REPUBLIC OF MAURITIUS
PORT OF PORT-LOUIS

PORT EXTENSION AND FREE PORT DEVELOPMENT PROJECT

CONSULTING SERVICES FOR
ENVIRONMENTAL IMPACT ASSESSMENT

TERMS OF REFERENCE

1. The purpose of the study outlined by the following terms of reference is to carry out an environmental impact assessment of the Port Extension and Free Port Development Project to be implemented in the port of Port-Louis (Mauritius).

Background

2. Mauritius economic performance continued to improve in 1992 with a growth rate in GNP of 6.4%, giving an annual average of 5.7% over the last ten years. In 1992, Mauritius exports reached Rs 20.7 billion (or about US$ 1.2 billion). It grew faster than GNP with a rate of 7.4%. Some 65% of exports are generated from the export free zone industries, but these activities are showing signs of slowing down with a growth rate of 6%. The Mauritius Employers Federation has called for a drive towards diversifying productions, by embarking on a second industrialization phase oriented on higher value added products and to develop off-shore services. This policy has been adopted by the Government, which has decided to develop facilities to be offered in freeport zones, under a new authority, the Mauritius Freeport Authority (MFA), created in 1992. Activities likely to be performed in these zones, such as warehousing, sorting, packing, minor processing and assembling, are export-oriented. They would be very instrumental in meeting the demand of investors and attracting new ones. Providing new port services, such as transshipment and bunkering, is also considered.

3. Over the last few years, the port, led by Mauritius Marine Authority (MMA), has engaged in major investments to develop the port capacity. Rice unloading and handling using lighterage is being modernized with the consolidation of existing quays into a 380 m quay, for which works are underway. In 1991, dredging to deepen the channel permitted the reclamation on the sea of 30 ha in complement of the 60 ha existing at Mer Rouge. To meet the continuing growth of container traffic, MMA has hired since June 1992 a consultant to carry out a feasibility study to provide gantry cranes to increase the capacity of the existing container terminal (quays 4 and 3). Given the required works for piers' strengthening, the consultant is investigating the option of using the Mer Rouge reclaimed area to build a new container terminal. However, such an option, which was not proposed in the 1989 Master Plan, would place MMA in front of conflicting and mutually exclusive land uses, as facilities to handle and store bulk cement, oil products, and other bulk handling such as coal, had been proposed in the new sea front of Mer Rouge. The new requirement to reserve land for the Freeport activities, which fast expansion is expected, should now also be accommodated.

4. The Government of Mauritius is eager to adopt a port development strategy that would integrate the new economic development policy to be promoted by the Freeport Authority as well as other demands of port users in an optimal and timely manner. Therefore, the Government intends to have, in concurrence with the World Bank recommendations, the following studies carried out by consultants:

(i) Preparation of Port Policy Package and Institutional Reorganization.
This study would review the current port operation, tariff structure and organization, giving recommendations to raise its efficiency and competitiveness. The study should also propose measures to strengthen the Government's institutional capacity for planning and regulating the port sector.

(ii) Revision and Updating of the Port Master Plan.
A revised strategic master plan will be prepared based on comparative analysis of alternative new land uses, consistent with safety and environmental concerns. The study will propose an optimal scenario that would accommodate conflicting needs, among which the facilities of the freeport and the extension of the container terminal.

(iii) Environmental Impact Assessment of the Port Development
This study, which is the subject of the present terms of reference, will identify major points of stress on the environment created by the port (now and when development steps recommended by the revised master plan are taken) and propose remedial measures, including ship waste facilities, international water protection, etc...

(iv) Feasibility Study for an Environmentally Sound Port Infrastructure Development Project.
This study will complete the on-going feasibility study for container terminal and examine, from a technical, economic and financial point of view, the feasibility of the port and other public works and equipment to meet forecast transport demand. Procurement of part of the project could be possibly funded, in part, by the World Bank.

(v) Detailed Engineering for the Port Extension.

(vi) Freeport Development Strategy.
So as to identify opportunities and needs for the development of freeport zones activities and foster the participation of the private sector, this study would examine, among other things, marketing and pricing issues and assess the necessary corporate structure, services and facilities to be provided.

(vii) Preparation of Design and Tender Documents for the Freeport Physical Development and Implementation.

