

**MINISTRY OF TOURISM
TOURISM DEVELOPMENT AUTHORITY
USAID-EEPP**

***OBJECTIVE 8.2.1 DOCUMENTATION
VOLUME I***

***ENVIRONMENTAL MONITORING UNIT
OPERATIONS AND
TRANCHE II PERFORMANCE VERIFICATION***

***Submitted in satisfaction of the Means of Verification 8.1.2
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1.0 INTRODUCTION

The Tourist Development Authority of the Egyptian Ministry of Tourism is currently strengthening the operating procedures of the Environmental Monitoring Unit (EMU). The purpose is to improve their capability in the environmental management of tourism development projects in order to fully achieve its responsibilities under Egyptian environmental law. As a result, the TDA is seeking to develop more streamlined procedures and improved environmental monitoring capabilities to achieve this goal. In March 2001, a institutional management plan was developed for the Environmental Monitoring Unit which included a management master plan together with preliminary recommendations for laboratory and equipment.

In April of 2002, the TDA underwent a major reorganization. EMU activities were at a minimum during the initial re-organizational phase that lasted from April to August of the same year. In August 2002, the Tourist Development Authority reactivated the Environmental Monitoring Unit giving it the responsibility of assuming the role as “Competent Entity” for the TDA for environmental management as defined in Egyptian Environmental Law, Law 4, 1996. As a result, the EMU assumes responsibility for the management of environmental protection programs for activities on all Tourist Development Authority assigned lands and their associated development projects.

Investment and tourism projects are subject to rules and regulations set forth in Egyptian law. The legal mechanisms applied by Tourist Development Authority in implementing its environmental management programs are evolving both internally and with respect to changes in Egyptian national law. It must also be remembered that the role of the Tourism Development Authority is to promote development in the context of national economic priorities. The environmental management process on the Red Sea coast will continue to evolve with the development and expansion of investment operations.

To maintain a healthy investment climate, it is critical that the mechanisms used to manage the environmental performance of the tourism investors and their developments are consistent and legally grounded. Investors must be allowed to operate within the framework of a consistent and compatible rules and regulations. At the same time, the protection of the development environment is critical to preserving the health of the tourism industry of the region. This is the mission of the Environmental Monitoring Unit, to provide a stable set of environmental expectations in order to promote a sustainable tourism development environment.

2.0 BACKGROUND

The Tourism Development Authority (TDA) of the Egyptian Ministry of Tourism administers a program designed to develop tourism resources throughout Egypt. This program is a national priority intended to strengthen the economy through the development of the tourism sector.

Under this program, The TDA was created to serve as the executive agency in control of the planning and allocation of land resources. Their primary function is to promote the development of these resources by stimulating investment from within the private sector.

Historically, to support tourism development, coastal lands along the Red Sea were transferred to TDA ownership. This area consists of properties situated in various locations along the Red Sea Coast, extending from the coast inland for 5 km. TDA properties are bordered by land areas under the jurisdiction of other national entities, principally the Red Sea Governorate, and subordinate local jurisdictions, such as Safaga, Hurghada, or El Qusier. For development purposes, these non-TDA areas continue to be administered by their respective jurisdictions.

Among the many activities conducted in support of the tourism development program, TDA has assumed the responsibility for regional planning and project review. Included in these activities is the development of an environmental management program.

The TDA approves land use conceptual plans and design layouts for each of the investment activities. Investments are of three principal types. These are:

- Individual project constructions such as a hotel complex
- Limited Development Centers – LDC (small, multi-element development)
- Integrated Development Centers - IDC (an investment involving multiple entities managed under a single development corporation).

Once plans are approved, TDA will issue a construction permit allowing development to proceed. TDA will perform periodic inspections designed to assure the timely progress of the investor development activities and verify the investors' adherence to the approved development plans.

The environmental management and monitoring of TDA developments is conducted by the Environmental Monitoring Unit (EMU). These responsibilities

are defined in the unit's enabling Executive Decree, number 54, April 23, 2000 (appendix A).

3.0 TDA ENVIRONMENTAL MANAGEMENT GOAL

TDA, as a development agency, has a national mandate to promote and stimulate tourism investment throughout the Red Sea Region. The ultimate measure of TDA's success is the construction and successful operation of these tourism facilities. This results in job creation and improved foreign exchange from tourism revenue. TDA is also a land planner. Through its actions, the TDA can control the type and location of tourism development through a regional planning and management process. This is because all projects on TDA lands must be approved by TDA.

From an environmental management perspective, TDA's goals are to maintain the region's environmental resources in order to preserve the tourism value of these resources. This requires the maintenance of a high level of regional environmental quality consistent with the demands of the tourism industry. While TDA is not in the business of managing parks and wildlife areas, it recognizes that there is a strong interrelationship between the regions resources and the quality of the tourism experience. For this reason, TDA seeks to develop an environmental management program that provides for the maintenance of these resources and which is consistent with the general protection of investor operations from environmental damages.

4.0 ENVIRONMENTAL MONITORING OBJECTIVES

Environmental regulatory authorities, in Egypt, are generally administered through the Egyptian Environmental Affairs Agency (EEAA). This agency was created under Law Number 4, of 1994 and assigns to the EEAA the responsibilities for enforcement and interagency coordination of the development of Egyptian environmental law. Under this law, EEAA is to coordinate with the various "competent ministries" to create pertinent laws, appropriate norms, standards and enforcement procedures. The TDA is a land owning agency and under the terms of Law Number 4, TDA is also the "competent authority" where TDA lands in the Red Sea region are concerned.

In the case of the tourism development, TDA reviews the environmental impact assessments prior to their submission to EEAA. TDA also assists the developer by addressing any comments that may result from the EEAA review. Additionally, TDA provides some environmental baseline information to prospective developers for integration in the development planning process.

Given TDA's executive role in the development process and its role as the "competent authority" in environmental management of TDA lands, TDA's environmental monitoring program must relate to achieving the following objectives:

- Accurately measure existing baseline conditions for use as benchmarks in assessing future changes.
- Identify activities that may result in unforeseen changes to the surrounding environments.
- Assure compliance with regulatory or contractual requirements.

Additionally, the methods of data collection, management, and distribution must be designed to insure that the data can be correctly interpreted, available to the appropriate user communities, and adequately captured for future use.

Beyond the need for data collection and management is the need to develop a clearly defined set of procedures and legal authorities for TDA implementation. These procedures must define the process TDA uses to take appropriate corrective actions should environmental problems be discovered through the monitoring process. These measures must also be constructed to assure that any corrective actions taken:

- Fall completely within the jurisdictional powers of the TDA as mandated under Egyptian Law.
- Conform to the requirements of the negotiated contracts under which investors are required to perform.
- Provide clear mechanisms and procedures for the design and implementation of corrective actions.
- Establish clear lines of authority and communication for addressing environmental management problems.
- Insure that information is communicated to all relevant departments and agencies with overlapping or collateral responsibilities for environmental management.

5.0 PROGRAM IMPLEMENTATION

5.1 Staffing and Organizational Structure

At the present time, the EMU is staffed by eight persons. This includes the Unit Manager, Unit secretary, 2 Senior environmental specialists, and 4 environmental specialists. Future plans include the addition of chemical laboratory staff and GIS processing personnel. The organizational plan for the EMU is presented in figure 5.1.

5.2 Position Descriptions and Qualifications

5.2.1 Unit Administrator

Description of Duties:

The Environmental Monitoring Unit Administrator shall manage and direct all activities of the Environmental Monitoring Unit. The administrator shall provide policy guidance in the environmental monitoring program design. The administrator shall serve as the principal point of contact with other agencies and departments with environmental management responsibilities and shall assist other TDA departments in the development of environmental management policies and procedures that can be reliably monitored in the field. Finally, the administrator shall maintain unit technical proficiencies through a program of professional development to assure that unit activities remain consistent with advances in environmental management sciences.

Specifically, the Unit Administrator shall:

- Manage the design and development of monitoring protocols to verify compliance with TDA environmental objectives.
- Develop and implement management objectives and management plans and provide final technical approval of unit operating policies and procedures.
- Manage the development of data capture and management information systems for recording and analyzing environmental data.
 - Supervise and coordinate the development of a supporting Geographic Information System.
 - Manage and direct the activities of all unit staff.

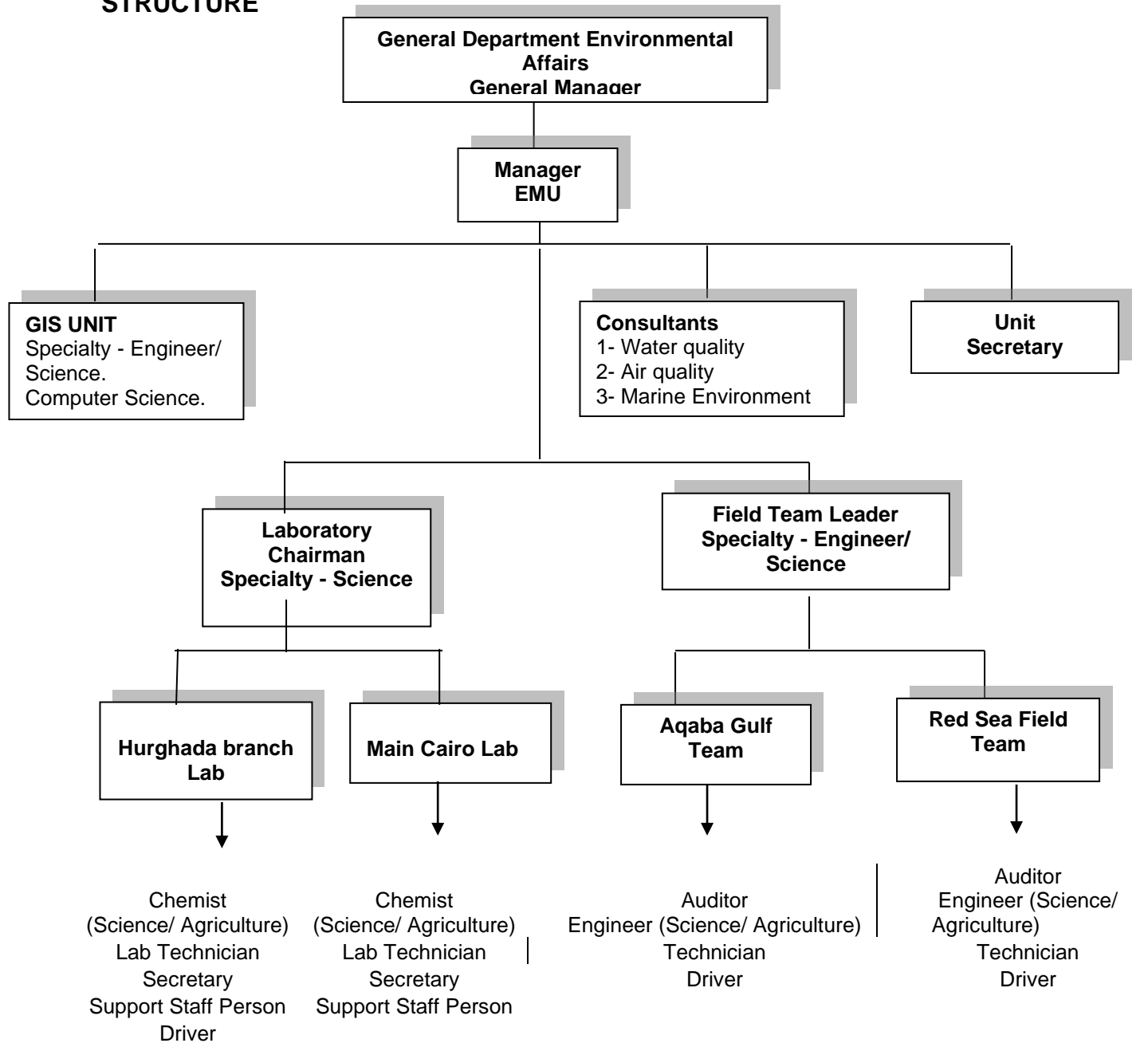
- Conduct field surveys, collect field samples and provide guidance to subordinate staff in the conduct of these activities.
- Provide principal liaison between other TDA departments, non-TDA government entities and TDA investors in the development and conduct of the monitoring program.
- Represent TDA as required on approved committees, boards, or organizations.

Qualifications:

- The Unit Administrator shall be senior level environmental engineer/environmental specialist with minimum of 14 years work experience at progressively increased levels of management responsibility.
- At least 2 years staff management experience.
- Bachelors degree in Civil/Environmental engineering, biology, chemistry or allied scientific discipline with demonstrated experience in their application to environmental issues in the field.
- Demonstrated skills in managing technical staff with direct field responsibilities.
- Strong field skills required with experience in conducting field work under primitive conditions.

Position requires technical experience and working knowledge of GIS and GPS data acquisition systems. Field experience and/or university course work in environmentally related sciences such as chemistry, physics, geology or biology with a demonstrated knowledge of field measurement and data acquisition techniques. This position also requires a demonstrated ability to work in an interdisciplinary environment with experience in developing policy based management objectives.

**TABLE 5.1
EMU ORGANIZATIONAL
STRUCTURE**



5.2.2 Senior Environmental Specialist

Description of Duties:

The Senior Environmental Specialist shall assist the Unit Administrator with the management of the day to day operations of the Environmental Monitoring Unit. During the development phase of the program, the Senior Environmental Specialist shall assist in the research, development, and coordination of the environmental monitoring standards and shall perform field studies as required.

The Senior Environmental Specialist shall assist the Unit Administrator in the identification of relevant testing equipment and protocols as necessary to monitor those criteria which are identified as the program develops. The senior Environmental Specialist shall serve as the coordinator of field activities and shall directly supervise the scheduling of field monitoring activities and serve as the principal technical resource in the field. Finally, the Senior Environmental Specialist shall serve as the Unit Administrator during the Unit Administrator's absence.

Specifically, the Senior Environmental Specialist shall:

- Assist the Administrator with the design and development of monitoring protocols to verify compliance with TDA environmental requirements.
- Assist the Administrator with the development and implementation of management objectives and management plans and provide final technical approval of unit operating policies and procedures.
 - Coordinate field staff as the senior field inspector
 - Conduct field surveys, collect field samples and provide guidance to subordinate staff in the conduct of these activities.

Qualifications:

- The Senior Environmental Specialist shall have a minimum of 6 - 8 years work experience at progressively increased levels of management responsibility.
- At least 1 years staff management experience.

- Bachelors degree in Civil/Environmental engineering, biology, chemistry or allied scientific discipline with demonstrated experience in their application to environmental issues.
- Strong technical skills in the conduct of environmentally related field studies and facilities inspections.
- Strong field skills required with experience in conducting field work under primitive conditions.

Position requires technical experience and working knowledge of GIS and GPS data acquisition systems. Field experience and/or university course work in environmentally related sciences such as chemistry, physics, geology or biology with a demonstrated knowledge of field measurement and data acquisition techniques is required.

5.2.3 Monitoring Unit Secretary

Description of Duties:

The unit secretary shall perform routine office management functions including maintaining unit files and information archives. The secretary shall produce correspondence and reports as requested by unit staff. Secretary shall maintain unit accounting information and provide other office staff support as needed. The unit secretary shall serve as unit receptionist and perform other administrative duties as required.

Specifically, the Unit Secretary shall:

- Maintain unit filing system
- Type correspondence and produce other office reports as required.
 - Operate unit office equipment including computers, copiers, and fax or other office systems.
 - Serve as unit receptionist.

Qualifications:

- Unit secretary shall have 3-5 years work experience in a technically oriented office environment.
- Shall be proficient in the use of spreadsheet and word processing software including MS Word, MS Excell, and Powerpoint.

- Shall have written and spoken proficiency in Arabic and English.
- Shall maintain equipment management logs and unit equipment inventory control system.

Position requires a high level of competency in the use of office equipment and software. Prior experience in a technically/scientifically oriented environment is desired. Knowledge of billing and accounting systems is a plus.

5.2.4 Environmental Specialist

Description of Duties:

The Environmental Specialist shall conduct field monitoring activities and produce required reports resulting from inspection operations. The environmental specialist shall conduct sampling and analysis protocols, conduct GPS surveys and generate field data in support of the monitoring program.

Additionally, the Environmental Specialist shall be capable of working with minimal supervision on a daily basis. This requires a high degree of discipline and self-motivation. The environmental Specialist shall regularly interface with TDA and Investor personnel while conducting monitoring activities. The environmental specialist will be required to maintain localized computer databases related to the monitoring activities, perform basic data transformations such as post processing and differential correction of GPS data. The specialist will be required to perform routine computer maintenance such as software installation, day to day data maintenance, and software update processing. Other computer skills will include downloading data from automated data collection and testing devices. For specialized systems, training will be provided.

The Environmental Specialist shall:

- Conduct field monitoring activities to include GPS surveys, field sampling and testing, observational surveys and investigations.
 - Provide detailed reports at regular intervals as required by the TDA monitoring program.
 - Maintain field equipment, office equipment and associated computer systems as required.
 - Work well with minimal supervision.

Qualifications:

- The Environmental Specialist shall have a minimum of 2 years work experience with environmentally related monitoring procedures using technical equipment.
- Demonstrate by training or education an understanding of sampling and analysis techniques.
- Possess a Bachelors degree in Civil/Environmental engineering, biology, chemistry or allied scientific discipline with demonstrated experience in their application to environmental issues in the field.
- Possess strong technical skills and a basic familiarity in the use of scientific/engineering equipment conduct of environmentally related field studies and facilities inspections.
- Possess strong field skills required with experience in conducting field work under primitive conditions.

Position requires technical experience and basic understanding of the principals of GIS and GPS data acquisition systems. Field experience and/or university course work in environmentally related sciences such as chemistry, physics, geology or biology is required. Candidate should possess strong oral and written communication skills. Position requires a highly motivated individual able to perform with minimum direct supervision.

