affects earnings from the tourism industry on which many Caribbean economies rely

## **1.2 History of the MARPOL Convention**

The International Convention for the Prevention of Pollution from Ships (MARPOL) was adopted on November 2, 1973 at the International Maritime Organisation (IMO) and covered pollution by oil, chemicals, harmful substances in packaged form, sewage and garbage. The Protocol of 1978 relating to the 1973 International Convention for the Prevention of Pollution from Ships (1978 MARPOL Protocol) was adopted at a Conference on Tanker Safety and Pollution Prevention in February 1978 held in response to a spate of tanker accidents in 1976-1977 and absorbed the 1973 MARPOL Convention which had not yet entered into force. The combined instrument is referred to as the International Convention for the Prevention of Marine Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), and it entered into force on October 2, 1983 (Annexes I and II).

The Protocol of 1978 modified various provisions of the 1973 Convention, in particular, Annex I (Regulations for the Prevention of Pollution by oil, including a list of oils). It also delayed the entry into force of Annex II of the Convention, (Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk), by two years.

The MARPOL Convention is the main international convention covering prevention of pollution of the marine environment by ships and its objectives are to preserve the human environment in general and the marine environment in particular, by achieving the complete elimination of international pollution by oil and other harmful substances and to minimise the accidental discharge of these substances.

The Convention contains six technical Annexes (Table 1) with regulations to achieve these objectives. It suggests that Parties establish Port Reception Facilities for Annex I to V substances and requires mandatory compliance with Annexes I and II. While the implementation of the requirements for the other Annexes is voluntary, once a country has ratified all the Annexes to the Convention, they are required to meet the obligations therein.

Jamaica has ratified all Annexes of the Convention except Annex VI and therefore has an obligation to provide adequate reception facilities for all wastes (except Annex III which does not need a WRF).

The “Date of Entry into Force” of this Convention for Jamaica was June 13, 1991 and the National Focal Point for the implementation of this Convention is the Maritime Authority of Jamaica (MAJ).

**Table 1 – MARPOL 73/78 Annexes**

Annex I	Regulations for the Prevention of Pollution by Oil
Annex II	Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk
Annex III	Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form (entered into force on 1 July 1992)
Annex IV	Prevention of Pollution by Sewage from Ships (entered into force 27 September 2003)
Annex V	Prevention of Pollution by Garbage from Ships (entered into force on 31 December 1988)
Annex VI	Prevention of Air Pollution from Ships (adopted September 1997 - enters into force on 19 May 2005)

The provisions of the MARPOL Convention 73/78 have been incorporated into the Shipping Pollution Bill which is currently being prepared by the Office of the Parliamentary Counsel based on drafting instructions from the MAJ.

### **1.3 Wider Caribbean Region – Special Area**

In addition to Jamaica’s obligations as a signatory to MARPOL, it also has great interest in establishing a WRF for the Port of Kingston in order to facilitate implementation of *Special Area* status for the WCR. The WCR was declared a *Special Area* for ship generated garbage in 1993 and it allows countries like Jamaica to enforce zero discharge limits for garbage (Annex V waste) if adequate WRFs are in place at the ports visited by ships operating within the WCR.

Annex V of MARPOL 73/78 defines the WCR to mean the Gulf of Mexico and Caribbean Sea proper, including the bays and seas therein. This region includes that portion of the Atlantic Ocean within the boundary constituted by the 30 deg. N parallel from Florida eastward to 77 deg. 30' W meridian, thence a rhumb line to the intersection of 20 deg. N parallel and 59 deg. W meridian, thence a rhumb line to the intersection of 7 deg.20' N parallel and 50 deg. W meridian, thence a rhumb line drawn southwesterly to the eastern boundary of French Guiana.

The term *Special Area* means a sea area where, for recognised technical reasons in relation to its oceanographic and ecological condition and to the particular character of its traffic, the adoption of special mandatory methods for the prevention of sea pollution by oil, noxious liquid substances, or garbage is required. *Special areas* are bodies of water which require additional protection beyond the normal discharge requirements.

The Marine Environment Protection Committee of IMO established a different standard for the discharge of victual waste<sup>1</sup> for the Wider Caribbean region than other special areas. Annex V requires that disposal of victual wastes into the sea be made as far out as practicable, but not less than 12 nautical miles from the nearest land. An additional provision requires disposal of victual wastes which have passed through a comminuter or grinder to be made as far as practicable from land, but in any case not less than 3 nautical miles from the nearest land. Such victual wastes should be capable of passing through a screen with openings no greater than 25 millimeters.

These discharge requirements will become effective for the WCR Special Area once each party to MARPOL 73/78 whose coastline borders the Special Area certifies that reception facilities are available and the IMO establishes an effective date.

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<sup>1</sup> Victual waste – food waste

## **2 Background**

In 1999, the Shipping Association of Jamaica commissioned a study to assess the feasibility of a WRF for Kingston Harbour. The study was conducted with the assistance of the Scientific Research Council with funding from the German Technical Cooperation (GTZ). Juergen Broschk, a German consultant, prepared the report entitled “Feasibility Study for a Waste Reception Facility in Kingston Harbour, October 1999”. A summary of the study is available at Appendix 1 for reference. The study proposed four possible sites for the WRF namely:

- Soapberry;
- Kingston Harbour;
- Greenwich; and
- Gordon Cay.

The report also suggested sizes for the oily waste and garbage reception and treatment facilities based on estimated quantities of oily waste and garbage that would be collected from ships calling at the Port of Kingston. The study envisaged the collection of similar wastes from land based sources to supplement the ship generated waste to improve the financial viability of the facility.

### Liquid Waste facility:

Building site of 40m x 60m to accommodate a 15m x 30m treatment facility.

### Solid Waste facility:

Building site of 40m x 60m to accommodate storage, sorting and a 10m x 20m handling facility.