5. These studies will be financed by a Japanese Grant Fund (Population and Human Resources Development, PHRD) administered by the World Bank and possibly by a World Bank Project Preparation Facility. The selection of consultants will be carried out in accordance with Bank guidelines. To allow smooth coordination and expedite project preparation, the detailed schedule (attached) for the studies has been agreed upon by the Ministry of Economic Planning and Development and the implementing agencies.
The studies shall provide a solid basis to prepare and implement a port extension and freeport development project, under a possible Bank financing, which would have four major components: (i) preparation and implementation of a long-range plan for an environmentally sustainable port development, (ii) freeport capacity building for planning and management, (iii) deregulation of the monopolistic port handling system, and (iv) rehabilitation and extension of the container port, other port works and related infrastructure. The project implementing agencies would be Mauritius Marine Authority and Mauritius Freeport Authority, acting for their respective supervising ministries (Ministry of Internal and External Communications, Ministry of Finance).

Objectives

6. The purpose of this study is (a) to determine the environmental baseline condition at the site, (b) assess the environmental impact of the construction and operation of the port in regard with the project and (c) identify and cost mitigation measures.

7. It is stressed that environmental assessment is most effective when even preliminary findings are made available early in the preparation process. At that time, alternatives which might be desirable from an environmental viewpoint can be considered realistically, and implementation and operating plans can be designed to respond to critical environmental issues in the most cost-effective manner. Consequently, integration between environmental assessment and master planning, feasibility studies and design work is essential. The consultant is thus expected to hold frequent coordination meetings with the master plan revision and feasibility study teams (whose appointments are scheduled to be concomitant), so as to exchange information on environmental issues and the responses they require.

Environmental Assessment Requirements

8. The conduct of the assessment will be governed and the content of the report will be specified by:

(i) the Environment Protection Act 1991, Part IV (attached as annex 1);

(ii) World Bank Operational Directive 4.00, Annex A and 4.01: "Environmental Assessment" (attached as annex 2a); World Bank Operational Policy Note 11.02 (wild lands and wetlands) (attached as annex 2b); World Bank Guidelines on Coastal and Marine Resources Management; World Bank Guidelines on Hazardous and Toxic Materials;

(iii) regional, provincial or communal environmental assessment regulations (to be checked with Mauritian authorities)

Scope of consulting services

9. The study area is the geographical area of the port and its immediate surroundings. However, whenever development impacts are likely to be felt in a larger area, the corresponding area will be included in the study area for the impact considered. Therefore, a brief description of the general environment characteristics in Mauritius is needed (see para 10) in addition to para 11.

Task 1. Brief outline of region and proposed port project

10. The consultant shall provide a brief description of typical features of Mauritius, in terms of population, economic activities, geography and environment. Then, based on the interim reports drawn by the master plan revision team and, if applicable, the help given by the feasibility study team, the consultant shall provide a brief description of the relevant parts of the projects proposed in the master plan, using maps (at appropriate scale) where necessary, and including the following information: location, general layout, size, pre-construction activities, construction activities, projected schedule, staffing and support, facilities and services, operation and maintenance activities, required off-site investments, life span.

Task 2. Description of the present environment

11. The consultant will assemble, evaluate and present baseline data on the relevant environmental characteristics of the study area. Hence, those data shall take into account the present port operations. The consultant will establish a data base on micro-computer to store all these data. The consultant shall also include information on any changes anticipated before the proposed project commences. Specifically, he shall:

(i) physical environment:
- examine coastal and oceanic parameters (tidal and permanent currents, shoreline, bottom sediment)
- collect data on geology, topography, soils, meteorology, surface and ground water hydrology as needed
- determine the level of land pollution (especially on the banks of the three rivers entering the harbor: Terre Rouge, Des Lataniers, Du Pouce)
- assess ambient air quality, existing sources of air emissions (especially chemical, fertilizer and other industries, automobiles and heavy machinery, flue emissions from ships and waste burning, if applicable)
- assess water quality, existing water pollution discharges (especially the three rivers mentioned above and the dumping ground of Roche Bois)
- assess noise, vibration and offensive odors levels
- assess the integration of the port in its urban environment (the sewage network will be especially examined)

(ii) biological environment:
- assess the health of the coral in the port area

- prepare an inventory of existing terrestrial and marine flora and fauna at the site, noting in particular rare and endangered species, micro-biological activity, primary productivity and plankton distribution
- locate sensitive habitats and significant natural sites, such as Terre Rouge Bird Sanctuary
- identify species of commercial importance
- identify species with potential to become nuisances, vectors or dangerous (for instance eutrophizing algae)

(iii) socio-cultural environment:
- assess the quality of the living environment of the port area
- make an inventory of fishing activities
- assess the links of the port with public health and other population related factors
- locate cultural assets (such as Fort George) in the area concerned with or surrounding the project, as well as recreation areas

Task 3. Legislative and Regulatory Considerations

12. The consultant shall investigate to describe the pertinent regulations and standards governing environmental quality, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc.. at international, regional and local levels. Some information can be found in the Environment Protection Act 1991.