5.2.5 Data Management/GIS Specialist

Description of Duties:

The Data management/GIS Specialist shall maintain the data capture, data management systems of the Environmental Monitoring Unit and establish a working GIS system in collaboration with the TDA GIS department. The Data management Specialist shall be responsible for the development and maintenance of analytical systems, computer software, data libraries and system hardware. Additionally, the Data Management Specialist shall work closely with field staff in the development of reports and analysis as needed in the course of unit operations.

Specifically, the Data Management/GIS specialist will:

- Design and develop the Environmental Monitoring Unit's GIS system.

- Work with unit personnel in the development of environmental management data libraries.
- Design and develop systems for the capture and archiving of environmentally relevant data.
- Provide a technical liaison with other data gathering resources both within and external to the TDA and make these data available to TDA staff.
- Maintain appropriate computer systems including individual platforms and network systems.

Qualifications:

- The Environmental Specialist shall have a minimum of 3 years work experience with PC based data management programs.
- Have at least 2 years experience in the use of GIS software including the analysis of spatial data relationships and spatial data management.
- Possess a Bachelors degree in Civil/Environmental engineering, biology, chemistry or allied scientific discipline with demonstrated experience in their application to environmental issues in the field.
- Possess strong analytical skills and a basic familiarity in the use of scientific/engineering analysis in the interpretation of spatially related environmental data.
- Have at least 2 years experience in the operation and management of PC systems including a working knowledge of network systems.

Position requires technical experience and basic understanding of the principals of GIS and GPS data acquisition systems. Strong computer skills in both hardware and software management and maintenance are required. A working knowledge of computer systems network architecture is highly desirable. The specialist will be required to participate in the design of analytical protocols and data capture systems in support of environmental monitoring activities. A working knowledge of environmental systems is highly desirable.

5.3 MONITORING STANDARDS

5.3.1 Sources of Standards

There are several potential sources for environmental monitoring standards available to the TDA for developing its monitoring program. These include:

- Environmental impact assessment (environmental management plan)
- Equipment manufacturers' performance specifications
- Scientifically accepted Indicators for baseline environmental systems
- State Regulations and Requirements
- Law No. 4, 1994 Executive Regulations and Annexes
- Ministry of Industry – Egyptian Standards (Construction)
- Ministry of Housing – Egyptian Code (Building Code)
- Laws Promulgated by the Ministry of Health
- Laws Promulgated by the Ministry of Tourism
- Laws promulgated by other Ministries or Agencies
- International Treaties and Agreements (e.g. MARPOL, CITES)
- Regulatory standards promulgated within TDA.
- Contractual requirements imposed by TDA.

As requirements are identified, monitoring indicators are selected to provide an appropriate measure of performance. When performance is unacceptable, corrective actions are indicated. In all cases, there must be a rational source for a particular monitoring standard. This means that the standard chosen must either have standing under Egyptian environmental law or established by contractual agreement. The standard must then be coupled with an appropriate action which will result when monitoring indicates unacceptable performance.

5.3.2 Development of Standards

Monitoring standards must relate to a requirement that results in a measurable or observable result. The failure to achieve a result is corrected by some process. In the case of TDA properties, TDA is a competent administrative authority under Egyptian Environmental Law (law 4 of 1994). The initial environmental requirements for tourism facilities on TDA lands are derived from this environmental law. Because of the interrelationship that exists between TDA management entities, other non-TDA agencies and other existing Egyptian Law, environmental standards development requires inputs from a variety of sources. However, as presented in figure 4.1, the EMU is the core unit for the development of standards within the context of the TDA.

5.3.3 Requirements from Existing Law

Specifically, Law 4, 1994, requires that an environmental impact assessment be conducted and that environmental management conditions relating to a particular facility will be assigned based on this assessment. Other specific criteria are outlined in the administrative appendices to the law and relate primarily to discharges to receiving waters and setbacks from coastline.

5.3.4 Requirements from the Environmental Impact Assessment

At a minimum, resulting from the findings of the environmental impact assessment, TDA can develop a series of environmental monitoring requirements for each approved facility. These comments are then incorporated in the monitoring program as needed Requirements Based on Resource Protection Needs

5.3.5 Requirements from Baseline Characterization

During the resource baseline characterization, conducted by the Environmental Monitoring Unit, fragile and important natural resources are being identified. Once classified, scientific standards, coupled with a baseline monitoring program, is used to identify measurable indicators and establish acceptable practices to be applied to facilities in the region. As these standards are developed, they will form the basis for additional requirements to be placed on the investor community.

6.0 TYPES OF MONITORING ACTIVITY

Four program areas have been identified which form the core of the monitoring program. These are:

- Development of Environmental Baseline Data

- Environmental Assessment Review
- Landuse and Resource Identification and Protection
- Pollution Management and Prevention

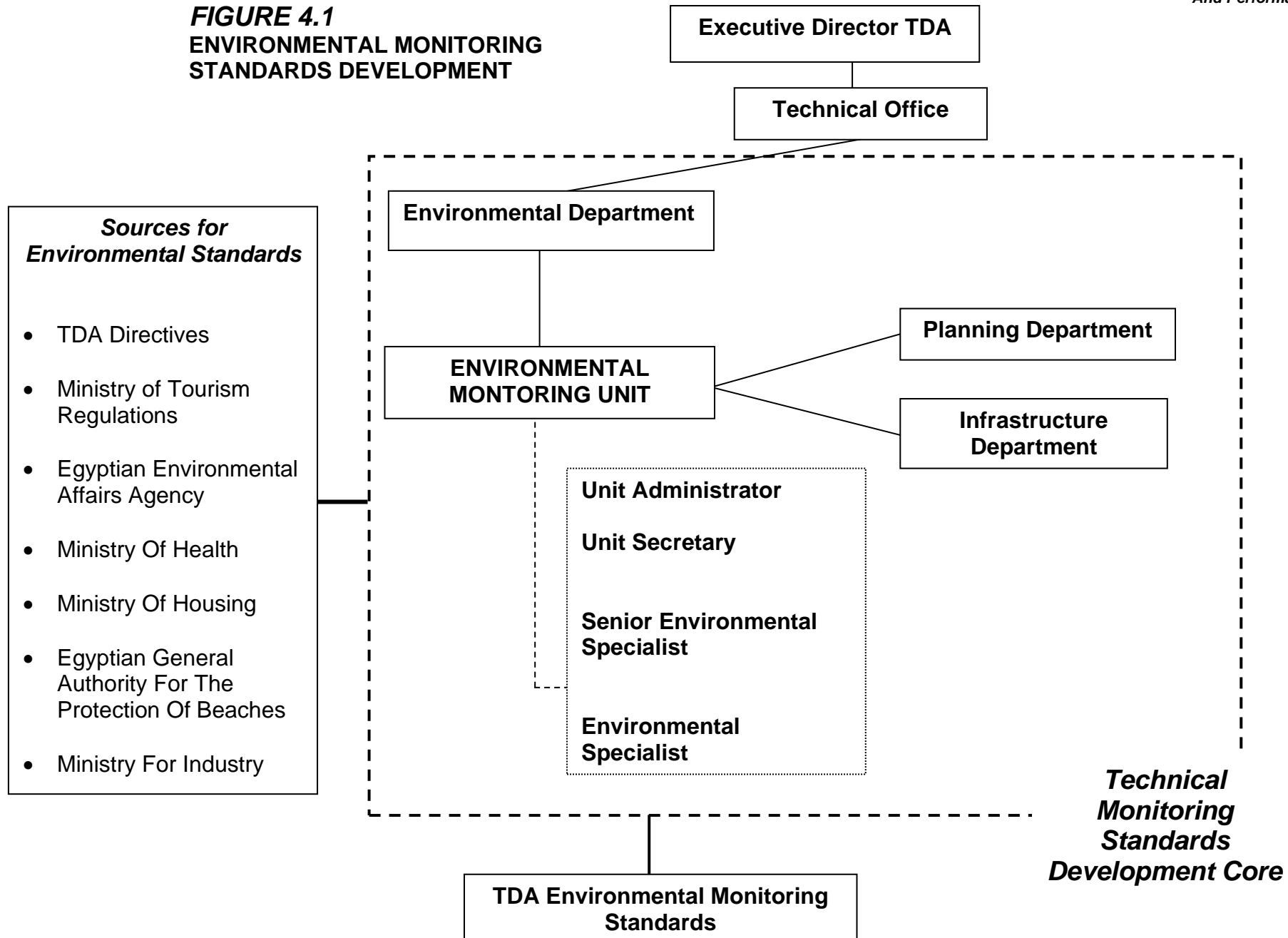
Additional program areas include design and construction standards, operational compliance, regional environmental planning and others. Inter-agency coordination is required to assure that TDA requirements and criteria are consistent with requirements developed by other government agencies such as Egyptian Environmental Affairs Agency, Ministry of Housing, Ministry of Health, Ministry of Transport, and the Red Sea and Governorate.

Monitoring activity within the EMU is based on these program areas and are divided into 5 separate areas. These are:

1. **Baseline Measurement Activities** – The monitoring of regional features which provides a consistent and repeatable indicator of a change in the quality of the existing resources to be protected from unacceptable impacts. Includes disturbed and undisturbed locations.
2. **Design Compliance** – Activities designed to assure that constructions required to mitigate potential environmental damages are installed as approved in the construction designs.
3. **Construction Quality Assurance** – Verifications designed to assure that those constructions, techniques and materials are of the quality required by TDA to operate satisfactorily over the agreed upon life of the system and that critical facilities (whose failure may result in environmental damage) are appropriately constructed.
4. **System Performance** – Monitoring designed to assure that critical facilities are operating normally and within the agreed design parameters.
5. **Operational Compliance** – A periodic monitoring activity designed to assure that facility operators provide adequate maintenance and supervision to assure that critical facilities continue to perform as expected.

Monitoring is accomplished through the implementation of various procedures designed to accommodate the nature of the monitoring activity. In the case of those requirements which carry a regulatory or legal obligation, the inspection and reporting procedure is designed to assure a clear and concise process for a stepwise process to assure remedial action is taken.

FIGURE 4.1
ENVIRONMENTAL MONITORING
STANDARDS DEVELOPMENT



7.0 PROTOCOLS, CHECKLISTS, AND SCHEDULING

A series of protocols checklists, and procedures have been developed to assure continuity in the inspection process. These procedures come in several forms suited to the nature of the activity being inspected. In the case of compliance related issues, a formal system of standard operating procedures has been developed to assure that any requirements are clearly communicated and consistently applied.

A complete set of monitoring protocols, checklists, and data collection forms can be found in the *EMU Operations Manual*. This is the operational manual that contains the guidance for unit operations. The manual was largely completed during the Tranche II performance period. The manual will continue to be updated and revised as conditions warrant. The EMU is committed to continue efforts to improve their policies and procedures that will be reflected in future revisions to the manual. The following is the extracted Table of Contents for the manual:

Table of Contents EMU Operations Manual

1. Laboratory operational Guidelines

- 1-1 Introduction
- 1-2 Laboratory Safety
- 1-3 Quality assurance of analytical data
- 1-4 Lab Techniques
- 1-5 Data & Results management
- 1-6 Laboratory analysis to be assessed
- 1-7 Methods of analysis
- 1-8 Bacteriological analysis

2. Natural Resource Monitoring

- 2-1 Environmental Monitoring Guidelines Coral Reef
- 2-2 Environmental Monitoring Guidelines for Mangrove Sit
- 2-3 Environmental Monitoring Guidelines for Wild Animals

3. Tourism Facilities Monitoring

- 3-1 Environmental Monitoring Guidelines for Marinas; Jetties; and Walkways

- 3-2 Environmental Guidelines for the Operation of Marinas
- 3-3 Environmental Monitoring Guidelines for Artificial lagoons
- 3-4 Environmental Guidelines for Designing of Artificial lagoons
- 3-5 Environmental Monitoring Guidelines for Waste Water Plants
- 3-6 Environmental Monitoring Guidelines for Water Treatment plants
- 3-7 Environmental Monitoring Guidelines for Electric Power Generating Stations
- 3-8 Environmental Monitoring Guidelines for Waste Disposal Sites
- 3-9 Environmental Monitoring Guidelines for Fuel Stations

4- Environmental Monitoring Checklists

- 4-1 Environmental Monitoring form for Under Constructions & Operating Projects;
- 4-2 Environmental Monitoring Checklist for Work Environment;
- 4-3 Environmental Monitoring Checklist for Mangrove Sites;
- 4-4 Environmental Monitoring Checklist for Fuel Stations;
- 4-5 Environmental Monitoring Checklist for Coral Reef Forward Different Objects;
- 4-6 Environmental Monitoring Checklist for Waste Water Treatment;
- 4-7 Environmental Monitoring Checklist for Desalinization Planet;
- 4-8 Environmental Monitoring Checklist for Walkways;
- 4-9 Environmental Monitoring Checklist for Marinas;
- 4-10 Environmental Monitoring Checklists for Jetty;
- 4-11 Environmental Monitoring Checklists for Artificial Lagoons;
- 4-12 Environmental Monitoring Checklists for Power Generation Stations;
- 4-13 Environmental Monitoring Checklists for Solid Waste;

5. Glossary of the Terminology used in the manual

7.1 Inspection Monitoring Protocols

Several inspection and monitoring protocols have been developed for implementation by the EMU. An example of the protocol with inspection form and schedule is presented for solid waste facilities in appendix B. Others such as those pertaining to the inspection of Fuel Stations, Power generating Stations, Solid waste Disposal Facilities, and Mangrove areas have also been developed in the same format. These protocols are designed for implementation by both the TDA-EMU and the respective facility operators. Each of these protocols is based on a standard format which is accompanied by technical criteria explaining the rationale for the selection of the various indicators used. Where possible, simple, low technology indicators were preferred over sophisticated and

elaborate methods. Frequency of sample, project phase, and indicator interpretation are contained within the monitoring checklist as well.

7.2 Baseline Data Collection Forms

Baseline data collection is an important part of the EMU operational program. It involves the location and identification of environmentally important attributes of the TDA's operations area to include natural and man-made features. A program has begun to identify, catalogue and map these features and the data collection tools used in this process have been designed to easily integrate with the EMU's GIS data storage system. Baseline data provide the necessary description of existing features within the TDA system, however, the design of the of the data collection format includes consideration for the future use of data in assessing cumulative impacts to TDA facilities. As data are developed, the capability for such assessments will improve proportionally. An example of a baseline data collection form for power generating stations is presented in figure 6.1.

FIGURE 6.1 BASELINE DATA COLLECTION FORM

EMU Utility Survey: Power Generation

Property Name: _____ Date of Survey _____ Surveyor _____

Power Plant Generators	GPS File Reference Number	Coordinate Location Latitude	Coordinate Location Longitude	Datum					
		Output kVA	Output kW	Generator Horsepower	Coolant	Lubricant Capacity (Liters)	Lubricant Specification/Standard	Lubercant Change Schedule	Filter Change Schedule
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								

Generator Manufacture:		
Plant Peak Capacity (kVA):		

Generator Fuel Storage Tanks								
Tank	Fuel Type	Storage Tank GPS Reference	Storage Tank Capacity (Liters)	Tank Type (above ground (AG) Below Ground (BG))	GPS File Reference Number	Coordinate Location Latitude	Coordinate Location Longitude	Datum
1								
2								
3								
4								
5								
6								
7								
8								

Generator	DayTank Count	Day Tank Capacity (liters)						
1								
2								
3								
4								
5								
6								
7								
8								

<i>Transformers</i>	Transformer Number	Rating (VA)	Type (Dry/Oil Filled)	Oil Type	Oil Description	GPS File Reference Number	Coordinate Location Latitude	Coordinate Location Longitude	Datum
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								

7.3 Standard Operating Procedures

Standard operating procedures are an administrative tool designed to clearly communicate an activity within the EMU. They are used to codify administrative procedures, operational directives and enforcement protocols. They are defined as follows:

- *Administrative procedures* are those pertaining to the internal operation of the Environmental unit.
- *Operational Directive* – these include formal procedures for both internal and field related activities. Included in this category are environmental inspections baseline monitoring and other similar activities. Concerning environmental inspections, inspections defined under the heading administrative procedures are not the result of legal requirements but conducted as a function of the general environmental management program.
- *Enforcement Protocol* – Enforcement protocols are legally binding inspection requirements placed on TDA activities. These are formally defined procedures with a legal basis which may result in the filing of legal actions, the collection of fines, or in actions required under contracts signed between facilities and the TDA.

SOPs are to be produced as needed and specifically, in the case of compliance inspections, for each property involved. Where compliance inspections are made, the SOP is provided to the pertinent facility at the time the procedure is developed and at the time of each inspection. This assures that all parties involved are aware of the requirements and the criteria employed during the inspection process.

A standard format has been developed for the presentation of SOPs. It is intended to assure that all elements for the procedure are defined and that the appropriate legal authorities are applied. The standard SOP is presented in the Exhibit 6.1.

Exhibit 6.1, SOP Format

Ministry of Tourism Tourism Development Authority Environmental Monitoring Unit (EMU)

STANDARD OPERATING PROCEDURE

Procedure Number: Prefix and sequence number

Title: Procedure name

Authority: Guiding legal or administrative authority

Supporting Law: Necessary supporting decrees, treaties or laws

Nature of SOP: Type of SOP: Administrative
 Operational Directive
 Enforcement Protocol

Description: Concise description of the SOP and its intent

Implementation: Description of the conditions for application of SOP and identification of affected entities.

Special Forms or Formats: An identification of any reporting forms, special presentation or design formats to be used during the execution of the SOP.

Responsibilities: Itemized description of responsibilities assigned under the terms of the SOP

Penalties: Penalties for non-compliance

Required Coordination: Other entities within the government or private sector, as required, who must be consulted while conducting a specified procedure.

Approvals: All required approvals and reviews which must be obtained prior to implementation of an SOP. This includes administrative and legal reviews, cooperative agreements and cooperating agency reviews and where appropriate, agreements with the private sector.

Implementation Date: Date on which the SOP is to become effective

Required Signatures: Signatures of approving entities.