Based on the sizes of the proposed facilities for garbage and oily wastes, a site of at least 1 hectare is required (0.5 hectares for treatment and handling facilities and 0.5 hectares for roadways, parking, storage, maintenance etc.). If allowance is made for 100% expansion, then a site of at least 2 hectares is required.

If only oily waste is to be treated however, it is estimated that only half the land space (1 hectare) is required taking into consideration 100% expansion in the future.



It is recognised that the estimated land requirements for the WRF is based on 1998 shipping activities, which suggests that the information is outdated. However, preliminary work done on Task C3 of the Kingston Harbour Study (covering technologies for treating ship generated waste) has revealed that growth in shipping activities over the past 6 years (since 1998) has only been 10% (1 to 2% per year). It is also likely that improvements in waste treatment technologies onboard ships (which would reduce the amount of ship generated waste for disposal at ports) could partially compensate for an increase in ship generated waste from increased shipping activity over the next 20 years. Considering these issues an 100% allowance for expansion of the WRF is considered to be conservative.

Task C3 will provide a more detailed analysis of the trends in ship generated waste over the next 20 years for the Port of Kingston.

Throughout this section a WRF has referred to a facility for sorting, treating, and recycling ship generated waste. This is in fact a misnomer based on the IMO definition of a WRF which is presented below at Section 3.1 of this report. From here on the facility for sorting, treating, and recycling ship generated waste will be referred to as the *treatment facility*.

### 3 Scope of siting study

The Port of Kingston is situated on Kingston Harbour, the world's seventh largest natural harbour and extends from Port Bustamante in the west to Harbour Head in the east and is bounded in the south by the Palisadoes and in the north by the Kingston Metropolitan Area shoreline.

This study entails the identification of a suitable site for the treatment of ship generated waste, specifically oily waste and garbage, from ships docking at the Port of Kingston as detailed in the Terms of Reference (TOR) for Task C1 at Appendix 2. Consideration is not being given to Annex II, IV and VI substances for the following reasons:

- Annexes II Noxious Liquid Substances in Bulk - not covered in the TOR.
- Annex IV Sewage - not covered in the TOR.
- Annex VI Air pollution - not mandatory for Jamaica and not covered in the TOR.

Based on the Flow Chart at Figure 1 outlining the steps involved in receiving ship generated waste, the scope of this study starts after the inspection of the waste and issuing of a permit by the Quarantine Authority.

#### 3.1 Definitions

Based on IMO requirements under MARPOL a **waste reception facility (WRF)** means any facility, which is fixed, floating or mobile and capable of receiving ship-generated waste or cargo residues.

However since the purpose of this study is to recommend a suitable site for the treatment of ship generated waste once it has been collected at the WRF, issues impacting on the siting of the treatment facility such as transportation or conveyance of the waste from the port to the treatment, recycling and/or disposal facility will also be considered.

**Ship-generated waste** means all waste, including sewage, and residues other than cargo residues, which are generated during the service of a ship and fall under the scope of Annexes I, IV and V to MARPOL 73/78 and cargo-associated waste as defined in the Guidelines for the implementation of Annex V to MARPOL 73/78. For the purpose of this study, sewage is excluded.

**Cargo associated waste** refers to materials such as like dunnage, shoring, pallets, lining, packing materials, plywood, paper, cardboard, wire and steel strapping.



**Garbage** from ships means food waste, plastic, domestic waste, cargo associated waste, maintenance waste (such as soot, machinery deposits, scraped paint, deck sweeping, wiping wastes, rags etc.).

**Cargo residues** means the remnants of any cargo material on board in cargo holds or tanks which remain after unloading procedures and cleaning operations are completed and shall include loading/unloading excesses and spillage.

For the purpose of this study, the WRF and treatment facility will handle garbage and oily waste.

## **4 Existing situation**

Currently there is no routine acceptance of ship generated waste at the Port of Kingston as a formal waste reception facility is not in place. In instances when ships make a request to offload waste, only garbage is accepted.

Presently when a ship wants to offload waste at the Port of Kingston, they send advance notice to their shipping agents in Jamaica. The agent sends a letter to the Quarantine Authority requesting permission to offload waste. The Quarantine Authority sends the letter from the shipping agents together with a cover letter advising the National Solid Waste Management Authority (NSWMA) that a request has been made to offload waste. If the waste to be offloaded is anything other than garbage, the NSWMA will not accept it as they only have provisions at this time for the collection and disposal of garbage.

When the ship arrives, the Quarantine Inspector inspects the waste onboard the ship. If the waste can be accepted, they send a letter to the NSWMA indicating that the waste has been found acceptable for offloading. The Quarantine Authority usually requires that the garbage be collected within six (6) hours.

There have been instances when requests to offload oily wastes have been denied by the Quarantine Authority as Jamaica does not have adequate facilities to accept such waste. The ships have been advised to offload these wastes at other ports which have an appropriate WRF.

The NSWMA will only collect waste from ships after it receives authorisation from the Quarantine Authority to do so. A fee is charged for the collection and disposal services and the waste is buried at a designated location at the disposal site immediately as it arrives on site.

Generally, once the Quarantine Authority is satisfied that facilities exist for the appropriate handling, treatment and disposal of ship generated waste, they will grant permission, after inspection, for it to be offloaded at the Port.

Quarantine Authority works under the following legislative framework:

- Quarantine Act 1951 (Based on the International Health Regulations but more detailed and specific to Jamaica).
- International Health Regulations 1969 WHO, Geneva (Applicable to Air and Sea Ports).
- MARPOL 73/78.

## **5 Design considerations**

In order for Parties to fulfill the requirements of MARPOL in relation to WRFs, IMO has stipulated two principal obligations:

- a. The WRF must be adequate.
- b. The removal of ship generated waste must not cause undue delay to the other ship operations.

Since the IMO has not defined the types of land based waste management systems that should be implemented, each country has the flexibility to design a system which suits their situation best.

This means that the treatment facility receiving ship generated waste from the WRFs could be a new facility or existing systems that provide these services could be utilised. There is an expectation however that the requirements for ship generated waste will be integrated within the country's waste management system.

