



## 11 Hazardous substances and Wastes Management

### 11-a Introduction

Hazardous Substances and Waste Management (HWM) is one of the major and most dangerous environmental problems related to economic, social, and legislative aspects. Law 4/1994 for the protection of the environment and its executive regulation has set up a general definition for hazardous substances and wastes, and pointed out main principles for handling such wastes in a comprehensive and integrated approach.

The law identified provisions and rules of classification, Identification, storage, transfer, and treatment systems of hazardous substances, and disposing of their generated wastes in appropriate areas completely isolated from the rest of the environmental system components.

Furthermore, the law identified relevant organizations to deal with such wastes, and

pointed out the roles of each organization and required each of them to issue lists of hazardous wastes prohibited from handling without special licenses due to their chemical and biological nature highly harmful to human health and the environment if not appropriately handled.

HWM Organizations are diverse in Egypt owing to the diversity of hazardous wastes generation sources. Six ministries are involved; these are the Ministries of Industry, Health, Petroleum, Interior, Electricity, and Agriculture. However, the Egyptian Environmental Affairs Agency (EEAA) is the organization legally mandated with coordinating between these organizations for regulating hazardous wastes handling technical support provision.

EEAA organizational structure includes a general department for Hazardous substances and wastes, with two sub-

departments for Hazardous Substances and Hazardous Wastes, each including a number of relevant sections for managing solid, liquid, and gaseous hazardous substances and wastes. Moreover, the organizational structures of the relevant organizations include a department for environment affairs and protection, include among their tasks HWM in coordination with EEAA.

### **11-b The Most Significant HWM Challenges**

Many challenges face the sound HWM in Egypt. However, it progresses steadily towards integrated management. The most significant of such challenges is their incomplete inventory, and insufficient data on their quantities, characteristics, and generation rates; besides, their classification lists are not yet completed. Furthermore, other problems include lack of trained and qualified cadres at all levels for identifying hazardous wastes and enforcing laws and controls regulating their management, in addition to lack of awareness of their safe handling techniques, lack of HMWM systems, utilities, infrastructure, and financial resources for hazardous wastes treatment or environmentally sound disposal or recycling.

Furthermore, there are inadequate laboratories required to conduct specialized and accredited examinations and identify health and environmental risks that may result from handling such wastes, in addition to mixing such wastes with other types of waste and the absence of independent systems for each type in most cases. Other problems relate to the illegal entry of some wastes from abroad, and the unwillingness of the private and investment sectors to become involved in the Integrated Hazardous Waste Management (IHWM) system due to unclear economic feasibility.

Exposure to hazardous wastes leads to several adverse impacts on human health according to the manner of exposure (respiration, skin, oral), conditions, duration, health status, age, and gender. Some impacts are transient, such as dizziness, headaches, and nausea, while others are persistent, such as cancer, partial and complete disability, as well as chronic skin and respiratory tract diseases.

Hazardous wastes also impact the different environmental media. Hazardous waste emissions resulting from their burning lead to air pollution, while their unsafe disposal results in the pollution of surface and ground water, soil, and marine life and fisheries, in addition to the negative effects on properties resulting from fires and explosions that may occur due to the unsafe handling and disposal of such wastes.

### **11-c State Efforts in Facing HWM Challenges in Egypt**

Hazardous substances are substances with chemical and biological nature harmful to human health and the environment unless properly handled. Such fact is reflected clearly in the Environment Law 4/1994 and its Executive Regulation. EEAA, convinced that environment and development form two sides of the same coin, standards and requirements to be implemented when handling hazardous material were developed in accordance with provisions of articles 29-33, Section 2, Chapter I of the Law, and articles 25-32 of its Executive Regulation.

Thus, the Law and its Executive Regulation have become the means for achieving the desired target, i.e. Integrated Hazardous Wastes Management (IHWM) to ensure environment and human health protection against impact of handling hazardous mate-

rial and wastes, and to achieve the long-term target in securing the sustainable economic development that satisfies the needs of present and future generations. Moreover, the Law specified the provisions and rules of classification, definition, storage, transfer, treatment, and disposal of such substances and their generated wastes.