7.4 Protocols derived from EIA's

Environmental Assessments are generally required from all TDA investors prior to the construction of their facilities. The process involves several tiers of review but begins with TDA's EMU and ends with the issuance of an approval from the EEAA. At the end of the approval process a set of requirements are sometimes generated by the EEAA as conditions of approval that constitute the environmental monitoring requirements for the facility. To date, there have been no such requirements issued by EEAA for incorporation into the EMU monitoring program. The EMU anticipates that, with the introduction of the Form B, environmental analysis tool and improved review of EIAs that EEAA will begin producing these requirements. The EMU has instituted a protocol for the incorporation of these requirements in their monitoring program. When received, these EIA based monitoring requirements will be incorporated into the program as Standard Operating Procedures in as Enforcement Protocols.

7.5 Standardized Procedures

7.5.1 Data collection

Data collection procedures relate to the collection of baseline or background data for use in the environmental monitoring program. This is particularly important for the identification and location of environmentally important facilities and in areas where development activity has not yet occurred. To date several procedures have been implemented for the identification and characterization of such facilities and features. Where appropriate these provide the data inputs to the EMU GIS for use in developing spatial environmental analysis. Data collection procedures have been developed and implemented for Fuel Stations, Power Generating Facilities, Marinas, solid waste management and mangroves.

7.5.2 Inspections

Environmental compliance inspections have been conducted for exhaust emissions, and noise in workplace environments. To date all facilities examined have passed their inspections. As additional requirements are provided by the EEAA, standard operating procedures will be developed and inspections will be held as required under the protocols identified.

7.6 Other Inspection protocols and checklists

In addition to the development of data collection and inspection procedures, a series of monitoring checklists have been developed to foster management recommendations for developments in the Red Sea Region. These include:

- Check list for Monitoring Artificial Lagoons
- Check list for Monitoring Coral Reef
- Check list for Monitoring Desalinization plants
- Check list for Monitoring Fuel stations
- Check list for Monitoring Jetties
- Check list for Monitoring Mangroves
- Check list for Monitoring Marinas
- Check list for Monitoring Power Generating Stations
- Check list for Monitoring Solid waste facilities
- Check list for Monitoring Wastewater treatment facilities
- Check list for Monitoring Walkways
- Check list for Monitoring projects under construction
- Check list for Monitoring projects in operation
- Check list for Monitoring projects under construction
- Check list for Monitoring the work environment

The use of these checklists occurs on a periodic schedule that is determined by the nature of the activity examined and availability of staff. As these are management inspections, the outputs are recommendations to TDA investors for improvements in environmental management procedures. As these checklists are incorporated into the TDA contracting system, they may become Enforcement protocols using the SOP system for implementation. Copies of these checklists can be found in the EMU operations Manual

8.0 REPORTING MECHANISMS

8.1 Introduction

The Environmental Monitoring Unit (EMU) of the Tourism Development Authority (TDA) was established by executive decree in 2001 and empowered to perform the environmental management functions associated with the management of properties under TDA control. Additionally, the unit is charged with the responsibility of developing environmental management systems in support of the development of a viable tourism industry along the Red Sea coast. The overall objective of EMU operations is to identify, assess, and facilitate the implementation of sound environmental management practices in order to assure the continued existence of a quality world class, tourism destination.

The relationship between tourism and environmental quality has long been recognized. Elements such as marine resources will directly affect the water-sports industry and related tourism, sociological effects, such as crime, social attitudes and morals will affect the desirability of a destination. Health effects relating to such activities as waste management and pest control affect the client perception of a particular destination. Indeed, where tourism is concerned, much of the product relates to the type of environment that is offered and the type of client that is sought.

Recognizing this relationship, under the Red Sea Sustainable Tourism Initiative, the TDA commissioned the Environmental Monitoring Unit which is charged with the responsibility of assisting with the maintenance of a quality environment for tourism development activities.

As part of this activity, the EMU is to conduct various inspection and data gathering activities in support of the TDA environmental management objectives. This report details the EMU environmental activity reporting procedures and the distribution of reporting information to TDA and client decision-makers and defines the EMU reporting requirements as required under the USAID sponsored Egyptian Environmental Policy Program (EEPP), Red Sea Sustainable Tourism Initiative.

The approval of this procedure, by the Tourism Development Authority constitutes the "Approved Environmental Reporting Procedure" as defined under Objective 7.2 of the EEPP which is to be implemented as an EEPP policy objective.

8.2 Objective of Reporting Procedure

The objective of the environmental reporting procedure is to provide a mechanism by which the TDA, and associated cooperators, can assess the

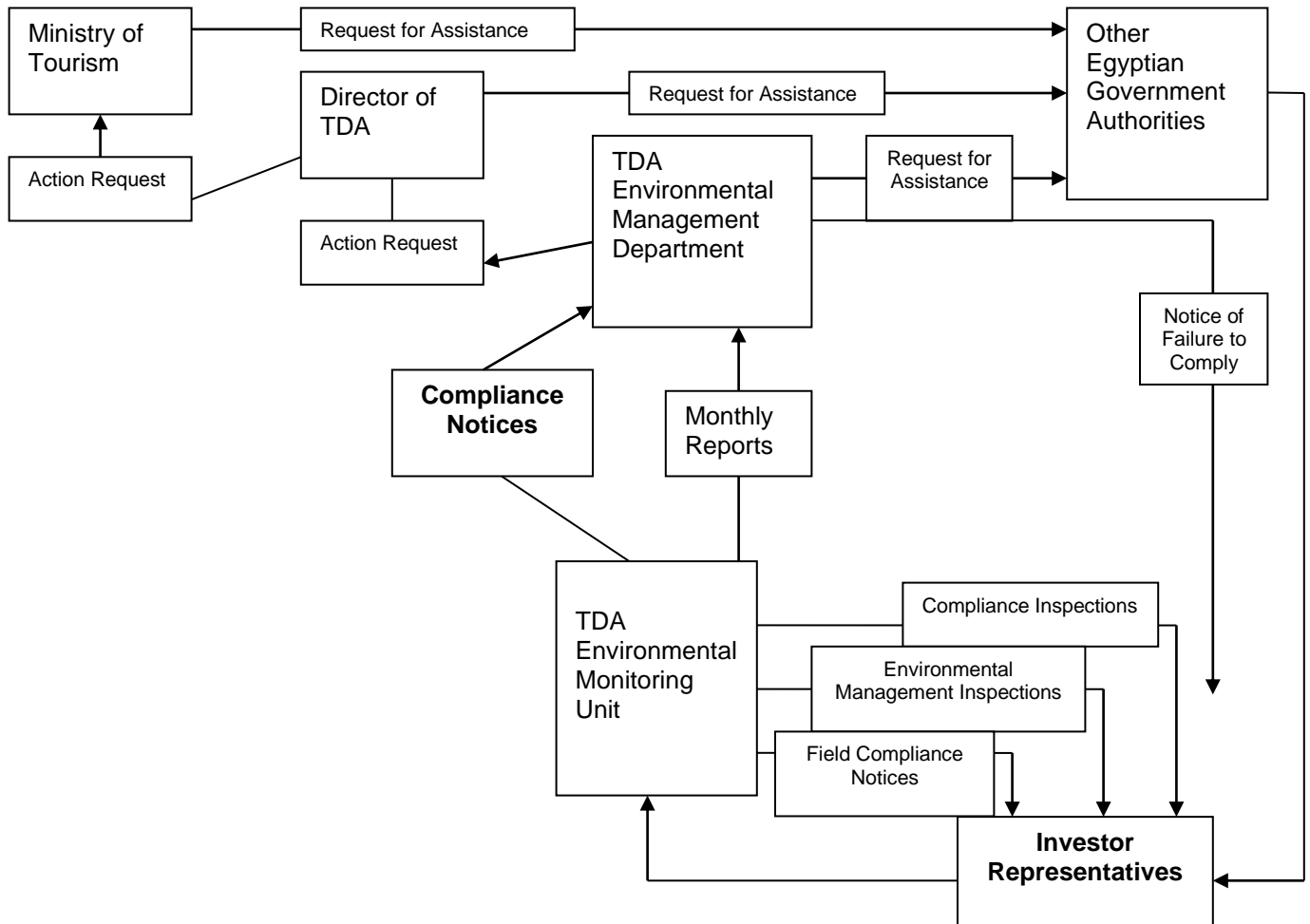
quality of their environmental management activities and provide responsible officials with sufficient information to make appropriate decisions concerning TDA environmental management program. The procedure seeks to assure that those persons who are responsible for environmental management, both within the TDA and in investor organizations, are adequately informed and held responsible for the actions required of them under the TDA environmental management program. The procedure recognizes that the role of the TDA is to stimulate and assist in investment in the tourism sector of the Red Sea region. It further recognizes that these investments are considered, by the Egyptian National Government, as strategic and critical to the growth to the Egyptian National economy. The procedure is designed to be concise, informative and consistent so as to allow comparisons between activity periods. It also recognizes the relative infancy of TDA environmental policy development and implementation as well as the developing nature of the overall Egyptian national environmental policy framework.

8.3 Reporting Framework

Within the TDA organization, the distribution of information is hierarchical and, because of the competitive nature of tourism investment, requires some degree of discretion. For this reason, the design of the TDA environmental management program seeks first to identify and rectify environmental management issues within the sphere of the investment authority and, wherever possible, is to be accomplished in a cooperative and positive atmosphere. This requires that upper management levels of TDA together with the higher level investor managers, be informed so that timely decisions can be made and implemented at the appropriate level of authority. When necessary, management decisions can be made, at the appropriate TDA management level, to involve other government agencies, national or regional, as necessary.

Most contact with the investor community, relating to environmental issues will be managed through the EMU. Reporting of these activities through the TDA hierarchy is accomplished through the issuance of the EMU monthly activity report. Where compliance actions are concerned, because they relate to a mandatory environmental requirement and may carry possible punitive actions, these are forwarded to the director of the Environmental Management Department for information. As the enforcement activity increases and commensurate with the need for enforcement action, the level of TDA involvement can conceivably increase to the level of TDA Director and beyond to other Egyptian governmental entities. This is to assure that the appropriate level of management is involved in the decision-making process concerning enforcement actions.

FIGURE 7.1
Environmental Management Unit
Reporting Flow



8.4 EMU Activities

EMU activities fall into three basic categories. These are environmental management activities and inspections, Environmental Compliance inspections, and environmental data gathering activities.

- Environmental management inspections are inspections to assess the general environmental quality of activities on or affecting TDA investments. These activities relate to the general environmental quality of the Red Sea Region that affect or pertain to tourism and related activities. Inspections relating to this activity are non-regulatory, non-binding and represent a good faith effort to assure continued maintenance of a high quality environment for the region. Records will be kept and assistance will be offered where such inspections reveal degradation in environmental quality as these activities ultimately affect the quality of the tourism product.
- Compliance inspections relate to those inspections that are made to assure that TDA investors are implementing the environmental programs required by their contract or under Egyptian law. These are binding inspections that carry punitive actions and may require legal proceedings to force compliance. The reporting procedure regarding this type of inspection is necessarily more rigorous and involves a greater degree of TDA management involvement as well as greater coordination with non-TDA entities. As TDA has assumed a policy that favors compliance assistance over enforcement, the procedure provides ample opportunity for the amicable resolution of compliance problems prior to initiating final legal actions.
- Data collection activities relate to the generation of environmental baseline information of survey activities designed to ascertain the status of environmentally important attributes in the region. These would include the identification and location of Internationally endangered species and their critical habitats such as dugong feeding grounds, turtle nesting areas, Reef health and tourism value, facilities locations and mapping and other such activities.

8.5 Types of Reports and Reporting Frequency

There are three basic reports to be filed by the EMU on a regular basis. The first is the Monthly report. The monthly report is a summary report to be filed with TDA management. It is a review of EMU activity with descriptive notes outlining activities conducted over the reporting period, planned future activities and a summary of the various actions taken and inspections made. This report is

routinely filed with the Manager of the Environmental Management Department and forwarded as needed by the Environmental Director to other TDA officers. As these are management reports, technical supporting documentation and technical field reports will be submitted as attachments under this procedure as needed.

8.5.1 Monthly Report

The **Monthly Report**, shown in exhibit 7.1, is prepared by the Manager of the Environmental Monitoring Unit based on the inputs provided by the EMU staff. The report is to be filed by the first week of the month following the reporting period. The monthly report is submitted together with copies of all inspection and compliance reports filed during the reporting period.

8.5.2 Annual Report

The second report type is the **Annual Report**. This is a summary of the year's activities and is based on the monthly reports. As shown in Exhibit 7.2, this report summarizes the EMU's annual activities in a clear and concise manner. It is transmitted together with a complete set of monthly reports. This report is provided to the Director of the Environmental Management Department and is forwarded to other TDA officials at the Department Managers discretion. The annual report is due in the first month following the reporting year.

8.6 Enforcement Compliance Notice

The last report to be filed, presented in Exhibit 7.3 is an **Enforcement Compliance Notice (ECN)**. This is an official notification that there has been a violation of TDA environmental policies, contractual requirements, or other legally binding Egyptian environmental statute.

As an official notification of violation, the Enforcement Compliance Notice begins the process that ultimately may carry penalties or result in court action if the problems identified are corrected. Once issued, the ECN is signed and received by the investor representative with signed copies distributed immediately to the Manager of the EMU, Manager of the Environmental Management Department (EMD), and, at the discretion of the EMD Manager, to other TDA officers. Copies of Enforcement Compliance Notices are also provided with each monthly report.

The ECN form is used in three ways. The first is a **Field Report**, which is issued by the inspecting official at the time of inspection. At this time, copies of the field report are given to the investor's facility representatives and to TDA management officials in the EMU. The Field Report is used by the EMU to develop a negotiated corrective action plan.

The corrective action plan is an agreement between TDA and the investor on the schedule for the completion of required corrective actions. Once this plan is developed, together with investor representatives, a formal **Notice of Failure to Comply**, is issued containing a time-table for corrective action. A re-inspection is made to verify compliance in accordance within the required timetable.

In the event of a failure to comply, the EMU issues **Notice of Enforcement Action**, which is forwarded to the Environmental Department for further action.

8.7 Linked Information Systems

In an effort to improve communication of environmental information both within TDA and between TDA and other relevant government entities, the EMU supports an Environmental Management Information system. This system is designed to capture and manage appropriate environmental information such as permit approvals, environmental management reviews and scheduling information. The system is linked with the Form B, an automated environmental screening tool used to assist managers in assessing the suitability of various environmentally related activities. The system provides a multiplicity of services and is geographically linked to allow the incorporation of EMU GIS. A description of EMIS is provided in appendix C.

8.8 Summary

The reporting process presented is designed to afford a maximum opportunity for the TDA to promote the cooperative implementation of sound environmental management procedures among the TDA investor community. While there may occur situations where investors are recalcitrant and unwilling to commit resources to correct environmental problems, the process is largely designed to promote a cooperative atmosphere between TDA and the investor community. The reporting procedures are also designed to promote transparency and to place needed information at the appropriate management level. As environmental management is largely a matter of policy implementation, the reporting procedure is designed to place needed information at the correct management level, depending on the type of action required.

Finally, the reporting process is designed to allow for progress tracking. Over the various reporting periods, these reports can be used to assess the level of effort and prioritize the types of environmental problems encountered among the TDA tourism investors. In this way, the reporting information can be used as a policy development resource to systematically eliminate common, recurrent environmental problems.

**Exhibit 7.1
Environmental Monitoring Unit, Tourism Development Authority
Monthly Activity Reporting Form**

Report Number:			Beginning	Ending
Date:		Period Covered:		
Reporting Officer and Title:				
<i>I. Summary Activities:</i>	<i>Activity</i>	<i>Count</i>	<p>* Inspections resulting in binding compliance notices requiring corrective action in accordance with contract or legal requirements. Follow-up inspections required.</p> <p>** <i>Inspection resulting in non-binding environmental management recommendations</i></p>	
	Environmental Compliance Inspections*			
	Environmental Management Inspections**			
	Baseline and Background Data Collection			
	Management Recommendations Issued			
	Compliance Enforcement Notices Issued			
	Compliance Follow-up Inspections			
	Management Recommendations Follow-up			
<i>II. Locations Visited:</i>	Location Name	Facility Point of Contact	Affiliation	

III. Monthly Activity Summary Narrative:

IV. Specific Problems Identified and Actions Taken:

V. Attachments and Supporting Documentation

Reporting Officer Signature: _____

Date: _____

Exhibit 7.2
Environmental Monitoring Unit, Tourism Development Authority
Annual Activity Reporting Form

Report Number:			Beginning	Ending
Date:		Period Covered:		
Reporting Officer and Title:				
<i>I. Summary Activities:</i>	<i>Activity</i>	<i>Count</i>	<p>* Inspections resulting in binding compliance notices requiring corrective action in accordance with contract or legal requirements. Follow-up inspections required.</p> <p>** <i>Inspection resulting in non-binding environmental management recommendations</i></p> <p>^A <i>Number of Compliance Enforcement Notices which have been resolved either because a facility was brought into compliance or because operating authority was revoked.</i></p> <p>^B <i>Number of Compliance Enforcement Notices which are awaiting final resolution because they are awaiting final actions (compliance, closure, court hearings etc.)</i></p>	
	Environmental Compliance Inspections*			
	Environmental Management Inspections**			
	Baseline and Background Data Collection			
	Management Recommendations Issued			
	Compliance Enforcement Notices Issued			
	Compliance Follow-up Inspections			
	Management Recommendations Follow-up			
	Compliance Enforcement Notices Resolved ^A			
	Compliance Enforcement Notices Pending ^B			
<i>II. Summary of Compliance Actions</i>	Location Name		Compliance Notice Actions	Results

III. Annual Activity Summary Narrative:

--

IV. Specific Problems Identified and Actions Taken:

--

V. Attachments and Supporting Documentation

Reporting Officer Signature: _____

Date: _____

Exhibit 7.3
Environmental Monitoring Unit, Tourism Development Authority
Compliance Enforcement Notice

I. Descriptive Information			
1. Report Number:		Date of Report	
2. Date of Inspection:		3. Inspecting Officer:	
4. Location Name			
5. Facility Point of Contact			
6. Title			
7. Type of Report (check one):	Field Notice	Notice of Failure to Comply	Notice of Enforcement Action
II. Standard Operating Procedure(s) Followed (copies attached)			
Procedure Title	Procedure Number	Comments	
III. Findings:			
IV. Corrective Actions Required			
Number	Description of Activity		

V. Corrective Action Completion Schedule		
Action	Date	Responsible Entity
Re-inspection Date:		
VI. Signatures:		
Inspecting Officer:		
Director Environmental Management Unit:		
Facility Field Representative:		
Investor Representative:		

9.0 GIS STANDARDS AND SYSTEM COMPONENTS

9.1 INTRODUCTION

The Tourism Development Authority (TDA) of the Egyptian Ministry of Tourism is building environmental management capacity under the U.S. AID Egyptian Environmental Policy Program or EEPP. Under the Red Sea Sustainable Tourism Initiative (RSSTI), a component of the EEPP, TDA is developing a basic Geographic Information System (GIS) for use in the environmental planning and monitoring program. The base GI system consists of a set of 1 to 50,000 scale topographic maps together with a complete series of Red Sea Nautical charts, a complete set of Egyptian Geologic Survey maps and LANDSAT 7 ETM imagery obtained from late summer and fall of 2001. From this foundation, the RSSTI program is developing a basic system of thematic data layers for use in the TDA environmental management program. As time progresses, the TDA anticipates the use of GIS by other departments within the organization and seeks to insure that efforts in GIS development will be compatible with efforts in other departments. The design of EMU GIS protocols assumes that the TDA will someday centralize its GIS data management system.