In order to assist countries, the IMO has provided guidelines for the design of WRFs. Based on the IMO Comprehensive Manual on Port Reception Facilities, the location of a WRF is influenced by the:

- types and volumes of waste being received;
- frequency of use and emptying requirements;
- disposal methods to be used;
- environmental and amenity values of the area; and
- access and security requirements.

The selection of a location for a ship waste reception facility should therefore:

- balance the operational requirements for easy access for use and for emptying facilities with the need to preserve environmental and amenity values of the area;
- avoid or reduce any adverse environmental effects associated with waste reception facilities (such as visual, noise, odour, attraction of rodents and birds, cleaning discharges etc.) through proper design, location and operation.

When selecting the site and designing the WRF, the following considerations are important:

**a. Adequacy**

All reception facilities, regardless of size should be able to receive MARPOL 73/78 Annex V wastes (garbage) and Annex I wastes (waste oils and oily mixtures). The planning and design processes should ensure that the facility has sufficient capacity to handle the peak load that would be imposed on the facility.

The hours of operation and availability of the reception facility should be appropriate to meet the needs of the vessels using the facility. Both the vessel and the facility should ensure that the systems used by each are compatible so that the safe and environmentally sound transfer of wastes can occur.

**b. Minimise Undue delay**

Undue delay could be considered to apply when the time spent in port disposing of wastes exceeds the normal turn-around time of the vessel in that port, unless the delay is caused by the fault of the vessel, its master, its owner or authorised representative, safety requirements or the normal port procedures.

The master, owner or the owner's representative should contact the providers in good time, generally not less than 24 hours before expected discharge of wastes. The transfer of information on the type and quantity of waste and the time and place of transfer of the waste should be made in advance, generally at the initial time of contact.

**c. Fixed WRFs**

All the local planning and environmental approval and performance requirements will need to be addressed for fixed facilities. This may require an Environmental Impact Assessment (EIA) especially if long term storage or onsite treatment facilities are incorporated into the WRF. Consideration needs to be given to the ability of the vessels being serviced by the reception facility to load and unload their cargo concurrent with discharging wastes.

The use of land based waste removal contractors is commonly used as it allows flexibility for loading and unloading of cargo and negates the need to relocate the vessel to discharge wastes or each berth having waste reception facilities. Road tankers fitted with vacuum pump-out systems are commonly used to collect oily waste from ships and multi compartment garbage compactors are used to collect segregated garbage. Vehicle access, turning areas and parking needs must be considered.

Discharge of oily waste via flexible hose to a storage tank is also a consideration especially if the oily waste will be treated onsite at the Port.

**d. Barges**

Where waste collection is by barge, specific attention should be given to strategies and equipment to prevent spillage and to provide containment and cleanup in the event of a spill. This is particularly applicable to Annex I (oily waste) and II (noxious liquids) wastes. Fendering systems should also be included in all barge designs. Barge mounted reception facilities are able to service vessels that are located at a dock or buoy where reception facilities do not exist or where vehicle access is not possible. Potential for spill incidents, servicing, emptying and cleaning the barges should be considered when planning and designing floating reception facilities. The use of a barge may be combined with a fixed facility or the barge may offload/discharge the waste collected directly to a mobile collection service provider.

**Table 2 – Site Selection Criteria for Waste Reception Facilities**

<p style="text-align: center;"><b>EXTRACT FROM “IMO COMPREHENSIVE MANUAL ON PORT RECEPTION FACILITIES”</b></p> <p>The following considerations are important when selecting a site:</p> <ol style="list-style-type: none"><li>1. Other port operations should not be hindered;</li><li>2. The risk for wastes to enter the water should be minimised;</li><li>3. The site should be at a convenient place both for seafarers and for port personnel and vehicles;</li><li>4. The site should have sufficient lighting to allow for and encourage garbage collection 24 hours a day;</li><li>5. Garbage reception areas need to be clearly marked and easily located;</li><li>6. Garbage reception areas must be secure to prevent abuse or misuse and to ensure the safety of seafarers and port personnel using them;</li><li>7. The impact of the facilities on the surrounding community should be minimised, especially with respect to noise, odour and outer appearance;</li><li>8. The facilities must comply with national, local and other applicable legislation on garbage collection and processing.</li></ol> <p><i>Source: IMO Manual</i></p>
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When considering the establishment of a treatment facility (on the Port or offsite) for ship generated waste that has been collected from WRFs, the following additional issues should be considered:

- Distance between the treatment facility and Port Bustamante (where the greatest shipping activity takes place) should be minimal to reduce transportation costs.
- Sufficient land space to meet current and future needs.
- Adequate security for employees and equipment at the treatment facility.
- Easy access to the treatment facility by employees and service vehicles.
- Potential for the management of ship generated waste together with similar land based waste.

### 5.1 WRFs in other countries

Waste reception facilities in other countries generally consist of collection and storage facilities at the port. Thereafter the waste is transported to an offsite location for treatment, recycling and/or disposal. In some countries, at some ports, provisions are made for the treatment of oily waste and the incineration of garbage at a facility located at the port. In many cases however, garbage is disposed of at a landfill.

A few examples of how ship generated waste is handled at ports in some countries is presented in Table 3.