Task 4. Determination of significant environmental impacts

Due to construction of proposed facilities

13. In this analysis, the consultant shall distinguish between significant positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. He shall identify impacts which are unavoidable or irreversible. Wherever possible, impacts should be described quantitatively, in terms of environmental costs and benefits. Economic values should be assigned when feasible. To this end, the consultant shall take into account all the possible impacts expected. For instance, destruction of coral reefs may have serious impact on tourism, fisheries and shoreline stabilization. Indeed, coral reefs are the basis for many coastal fisheries, providing food, shelter and nursery areas for commercially important species of fish and shellfish. Reefs also form breakwaters which protect harbors and bays and limit coastal erosion. Coral skeleton are often the major natural source of sand, maintaining the beaches. Another example is mangrove forests, which provide a surface for attachment of marine organisms, reduce tidal and wave energy, stabilizing the soil and maintaining the coastline against erosion. Finally, the consultant shall characterize the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with predictions of impact.

14. The analysis shall give the impact of port construction on each item listed in para 11. The following issues should in any case be addressed:

(i) impacts caused by dredging

Dredging can cause dispersal and settlement of resuspended sediments on sensitive aquatic ecosystems, among which coral reefs, that may be permanently damaged. Dredging can also release pollutants. Deepening operations may permit salt wedge intrusion higher upstream, thus changing the regime of bankside wetlands as well as that of rivers. They can also result in increased shoreline wave action with consequent accelerated erosion among other problems. Finally, dredge spoils must be properly disposed of.

(ii) impacts of land reclamation, construction of piers and other shoreline structures
Erosion and accretion effects are likely to occur where such structures are built in a zone of high littoral sediment transport, as current patterns change.

(iii) impacts of waterfront industries
In case the port development includes the establishment of industries that require port or waterfront lands (power plants, fertilizer industry, cement silos, oil and coal storage), the impact of these industries should be carefully looked at. The consultant shall particularly examine the impact of operating a coal fired power station in the port area, as proposed in the master plans of 1985 and 1989.

Due to port operation with proposed project

15. The same kind of analysis will be used, which will at least address the following issues:

(i) impact of ship discharges (oily ballast, bilge water, sewage/from waste collection to treatment and final disposal)

(ii) impact of accidental oil and chemical spills

(iii) impact of run-off from open storage areas
In case the run-off from open storage areas leads to adjacent wetlands, the area can become degraded and act as a sink for contaminants.

(iv) impact of dust and other air-borne emissions
Wind blown dust from stockpiles of bulk materials, such as fertilizers, coal, animal feed or ammonia, can be a major problem.

(v) impact of traffic burdens
Because of the location of the port of Port-Louis, very difficult issues are likely to arise over the increased road traffic to and from port areas. This should be particularly acute as the main arteries to and from the port pass through heavily built up and congested urban areas and there is little or no way to provide alternative routes.

(vi) impact of transport of hazardous cargoes
The consultant shall particularly examine how pesticides in drums, corrosive chemicals in jars or drums, minor explosives, cylinders of pressurized gases and radioactive products are being handled.

16. The proposed project is likely to have several alternatives in terms of siting, design, technology selection, construction techniques, phasing, operating and maintenance procedures. The consultant shall therefore compare the alternatives in terms of potential environmental impact. He shall also include the alternative of not constructing the project, in order to demonstrate environmental conditions without it.

Task 5. Development of measures to mitigate negative impacts

17. The consultant shall recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels. The range of measures recommended shall be the broadest possible: new regulations and enforcement incentives, installation of control equipment (baghouses, scrubbers,...) or receiving facilities, implementation of new procedures (such as tracking for ship waste disposal control), landscaping to improve the port environment, ... The consultant is particularly requested to design the facilities that would be needed if the Mauritius Government was to ratify the MARPOL Convention 73/78. Most emergency plans will be elaborated in the master plan revision study; the consultant is greatly encouraged to participate in their elaboration with the master plan revision study team.