9.2 TYPES OF DATA

The EMU GIS system consists of a collection of datasets which can be broadly categorized as georeferenced vector and raster data types. Two types of raster data are used in the system consisting of georeferenced scanned paper maps and LANDSAT Imagery. These layers form the overall georeferenced base for the system.

Vector or thematic datasets are constructed in either ERDAS or ARCGIS program packages and managed through ARCGIS 8.2.

Other data structures anticipated for inclusion within the Gito be developed in conjunction with the GIS will include Excel Spread sheets, Dbase files, and other dataset systems which have been organized to be compatible with ESRI's Arcgis program.

9.3 BASE SYSTEM STANDARDS

The EMU GIS system is based on the following general geographic parameters:

Projection: Universal Transverse Mercator (UTM)
Horizontal Datum: World Geodetic System 1984 (WGS84)
Vertical Datum: Alexandria, 1906
Spheroid: WGS84
Accuracy of Graphic Representation: $\pm 0.0002 \times$ Scale (E.G. ± 10 meters @ 1:50,000; ± 5 meters @ 1:25,000)

To rectify raster imagery, ground control points are to be referenced against the Egyptian National Grid, High Accuracy Network, 1996, (HARN96) which is planned as the new Egyptian triangulation network. This network will be replacing the old 3 zone system based on the Az Zahara, 1874 datum and projected on the Helmert spheroid.

Spatial referencing shall be cast in the UTM coordinate system using the WGS84 horizontal datum and WGS84 spheroid.

9.4 Coordinate Conversion Standard and Documentation

National Egyptian spatial datasets have been constructed using various coordinate systems and standards. One of the most significant problems associated with using these data is the conversion of these various systems to the standard reference system used under these specifications. There are various mathematical methods for converting data that produce various levels of precision and accuracy. Because the system in use under this program is based on WGS84, the native reference system for the GPS network, any re-projection of data to or from another reference system will introduce a calculation error. The magnitude of this error is dependent on the mathematical model used to perform the conversion. For the purposes of standardization and documentation, the following system shall be applied to data included within the TDA-EMU GIS.

All GPS data collected by EMU personnel shall be collected in the WGS84 reference system. The level of positional accuracy shall be determined based on the needs of the survey.

Coordinate conversions from other systems, such as when taking data from paper maps or other data sources, shall be re-projected so as to achieve the required spatial accuracy given the graphic standard of the EMU GI system. There will occur exceptions where the data are obtained from non-GPS sources. These, of course will reflect a different standard of accuracy. Recognizing this, the method of coordinate transformation should be chosen to represent the nominal accuracy of the data to be represented. There is little need to represent data with accuracies of ± 1 part per hundred with rigorous conversion equations that achieve accuracies of parts per million. Typical coordinate transformation models include:

- Polynomial Fit – This is the most accurate of models to be used for coordinate transformations. Parameters were calculated and published for Egypt by Mohamed El Tokhey of Department of Public Works, Faculty of Engineering, Ain Shams University, Cairo.

**TABLE 9.1 Geodetic Transformation Parameters (polynomial)
Old Egyptian, 1906 (1907)**

Coefficient	x_0 (m)	y_0 (m)	z_0 (m)
a00	-129.166	-1.920	325.161
a10	562.715	-652.805	-746.701
a11	351.913	229.206	-401.792
a20	-198.049	519.202	385.989
a21	-586.197	211.158	616.144
a22	-36.905	-326.321	40.333

in "On the Determination of Consistent Transformation Parameters between GPS and the Egyptian Geodetic Reference Systems" Department of Public Works, Faculty of Engineering, Ain Shams University, Cairo.

- 3 Parameter Transformation

A more common approach is the Molodensky transformation requiring 7 parameters which include shifting the X axis (DX), the Y axis (DY) and the Z Axis (DZ). Also necessary are values for X_r , Y_r , Z_r , or the rotation factors about the X, Y, and Z axis. An abridged method eliminating the need for the rotational parameters was devised which uses the parameters presented in table 9.2

**TABLE 9.2 Geodetic Transformation Parameters (3 Parameter)
Old Egyptian, 1906 (1907)**

Parameter	Value
DX	130
DY	-110
DZ	13
X_r (rotation)	N/A
Y_r (rotation)	N/A
Z_r (rotation)	N/A
S scale	1.0

Egyptian Blue Belt Parameters:

```
False_Easting  300000.00000000000000000000
False_Northing 1100000.00000000000000000000
Central_Meridian    35.00000000000000000000
Scale_Factor    1.00000000000000000000
Latitude_Of_Origin  30.00000000000000000000
```

These are the common parameters used in most commercial projection engines.

9.5 Vector/point Data Representation

Vector and point data may be introduced into the EMU GIS from various sources. Data may be generated directly by the EMU or received from other Egyptian government agencies, international resources or other sources. These data will be introduced into the system in the form of computer datafiles and presented in the ESRI ARCGIS *Shapefile* format together with the appropriate supporting database structures. These files will form the basic layers of spatial data supplied to the system.

Whatever the source, basic information must be maintained with the datasets which describes the nature, quality and attributes of the data. A measure of precision must be concluded to adequately describe the error possible within the data received so that its use cannot be over stated. For this reason the following minimum requirements shall be observed when vector datasets are established within the system.

Data shall be represented, at a minimum, on a 1:50,000 scale observing the tolerances of not more than ± 10 meters error in graphic representation at 1:50,000 scale.

9.6 Dataset Documentation

No formal documentation standard yet exists in the TDA but at a minimum, as datasets are developed, the following attributes are documented:

- Date of data collection
- Method of collection (map, GPS)
- Datum of data
- Description of Data
- Data accuracy estimate
- Intended use of Data

As the EMU GIS matures, a system of metafiles compatible with a larger TDA system (under construction) will be adopted to insure compatibility with the general TDA GIS.

9.7 Base Data Holdings

9.7.1 Scanned Maps

Scanned maps comprise the base layers for use in the EMU GIS effort. These were taken from the Egyptian Topographic Survey maps at 1:50,000 scale, the published Egyptian Geologic Survey maps, marine navigation maps published by the British Admiralty map series, and U.S. National Imagery and Mapping Agency. Maps were scanned at 250 dpi to assure that they would remain clear at all usable resolutions. Maps were geo-referenced in their published datums and those maps obtained from the Egyptian Topographic series (181) were further processed to include a set referenced in the WGS84 datum for use with satellite imagery. The list of scanned maps is contained in table 8.1

TABLE 8.1 SCANNED MAPS IN THE EMU GIS EFFORT

Name	Grid Reference
Jabal Gharib	NH 36 B3b
Jabal Umm Rujum	NH 36 B3c
Wadi Abu Had	NH 36 B3d
Jabal Ghurmul	NH 36 C1a
Ras Shuqayr	NH 36 C1b
Ras Gharib	NH 36 C1c
Ash-Shaykh Ash-Shadhli	NG 36 D1a
Jabal Abu Mimimid	NG 36 D1b
Jabal Al-Khullah	NG 36 D1c
Jabal Sartut	NG 36 D1d
Jabal Hamatah	NG 36 D2a
Wadi Lahaml	NG 36 D2b
Abu Ghusun	NG 36 D2c
Wadi Al-Qul'an	NG 36 D2d
Marsa Miki Al 'Ud	NG 36 D3a
Jabal Hafifit	NG 36 D4a
Jabal Sakit	NG 36 D4b
Jabal Nuqrus	NG 36 D4c
Jabal Ghadir	NG 36 D4d
Wadi AL Jimal	NG 36 D5a
East Jabal Ghadir	NG 36 D5c
Jabal Humr Wajjat	NG 36 G3b
Jabal Al-Mayyit	NG 36 G3d
Jabal Umm Khurs	NG 36 G5d
Jabal As-Sibal	NG 36 G6a
Wadi Umm Ghayj	NG 36 G6b
Bir Karim	NG 36 G6c
Bir Isl	NG 36 G6d
Jabal Al-Aswad	NG 36 H1a
Marsa Alam	NG 36 H1b

Bir Umm Huwaytat	NG 36 H1c
East Bir Umm Huwaytat	NG 36 H1d
Marsa Umm Ghayj	NG 36 H4a
East Bir Isl	NG 36 H4c
Jabal Al-Murr	NG 36 K2b
Jabal Simnah	NG 36 K2c
Jabal Abu Aqarib	NG 36 K2d
Jabal Dawwi	NG 36 K3a
Al-Qusayr	NG 36 K3b
Bir Quwayh	NG 36 K3c
Wadi Abu Shih	NG 36 K4b
Jabal Shayib Al-Banat	NG 36 K4d
Jabal Wairah	NG 36 K5a
Safaja	NG 36 K5b
Jabal Umm Inab	NG 36 K5c
Ras Abu Sumah	NG 36 K5d
East Safaja	NG 36 K6a
Jabal Abu Dukhan	NG 36 O1b
Jabal Abu Harbah	NG 36 O1c
Bir Al-Masa Id	NG 36 O1d
Wadi Um Dalfah	NG 36 O2a
Al-Ghardaqah	NG 36 O2b
Jabal Abu Shar Al-Qibli	NG 36 O2c
Jazirat Shakir (South)	NG 36 O2d
Jabal Ladid Al-Jidan	NG 36 O4a
Bir Milahah	NG 36 O4b
Jabal Umm-Mujul	NG 36 O4c
Wadi Dibb	NG 36 O4d
Ras Al-Jimshah	NG 36 O5a
Jazirat Shakir (North)	NG 36 O5b
Az-Zaytiyyah	NG 36 O5c
Jabal Garf	NF 36 L5a
Bir Baneet	NF 36 L5b
Wadi Madi	NF 36 L5c
Bir Baydah	NF 36 L5d
Jabal Homra-Dum	NF 36 L6a
Wadi Maysa	NF 36 L6b
Wadi Shab	NF 36 L6c
Marsa Shab	NF 36 L6d
Marsa Shab	NF 36 L6d
Bir Dif	NF 36 P1b
Bir Abraq	NF 36 P1d
Wadi Khashab	NF 36 P2a
Jabal Al-Anbat	NF 36 P2b
Jabal Umm Tinaydab	NF 36 P2c
Jabal Al Marafay	NF 36 P2d
Shalatin	NF 36 P3a

East Jabal Al Marafay	NF 36 P3c
Jabal Al-Arayis	NF 36 P4b
Jabal As-Sila'I	NF 36 P4d
Bir Bitan	NF 36 P5a
Wadi Khuda	NF 36 P5b
Bir Shut	NF 36 P5c
Baranis	NF 36 P5d
East Wadi Khuda	NF 36 P6a
Mina Baranis	NF 36 P6c
Ras Banas	NF 36 P6d
Marsa Abu Al Qaseem	NF 37 I4a
Jabal Kurab Kansi	NF 36 I4b
Wadi al-Anid	NF 36 P1c
Wadi al-Atrash	NG 36 K4c
Jabal al-Waquif	NF 36 L4c
Jabal Niqrub al-Fuqani	NF 36 L4d
Kalabshah	NF 36 N3d
Dabud	NF 36 N6d
Jabal Dajalay	NF 36 O3d
Bir Umm Hibal	NF 36 O4a
Jabal al-Ijayib	NF 36 O4b
Jabal Dihmet	NF 36 O4d
Kulat an-Nuss al-Bahariyyah	NF 36 O4c
West Jabal Ni'aj	NF 36 O5a
Jabal Ni'aj	NF 36 O5b
South Wadi al-Kharit	NF 36 O5c
Wadi al-Jararah	NF 36 O5d
Jabal Abu Hashim	NF 36 O6a
Wadi Dajalay	NF 36 O6b
Jabal Filaytah	NF 36 O6c
Jabal an-Nikaybah	NF 36 O6d
Bir Amrayt	NF 36 P1a
Jabal Hajar al Fil	NF 36 P4a
Jabal Junaynah al Gharbi	NF 36 P4c
Aswan	NG 36 B3b
Kawn Umbu	NG 36 B3d
Silwa Bahari	NG 36 B6b
Idfu	NG 36 B6d
East Aswan	NG 36 C1a
Jabal Dihaysah	NG 36 C1b
Wadi Umm Rukbah	NG 36 C1c
Sarir Umm Battikh	NG 36 C1d
Wadi al Kharit	NG 36 C2a
Jabal al-Ghurab ar-Rayyan	NG 36 C2b
Jabal Nuqrah	NG 36 C2c
Wadi Natash	NG 36 C2d
Jabal Humr Akarim	NG 36 C3a

Jabal Humrat Mukbid	NG 36 C3b
Jabal al-Muqtal	NG 36 C3c
Jabal Umm Quraf	NG 36 C3d
Jabal al-Mizan	NG 36 C4a
Bir Salamah	NG 36 C4b
Wadi Umm Salamah	NG 36 C4c
Jabal Midrik	NG 36 C4d
Wadi Shi'ayt	NG 36 C5a
Bir Hulaywat	NG 36 C5b
Wadi Bizah	NG 36 C5c
Bir Dunqash	NG 36 C5d
Bir Umm Qubur	NG 36 C6a
Jaba. Humrat Salamah	NG 36 C6b
Urf Umm Rashid	NG 36 C6c
Jabal Midarjij	NG 36 C6d
Wadi ar-Riddah	NG 36 F2b
West Isna	NG 36 F2d
As-Siba'iyyah	NG 36 F3a
Al-Kilh	NG 36 F3b
Isna	NG 36 F3c
Jabal ar-Rukhamiyyah	NG 36 F3d
Ar-Rizayqat	NG 36 F5b
Jabal Qarn al-Jir	NG 36 F5d
Al-Uqsur (Luxor)	NG 36 F6a
Jabal an Nazzi	NG 36 F6b
Naqadah	NG 36 F6c
Qus	NG 36 F6d
Wadi ash-Shaghab	NG 36 G1a
Wadi al Batur	NG 36 G1b
Wadi Umm Tinidbah	NG 36 G1c
North Wadi al-Batur	NG 36 G1d
Wadi al-Barramiyyah	NG 36 G2a
Al-Barramiyyah Mine	NG 36 G2b
Jabal ash_Shalul	NG 36 G2c
Bir al-Jindi	NG 36 G2d
Jabal al-Yutaymeh	NG 36 G3a
Jabal al-Hadid	NG 36 G3c
Wadi al-Mashash	NG 36 G4a
Wadi Minayh	NG 36 G4b
Al-Laqitah	NG 36 G4c
Wadi al-Qashsh	NG 36 G4d
Bir Minayh	NG 36 G5a
Jabal Al-Khaznawiyah	NG 36 G5b
Jabal Shahimiyyah	NG 36 G5c
Naq al-Bishariyyah	NG 36 K1a
Jabal 'Atallah	NG 36 K1b
Bir al-Jidami	NG 36 K1d

Al-Fawakhir	NG 36 K2a
Wadi Fatirah	NG 36 K4a
Jabal Mishbih	NF 36 L4a
Jabal Sabir	NG 36 N3d
West Jabal Ladid al-Jidan	NG 36 N6b
Jabal al-Kharazan	NG 36 N6d
Jabal Umm Juruf	NG 36 O1a
Jabal Niqrub al Fuqani	NF 36 L4d
Jabal al Waqif	NF 36 L4c
Jabal Kurab Kansi	NF 36 L4b
Wadi Abu Juluf	NG 36 N3b
Gazaer Rawabil	NF 37 I4b
Gazaer Sial	NF 37 I4c
Jabal Al Mizan	NG 36 C4a
Bir Al Quirayyah	NG 36 K1c
Aswan	NG 36 B3b
Geologic Map of Wadi Shait	
Geologic Map of Baranas Quadrangle	
Geologic Map of Jabal Hamatah Quadrangle	
Geologic Map of Jabal Ilbah	logic Map of Wadi Shait
Geologic Map of Wadi Wadi Hadid-Wadi Mubarak District	
Geologic Map of Jabal Hadab	
Structural Geologic Map of Wadi Hafafit	
Geologic Map of Wadi Hafafit Area	
Geology of Egypt	
Baranis and Approaches-1:50,000; Baranis-1:20,000	1:50,000 and 1:20,000
Bur Safaga and Approaches 2 parts A) Bur Safaga-1:15,000; B) Bur Safaga Approaches- 1:75,000	1:15,000 and 1:75,000
El Ghardaqa - 1:25,000; Approaches to El Ghardaqa-1:75,000	1:25,000 and 1:75,000
Madiq Gubal to Ras Gharib - 1:150,000; Sharm el Sheikh- 1:25,000	1:150,000 and 1:25,000
Approaches to Bahr el Qulzum- 1:50,000; Ain Sukna-1:25,000	1:50,000 and 1:25,000
Ras Shukheir to Ras el Sudr- 1:150,000; Ras Gharib-1:25,000	1:150,000 and 1:25,000
Gulf of Aqaba- 1:150,000; inset	1:150,000
Omega - Madiq Gubal to Geziret Zabargad	1:500,000
Suez (El Suweis) to El Akhawein (The Brothers) Including the Gulf of Aqaba- 1:750,000	1:750,000
El Akhawein to Rabigh	1:750,000
Offshore Installations in the Gulf of Suez (Including Ras Shukheir)	1:50,000
Plans in the Gulf of Aqaba A) Approaches to Eilat and El Aqaba- 1:75,000; B) Eilat and El Aqaba- 1:25,000; C) El Aqaba Industrial Port- 1:25,000; D) Approaches to Strait of Tiran - 1:75,000; E) Strait of Tiran- 1:25,000	5 in all, Multiple 1:25,000-1:75,000