**Table 3 – Methods of Handling Ship Generated Wastes in Other Countries**

Country	Method of Handling Ship Generated Waste
Malaysia	<p>Existing land based service providers are contracted to remove garbage, sewage and oily wastes from ships which dock at the Ports.</p> <p>The Department of Environment Malaysia maintains a list of companies licensed to handle the waste on their premises and a List of Scheduled Waste Contractors consisting of private contractors to handle the waste discarded from ships or ship-related wastes.</p> <p>A specific company has been appointed by the Department of Environment Malaysia for comprehensive off-site treatment and disposal of ships wastes.</p>



<p>Countries bordered by the Baltic Seas (Sweden, Estonia, Latvia, Lithuania, Poland and Russia)</p>	<p>The 1999 document issued by the Swedish Maritime Administration entitled “THE BALTIC STRATEGY - A report on the progress of the Baltic Strategy for Port Reception Facilities for Ship-generated Wastes and Associated Issues” suggested that Ports do not need to own equipment and facilities for the management of ship generated waste. They can be owned by private contractors, who are licensed by the appropriate authorities, and with whom the ports have agreements on the provision of reception facilities.</p>
<p>United Kingdom</p>	<p>A study was conducted in July 2000 to assess the effectiveness of WRFs at ports throughout the United Kingdom (UK). It covered 10 ‘Major’ Ports and 23 ‘Other’ Ports. Two of the findings of the study indicated that:</p> <ul style="list-style-type: none"> <li>a. Fixed recycling facilities for oil are rare and are only viable at berths adjacent, or linked, to oil terminals. It was clear that most ports rely on mobile facilities from waste contractors for the disposal of oily wastes. However, costs at some ports are high, with costs increasing with the distance from a reprocessing facility. Purpose built, double skinned, waste oil recycling banks within each port, to maximise the volumes available for collection, may help to minimise these costs. The contractors often only charge a nominal sum to collect such waste, which is of a sufficient quality that the recovery operation is profitable. The use of such collection facilities should be encouraged, to reduce costs and improve upon the continued bad practice in some ports of collecting or storing waste oil in un-banded drums on the quay.</li> <li>b. It is a source of annoyance amongst many port users that wastes segregated on board ship has to be placed in a single skip when docking in the UK. With increased centralisation of many facilities it should be possible to include, at a minimum, at least one set of basic recycling facilities for cardboard, paper, glass, cans and bottles, at all ports. This would serve the need of many waste producers where the volumes of individual arisings are often minimal.</li> </ul>

<p>New Caledonia (a French administered Pacific territory neighboured most closely by Vanuatu to the northeast, Fiji to the east, Australia to the west, and New Zealand to the southeast.)</p>	<p>Noumea is New Caledonia's main port and may be considered a major regional port. It is a sophisticated and modern port operation that supports a wide range of merchant, passenger, fishing, tourist, recreational and naval traffic, and is also a centre of maritime support and ship repair. In addition to the main commercial wharf areas for passenger and merchant ships, the port of Noumea also boasts three marinas and two anchorages dedicated to pleasure craft.</p> <p>Garbage is removed from the port area to a transfer station where it is sorted into categories. Aluminium and cardboard are separated from the waste stream and exported to Australia for recycling. Green waste is also removed and composted. All other garbage is disposed in the municipal landfill.</p> <p>Quarantine wastes are not separated from non-quarantine material. All garbage is disposed in lined, deep landfill. It is intended to commission a waste incinerator in 2002, at which time quarantine wastes will be incinerated.</p> <p>Modern, well-maintained reception facilities and services are provided for all types of waste oil and oily wastes. These include fixed wharf discharge points, sullage trucks and waste oil collection tanks. The latter are generally situated within bunded enclosures. Waste oil is collected and then disposed by burning as fuel in the local power station. It is envisaged that waste oil may be incinerated when the new waste incinerator enters service in 2002. Oily rags and used oil filters are collected and disposed of within the general garbage stream.</p>
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## **6 Design options for the Port of Kingston**

There are three possible scenarios that may be considered for WRFs and a treatment facility for the Port of Kingston.

### Scenario #1

- WRF for the collection of oily waste and garbage at the Port.
- Removal of wastes to an existing offsite facility for treatment, recycling and disposal by existing service providers.
- No new site required.

### Scenario #2

- WRF for the collection of oily waste and garbage at the Port.
- Removal or conveyance of wastes to a new facility at the Port or offsite for treatment, recycling and disposal by the operator of the treatment facility or by existing service providers.
- A site that can accommodate a treatment facility for both garbage and oily waste would be required.

### Scenario #3

- WRF for the collection of oily waste and garbage at the Port.
- Removal or conveyance of oily waste to a new facility at the Port or offsite for treatment and recycling by the operator of the treatment facility or by existing service providers.
- Removal of garbage to an existing offsite facility for treatment, recycling and disposal by existing service providers.
- A site to treat oily waste only would be required.

### Assumptions:

- Segregated waste will be removed from ships.
- Ship waste would have been inspected by the Quarantine Authority.
- Final disposal of solid waste or residues such as ash from incinerators would be at the Riverton Disposal site at a designated location.

This siting study will therefore suggest suitable sites for a treatment facility based on Scenarios # 2 and # 3.

## 7 The proposed sites

In addition to the sites short listed in the 1999 Feasibility Study namely Gordon Cay, Soapberry and Greenwich, some other sites were reviewed for suitability. Three out of four possible sites were eliminated for the reasons listed in Table 4.

**Table 4 – Sites Reviewed and Eliminated**

<b>Location of Site</b>	<b>Reasons of Unsuitability</b>
Land immediately east of the Sandy Gully’s outfall at Hunts Bay and south of the Spanish Town Road	Land marginal due to high water table, accessibility by employees and vehicles likely to be difficult
Land northwest of Port Bustamante and east of the Causeway	Land to be utilized for the new alignment of the of the new Causeway
Land immediately southeast of the Causeway bridge	Land unavailable and unable to accommodate future expansion

Based on reconnaissance visits in Newport East and West a site at Newport East adjacent to Newport Mills was identified and evaluated along with the three from the 1999 Feasibility Study.

Site visits were conducted at the Gordon Cay and Greenwich sites and there were consultations with representatives of the Port Authority of Jamaica and the NWC regarding the Gordon Cay, Greenwich and Soapberry sites. A hydrological study conducted in February 2004 by Beckford and Dixon for the proposed expansion of the Riverton Landfill was also reviewed with regards to the Soapberry site.