### **Causing Forces**

- Continuous increase of chemical material use for meeting the needs of progress and development in industrial, agricultural, and health fields ...etc. such substances are handled through Ministries of Agriculture and Land Reclamation, Industry and Technological Development, Health and Population, Petroleum, Electricity and Energy, and Interior, in addition to the Ministries unstated in the Law including Water Resources and Irrigation, Foreign Trade (General Authority for Exports and Imports Control), Manpower and Emigration, Housing and Utilities, Scientific Research, and the General Investment Authority.
- Lack of awareness of safe ways to handle hazardous chemical material, and insufficiency of data available for hazardous material users.
- Illegal trade in hazardous chemical material.
- Lack of qualified laboratories.
- Lack of trained cadres on safe handling of hazardous material.
- Difficulty in using hazardous material alternatives for economic reasons.
- Absence of sufficient coordination among hazardous material handling relevant organizations.

### **Resulting Pressures**

- Occurrence of many accidents due to unsafe handling of some hazardous chemical material.
- Air, water, and soil pollution.

### **Current Status of Handling Hazardous Material**

- The presence of many organizations responsible for handling hazardous substances in Egypt. Besides the 6 organizations mentioned in Article 25 of Law 4/1994 Executive Regulation, there are other unlisted ones, such as the General Investment Authority, Ministry of Foreign Trade, National Research Center, Ministry of Water Resources and Irrigation, and other organizations.
- The presence of many organizations responsible for customs release of hazardous substances.
- Many importers disregard attaching Material Safety Data Sheets (MSDS) of imported substances as part of their consignments' documents.
- The absence of a central network to serve such organizations; however, there are independent information systems in every organization.

### **Effects of Such Pressures On The Environment**

Unsafe handling of hazardous substances led to many accidents with significant adverse impacts on man and the ambient environment, and resulted in huge economic losses due to impacts on buildings and equipment.

#### **Actions taken:**

- Issuing Law 4/1994 for the Protection of the Environment and its Executive Regulation.
- Signing the Stockholm Convention on

Persistent Organic Pollutants (POPs).

- Following up Rotterdam Agreement to establish an international legally binding Bond to implement Prior Informed Consent Procedure for certain Hazardous Chemicals and Pesticides in International Trade (PIC).
- Participating in developing the Strategic Approach to International Chemicals Management (SAICM).
- Participating in the Intergovernmental Forum on Chemical Safety (IFCS).
- Developing the Cleaner Production National Strategy.
- Participating in the Global Mercury Assessment (GMA).
- Issuing Emergency Response Sheets (ERSs) for substances, which provide all information necessary for handling substances in emergencies.

Establishing the following committees anchored in the Ministry of State for Environmental Affairs (MSEA):

- The National Committee for International Agreements on Hazardous Substances and Wastes (Basel, PIC, and POPs) with the participation of all relevant ministries and organizations.
- The Committee for studying the disposal of expired pesticides by burning in cement furnaces with the participation of the Ministry of Agriculture and Land Reclamation and other relevant organizations.
- The Steering Committee for the project of preparing the National Implementation Plan of Stockholm Convention on Persistent Organic Pollutants (POPs).
- Hazardous Substances Department Participation in:
  - The Arab Team on following up environmental agreements on HMW – the Arab League.

- Follow-Up Committee for Integration and Coordination Works of Petrochemicals area, Ameriyya, Alexandria.

- Safety and Occupational Health Decisions Project Committee – Ministry of Manpower.

- Committee on Safety Standard Specifications in Industrial Facilities.

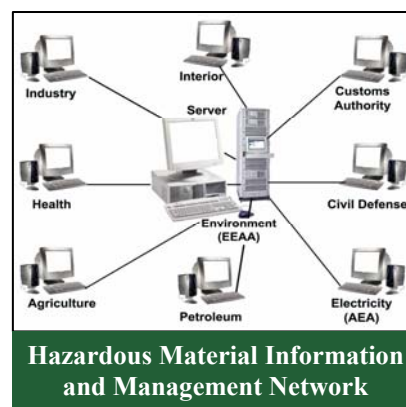
- Hazardous Substances and Wastes Committee – Ministry of Health and Population.