Ras Matarma to Ain Sukna- 1:40,000; North Ain Sukna Port- 1:20,000	2 in all, 1:40,000 and 1:20,000
Approaches to the Port of Suez	1:40,000
Suez Bay (Bahr el Qulzum) to Ras Sheratib - 1:50,000; A) Ras Budran Terminal- 1:50,000; B) Wadi Feiran- 1:30,000	3 in all, 1:50,000 and 1:30,000
Ras Sheratab to Ashrafi Islands/ with inset (A) Zeit terminals, Inset (B) Ras Garib	1:150,000/ (A) 1:50,000 (B) 1:15,000
Ashrafi Islands to Safaga and Strait of Tiran	1:150,000
Ports on the Coast Egypt- A) Safaga - 1:35,000; B) Hurghada 1:25,000; C) Approaches to Safaga - 1:75,000; D) Approaches to Berenice- 1:60,000; E) Berenice- 1:25,000; F) El Qusier- 1:25,000	6 in all, Multiple 1:25,000-1:75,000
Bur el Suez	1:20,000

9.7.2 Satellite Imagery

A total of 14 LANDSAT 7 ETM Satellite images were purchased for use in developing the EMU GIS. These range in date from July 18, 2001 to October 27, 2001. The goal was to obtain imagery as close to September 2001 with the minimum of cloud cover and to maximize the agreement in date of acquisition within the same path and row. The list of images obtained in support of the EMU program are contained in table 8.1

TABLE 8.2 EMU Satellite Image Holdings

<i>Order Sheet - LANDSAT 7 ETM Data</i>			<i>IMAGE SPECIFICATIONS</i>				
<i>Image ID</i>	<i>Date</i>	<i>PRODUCT DESCRIPTION</i>	<i>Datum</i>	<i>Projection</i>	<i>Pixel Size</i>	<i>Image Orientation</i>	<i>Format</i>
7175039000119950	7/18/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7175040000124750	9/4/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7175041000124750	9/4/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7174040000120850	7/27/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7174041000120850	7/27/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7174042000127250	9/29/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7174043000127250	9/29/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7174044000122450	12/8/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7174045000122450	12/8/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7173043000124950	9/6/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7173044000124950	9/6/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7173045000124950	9/6/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7172044000129050	10/17/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS
7172045000129050	10/17/2001	ETM SYSTEMATIC CORRECTED SNGL	W84	UTM	28.5	MAP	NLAPS

9.7.3 Integration of GIS in EMU Activities

EMU is actively developing its baseline information and incorporating it into their GIS. Shape files have been constructed that contain the TDA cadastral which is addressable down to the individual lot level. Data are being collected to identify the status and ownership of each individual lot for use in a GIS based environmental tracking system. The GIS objective, in the current program, was to develop the basic GIS tools for the development and expansion of an integrated GIS for environmental management within the TDA. The basic tools are in place and baseline data are being added as a result of EMU survey operations. Surveys have been conducted at 44 specific installations for inclusion in the EMU GIS. These relate primarily to Power Plants, Marinas, Desalinization plants, and wastewater treatment plants. The data collected are obtained with the use of GPS and a standard survey form designed to highlight the environmentally important features of the various facilities involved. As the EMU matures these data will be used in the development of regional characterizations, for scheduling inspection, tracking results and the future examination and evaluation of accumulated impacts from increased density of operation.

A sister program in the development of a Land Use Management plan has produced much regional baseline information. These datasets have been converted, where useful in the monitoring program, to an appropriate GIS format for inclusion in the TDA GIS.

10.0 FUTURE DEVELOPMENTS

As the role of the EMU is expanding with increased emphasis on environmental management, the TDA has elected to provide the EMU with analytical laboratory capability and improved computer processing services. Acquisitions in these areas were made using funds obtained from the disbursement made under the USAID-EEPP program in 2000 – 2001, Tranche 1.

10.1 Computer Lab

With the initiation of the Unit's environmental monitoring program, EMU start to establish a computer laboratory with sophisticated hardware; GPS equipment and accessories that can best meet the needs of its operations. (The equipment list is presented in Appendix D).

10.2 Laboratory Unit

Within the framework of establishing the Environmental Monitoring Unit, a number of analysis and measurement laboratories are being prepared to monitor environmental changes in tourism centers, whether tangible and visible by the naked eye or through high-precision, high-tech measuring equipment.

This effort assists tourist center developers to comply with environmental rules of development in coastal areas and to meet with Tourist Development Authority requirements related to standards required to maintain quality of environment, pursuant to Law No.4 of 1994 on Environmental Protection.

Available laboratory equipment includes state of the latest observation and measuring equipment for environmental quality standards (environment means all activities and services for tourist centers).

By equipping stationary and mobile laboratories, Environmental Monitoring Unit aims to conduct field monitoring of activities and services at tourist centers in various phases from construction to operation. It also aims to monitor environmental changes concomitant to development process and expansions of tourism centers and projects for prompt intervention with the purpose of guidance and correction of any such situations as may negatively affect the natural system of the place. The environmental field monitoring work team conducts a number of field observations and measurements on site, takes samples for laboratory analysis, assesses a number of different parameters to identify the environmental status of the site and determine whether there is pollution or not.

10.2.1 Central Laboratory in Cairo

The main laboratory contains the latest stationary laboratory measuring equipment necessary to conduct measurement and assessment of soil and water, being basic constituents of marine environment; (The equipment list is presented in Appendix E). Equipment is as accurate as to measure levels below the minimum limits and conditions required by law for quality standards. They are equipped with standard chemicals necessary for calibration so as to be compatible with performance quality control systems and good laboratory practice, according to the international documented and official methods in this respect.

The main laboratory conducts standard preparations for exploratory chemicals and field measurement solutions. It also tests accuracy of field measurements and compares results by operating the same samples imported from measuring sites after storage through sound scientific methods.

Laboratory also conducts tests that cannot be completed on site such as the following measuring tests:

- BOD and COD;
- Heavy elements and nitrogen compounds and
- Microscopic tests.

10.2.2 Regional laboratories

- The Red Sea laboratory in Hurghada,
- Gabal al-Gezira al-Hamra tourist center laboratory.

Regional laboratories perform missions similar to the central laboratory. They contain basic laboratory equipment (Attachment VI) necessary to qualify the operation of the mobile laboratory in field missions. They also receive field monitoring and measuring equipment for calibration and preparation for another working day, including washing and cleaning glassware used.

A branch laboratory may also perform measuring or monitoring assignments in emergency cases or may fetch samples from a site for examining any complaint.

10.2.3 Mobile laboratory

A mobile laboratory contains most sophisticated high-precision, mobile field measuring equipment, equipped with high-quality chemical kits that instantly shows test results and environmental status.

11.0 WORKPLAN

11.1 Introduction

This work plan describes the activities to be to be developed by the Environmental Monitoring Unit of the Tourism Development Authority over the years 2003-2004.

As a result of the technical assistance provided though the Egyptian Environmental Policy Program from 2000 to 2003, the EMU has:

1. Establish the legal compliance framework.
2. Begun the development of an environmental information baseline for environmental impact analysis.
3. Received equipment and training
4. Identified and Implemented legally enforceable compliance monitoring procedures
5. Continued staffing and EMU technical development.

The following work plan includes continued emphasis on standards development and the development of enforceable compliance monitoring procedures together with continued training and manpower development.

11.2 Task 1 - Identification and Standardization of Field Inspection Procedures and field inspections

Description

Under this task, the Environmental monitoring Unit of the TDA shall conduct a review of all EEAA approved environmental assessments and extract the monitoring requirements for each of the activities assessed. These requirements shall be developed into Standard Operating Procedures for implementation in the field.

Once these requirements are identified and enumerated, the unit shall develop a standard protocol for the conduct of compliance inspections for inclusion in the SOP. As the review progresses, it is highly probable that the different EIAs will contain many of the same requirements for the various properties. In this case, a standardized procedure shall be developed for the conduct of the inspection that is common to the various facilities. This is to assure that no one facility is subject different of unfair inspection procedures.

Additionally, after the completion of the development of particular standard procedures, EMU staff will begin a regular schedule of inspections as mandated in the in the procedures developed.

Period of performance ongoing.

Coordination with other Departments or Agencies

Affected investor groups.

11.3 Task 2 - Identification and Collection of Environmental Baseline Information

Description

Unit personnel shall continue the identification and collection of regional environmental baseline information. This information shall include the identification and location of environmentally sensitive operations including Wastewater treatment plants and wastewater disposal, Solid waste management systems and disposal sites, freshwater resources (local wells) and desalinization systems. Data shall be collected and archived concerning important

socioeconomic resources and cultural sites to be used in the assessment of impacts of proposed development projects. Additionally, information concerning ecological attributes in the region shall be identified and collected for inclusion in the EMU baseline.

Period of performance 1 year, ongoing.

Coordination with other Departments or Agencies

This effort will be coordinated with the appropriate government and academic entities as identified during the review process.

11.4 Task 3 - Field Inspector Training and Workshop

Description

The EMU shall develop a training program for field inspectors assigned to provide compliance inspection services. Initially, this shall take the form of a workshop for the field inspectors to provide initial environmental inspection training and awareness. Initially, inspectors shall be trained in basic TDA environmental policies and operational directives as they pertain to inspection activities. Inspectors shall be trained on the use and implementation of Standard Operating Procedures in the performance of environmental inspections. As their activities are considered in the implementation of Law 4 as the activities of the Competent Administrative Authority, their activities carry the full weight of Egyptian Environmental Law. The workshop and subsequent in-service training shall include a training in the authorities, responsibilities and documentation requirements for conduction environmental compliance inspections.

Coordination with other Departments or Agencies

This effort will be coordinated with the appropriate TDA regional offices, Legal department, and other TDA departments as necessary.

11.5 Task 4 - Identification of Monitoring Standards and Norms

Description

Various Egyptian government agencies already administer regulations and surveillance programs that affect environmental quality. Many of these already apply to the Red Sea region. The Ministry of Health, the EEAA, the Ministry of Housing and the Egyptian General Authority for the Protection of Beaches are examples of such agencies. Where existing laws directly affect the operations of TDA concessions, the norms presented by these laws should be directly

incorporated into the TDA monitoring program. To facilitate the implementation of these norms, the TDA should consider the development of appropriate Memoranda of Understanding with cognizant ministries to coordinate the monitoring and enforcement activities.

Regional resources requiring varying degrees of protection may also provide sources for norms or standards development. Minimum distances from vegetation such as mangrove or seagrass beds may be required to assure the protection of these critical resources. Additionally, regional cumulative development effects may result in a general degradation of local environmental quality. Particularly important to the tourism industry, this potential may provide yet other norms or standards.

Aside from existing regulation and natural resource protection requirements, investors may provide yet another source of standards which may be needed to protect tourism operations. For this reason, the development of the standards and monitoring activities must consider the needs of the investors. This can be accomplished through the establishment of formal liaison with tourism investors through their association or the establishment of an advisory committee.

Specialized Equipment

None

Coordination with other Departments or Agencies

This effort will be coordinated with the appropriate investor groups and government entities as identified during the review process.

11.6 Task 5 – Training and Manpower Development

Description

Training and manpower development are essential to the success of the TDA environmental monitoring program. Among the types of training and professional development anticipated are training in the use and operation of technical equipment, information management systems, and in the use and interpretation of results. Additionally, technical conferences and seminars will provide necessary professional development and assure that the environmental monitoring maintains a high degree of professional competence in a constantly evolving field.

A strong emphasis will be placed on field or, “on the job”, training. As new technical systems and data collection tools are introduced, training in their use and operation will be required. General practices in data collection and

environmental monitoring techniques will form a major part of the institutional strengthening of the monitoring unit.

Additionally, as the program becomes more focused and defined, appropriate certification programs and professional development needs will be defined.

Initially, these training needs will be defined as the monitoring program criteria are established. Initial training will focus on the equipment and data systems used to collect and interpret field data. Training should include courses on:

- The operation of environmental monitoring equipment
- Staff training on the use and operation of the environmental data reporting systems
- Staff training in data analysis and report preparation.

Specialized Equipment

Equipment as needed for training exercises, to be defined within the context of the program.

Coordination with other Departments or Agencies

As training programs are developed, other departments may be interested in attending courses or seminars relevant to their respective areas of responsibility.

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APPENDIX A

EXECUTIVE DECREE 54, APRIL 23, 2000 Creating the Environmental Monitoring Unit within the TDA

ARAB REPUBLIC OF EGYPT
MINISTRY OF TOURISM
TOURISM DEVELOPMENT AUTHORITY



T. D. A.

DECREE NO. (54)
ISSUED BY
CHIEF EXECUTIVE OFFICER OF
TOURISM DEVELOPMENT AUTHORITY
Dated 23/4/00

Chief Executive Officer

- Having reviewed Law No. 47 of 1978 issued on the State Civil Servants Act and,
- Law No. 7 of 1991 and,
- Presidential decree No. 374 of 1991 issued on the organization of TDA and,
- For the purpose of work...

Decreed

(Article One)

An Environmental Monitoring Unit (EMU) relevant to the Memorandum of Understanding (MOU) relating to the Egyptian Environmental Policy Program (EEPP), and signed as parties, among others, by the United States Agency for International Development (USAID) and the Tourism Development Authority (TDA), shall be established to strengthen the environmental review and monitoring capabilities of the TDA.

(Article Two)

The function and responsibilities of the EMU are to coordinate and provide direction relating to monitoring activities undertaken by TDA Field Office staff, in order to ensure that construction and operation of developments under the authority of the TDA are undertaken in accordance with the rules, regulations and permit conditions of the TDA, and in accordance with Law No. 4 of 1994 and other Laws and regulations pertaining to development in coastal and other areas, and in order to ensure generally that minimal environmental damage is incurred by developments under the jurisdiction of the TDA.

(Article Three)

The EMU staff shall comprise an Administrative Officer, one Planner, three Engineers and one Secretary. The Administrative Officer shall be responsible for overall coordination of the EMU staff and liaison with TDA Field Office managers, and shall be assisted in administrative operations by a Secretary. The Planner shall provide assistance and guidance relating to the spatial integration of monitoring activities at the site and regional levels. The responsibilities of the Engineers shall be to provide guidance and assistance to TDA Field Office staff in the proper monitoring and inspection of TDA project activities.

**ARAB REPUBLIC OF EGYPT
MINISTRY OF TOURISM
TOURISM DEVELOPMENT AUTHORITY**



T.D.A.

(Article Four)

The Administrative Officer shall ensure that an EMU Engineer accompanies TDA Field Office staff in the Red Sea Region on a weekly basis, and that all TDA properties in that region are inspected on at least a monthly basis.

(Article Five)

The Administrative Officer shall be responsible for conducting bi-weekly meetings with EMU staff to compile field inspection findings, and shall report the results of those meetings to the Chief Executive Officer at the end of every month.

(Article Six)

All departments shall implement this decree.

Dr. Eng. Adel Rady
Chief Executive Officer of
Tourism Development Authority

APPENDIX B

EXAMPLE

INSPECTION MONITORING PROTOCOL

SOLID WASTE DISPOSAL

1. DESCRIPTION OF ACTIVITY

1.1 General Description, Operation and Typical Setting

The problem of solid waste disposal has been aggravating everywhere in the Red Sea. Its negative manifestations on public health, environment and national economy are being quite apparent and acute. The currently operating waste disposal sites are very poorly managed and the need for at least controlled solid waste disposal sites is increasing in the region.

Controlled disposal site should be properly selected to minimize its negative impacts on the environment. For example, wetlands and areas of flooding potential are unsuitable for this use. The groundwater level should be deep enough from waste liquid (leachate). Moreover, disposal sites should not be in the neighborhood of drinking water wells, urban areas, airports, or sensitive protected areas.

In the Red Sea region, controlled disposal sites are not required to be state-of-the-art for engineered sanitary landfills, but represent the minimum standards for waste disposal sites in an arid environment like the Red Sea.

The operation procedures inside a controlled disposal site starts with dumping incoming waste at the disposal pit (filling area). Dumped waste shall exclude any medical waste, liquid waste or recyclables like plastic bottles, aluminum cans and glass bottles. Only hotel waste (include landscape waste), construction waste and sludge shall be accepted in the disposal site and must be dumped separately. Mixing of any of the three waste types shall not be permitted at the disposal site.

The filling fundamental concept is that incoming waste is deposited in a specific area in the filling area, spread, and compacted and covered at the end of each working day with a thin layer of soil.

1.2 General Design Features

The proposed general design features of controlled disposal sites in the Red Sea include:

Disposal Pit (Filling Area). This is an excavated area designated for filling operations. The excavation depth shall consider the groundwater depth. The bottom of the pit must be designed to minimize percolation of liquid from the waste "leachate" down toward groundwater. A soil liner should be constructed

from low permeability soils compacted to a thickness of at least 30 cm. The soil liner should be then covered with at least with another 30 cm of drainage material to ensure its integrity during operation.