### 7.1 Greenwich

This is currently the site of the National Water Commission (NWC) primary sewage treatment plant. The site comprises 152,171 m<sup>2</sup> (15.2 hectares) of land with less than one third being used for the treatment works. The NWC has plans for the Greenwich Treatment Plant to become a pumping station and form part of the proposed municipal sewage treatment works for the Kingston Metropolitan Area to be situated on Soapberry Lands (Refer to letter from NWC at Appendix 3).

There is sufficient space to accommodate the treatment facility and the location is in close proximity (within 30 minutes driving distance) to both Port Bustamante (where greatest shipping activity occurs) and the Riverton City Disposal Site (final disposal site for solid waste and residues). The available lands are in an area zoned for industrial and commercial development which is ideal for the proposed use of the site. There are two points of access: via Spanish Town Road and via Bell Road. Also, if

the Jamaica Railway line was to be reinstated, access by rail would be possible as well. There is also the possibility of running a pipeline from Berth 2 situated at the eastern end of the Kingston Wharves Terminal to convey waste oil that is discharged from ships via a storage tank to a treatment facility situated at Greenwich.

There are some security concerns, based on the overgrown nature of the lands at this time. There could also be concerns for potential investors associated with unconfirmed reports of extortion rackets within the area. Once these lands are cleared and developed some of the current security concerns would be addressed.

Trade effluent (treated to NRCA standards) from the treatment of oily waste can be discharged via the same channel as the sewage effluent from the Greenwich Sewage Treatment Plant.

This location would facilitate the use of the treatment facility for land based sources of waste.

Due to the close proximity of a residential community, the Tinson Pen aerodrome and a school, adverse impacts associated with odours from the treatment facility may be a concern. These impacts can be mitigated by ensuring that the design of the facility reduces the likelihood of this problem and it can also be addressed by ensuring that there is a sufficient buffer zone between the treatment facility and its neighbours. The site at Greenwich has adequate land to address the latter issue.

Based on the assumptions in Section 6, there would be no impact from birds, as no sorting or disposal of garbage would be carried out. However if the waste is incinerated, there are potential health and environmental impacts from emissions which can be mitigated through the proper design, operation and maintenance of the incinerator.

### **Greenwich Sewage Treatment Plant**



### **Land adjacent to Greenwich Sewage Treatment Plant**



### **Land adjacent to Greenwich Sewage Treatment Plant**



#### **7.2 Gordon Cay**

This site is currently being developed by the Port Authority of Jamaica as an extension to the existing container terminal. There is no space available at this location for a treatment facility for ship generated waste as the proposed development plans do not include provisions for such a facility. (Refer to letters at Appendix 3). Additionally it would be difficult to accommodate a treatment facility at a container terminal as it would pose a hindrance to Port operations which involve the movement of large containers and heavy duty equipment. This is further compounded by the new international security requirements for ports. There is also a preference by the Port Authority that a treatment facility be situated outside of the Port so as not to pose an added security risk.

Adverse impacts associated with a treatment facility such as odour could cause a concern due to the close proximity of the other Port operations. To some extent the design of the facility could aim to reduce this impact. Based on assumptions in Section 6, there should be no impact from birds as there will be no sorting or disposal of solid waste at the facility. However, if garbage is incinerated, there could be adverse health and environmental impacts from emissions which can be mitigated through the design, operation and maintenance of the incinerator.

Site security is good, but movement of employees working at the treatment facility, would subject to strict security restrictions. Due to the security features, it would not be a suitable location to receive wastes, from land based sources.

Trade effluent (treated to NRCA standards) from the oily waste treatment facility could be disposed of at sea.

The Port will have to accommodate waste receptacles for the collection of garbage and recyclables and it must facilitate the movement of trucks to collect oily waste from ships.

### **Gordon Cay**





### **Entrance to Gordon Cay via the Causeway**



### **7.3 Newport East Site**

As there is no specific site defined as Kingston Harbour in the 1999 Feasibility Study, a survey of available land was conducted in the Newport East and West areas of the Kingston Harbour. One lot at Newport East adjacent to Newport Mills was identified as a possible site for the WRF. The location of this site is likely to be more favourable to potential investors in comparison to Soapberry and Greenwich, as there is a perception that it may have less security concerns. The amount of land at that site is limited, however, as it only comprises approximately 1.1 hectares of land, which would only be suitable for an oily waste treatment facility. The site would be too small for a full scale facility (solid waste and oily waste treatment) which requires at least 2 hectares.

The nearest drain(s) leading to the sea would need to be identified to discharge trade effluent (treated to NRCA standards) from the treatment of the oily waste. This may require the construction of piping infrastructure to connect to the existing storm water drainage system.

This site is situated in an industrial zone however, adverse impacts from a treatment facility such as odours could affect neighbours due their close proximity. The design of the facility could aim to reduce this impact. Based on assumptions at Section 6, there should be no impacts from birds as there will be no sorting or disposal of solid waste at the facility. However if garbage is incinerated, there could be adverse health and environmental impacts from emissions which can be mitigated through the design, operation and maintenance of the incinerator.

Accessibility to this site by employees and service vehicles is good. This site is in close proximity to Port Bustamante but it is a little further east of Riverton Disposal site than Greenwich. This location would facilitate the collection and treatment of waste from land based sources.

### **Newport East (adjacent to Newport Mills)**



## **7.4 Soapberry**

Soapberry is the proposed site of the municipal sewage treatment works for the Kingston Metropolitan Area to be developed by the NWC (Refer to Figure 1). The NWC proposes to use this site comprising 2,238,337 m<sup>2</sup> (224 hectares) for their development which will consist initially of works to treat wastewater currently being conveyed to Greenwich and Western treatment plants. It is planned to incorporate the sewage treatment systems in St. Catherine thereafter and eventually it will treat wastewater generated from the expansion of the sewerage system in Kingston and St. Andrew. Consultation with NWC has revealed that no land is available at Soapberry for a treatment facility. When land was said to be available, by the Permanent Secretary in the Ministry of Water, in a letter dated February 19, 2001, to the Chairman of the PAJ, only secondary treatment of wastewater was being considered. Recognising the need to meet the national standards for effluent discharge, the NWC has since upgraded the design of their system to tertiary treatment and now require all the land at Soapberry.