- Committee on the development of Hazardous Waste Lists – the General Authority of Investment and Free Zones.

- EEAA Hazardous Substances Department studies and reviews customs release requests of hazardous substances supplied by their importers, and coordinate with relevant authorities for the release of these substances; thus, helping in preventing the entry of any prohibited substances into the country.

- EEAA has developed an Integrated Hazardous Material Management Plan for Egypt to achieve Law 4/1994 objectives.

- The EEAA Hazardous Substances Department holds training courses on Integrated Management of Hazardous Substances for relevant organizations in



Egypt (Civil Defense Authority, Chlorine Gas Water Treatment Stations, EEAA Regional Branch Offices (RBOs), factories and companies using hazardous substances, ...etc.).

- Egyptian Hazardous Material Department Information System has been operating since 1999 for the safe handling of hazardous material with support from the Swiss Government. The operation was implemented in collaboration with 6 line ministries (Agriculture, Electricity, Health, Industry, Interior, and Petroleum) according to the provisions of Law 4/1994, in addition to the Customs Department and Civil Defense Authority.
- The principal objective for establishing the Information System and the Hazardous Material Department was the development of an information network among the abovementioned ministries and authorities on the one hand, and EEAA on the other, to provide information necessary for the management of hazardous substances including lists of imported or locally produced substances.
- Approved lists of hazardous substances were issued by the Ministries of Industry, Interior, Health, Petroleum, and Electricity and Energy. Coordination is ongoing for issuing of the Ministerial Decree on the List of Hazardous Substances for the Ministry of Agriculture and the other ministries not stated in the Law. Such lists include:
  - List A: Banned substances.
  - List B: Substances imported with license.
  - List C: Substances imported without a license.
- Information network includes also an automatic licensing system for issuing licenses from all relevant organizations,

in addition to a database on 5,400 chemical substances with their natural and chemical characteristics, ERSs, safe handling guidelines in cases of accidents, safety instructions for packaging, identification, storage, and transport. The most significant project outputs in phase I are:

- Hazardous substance ERS, which contains all necessary handling information in emergencies. For disseminating the benefits, information can be accessed at the following Website: [www.ehsims.org](http://www.ehsims.org)



EHSIMS Website

- A Unified Licensing Form for handling a material.
- A CD containing data of Hazardous Substances Information and Management System.



Compact Disk

- System Usage and Operation Manual for specialists in participating organizations.

Hazardous Substances Lists Issued by Relevant Ministries				
Ministry	List (A)	List (B)	List (C)	Notes
Health	7	52	-	In addition to list (B): All cleaners and detergents of high concentrations. Pesticides used in public health aspects. Pharmacological compounds.
Electricity & Power	-	66	-	Annexed to the list is a paragraph on natural substances.
Industry	-	145	183	
Petroleum	-	48	134	
Interior	-	75	-	
Agriculture	123	690	-	List B is under updating

- Importers database.
- Data card of hazardous material containers.
- Hazardous substances were classified

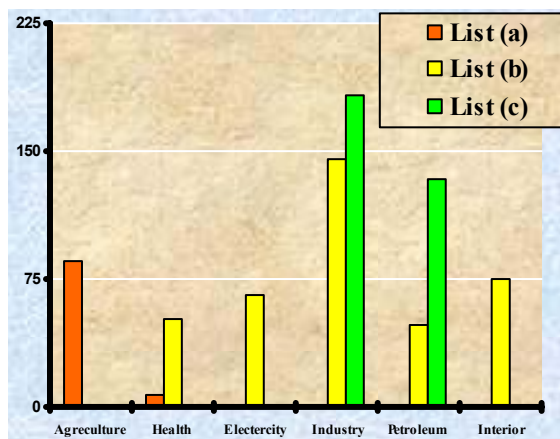


UN Classification

based on UN classification including 9 categories: explosives, gaseous, liquid flammable, Oxidizing Agents, solid Substances, toxic, radioactive, corrosive, and other hazardous substances.



European Classification



Hazardous Substances Lists of Relevant Ministries

- Moreover, such substances were classified according to the European classification that includes 5 categories: oxidizing agents, toxic substances, harmful substances, and explosives.