Fence. Two types of fencing shall be used at the disposal site. Movable fencing should be placed directly downwind from the filling part in use and this can be adjusted daily. Permanent fencing should be at least placed along the downwind perimeter of the whole filling area and perpendicular to the prevailing wind direction, but it would be better to have permanent fencing all around the filling area.

Access Road. The access road must provide direct access to the disposal area and be designed to bear the weight of heavy trucks. A well graded and constructed access road makes it easier for trucks to reach the disposal area and thus minimizes the chances of random dumping. Also a well compacted access road will minimize the impact on air quality due to dust generation from truck movement.

Site Security. The entrance to the disposal site should be secured with a fence and gate to prevent uncontrolled dumping. Fencing should be placed strategically to prevent uncontrolled access by trucks and/or scavengers. It is also advisable that personnel be assigned to police the site regularly during off-hours.

Employee facilities. There should be facilities for employees working at the site including bathroom, drinking water, first aid and shelter.

Storm water drainage. The perimeter of the disposal area must be designed to divert precipitation and surface water from running onto the disposal area. All such water must be diverted away from the disposal area.

Visual buffer. When a controlled disposal area is sited within visual distance of public roads and buildings, a visual barrier should be constructed to hide the active disposal area.

Finally, it is important to mention that both leachate control and landfill gas are not included in the given design features for the following reasons:

1. These design features will add significant cost.
2. Leachate amount will probably be very little because of the high evaporation rate in the Red Sea region.
3. Landfill gas will be produced but the cost again is the barrier.

1.3 Principal Environmental Concerns

Improper solid waste disposal causes many negative environmental impacts. The following represent the principal environmental concerns during construction and operation of solid waste disposal sites:

- Air Quality
- Groundwater level
- Proximity to urban areas and airports
- Proximity to drinking water wells
- Ground Stability
- Floods
- Proximity to sensitive area (e.g. protected areas)
- Proximity to occupied facilities (e.g. resort/hotel, school, hospitals, etc.)
- Public Health

1.4 Internal system interactions

In the disposal site, the collection trucks unload the collected waste in an area called the "receiving area". At this area waste separation starts to sort out the recyclables and the remaining waste taken to the filling area or the disposal pit where waste compaction takes place to reduce the waste volume. This step is followed by the placement of daily soil cover and ensures complete coverage of waste.

It is important to have a monthly complete record for the number of loads coming to the site every day. This could help to have an estimate of the waste generation rate and its consistency throughout the year.

1.5 Interactions with external systems

Solid waste disposal interacts with other external systems like collection and transportation. External systems directly affect the required number of workers and the operation schedule inside the disposal area. For example, efficient collection system definitely increases the amount of collected waste, which ultimately goes to the disposal site and the number of required workers, will increase. With the same concept, efficient waste transportation helps the contractor to have an accurate operation schedule. This means, that proper management of disposal sites must be coupled with both efficient waste collection and transportation.

Moreover, at source waste separation that most of the Red Sea resorts perform is a step ahead for decreasing amount of waste going to the disposal site and decreasing efforts needed at the disposal site for separating recyclables.

1.6 Key Environmental Effects and Interactions

The main environmental effects resulting from both construction and operation of solid waste disposal sites are:

- Air pollution
- Groundwater contamination
- Land pollution

- Health

These effects will be described in details in 2.1.1 and 2.1.2.

1.7 Hazardous Materials used in Operation

There are no expected hazardous materials to be used during operating the disposal site.

2. INDICATORS AND MEASURES OF EFFECTS

2.1 Description of Indicators of Environmental Effects

2.1.1 Construction

During the disposal site construction phase the following parameters could be affected as follows:

Air Quality

Generally, dust generation due to excavation work and truck movement shall impact the air quality in the area. This is a short-term impact, as this impact will stop after construction. The air quality in the area shall be also impacted if poorly maintained equipments are used.

Groundwater

The groundwater shall be contaminated if there is any fuel spillage either from working equipments or from fuel storage tanks kept in the site. This impact is also applied to any other liquid chemicals stored in the site during construction.

Land

Construction activities, which are mainly excavating the disposal pit and constructing the access road, will have a negative effect on land by changing the natural landscape. Because this is an irreversible impact and to avoid this kind of impacts, it is preferred to select naturally low area with considering the flood pathways.

Marine Life

The marine life could be negatively impacted if excavation and construction waste is dumped close to the beach or not handled properly. For example, empty cement bags can be carried by wind to the sea. This is a very long-term impact as any damage to the marine life and especially the coral reefs would take hundreds of years to grow up again.

 **Terrestrial life**

Loss in terrestrial life could happen in the disposal site due to excavation work. Site selection should take in consideration both terrestrial fauna and flora. Selection of a barren site of any terrestrial life will eliminate this impact.

 **Heath**

During the construction phase, negative heath impacts could occur on workers due to dust generation from excavating the disposal pit.

 **Workforce**

Local workers are needed during the construction phase. This is considered to have a short-term positive impact on the population living in the surrounding areas.

2.1.2 Operation

During the disposal site operation phase the following parameters could be affected as follows:

 **Air Quality**

The air quality will be negatively impacted during the disposal site operation due to filling operations and vehicle movements along the access road. Both will generate dust and this will impact the air quality as long as the disposal site is in use. Burning of waste shall also affect the air quality.

 **Groundwater**

The negative impacts on the groundwater will likely to happen if the compacted soil layer liner was not installed properly and therefore, leachate percolation will contaminate the groundwater. Negative impacts from fuel spillage either from equipments or from fuel storage tanks will also affect the groundwater. Bringing any type of unacceptable waste especially liquid waste to the disposal area shall also have negative impacts on the groundwater.

 **Land**

The main negative impacts on land will be during the construction phase. During operation, land could be negatively affected by wind-blown trash. Both continuous fence maintenance and placement of daily soil cover could minimize this impact.

 **Marine Life**

The marine life could be directly impacted if the fence is broken or has holes in it. This could allow wind-blown trash to spread allover the surrounding area and if carried to the sea serious losses in the marine life will happen. This is a long-term relatively irreversible negative impact.

 **Terrestrial life**

The terrestrial life in the surrounding area will be negatively impacted by any wind-blown trash. Wind blown plastic bags captured by desert plants are an example that could cause serious losses in these plants. The plastic bags acts as barrier for air and sunlight for these plants.

 **Heath**

The workers heath could be negatively impacted due to their direct contact with waste and dust generation from the filling operations. Beside the workers, the presence of facility shall have positive impacts on the public heath in the region if the disposal site runs properly.

 **Workforce**

Local workers are needed during the operation phase. This is considered to have a long-term positive impact on the population living in the surrounding areas.

2.2 Observations and Measurement Techniques

2.2.1 Construction

 **Air Quality**

The monitor shall note the dust height from the ground surface during the construction of the access road and excavating the disposal pit.

 **Ground water**

The monitor shall inspect the compacted soil layer and ensure it covers to the whole disposal pit where waste will be placed. He shall also note any fuel leak in the site.

 **Land**

The monitor shall note the presence of any excavation or construction waste at the beach area. Any wind-blown trash shall be also recorded.

 **Marine Life**

The monitor shall note the presence of any excavation or construction waste at the beach area. Any wind-blown trash shall be also recorded.

 **Terrestrial life**

The monitor shall note the presence of wind-blown trash in the area surrounding the construction site.

 **Heath**

During the construction phase, all workers at or close to excavation area shall wear masks to protect them from breathing dust suspended in the air.

 **Workforce**

The monitor shall note the number of local workers involved in the construction of the disposal site.

2.2.2 Operation

 **Air Quality**

The monitor shall note any fire or smoke coming out from the dumped waste. Dust height from the filling operation shall be also recorded.

 **Groundwater**

The monitor shall inspect all incoming loads to the disposal area to ensure absence of any liquid waste which shall not be collected by the contractor. There should be also no fuel leak on the ground.

 **Land**

The monitor shall inspect the fence and note the presence of wind-blown trash in the area surrounding the disposal site. Any dumped waste seen along the access road sides must be recorded.

 **Marine Life**

In cooperation with resorts the monitors shall be informed during their regular visits of any wind-blown trash occurring at their beaches. The fence height must be checked for capturing all trash.

 **Terrestrial life**

The monitor shall note the presence of wind-blown trash in the area surrounding the construction site. The fence height must be checked for capturing all trash.

 **Heath**

During the operation phase, all workers at or close to excavation area shall wear masks to protect them from breathing dust suspended in the air. Fire and smoke shall be recorded if seen at the site

 **Workforce**

The monitor shall note the number of local workers involved in the operation of the disposal site.

2.3 Interpretation of Results

2.3.1 Construction

 **Air Quality**

Dust control measures could include paving of the access road, use of water trucks to spray water, minimizing excavation works in windy days.

 **Ground water**

In case the monitoring record contains any comments regarding any fuel leakage, the monitor shall inform the contractor immediately to take corrective actions like stop using the equipment making this leak or fix any fuel tanks in the site.

 **Land**

The monitoring record shall mention any construction or excavation waste at the surrounding area or along the access road. The contractor must remove all this kind of waste and designate an area in the disposal pit for dumping the construction waste. The excavation waste can be used as a daily soil cover.

 **Marine Life**

Any construction or excavation waste recorded at or close to the beach area must be removed immediately by the contractor.

 **Terrestrial life**

Any construction or excavation waste recorded at or close to the disposal site must be removed immediately by the contractor.

 **Heath**

The contractor shall stop the excavation works, if his workers are not wearing masks to protect them from breathing airborne dust. He shall not start working unless he provides masks.

 **Workforce**

The contractor shall be encouraged to use local workers during construction, as they will cost him less than bringing workers from other areas. This could be stated in the agreement between the TDA and the contractor to use a certain percentage of his workers from local people.

2.3.2 Operations

Air Quality

Burning waste must be forbidden. There should be always a water truck in the site to spray water to minimize the dust in the air. In windy days, the contractor can be asked to decrease waste filling operations.

Ground water

The proper placement of the bottom liner shall minimize the negative impacts of leachate on the groundwater. If the monitor record show any dumped waste without lining, the contractor must remove this waste immediately to the lined filling area. The same applies to any fuel leakage seen or liquid waste seen on the ground.

Land

The monitoring record shall mention any wind-blown trash at the surrounding area or along the access road. The contractor must take corrective actions like sending his workers to cleanup the surrounding area. The contractor shall also increase the fence height to be more efficient in capturing wind-blown trash.

Marine Life

The monitoring record shall mention any wind-blown trash at beach areas close to the site. The contractor must take corrective actions like sending crews to cleanup the beach. The contractor shall also increase the fence height to be more efficient in capturing wind-blown trash.

Terrestrial life

The monitoring record shall mention any wind-blown trash at the surrounding area. The contractor must take corrective actions like sending crews to cleanup the surrounding area. The contractor shall also increase the fence height to be more efficient in capturing wind-blown trash.

Heath

The contractor shall be asked to stop the filling operations, if his workers are not wearing masks and gloves to protect them from direct contact with waste. He shall not start working unless he provides mask and gloves for his workers.



Workforce

The contractor shall be encouraged to use local workers during operation as they cost him less than bringing workers from far areas. This could be stated in the agreement between the TDA and the contractor to use a certain percentage of his workers from local people.

3. IMPLEMENTATION OF MONITORING REQUIREMENTS

3.1 Assignment or Responsibility

Waste disposal sites will be most probably located in the TDA lands. For this reason, the TDA shall be responsible for monitoring their lands. The private sector (resorts/hotels) as it represents the main source of waste in the region and the solid waste problem could affect their investments is also responsible for monitoring the solid waste contractor performance. Therefore, it is very important to keep continuous exchange of monitoring results between both parties. The success of the monitoring program will be directly affected by this cooperation. Moreover, the disposal site operating contractor shall also have a monthly environmental register showing all his daily activities.

3.1.1 TDA

The TDA shall be responsible for sending well-trained monitors for evaluating the disposal site contractor compliance with the environmental conditions. The TDA monitoring plan shall include the following:

■ Access Road

The access road gives a first impression about the level of compliance of the operating contractor in handling waste at the disposal site. In other words, the access road must be clean of any litter. The presence of waste will be due to either unloading waste outside the disposal site or wind blown trash. In both cases the surrounding area will be contaminated. The TDA monitors shall inspect the access road daily.

■ Fence

No holes or breaks in the fence shall be observable. Also, the fence height shall not allow any wind-carried litter to spread out in the area surrounding the disposal site. The TDA monitors shall inspect the fence and ensure that litter-picking crews are regularly working in the surrounding area.

■ Presence of unacceptable waste

Acceptable waste is only allowed to be taken to the disposal area and include hotel waste, construction waste, and sludge. Other waste types, like medical waste, liquid waste, and hazardous waste shall not be even collected by the contractor. The TDA monitor shall be responsible for recording any type of unacceptable waste in the site.

■ **Waste separation**

The contactor shall assign an area inside the disposal site for waste separation if not previously sorted at the source. Nothing should be left in this area at the end of every working day. Recyclables are either placed in a different area or sent for selling. The TDA monitor shall inspect that recyclables are not dumped in the filling area.

■ **Waste Compaction**

In-place waste compaction will decrease the waste volume and in turn will add more lifetime to the selected disposal site. This process shall be performed at the end of every working day. The TDA monitors shall check that the waste compaction equipment is working properly.

■ **Placement of daily soil cover**

The daily soil cover will suppress fires, control vectors, and hide the waste from birds and scavengers. Therefore, the placement of daily soil cover will decrease the environmental impacts resulting from direct exposure of waste. The TDA monitors shall note any waste exposure without soil cover.

■ **Scavenging**

All type of scavenging carried out by the Ababda inside the disposal site must be forbidden. Any on-site sorting shall be confined to a dedicated area of the disposal site. The negative environmental impacts will arise from the direct contact with waste. The TDA monitor shall ensure that all waste separation workers are wearing gloves. He also shall note any waste scavenging by Ababda.

■ **Litter Control**

The disposal site crew shall be responsible for picking up litter inside the disposal site as well as wind blown litter caused by the disposal site and along all access roads and the surrounding area. On a continuous basis, the disposal site crew shall inspect the entire perimeter and collect all litter outside the disposal site. The TDA monitors shall inspect the disposal site, access road, and the surrounding area to ensure that the litter control measures are effective.

■ **Fire**

Burning of waste to decrease the waste volume shall be forbidden in the disposal site. Any fire and smoke will definitely affect the air quality in the area. Moreover, this will affect the labor health working in the site. The TDA monitors shall note any waste burning in the site.

■ **Dust**

There will be dust generation in the disposal site due to waste filling operations. The TDA monitors shall note the dust height and the presence of water truck in the site used for water spraying when the dust levels increase.

It is important to mention, regarding the operating contractor environmental register, the previously described parameters shall be also monitored and included contractor register. The difference here is that the contractor has to monitor the same parameters but more frequent and preferably monitoring all of them on a daily basis.

3.1.2 Private Sector

The private sector (resorts/hotels) shall be responsible for monitoring the following:

- Access Road
- Fence
- Litter
- Fire
- Dust

The results of these monitored parameters shall be available for the TDA monitors to confirm the contractor register accuracy. These parameters were selected in a way that the resorts can do their records without going inside the disposal site. For example, dust and smoke from fire can be recorded if seen from the resorts.

3.2 Specialized Expertise


3.2.1 Personal and Training required


The training of all monitors should concentrate on teaching them how to evaluate the contractor compliance with the minimum technical requirements contained in the agreement between the TDA and the disposal site contractor. To achieve this, monitors need to be trained on the following:


- Study and become fully knowledgeable of the agreement specifications for solid waste disposal site construction and operation.
- Aware of all laws regulating waste collection, transportation and final disposal.
- Aware of the Red Sea solid waste characteristics (waste generation & waste composition).
- Fully aware with operation of controlled solid waste disposal site.
- Observe and report violations of disposal site rules and regulations.
- Complete monitoring forms.

3.2.2 Specialized Equipment

Controlled disposal sites require daily management. Three pieces of equipment are essential: front-end loader, bulldozer, and dump truck.

 **Front-end loader.** The loader is used for material handling: loading the dump truck, placing cover material, etc. Smaller scale sites may only need the loader periodically for material handling. Larger scale sites will probably require a loader on site at all times.

 **Bulldozer.** The bulldozer is used to manage the filling process, compact waste, spread cover material, maintain on-site roads, perform general grading work, etc. A bulldozer needs to be on-site at all times.

 **Dump truck.** The dump truck is used for moving materials. It may be needed only periodically.

Additional pieces of equipment that may be needed during operations include: water truck, scraper, and/or road grader. Depending on the site of operation, more than one piece of a certain type of equipment may be needed. It may be feasible to share equipment among several sites or lease equipment for temporary use.

3.3 Recommended Implementation Schedule

The following table represents the proposed schedule for the TDA and the private sector to monitor the performance of the disposal site contractor.