Even if land was available, it would be near to the sea and recent studies in the area have indicated that the southern section of Soapberry is at or below sea level in many places. This means that the site is affected by a high water table making it prone to flooding. It would require extensive infrastructure works to make it useable.

If this site were available and suitable, there would be at least two options for access to the site: by road and by sea. The option of using a barge to convey waste from the Port was examined and the following issues noted:

- a. There would need to be at least two barges so that one is available when the other is out of service (due to defects or maintenance);
- b. Extraordinary security measures would be required as this method of transporting waste and the location of the WRF site poses high security risks for the smuggling of contraband;
- c. Safety and emergency measures and cleanup equipment would be required to address possible spills at sea; and
- d. Infrastructure such as a pier would be required for the barge to dock.

The close proximity of Riverton Waste Disposal site would make it a favourable location for a treatment facility. Adverse impacts from odour can be addressed in the design of the facility and birds would not be a concern as no sorting and disposal of garbage would take place. Impacts from emissions associated with the incineration of waste could be addressed in the design, operation and maintenance of the incinerator. In fact, the potential exists for the operations at the nearby Riverton landfill to release pollutants and hazards such as odours, dust and fires that may adversely affect the employees and the operations at the treatment facility.

Security concerns may make this site unsuitable for potential investors. The area is remote and there are unconfirmed reports of extortion rackets in the area. Access by vehicles and employees is difficult and employees may feel constrained to report to work in that environment.

Trade effluent (treated to NRCA standards) from the treatment of oily waste could be disposed of at sea.

## **8 Comparison of sites**

The sites were assessed based on the following criteria and scores applied with one (1) being the lowest (unfavourable) and ten (10) being the highest (favourable). Table 5 outlines the scores for each site. Reference can be made to Figure 2 which shows the location of the Soapberry, Greenwich and Gordon Cay sites as well as the Riverton Disposal Site.

### **8.1 Treatment facility for solid and oily wastes**

The analysis outlined in Table 4, indicates that the most suitable location for a treatment facility for solid and oily waste would be at Greenwich. The principal area of concern with that location is site security as the lowest score was assigned to that criterion. In comparison to the other sites (for that criterion) Gordon Cay scored the highest, which is to be expected based on the tight security in place at that location and the site at Newport East was next in line. However neither of these sites is a feasible alternative because there is no land space to meet the current or future needs for a treatment facility.

It is envisaged that development of the lands at Greenwich will positively address some of the security concerns as the area is currently overgrown with foliage which makes it a hideout and haven for homeless persons and criminals. Additionally the site should be situated near to Daffodil Avenue so that it can be accessed from Bell Road rather than utilising the Spanish Town Road entrance.

The area of interest for the treatment facility is delineated on the map at Figure 3. The terrain is relatively flat however there are some gullies on site that the facility design will need to take into consideration.

### **8.2 Treatment facility for oily waste**

If only oily waste is to be treated then only 1 hectare of land will be required for a treatment facility including provisions for expansion. The dynamics for a suitable site change in favour of the location at Newport East as indicated by the scores in Table 6. Issues to be addressed for this site include:

- The need to construct infrastructure to facilitate the discharge of treated effluent.
- Identifying the owner of the land.

The area of interest is shown on Figure 4.

**Table 5 – Comparison of Sites for a Treatment Facility for Solid & Oily Waste**

		<b>Gordon Cay</b>	<b>Soapberry</b>	<b>Greenwich</b>	<b>Site adjacent to Newport Mills (Newport East)</b>
■	Shortest distance between the treatment facility and Port Bustamante (location of greatest shipping activity)	10	6	8	7
■	Security clearance (entrance and exit)	2	8	8	8
■	Hindrance to other Port operations minimal	2	10	10	10
■	Land space to meet current & future needs	0	2	9	0
■	Site security	9	3	4	8
■	Site accessibility (for employees and vehicles)	7	4	8	9
■	Easy disposal of effluent (from treatment of oily waste)	3	8	8	7
■	Proximity of Riverton City Disposal site	8	10	8	7
■	Potential to improve economies of scale by treating land based waste	1	8	8	8
■	Minimal risk for wastes to enter the water <sup>2</sup>	10	3	10	10
■	Minimal impact to surrounding community especially with respect to noise, odour and outer appearance	5	9	8	7
	<b>Total</b>	<b>57</b>	<b>71</b>	<b>89</b>	<b>81</b>

<sup>2</sup> The score allocated to the Soapberry site is when a barge is used to transport waste from the Port to that site

**Table 6 – Comparison of Sites for a Treatment Facility for Oily Waste**

		<b>Gordon Cay</b>	<b>Soapberry</b>	<b>Greenwich</b>	<b>Site adjacent to Newport Mills (Newport East)</b>
1.	Shortest distance between the treatment facility and Port Bustamante (location of greatest shipping activity)	10	6	8	7
2.	Security clearance (entrance and exit)	2	8	8	8
3.	Hindrance to other Port operations minimal	2	10	10	10
4.	Land space to meet current & future needs	0	2	9	8
5.	Site security	9	3	4	8
6.	Site accessibility (for employees and vehicles)	7	4	8	9
7.	Easy disposal of effluent (from treatment of oily waste)	3	8	8	7
8.	Potential to effect economies of scale by treating inland waste	1	8	8	8
9.	Minimal risk for wastes to enter the water <sup>3</sup>	10	3	10	10
10.	Minimal impact to surrounding community especially with respect to noise, odour and outer appearance	5	9	8	8
	<b>Total</b>	<b>49</b>	<b>61</b>	<b>81</b>	<b>83</b>

## 9 Conclusion and recommendations

Based on the analysis of the four possible sites for a treatment facility for ship generated waste, the site at Greenwich is recommended as the site most suitable for a facility to treat garbage and oily waste and the site at Newport East is recommended for a facility to treat oily waste only.