18. The consultant shall estimate the impacts and costs of these measures, and of the institutional and training requirements to implement them. An economic analysis shall be carried out to quantify the cost with the measure implemented and without it (cost of negative impact and future emergency measures needed). When impacts cannot be mitigated, the consultant will consider compensation to affected parties. The consultant will quantify the costs and benefits of each alternative for the project, incorporating the estimated costs of any associated mitigating measures.

19. A management plan including proposed work programs, budget estimates, schedules, staffing and training requirements, institutional needs (in terms of authority and/or regulation) and other necessary support services will be proposed to implement the mitigating measures. The consultant is also expected to propose a plan to monitor the implementation of mitigating measures and the impacts of the project during construction and operation. He will include in the plan an estimate of capital and operating costs and a description of other inputs (such as training and institutional strengthening) needed to carry it out.

Suggested mode of operation

20. The consultant is expected to obtain the views of local NGOs and affected groups. Community involvement is important in order to understand the nature and extent of potential impacts, especially the sociocultural ones, and to assess the suitability and acceptability of various measures that might be used to prevent or mitigate impacts, or to compensate affected groups for unavoidable ones. Moreover, a genuine effort should be made by the Government with the help of the consultant to provide the public with information about the project and to solicit public reactions and suggestions. This leads to projects that are more acceptable and more likely to be supported.

21. The consultant is also expected to cooperate closely with the following Ministries: Environment and Quality of Life; Fisheries (Fisheries Protection Unit) and Natural Resources (Conservator of Forests); Economic Planning and Development; Energy (Central Water Authority); Finance (Development Bank of Mauritius); Health (Environmental Health Unit); Industry (MEDIA); Labor (Factory Inspectorate); Local Government; Tourism; Trade and Shipping; Works (National Transportation Authority and Sewerage Division); and the University of Mauritius.

22. The consultant is greatly encouraged to use the following documents:
- National Environmental Action Plan for Mauritius
- Environment Protection Act 1991
- Master plan for the port of Port-Louis, 1989, Consulting Engineering Services (India) Private Limited
- Master plan for the port of Port-Louis, 1985, BCEOM
- Techno-economic study on the relocation of facilities for handling bulk liquid cargo at Port-Louis harbor, 1987, SPECS Consultants Ple Ltd
- Aide-mémoire of World Bank Identification Mission (March 26 - April 2, 1993)

Mauritius Marine Authority will provide the consultant with relevant information on port development. The Ministry of the Environment and Quality of Life will provide data on existing projects.

Consulting team

23. Environmental assessment requires interdisciplinary analysis and should therefore be prepared by a team. The following specializations ought to be included on the team:

(i) marine ecology or biology

(ii) hydrogeology, hydrology or soil science

(iv) urban planning

(v) expertise in pollution control

A planner, social or natural scientist, or environmental engineer, the project manager should have experience in preparing several, similar environment assessments. Management skills and sufficiently broad training and/or experiences are required, to be able to provide overall guidance and to integrate the findings of individual disciplines. The consultant is highly encouraged to use local staff. The manpower required is estimated at 7 man/months, with about half of local expertise. The budget available is limited to US$ 120,000, and shall be funded by a Japanese Grant Fund for Population and Human Resources Development (PHRD), to be administered by the World Bank..

Schedule and Report

24. The study is scheduled to be carried out over a six-month period, with an interruption to allow review of feasibility study proposal.. Progress reviews shall be organized at the end of the second month of each period, to match with the master plan revision and feasibility study teams. A mid-term report is expected in 15 copies for

comments. A draft final report in 15 copies is expected one month before the end of the study and, after validation, the final report will be issued and presented in 25 copies. All reports shall be written in English.

25. The environmental assessment report should be concise and limited to significant environmental issues. The main text should focus on findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting those data. Detailed or uninterpreted data are not appropriate in the main text and should be presented in appendices or a separate volume. Unpublished documents used in the assessment may not be readily available and should also be assembled in an appendix. The environmental assessment report should be organized according to the outline below:

- executive summary
- outline of region and proposed port project
- description of the environment
- significant environmental impacts
- analysis of alternatives
- mitigation management plan
- monitoring plan
- list of references
- appendices:
    - list of environmental assessment preparers
    - data and unpublished reference documents
    - records of inter-agency and public/NGO communications

Bibliography:

Environmental Assessment Source book, Vol. I, Environment Department; World Bank Technical Paper #139

Environmental Considerations for Port and Harbor Developments, J. Davis, S. MacKnight, IMO staff and Others; World Bank Technical Paper #126

Attachments:
Timetable of studies
Annex 1
Annex 2

Port-Louis - July 3, 1993
#TOREIA.DOC