Monitored Item	Sample Period (TDA)	Sample Period (Resorts/Hotels)	Sample Period (Operating Contactor)
Access Road	Weekly	Daily	Daily
Fence	Monthly	Monthly	Weekly
Presence of Unacceptable waste	Daily	TDA and contractor only	Daily
Waste Separation	Weekly	TDA and contractor only	Daily
Waste compaction	Daily	TDA and contractor only	Daily
Placement of daily soil cover	Daily	TDA and contractor only	Daily
Wind-blown litter	Weekly	Daily	Daily
Dust	Weekly	Daily	Daily
Fire	Daily	Daily	Daily
Scavenging	Weekly	TDA and contractor only	Daily

**Appendix A
Monitoring Matrix**

Anticipated Environmental Effect	Life Cycle Phase (Construction/ Operation)	Indicator	Measure of Effect	Measurement or Observation Technique	Responsible Entity	Sample Period	Record Keeping Requirement
Air Pollution	Construction & Operation	-Presence of airborne dust in the area -Presence of fire	-Dust Height from the ground surface. -Presence of smoke	Trained observer notes current conditions and compared to typical unpolluted systems and compares observations with previous inspections.	TDA and Investor	TDA – Weekly Investor – 2 times a week	Investor maintains record of observations and the TDA observations verifies investor records
Groundwater contamination	Construction & Operation	-Presence of fuel spillage during construction -Presence of liquid waste during operation	No attempt to stop fuel spillage on the ground and continue receiving liquid waste.	Analysis of Water samples from monitoring well close to the site.	TDA	TDA –Weekly	TDA maintains record of observations and compare it after controlling the effect
Land pollution	Construction & Operation	Presence of wind-blown trash	Wind-blown trash with no apparent attempt to stop it.	Trained observer notes current conditions and compared to typical unpolluted systems and compares observations with previous inspections.	TDA and Investor	TDA – Weekly Investor - Daily	Investor maintains record of observations and the TDA observations verifies investor records
Loss in Terrestrial and Marine life	Construction & Operation	Presence of construction waste and wind-blown trash close to the beach	Piling up of waste close to the beach.	Trained observer notes the current conditions and compare it with unpolluted areas.	TDA and Investor	TDA – Weekly Investor - Daily	Investor maintains record of observations and the TDA observations verifies investor records

Heath	Construction & Operation	-Workers not wearing masks and gloves. - Ababda scavenging waste	No attempt to stop scavenging and providing workers with masks and gloves	Trained observer notes the current conditions.	TDA and Investor	TDA – Monthly Investor - Weekly	Investor maintains record of observations and the TDA observations verifies investor records
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Appendix B

Monitoring Reporting Form TDA (Construction)

Facility Name	Name of disposal site (e.g Shagraa Disposal site)	Facility Coordinates (decimal degrees)	
Date of Inspection		Latitude	Longitude
Inspector			
Life Cycle Phase (construction)			
Inspection Parameter	Finding	Yes	No
Parameter 1 Excavation Waste	e.g. excavation waste dumped in the desert.		
Parameter 2 Construction waste	e.g. construction waste dumped in the desert.		
Parameter 3 Lining	e.g. The filling area lining is not as stated in the design.		
Parameter 4 Construction material handling	e.g. Cement bags scattered all over the surrounding area.		
Parameter 5 Fence	e.g. The fence is broken		
Parameter 6 Access Road	e.g. The access road is not well graded		
Parameter 7			
Parameter 8			
Parameter 9			
Parameter 10			
General Observations			
<p>Example: 1. The filling area is lined. 2. Fence height. 3. Access road is well graded.</p>			
Noted Deficiencies			
Follow-up Recommendation			

Monitoring Reporting Form TDA (Operation)

Facility Name	Name of disposal site (e.g Shagraa Disposal site)	Facility Coordinates (decimal degrees)	
Date of Inspection		Latitude	Longitude
Inspector			
Life Cycle Phase (operation)			
Inspection Parameter	Finding	Yes	No
Parameter 1 Access Road	e.g. Dumped waste along the access road		
Parameter 2 Fence	e.g. Fence height not capturing all wind blown trash		
Parameter 3 Presence of unacceptable waste	e.g. Presence of medical waste		
Parameter 4 Waste separation	e.g. Presence of recyclables in the filling area		
Parameter 5 Waste compaction	e.g. The waste compaction equipment is not working		
Parameter 6 Daily soil cover	e.g. waste is exposed		
Parameter 7 Fire	e.g. Smoke coming out from waste		
Parameter 8 Litter	e.g. Wind blown trash in the surrounding area.		
Parameter 9 Dust	e.g. Dust height from the filling area is high		
Parameter 10 Scavenging	e.g. Presence of Ababda scavenging waste.		
General Observations			
Noted Deficiencies			
Follow-up Recommendation			

Facility Monitoring Reporting Form

Facility Name	Name of disposal site (e.g Shagraa Disposal site)	Facility Coordinates (decimal degrees)	
Date of Inspection		Latitude	Longitude
Inspector			
Life Cycle Phase (construction/operation)			
Inspection Parameter	Finding	Yes	No
Parameter 1 Access Road	e.g. Dumped waste along the access road		
Parameter 2 Fence	e.g. Wind blown trash in the surrounding area.		
Parameter 3 Fire	e.g. Smoke observed or smelled from the disposal site		
Parameter 4 Litter	e.g. Wind blown trash in the surrounding area.		
Parameter 5 Dust	e.g. Dust height from the disposal site is high		
Parameter 6			
Parameter 7			
Parameter 8			
Parameter 9			
General Observations			
Problems Identified			
Corrective Action Taken			

APPENDIX C

TDA ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEM EMIS

USAID/Egypt

Egyptian Tourism Development Authority (TDA)

TDA Department of Environment Environmental Management Information System (DoEMIS)

Overview

Cairo-Egypt, June 26th, 2003



Tourism Development Authority
TDA Egypt



Red Sea Sustainable Tourism
Initiative RSSTI

I. BACKGROUND/CONTEXT

Red Sea Sustainable Tourism Initiative (RSSTI) is a PA Government Services, Inc.-implemented project providing technical assistance to the Egyptian Tourism Development Authority (TDA), with funding provided by the U.S. Agency for International Development (USAID). The RSSTI is being implemented under the broader Egyptian Environmental Policy Program (EEPP), a USAID–Government of Egypt (GoE) policy support program.

The TDA was established under presidential decree in 1991 to facilitate private investment and development in designated tourism regions in Egypt. As part of its mandate, the TDA has been directed to bring on line 10,000 hotel rooms each year to reach a total of 200,000 by 2017; nearly 3,000¹ small, medium, and large individual tourism projects and facilities of various types are being planned and implemented. Approximately 45 percent of these new facilities will be located on the Red Sea Coast. Associated with such rapid growth is the potential threat of environmental degradation to both terrestrial and marine ecosystems.

As required by Egypt's Law No. 4 of 1994 for the Environment, in 1997 the TDA began strengthening its policy of incorporating environmental impact management considerations into its development program. The TDA has since become very active in implementing the process of Environmental Impact Assessment (EIA) in tourism development projects, and is pursuing automated solutions to facilitate the related application and submittal procedures. Law No. 4 designates the Egyptian Environmental Affairs Agency (EEAA) as the regulatory government agency responsible for overall environmental compliance and monitoring tasks across the different sectors, including tourism development. In new tourism development regions such as the Red Sea, the TDA plays an administrative and directorial role and is referred to as the Competent Administrative Authority (CAA)². The TDA's Department of Environment (DoE) is responsible for receiving and reviewing all EIA applications (i.e., comprehensive or scoped studies) for new projects, and approving or rejecting each application based upon an initial review by its own staff. The DoE review is followed by multiple reviews by members of EEAA's review community (i.e., EEAA staff, consultants), awards approval as well as monitoring the process of

¹ Conservatively estimated and based on an average of 50 individual projects per tourism development center (TDC). An individual project can be any of the following: coastal resort, inland resort, jetty or walkway, marina, golf course, central or individual utility, or any individual or central facility. TDA's *Development Strategy Report* also gives an estimate for the total number of projects; this number, however, does not reflect support facilities.

² Under Environmental Law 4/1994, the TDA is the Competent Administrative Authority (CAA) for tourism projects located in the designated tourism development regions. As such, it is responsible for reviewing and submitting each client's Environmental Impact Assessment (EIA) to the Egyptian Environmental Affairs Agency (EEAA), which has final authority regarding EIA approval.

implementation. Since 1999, the activity level, quantity, and complexity of the DoE's workload have increased dramatically³, but staffing has remained essentially the same. At present, the DoE is highly dependent on manual information processing. RSSTI and TDA are moving aggressively to eliminate excessive paperwork from internal DoE processing. The TDA is relying on information technology to play a major role in the DoE's ability to keep pace with its increasing workload and paperwork requirements.

II. OVERVIEW OF INFORMATION SYSTEM SPECIFICATIONS

This section describes the specifications of the DoE's Environmental Management Information System (referred to hereafter as "DoEMIS"). The DoEMIS is an application that will track the environmental applications approval process throughout the Department of Environment (DoE) of the Egyptian Tourism Development Authority (TDA). This automated tracking system will allow the DoE to determine the status of an application at any point in the review process, reduce lag time between approval steps, reduce paperwork, and streamline the DoE's information processes of receiving, reviewing, and approving different types of environmental applications (e.g., EIA study/report applications, EIA scoped report applications, screening form "B" applications).

INFORMATION SYSTEM CONCEPT/ARCHITECTURE - The proposed system is expected to greatly enhance the DoE's project tracking services by providing a multi-user environment based on a client-server platform for current and future development. An n-tier solution is envisaged, using the Microsoft.NET platform and the Microsoft Visual Studio.NET integrated development environment.

The system will be based on a scalable 5-tier logical architecture supported by the .NET platform:

- ◆ The Data tier (SQL server) - built on Windows® 2000 Advanced Server, will be used as system back-end.
- ◆ The Web tier (Web server) – an alternative remote access gateway that is open to the Internet (through leased line or dial-up) will be made available for remote access from the field or DoE's regional operations. The Web tier is based on ASP.NET, a component of the .NET Framework that enables

³ Source: *USAID EIA Performance Indicator Survey Notes*. RSSTI (2002). "As of the end of 1999, TDA had on file 307 discrete projects mainly resorts – planned, existing or under implementation – in the Red Sea Region alone, equivalent to about 45% of the total national development plan. During the period 1997 through 1999, TDA received 130 project submittals, of which 20% submitted EIA applications/studies. It is anticipated that future submittals will approximate this level of activity, with all projects submitting EIA applications by 2006."

developers to build powerful server-side Web applications and XML Web services.

- ◆ The User tier (client) - provides user interface. All users will have the Win 98 SE for workstations operating system and Internet Explorer 5.X. The user interface can be created using the new ASP.NET Web Forms design tools in Visual Studio.NET, which enable developing Web applications using the same powerful form-based design techniques traditionally employed for building desktop applications. The Visual Studio.NET will provide the front-end tool in the Windows environment.
- ◆ The Business tier – is the middle-tier and incorporates the business rules and exposes web services to the client. It runs on the Data tier (i.e., thin client).
- ◆ The Geographical Mapping tier – from the middle tier, the application consumes an XML Web service for an ESRI geographic information system (GIS).

The system will have a 4-tier physical architecture. The separation of tiers described above will provide encapsulation for the different tiers and components, which can result in a more robust system application. Each tier is treated as a black box by the other tiers, and only clearly defined inputs and outputs can be exchanged. Built using Visual Studio.NET, the solution leverages the .NET Framework's comprehensive support for XML Web services-programmable application components that can be accessed using standard Web protocols.

INFORMATION SYSTEM OBJECTIVES/FUNCTIONS - In summary the system will provide the following functionality:

- ◆ Add flexibility to the way a system process is delivered to the user. An example of a system process is the default project environmental approval letter creation. This letter can be created dynamically and stored permanently in the database at the time of approval. It is important to make the default letter formats easily modifiable by the user and not "hard-coded" in the application program. It is desired that this process be made flexible so that, when necessary, defaults can be changed through a procedure without requiring a program modification. Another example of a system process is the default alarm lag time between the different review steps, which can be modified depending on the DoE's procedural operations.
- ◆ Built-in edits of business rules - flexibility to make system edits for business rules customizable by the user by specific type of work action is required. There are many edits embedded in the system throughout all applications and programs. Some edits apply to all actions, while others apply to a specific type of action. One example of desired customizable edits is the project type edit. Applications responding to a specific project type (e.g., resort, marina,

golf course) must meet certain criteria or terms of reference (i.e., data requirements). These criteria then become edits for those applications responding to that particular project type. The system should have the ability to input the particular project type's criteria as edits for those applications into the system, and be able to modify and add edits as necessary.

- ◆ Have the option to automate functions performed individually to improve productivity, such as the ability to carry out a batch of work actions at the same time. One example is the mass-issuance of letters to applicants (e.g., letters of approval or requests for clarification on project environmental proposals/studies). This can be based on the system's ability to group work actions according to common attributes, and then action a group as a whole, rather than one by one.
- ◆ Take full advantage of the client-server system user interface, i.e., pull down menus, point and click selection, multiple data windows, scrollable data fields, and multiple user processing.
- ◆ Multiple approval authority levels and separation of authorities by job classification, with security attributes and access codes.
- ◆ Automatic work logs/assignment of users and automated recording of work logs and detailed logs of every interaction a user has with the server.
- ◆ Default formats for correspondence and reports, which can be modified with a user-friendly designer interface.
- ◆ Perform automatic tasks such as notification alarms for delayed applications or pending work requests, automatic generation and coding of letters, and periodic reporting.
- ◆ System interface capabilities with other systems in future developments, and Electronic routing to EEAA at the data exchange level, to be possibly extended in future to direct on-line interface.
- ◆ Partial bilingual capabilities to allow data input in Arabic where necessary (e.g., Arabic letters, correspondence, and applications).
- ◆ Entry and storage capability for applications submitted on paper using bilingual optical character recognition (OCR) technology.
- ◆ Data input capabilities in digitized format on removable media (e.g., Applicant Project files⁴).

⁴ Applicant Project files (.prj) are files produced with a set of productivity software tools used by the applicant to fill out an EIA application form, for example, eForm B for Resorts. The Electronic Environmental Screening Form 'B' for Resorts is software designed to complete a resort EIA application using MS Windows and produces a Resort Project (.prj) file that can be opened, modified, and printed. Instead of submitting a printed application on paper, the applicant can provide the DoE with a soft copy on disk. The prj file can be easily read by the proposed system, thereby reducing paperwork requirements and the time needed by DoE staff to enter the application into the system.

APPENDIX D

EMU COMPUTER EQUIPMENT PURCHASES 2003 (From funds disbursed from USAID-EEPP Tranche 1)

- **3 Brand Name computers with the following specifications:**

- **Processor** : Intel Pentium 4 Processor 3.00 GHz or Higher w/Hyper- Threading Technology.
- **Memory** : 512 MB RDRAM PC1066 Expandable to 1.5GH
- **Storage** : 200GB (or Higher) UATA 100 7200RPM Hard Drive with 8MB Performance Enhancing Cache
- **Media Drives** : 3.5" 1.44 MB diskette Drive, DVD – R/-RW/CD-RW Recorder, and 48x/24x/48x CD-RW
- **Graphic Card** : 128MB AGP graphics Accelerator with TV out and DVI
- **Monitor** : 18" LCD Flat Panel Display Analog / Digital (18.1" Viewable)
- **Audio & Speakers** : SoundBlaster Gaudily Audio w/IEEE, with Digital External Acoustics 5.1 Speakers
- **Modem** : 56K PCI Voice Modem
- **Network Adapter** : 10/100/1000 Ethernet
- **Keyboard & Mouse** : Multifunction Keyboard and USB Optical Wheel Mouse With Mouse Pad
- **Operating System** : Microsoft Windows XP Professional Version
- **Application Software** : Microsoft Office XP Small Business
- **Anti-Virus Software** : Anti-Virus latest version
- **Memory Slots** : 2 Direct – RDRAM channels
2 RIMMs per channel
4 RIMM sockets
- **Bios** : Intel
- **Chipset** : Intel 850 E
- **Controller** : 1 FDD controller , 2 IDE channels each supporting 2 devices
- **Expansion Bays** : External : three 5.25"bays ,two 3.5" bay
Internal: two 3.5" bays
- **USB Ports** : Total of 6 USB ports
2 version 2.0 USB ports in the front
2 version 2.0 USB ports in the rear
2 version 1.1 USB ports in the rear
- **Dust Cover** : Dust Cover

- **4 lap-tops with the following specifications**

- **Processor** : Intel Pentium 4 Processor 2.4 GHz
- **Memory** : 512 MB RDRAM
- **Storage** : 60GB Hard Drive
- **Media Drives** : 3.5" 1.44 MB diskette Drive
8x DVD-Rom and 24x/10x/24x CD-RW (combination drive)

- **Graphic Card** : 64MB
- **Monitor** : 15.7" LCD TFT Active matrix
- **Audio & Speakers** : Built in Stereo Speakers
- **Modem** : Built-in V.92 modem and network interface
- **Network Adapter** : 10/100/1000 Ethernet
- **Pointing Device** : Touch
- **Expandability** : Two multipurpose bays, two PC Card slots, expansion bay port.
- **Extra Ports** : Headphone Jack, composite video, fire wire ports.
- **Operating System** : Microsoft Windows XP (latest version).
- **Carrying Bag** : Original Carrying bag
-

- **10 (GPS) Geographic Positioning System**

Receiver/Handheld

- The handheld must include an integrated GPS receiver and GPS antenna.
- Car Antenna.
- Graphic display.
- Car lighter power source.

Power

- Power usage: AA or AAA internal battery suitable for operating GPS receiver more than 8 hours .
- The handheld must be able to be powered from an external sources (vehicle, mains power) through the use of an optional external power kit.

GPS receiver

- The GPS receiver must be capable of differential being used for differential correction purposes.
- The GPS receiver must offer L1 C/A code with carrier phase filtered measurements band channels, and must be able to track up to 12 satellites simultaneously.

Communications

- The handheld must be capable of downloading to personal computer.
- The following protocols must come standard with the receiver:
 - RTCM CS-104 Version 2.1 Input
 - NEMA-0183 output

Operation

- The handheld must have a minimum of one megabyte of storage space for GPS positions and associated data Operation
- The handheld could support GIS data collection.