At Greenwich, 2 hectares is required while at Newport East, 1 hectare is needed. The land allocations in both instances have provision for 100% expansion of the treatment facility.

The identification of the preferred site is merely the beginning of the process for site selection. There are a number of other actions that must be completed prior to finalising the location of the treatment facility.

The acquisition of the land for the treatment facility must be made formal and to this end a letter has been sent to the NWC requesting the use of up to 2 hectares of land at Greenwich. In the case of the site at Newport East, a title search would need to be conducted to identify the owner and arrangements made to acquire the land if it is available. Greenwich could also be considered for the oily waste treatment facility as a second choice if the site at Newport East is unavailable.

The facility must comply with national, local and other applicable legislation related to garbage collection and processing. This means that a permit must be obtained from the National Environment and Planning Agency (NEPA) as ***Solid Waste Treatment and Disposal Facilities*** and ***Industrial Wastewater Facilities*** are developments which require permits under the Natural Resources (Prescribed Area)(Prohibition of Categories of Enterprise, Construction and Development) Order, 1996 and the Natural Resources Conservation (Permits and Licences) (Amendment) Regulations, 2004. This will require the completion and submission of a permit application, a licence application (for the discharge of effluent) and a Project Information Form. NEPA may require an Environmental Impact Assessment (EIA) after reviewing the permit and licence applications and the Project Information Form (PIF). Additionally, the National Solid Waste Management Authority (NSWMA) will need to approve the proposed storage, treatment, transportation, handling and disposal methods to be applied to the garbage collected from the Port of Kingston.

Detailed layouts of the proposed facilities will be presented in the deliverables for Task C3 which will recommend the most appropriate technologies to be employed for treating ship generated garbage and oily wastes from WRFs.

## **APPENDIX 1**

### **SUMMARY OF FEASIBILITY STUDY FOR A WASTE RECEPTION FACILITY IN KINGSTON HARBOUR (October, 1999)**

- Approximately 2200 ships visit Kingston Harbour based on 1998 figures (typical) on an annual basis which is 2/3 of all ships calling at Jamaican ports
- For the report the quantity and composition of the waste had to be estimated as there were no data available
- Average annual tonnage of ships visiting Kingston Harbour (1998) is approximately 13000 tons
- Ship generated liquid waste could meet the requirements of the Caribbean Cement Company if the 74% water content was reduced to <2 %. (Need to check if this is still the case)
- Average of 1.98 kg/person/day of solid waste generated on freighters with food and glass being the largest fractions of 30% each.
- Hazardous waste amounts to 15% of the total solid waste ( paints, medical waste batteries)
- Opportunities to separate recyclable portion of the solid waste (paper, cardboard, plastic bottles, batteries)
- Wastes to be disposed of that are generated as a result of the dewatering of the of oily wastes include wastewater that must meet NRCA's trade effluent standards and oil contaminated solid waste which must be incinerated if it cannot be accommodated in the cement kiln
- Waste Management plan proposed treatment of oily water and sorting of solid waste into recyclable components and the remainder being sent for disposal at the Riverton Landfill
- Proposed oily waste treatment facility will use centrifugal forces to separate oil, water and solid particles; proposed liquid waste facility should have a size of 40m x 60m and treatment facility should be 15m x 30m
- Sorting facility should be designed for an annual throughput of 10,000 to 15,000 tons





- Liquid waste treatment facility
  - Reception and treatment facility costs: US\$ 300,000
  - Buildings and Infrastructure: US\$ 218,000
  - Annual operating costs US\$ 429,100/annum
  
- Solid waste sorting facility
  - Reception and sorting facility (sorting facility) US\$ 25,500
  - Annual operating cost US\$ 28,250/annum
  
- Large scale sorting facility for commercial and ship generated waste
  - Large scale facility for sorting US\$ 210,000
  - Buildings and infrastructure US\$ 239,600
  - Annual operating costs US\$ 669,400/annum
  
- One possible financier for the project was the Environmental Foundation of Jamaica
  
- An EIA is required for a project of this nature.

## APPENDIX 2

### TERMS OF REFERENCE FOR TASK C1

#### Tasks/Scope of Work

**Work Plan Task C1** -Carry out an appropriate Siting Study and recommend the most suitable site for location of the proposed Ship Generated Waste Reception Facility, (WRF) .

In 1999, the Scientific Research Council and the Shipping Association of Jamaica jointly sponsored a study to investigate the feasibility of constructing a ship-generated waste reception facility for the port of Kingston. The findings of that study are contained in a document titled *FEASIBILITY STUDY FOR A WASTE RECEPTION FACILITY IN KINGSTON HARBOUR*, dated October 1999, prepared by Juergen Broschk, in collaboration with Senior Expert Services, and the German Agency for Technical Cooperation, (GTZ). Consultant will find the above document to be a very useful reference in terms of providing some pertinent data and preliminary design information regarding the required facility.

In the Broschk report suggestions were made regarding the spatial requirements for the two major components of the WRF, as follows:

- i). "The building site for the **liquid waste facility** should ideally have a size of 40x60m and the building in which the facility will be housed a size 15 x30m. (pg.12);
- ii). "It is necessary to cover the interim storage area and the **(Solid Waste) sorting facility** and a perimeter fencing is to be included. The building site should have a size of 40x60m and the building a size of 10x20m." (pg.13).

Broschk further mentioned four places as possible locations for the proposed WRF (see pg. 20): Soapberry, Kingston Harbour, Gordon Cay and Greenwich Town, and suggested that a detailed study would have to be done to select the most suitable site.

The Consultant engaged for performance of Component C will be required to carry out an appropriate study and recommend the most suitable location for the proposed WRF.