- **1 Laser printer A3 with the following specifications:**

- **Resolution** : 1200 dpi
- **Speed** : 40 ppm
- **First Page Out** :12 sec
- **Memory** : 32 MB at least
- **Page Size** :A3, A4
- **Printer Type** : Monochrome Laser
- **Printer Language** :PCL 5e, PCL6 , Postscript Level 3
- **Compatibility** : Windows 98/ 2000/ XP
- **Interface** : Ethernet , Parallel
- **Network Card** :Ethernet 10/100 Mbps

- **1 Data Show with the following specifications:**

- **Real Resolution** : Native XGA 1024 x 768
- **Max. Resolution** : 1600 x 1200
- **Video Compatibility** : XGA ,SVGA ,
- **Brightness** : 2500 ANSI Lumens.
- **Connectors** : CSV Video ,VESA M1-DA (includes RGBHV, panel Link Digital and USB)
- **Weight** : 4.5 Kg Max
- **Screen** : White Screen must be Included
- **Display** : 3 x 0.9" Poly Si LCD
- **Zoom** : Manual
- **Contrast** : 400 :1
- **Format** : 4 : 3

- **2 Laser printer A4 with the following specifications:**

- **A3 Ink jet Color Printer**
- **Resolution** : 1440 dpi
- **Compatibility** : windows 98/2000/XP
- **Media Type** :Plain paper – Coated-Glossy - Transparence
- **Connectors** :Parallel - USB
- **Printer Language** :Postscript level 3
- **Network Card** :Ethernet 10/100 Mbps

- **2 Color Scanner A3 with the following specifications:**

- **Full Color Scanner**
- **Max Scan Resolution** : 9600x 9600 dpi
- **Document Size** : A3
- **External Scan Depth**: 256 Gray Shades (8 bit) , 16.7 million color (24 bit).
- **Internal Scan Depth** : Black & White (1 bit),68.7 million Color (36 bit) , Gray Shades (12 bit) .
- **Connectors** : SCSI External – 50 pin High Density (M-50).
- **Interface** : Fast SCSI 2

- **1 Digital Still Camera with the following specifications:**

- **Recording System** : Still Image : (Tiff/ JPEG with DCF)
Motion JPEG Image : Quick Time Motion JPEG Support ,Voice Memo , E-mail and Text Still Image Modes.
- **Memory** : 64 MB Memory Stick Media
- **Recording Image** : 5MP (2560x 1920) , 3:2 5MP(2560x1712)
QXGA (2048x1536), SXGA(1280x960)
VGA(640x480) Picture Size.
- **Focusing** : Auto Focus , Manual Focus Ring with LCD magnifier and Hologram AF low light Laser focusing assist.
- **LCD Monitor** : 1.8 inch 123K Pixel Wide-angle color TFT <CD display.
- **Flash Mode** : Night Shot Infrared Illumination System , Night Framing Infrared.
- **All Accessories** : Batteries , Batteries Charger , Leather Bag , USB Connector with Cables and Software , AC Adaptor Card.

- **5 Personal Digital Assistant (PDA) with the following specifications:**

Processor: A.206 MHz Intel Strong ARM SA-1110 32-bit RISC
b. Operating System Microsoft Pocket PC 2002

Memory : 64-MB SDRAM, 32-MB Flash ROM Memory

Weight : Less than 8 oz.

Input Method : Touch screen, handwriting recognition , soft keyboard, character , voice recorder .

Interfaces:

- front panel Buttons.
- Stylus Eject Button 1
- Side Panel Recorder Button Voice Recorder.
- Active Bluetooth Indicator.

- Directional Pad 1.
- Light Sensor .
- CFA compliant For using with GPS flash card.
- Infrared Port IrDA standard.
- Microphone and Speaker.
- Communications Port Interface with USB/Serial connectivity that connects to cradle or directly to PC via Serial or USB cable.
- Compatible for connection with GPS receivers using popular output format messages.
- Stereo Audio Output Jack.

Cradle Interfaces Connector:

- a. Cable USB or Serial connects to PC.
- b. DC Jack connector for AC Adaptor.
- c. Auto Adaptor.

Display: 64 k color (65.536 colors)

16-bit touch-sensitive thin film transistor (TFT) liquid crystal display (LCD)

Viewable image size large than 5x7 cm.

Power Supply:

Lithium polymer rechargeable (in docking cradle or with AC Adaptor) Auto power supply .

Audio Capabilities:

- Plays back voice notes or meeting notes.
- Audible player link.
- Stereo Headphone Jack.
- One-touch record button.
- Integrated Speaker.
- Integrated Microphone.

Bundled Software:

Calendar, Contacts, Tasks, voice Recorder, Notes, Pocket Word (with Spell Checker), Pocket Excel, Pocket Internet Explorer, Windows Media Player 8(MP3), audio and video streaming), Calculator, Inbox (with Spell Checker for E-Mail), Microsoft Reader (E-book), File Explorer, MSN Messenger, Terminal Services Client, VPN Client, Infrared Beaming .

Carrying Case: Rugged Cover Carrying Case

The following is an optional requirement.

An advanced flexible GIS software suitable for use in presence of a connected GPS receiver for mapping and customized field data collection, with export capabilities in popular GIS file format.

• **2 GPS Flash Card with the following specifications :**

- a. CFA compliant for using with PDA and POCKET PC.
- b. Fast acquisition and reacquisition using parallel satellite tracking channels.
- c. Support for true NEMA -0183 data protocol.
- d. Automatic cold start acquisition process.
- e. Built-in Antenna.
- f. LED indication for navigation update.

- g. Data retention with Li-Ion battery.
- h. Reversed straight MMCX subminiature ,snap-on , coaxial RF jack receptacle.
- i. RF input : 1575.42 MHz (L1 band) to an reversed MMCX high-retention female connector.
- j. Serial Data Output Protocol Sir F Binary Serial I/O Messages or NEMA-0183
Bundled software appropriate customized field data collection and mapping software with export capabilities in popular GIS file format.

- **3 UPS with the following specifications:**

- SMART UPS 1000 VA at Least

APPENDIX E

EMU LABORATORY EQUIPMENT PURCHASES 2003

(From funds disbursed from USAID-EEPP Tranche 1)

1. Stationary laboratory Equipments

- **Bench Top Turbidity meter**

Digital reading, automatic multi
Point calibration and data logger
Measuring range: 0-1000 NTU \pm 2% max.
Operation temp.: 0 - 95°C
Supplied with 4 sample cells
& secondary calibration
Standards of <0.1, 20, 100, 800 NTU

- **Multiparameter Electrochemistry Analyzer**

Bench top high performance for GLP
Confirmation, built in printer
Multifunction electrodes holding device
Data logger bidirectional interface
*Gel pH electrode with built in temp. Sensor
pH range: -2.000 to +16.000 + 0.003
MV range: -999.9 to + 999.9

Equipped with all functions needed for ISE

*Conductivity cell ,4-electrodes design
With 0.01 mol/L KCL checking solution
Range : 0.0 uS/cm to 500 mS/cm(multi range)
Salinity: 0.0 to 70.00 ppt
TDS: 0.0 to 1999 mg/L
Temp. measuring range: -5.0°C to 100°C
Multipoint calibration for pH, ISE and conductivity
All calibration solutions must be supplied

- **Bench top dissolved oxygen Meter**

O₂ Concentration:- 0.00 to 19.99 mg/l
O₂ Saturation:- 0.0 to 199.9 % O₂
Universal electrode holder with storage box
Calibration solution and storage vessel
3 exchange membrane heads with cleaning
And electrolyte solutions

- **Water Quality Photometer**

Wave length range: 330 - 900 \pm 1 nm
Operation modes: extinction, conc. and spectra

Simultaneous measurements for turbidity correction
Auto zero adjustment and auto select function

With the test curette insertion Programmed test parameters,
additional methods can be programmed and stored Data logging
interface and soft ware (windows programs) spare lamps and fuses.
Software for PC under Windows For documentation and statistical
evaluation
Automatic acceptance of measurements
Automatic instruments recognition

- **Complete reagents and standards sets**

Supplied to perform water quality tests from A (ammonia) to Z
(Zinc), high selectivity, long shelf life chemicals fine packaging
&pkg/ 100 tests.

- **COD Thermal Digestion Thermoteactor**

Dual temp. (100 /148°C) control with 120 min Timer
safety cover with lid, overheat protection
Tube holder: - 15 to 20 holes for 16 mm O.D
2 holes 22 mm O. D

- **BOD Low Temp. Incubator**

Microprocessor controlled, high and low temp. Protection, simple
front-panel set up and reading,, 220 V
Temp range: -4 °C- 40°C
Capacity :- 260 lit.

- **BOD Manometer Test Kit Consists of:**

Non Mercury Pressure Measuring 8-places inductive stirring tray
equipped for 8-sample bottles with stirrer bar the measuring heads
each contains piezoelectric pressure sensor with display,
operating keys, memory and timer.
Measuring range: 0-80 mg/l BOD
Data transfer control unit & IR-thermal printer
Storage rack with marking rings.
Test agents for monitoring accuracy, calibration and leakage
Eye protection spectacles shatter proof carob Glass UV 400.
Smoke lenses

- **Microbiological Incubator**

Microprocessor controlled, high and low temp. Protection, simple
front-panel set up and digital reading, , 220 V st. st champ, double
door

Temp range: amb. to 70°C
Capacity :- up to 150 lit.
Respiratory protection mist / dust respirators
Convex shape with nose clip pkg/20

Safety Gloves (sizes) pkg / 100
High quality, Clear vinyl, powdered

- **Colony counter**
LED display reset able to zero fold surface magnification, 100 mm diameter.
Ring illumination lamp, pressure sensitive surface with switch able background counter marker with closing contact.
- **P late -form shaker**
Orbital action, Microprocessor controlled, high and low speed
Protection,
Plate form area: up to 45*45cm
C/w 250 ml & 100 ml flasks fittings, pkg/12
- **Water bath**
Microprocessor controlled, high and low
Temp. Sensor Protection with st.st chamber
Temp. to: 100C
Capacity: up to 6 lit
- **Ultra sonic water bath**
Microprocessor controlled, with heater & 60 min timer
Temp protection ,st.st basket & cover
Capacity: up to 2.5 lit
- **Trinocular Stereo microscope**
High quality optics, binocular head with
Variable intensity three way illumination fine focus control ,
tempering proof eyepiece.
Fully Rota table, 45 ° inclined magnification X15 /22 eyepieces
Supp. lens: X0.5&X2.0
Stereo zoom range: X5 - X30
Field dim.,mm : 46.6 – 7.8
Fiber optic light source & dual light guide
Image port on swinging arm stand
Supplied complete with digital video C-mount
Camera, Monitor adapter & monitor
- **Compound binocular microscope**

Right hand stage mechanical specimen holder, with 10 x eye piece and immersion oil.

Objectives (4 x, 10x, 40 and 100 x) with all needs & accessories

- **Automatic water distillation system**
With reverse osmoses To produce grade II water, capacity up to 4 lit./h
Automatic drain cycle with low water protection
Visual indicator water deionizer with disposable cartridge
Pkg / 10.
- **Automatic water distillation system**
Dual distillation system to produce grade II water, capacity up to 4 lit./h
All glass constriction with storage tank.
Automatic drain cycle with low water protection
- **Centrifuge, 220v**
For determination of suspended solids in wastewater at 3000 rpm speed for 15 min. with timer
Capacity:- 6 x50 mm
PC conical tubes tapered design calibrated to read percent volume
- **Glass filtration unit**
1 lit flask,250 ml funnel with clamp& cellulose acetate filtration
Membrane box/100 and vacuum pump220V
With gauge, tubing & fitting
- **Nalgen filtration set, pkg/12**
500 ml flask,100 ml funnel
Cellulose acetate filtration membrane box/100
Handy pump with gauge up to 16 m bar
- *Glass pipette filler*
Variable accurate controlled
- *Aspirate, dispense speed with trigger buttons*
Anglo nozzle with 0.45 um filter 220V charger
Accept pipettes form I to 100 ml
- *Bottle top dispenser*
For aggressive reagents
Safety prime with PTEF and ceramic path
Capacity 1-10 ml 0.05 ml division
C/w 3 bottle Adaptors 38.40 & 450

- **Sterilization/drying oven**
 - Digital read out, microprocessor control
 - With digital timer, st. st inside chamber
 - With 2 shelves,
 - Uniform heat/air distribution
 - Temp range: up to 250°C ± 0.1°C
 - Volume: Up to 6 cu. Ft
 - Hot hand, silicon rubber, gripping surfaces.
- **Portable Sterilization autoclave**
 - All aluminum construction, automatic
 - Thermostat control release valve
 - Pressure gauge & pilot light, 220v
 - Capacity up to 25 lit
- **Analytical Balance**
 - Internal auto calibration, 220V
 - Digital read out, glass chamber
 - Capacity up to 120 gm
 - Sensitivity: 0.1 mg
- **Top loading balance**
 - St. St wide round pan, leveling system
 - Capacity:- up to 1500 gm, 0.1 gm accuracy.&
 - Balance accessories
- **Hot plate/ magnetic stirrer**
 - Temp. up to : 450 C
 - St.st surface area: 20*20 cm
 - Speed: 40 to 1500 rpm
- *Horizontal laminar air flow*
 - 316 grade st.st work surface up to 65cm
 - HEPA filter airflow: 220 cubic m/hr
 - UV lamp, water& volt. Supply
- *Nitrogen determination kjeldahl system*
 - Digestion unit micro processor controlled Temperature
 - With IP digital module ,temp to 450 C
 - Chamber with st.st. Cover holds 20 tube 250 ml
 - Distillation unit / Aspiratory pump, 5 lit
 - Fully automatic system with water& reagent
 - Delivery pumps and two 5lit reservoir

2 - Portable Laboratory equipments

- **Portable gas analyzer**

Measurements of Emission for reliable combustion and pollution monitoring. Touch panel display, sampling pump, water catch pot, gas filters, integral rechargeable batteries and mains leads, integral printer measuring Ranges:-

O₂ :- 0-25%

CO Low range :- 0-4.000 pmm (or) 0-20.000 pmm
High range:- 0- 40.000 pmm (or) 0- 100.000ppm

SO₂ :- 0-4.000 pmm

NO :- 0-4.000 pmm

H_xC_x :-0-5%

Automatically Calculate and Screen & print out of CO₂
Efficiency, Excess air, losses and NO_x
stack temperature up to 1000 C
Probe handle with 3M hose.
Probe Pipe 1.5 M
Automatic zero calibration on switch on for all cells.
Automatic purging for all cells on shut down.

- **Oil and Grease Analyzer**

Portable for on-sit testing
High Sensitivity Infrared quartz cell
DATA logger & soft ware
Range: 0.5 to 1000 ppm
supplied with :-
a) sampling kit for TOG &TPH
in water and soil
b) 5lit.sample extraction solvent

- **Portable Multi-parameters Monitor**

Portable pH/Con. Meter
No interference in parallel measurements.
Automatic Calibration & temp. Compensation
With recognition of all sensors.
Auto read function with built in memory
Of data sets (values, date and time).
Data logger interface.
Corrosion protected plug contacts

supplied complete in a case for in-site
measurements with all accessories,

Power: NiCd rechargeable 4 batteries & 220v AC adapter
Electrodes holders and calibration standards &

Recommended spares .

Ranges:-

pH :- -2.00 to +16.00 (+ 01)

mV :- -1250 to + 1250 (1 mV)

Conductivity:- 0.0 to 500 ms/cm (+ 1%) (in multi ranges)

Salinity 0.0 to 70.0 ppt

Temp.: -5 to 100°C

- **portable Oxygen Meter**

Automatic Calibration & Temp. Compensation

Data logger interface.

Corrosion protected plug contacts

Supplied complete in a case for in-site

Measurements with all accessories,

Oxygen :- 0 to 600% (1%)

Oxygen conc. :- 0 to 19.99 mg/L

Temp. : -5 to 100°C

- **Portable turbidity meter**

Direct digital read out in NTU

Range: 0 - 1000 NTU

Accuracy: + 2% with 0.01 resolution

Operation temp.: 0 - 95°C

Data logger interface.

Corrosion protected plug contacts

Supplied complete in a case for in-site

With 4 sample cells & secondary calibration

Standards of 100, 800 NTU

- **Portable photometer**

Hand photometer with sufficient capacities

For saving calibrated plots of about 100 reagents.

Automatic calibration, results storage memory,

Data logger for PC transfer

Supplied in well arranged box for

Evaluation on the spot holding all cassettes,

Stand and reagents.

Spectral range:- 480/565/585/635 nm

Corvette size :- 16 mm round cuvette.

Ready mixed reagents (or another) can be used.
Supplied with reagents for A (Ammonia) to
Z (Zinc) test sets.

- **Portable chlorine analyzer**
For free and PDP measurement
Automatic calibration Data logger interface.
Corrosion protected plug contacts
Range: 0.00 to 5.00 ppm
c/w reagent test kit for 2000 test

- **Digital sound meter**
Dual scale decibel ,dual power Ac/Dc
Cover range:- 30 - 130 dB
 :- 35 -135 dB
Easy calibrate internal oscillator
With certificate of calibration
Ear protection telescopic- foldable muffs,
With ear pads pkg/100

- **Water Current meter**
Doppler current sensor mechanical
Light weigh
Current range: 0.0 to 10 m /sec.
Current direction range: 0 to 360
Accuracy \pm 5
And 20 m interconnecting cables

- **Portable balance**
Compact light weight battery operated
High stability range up to 300 gm,
0.1 gm readability
5 cm deep removable weighting pan
Automatic shut off

- **mirror stereo scope three direction**

- **Echo - sound depth meter**
Up to 100 meter
Imp-Hoff Settling Cone

- **one liter Pyrex glass**
With end tip pkg/4
With 3 cones heavy steel support rack

- **Spectrometer**

One liter clear plastic with mixing
Paddle Snap on lid, calibrated markings
For percent solid and settled sludge volume

- **Sample taking scoop**

For Water/ sludge and soil
Compleat with telescope pole
Up to 3 meter length adaptable to all
Scoop, nabbed types
Supplied with beakers, bottles
And Plankton (65&105um gauge) nets.

- **Transport Cart**

Transporting all sorts of field requirements.
Aluminum constriction, foldable with
Hand two air filled wheels and supporting stands.

- **Cold box (Ice-box)**

12 volt. Electric cold box.
Digital display for inner temp. monitoring
Double handling.
Capacities: 15,35 and 50 Lit.

- **Compass**

Out door excision& map protractor

- *Compact whether station*

Deluxe in door, out door monitors
pressure, Humidity , temp. dew point
Wind speed, direction and chill &rainfall
220 v with battery back via 9v batteries

- **Infra Red electric distance meter**

- **Binocular**

With perm focus
Edition 30*8wide angle&8x,

- **Digital roller**