Consultant #1 qualifications: Advanced educational qualifications in civil or industrial engineering with at least 10 years experience in the design of waste treatment facilities. Familiarity with the typical environmental management issues involved in providing and operating facilities for receiving, handling and treating the types of ship-generated waste that can be expected to come into Kingston Harbour.



Person Days: 8

Deliverable Products:

- a). Siting Study Report, comparing the advantages and disadvantages of the four possibilities mentioned in the Broschk report as well as any other possibilities that might be identified; and recommending the site deemed most suitable.
- b). Site Layout Plan giving preliminary delineation of the spatial requirements for the establishment of an appropriate WRF.



**APPENDIX 3**



**Environmental & Engineering Managers Ltd.**

26 Armour Glades Drive, Kingston 8  
Tel: 925-9060, Fax: 969-6651, email: itsmith@mail.infochan.com

November 8, 2004

The Port Authority of Jamaica  
15 Duke Street  
Kingston

**Attention: Mr. Noel Hylton**

**Re: Kingston Harbour Project – Siting of Port Waste Reception Facility**

I am currently working on the captioned project as a sub consultant to Lawson and Associates Ltd.

One component of the project involves examining a number of possible sites for a Waste Reception Facility (WRF) for ship generated waste. A previous study had suggested Gordon Cay and Kingston Harbour as possible locations for the WRF. Recognising that about 60 % of the shipping activity takes place at Port Bustamante, a WRF in close proximity to this area is desirable. Initial estimates indicate that 2 hectares of land will be needed for the WRF.

Kindly indicate whether or not PAJ owns 2 hectares of land that could be made available at a location near to the western side of the Port of Kingston for the WRF.

Your early response on this matter will be appreciated as it will have implications for how we proceed with the other components of the study.

Yours sincerely,

Ianthe Smith  
MANAGING DIRECTOR

Copy: Mervis Edgehill – Paort Authority of Jamaica  
Hopeton Delisser – Port Authority of Jamaica  
Cowell Lyn – National Environment and Planning Agency

**Correspondence with PAJ and NWC Regarding Availability of Land for  
Treatment Facility for Ship Generated Waste**



## Environmental & Engineering Managers Ltd.

26 Armour Glades Drive, Kingston 8  
Tel: 925-9060, Fax: 969-6651, email: itsmith@mail.infochan.com

---

November 8, 2004

The President  
National Water Commission  
28 Barbados Avenue  
Kingston 5

**Attention: Mr. E.G. Hunter**

**Re: Kingston Harbour Project – Siting of Port Waste Reception Facility**

I am currently working on the captioned project as a sub consultant to Lawson and Associates Ltd.

One component of the project involves examining a number of possible sites for a Waste Reception Facility (WRF) for ship generated waste. The NWC has plans for two of the short listed sites from a previous study namely Greenwich and Soapberry. Initial estimates indicate that 2 hectares of land will be needed for the WRF.

Kindly indicate whether or not 2 hectares of land can be made available at either location for use as the WRF.

Your early response on this matter will be appreciated as it will have implications for how we proceed with the other components of the study.

Yours sincerely,



Ianthe Smith  
MANAGING DIRECTOR

Copy: Vernon Barrett – National Water Commission  
Cowell Lyn – National Environment and Planning Agency



November 18 2004

Mrs Ianthe Smith  
Managing Director  
Environmental & Engineering Managers Limited  
26 Armour Glades Drive  
Kingston 8

Dear Mrs Smith:

***Re: Kingston Harbour Project – Siting of Port Waste Reception Facility***


Reference is made to your letter of November 8 addressed to our President & CEO in relation to the captioned matter.

Since the beginning of the 1990's, the Port Authority has been embarking on the expansion of our transshipment facilities in order to respond to the demands of the trade.

Notwithstanding the increased capacity, we are still experiencing some congestion on the port, and demand for space is expected to continue into the foreseeable future.

As a result of the foregoing, we are unable to identify additional space in support of a Waste Reception Facility. We hope that other suitable alternatives can be identified.

Yours sincerely,

  
Captain Hopeton DeLisser  
**VICE PRESIDENT**  
**HARBOURS & PORT SERVICES**

HD/sl.

c. Mr Mervis Edgehill – Port Authority of Jamaica  
Mr Cowell Lyn - National Environmental and Planning Agency  
Dr. Ian Blair - Port Authority of Jamaica



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Fax: (876) 967-1499

November 18, 2004

Ms. I Smith  
Managing Director  
Environmental & Engineering Managers Limited  
26 Armour Glades Drive  
Kingston 8

Dear Ms. Smith:

**RE: Kingston Harbour Project – Site of Port Waste Reception Facility**

We note your letter of November 8, 2004 regarding the proposed site of the Waste Reception Facility (WRF). You requested information on the availability of two (2) hectares of land at our Greenwich Sewage treatment plant or at Soapberry.

NWC does not own the land at Soapberry; this matter should be addressed to the owner of this property.

On completion of the proposed Soapberry Wastewater Project, land will be available at the Greenwich facility for other use. This could include its use for the WRF. It will be necessary, however, to obtain the approval of the Board of NWC to do this.

In preparing to take steps to obtain this approval, we will require that you identify a specific section of Greenwich. We are prepared to meet with you to discuss possible options for site.

Sincerely yours,

  
Vernon Barrett

**AVP, Systems Development Planning**





## REFERENCES

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2. MCA Research Project 469, Survey Of Waste Reception Facilities In UK Ports, Contractor WRc plc, November 2000
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4. Waste Reception Facilities Under Marpol 73/78 In Malaysia: 2004 Update, Noor Apandi Osnin Centre for Ocean Law and Policy Maritime Institute of Malaysia, January, 2004
5. Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand, Working Together to Reduce Impacts From Shipping Operations: ANZECC Strategy to Protect the Marine Environment, Australian & New Zealand Environment and Conservation Council, 1997
6. Hydrological Investigation and Drainage Design for Proposed Expansion of Riverton Landfill, Beckford and Dixon Ltd, February 2004