Based on the successful implementation of phase I of the system, phase II was implemented during 2001-2003, including building an importers databases and hazardous chemical material warehouses database and using the GIS system to identify hazardous substances transport routes, which would allow full tracking of such substances from importation till final disposal, such as

ports; thus ensuring taking all measures that safeguard their transport. Moreover, this stage also includes risk assessment of hazardous material handling facilities, preparation of on-site emergency handling plans, and preparation of the national strategy for the safe handling of chemicals.

In light of the Egyptian Hazardous Material Information System and Management, EEAA has developed an integrated Hazardous Substances Management Plan for Egypt in order to achieve the objectives stipulated by Law 4/1994. Additionally, the Hazardous Material Department was able, through the Hazardous Material Information and Management System, to prepare the National Chemical Profile and guidelines for the safe use and storage of hazardous material, besides awareness programs and information on the hazards of such substances and their safe handling.



substances used in industry, and pesticides employed in agriculture, so that new types of chemicals appeared and others disappeared. In the framework of Stockholm Convention on Persistent Organic Pollutants (POPs), and in light of Egypt's concern with the protection of public health and environment, the importation and utilization of all substances listed in the Agreement since 1999 were prohibited, thus leading to the signing of the convention by Egypt on 17/5/2002 and its adoption on 13/1/2003.



Guideline were issued composed of a series of booklets on the awareness of potential risks, stability, compatible and incompatible substances, transportation, safe handling, storage, first aid, emergency response, treatment, and safe disposal.

Technological and economic development led to change in production means, raw



In the framework of collaboration with the UN Organization for Industrial Development (UNIDO), a project is currently being implemented for the development of the National Plan of Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs). The 2-year Project activities include: identification of coordination and work organization

mechanisms, setting up POPs inventory lists, assessment of basic structures and national capacity, setting priorities and identification determination of objectives, formulating the national implementation plan and the development and endorsement of the POPs action plan. The first three phases were implemented, which was concluded by developing initial priorities.



POPs

## **Hazardous Wastes Management**

Many efforts have been implemented, and many others are ongoing, to promote the legal, institutional and technical frameworks for the Integrated Hazardous Waste Management System, most important of which are the development of a draft document for the Integrated Hazardous Waste Management National Strategy for Egypt. A review of the document is currently being undertaken with all the relevant organizations, as a step towards its publication. The IHWM legal framework has already been set, in addition to the legal framework for the Integrated Health Care Wastes Management (IHCWM).

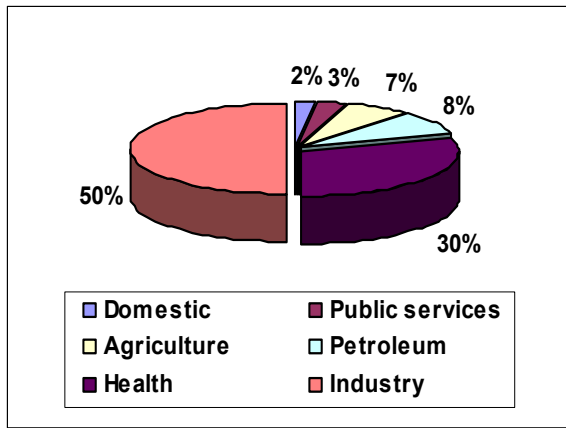
Hazardous wastes management in Egypt is also subject to the national law (Law 4/1994). International agreements concluded by Egypt and entering into force are also considered part of the legislative framework. Among the most important of these agreements are the Basel Convention on Transboundary Movement of Hazardous

Wastes and their Disposal, the Regional Bamako Convention on the Prohibition of Hazardous Wastes Importation into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa.

## **11-d Hazardous Wastes Generation Sources and Major Pressures**

With the increase of human activities in all domains over the last fifty years in Egypt, hazardous wastes generation also increased from the different activities and their safe disposal constituted significant pressures on the environment. Hazardous wastes in Egypt are generated by a number of sources. These are:

- Industrial activities, such as chemicals and petrochemicals, spinning, weaving, dyeing and preparation, fertilizers and pesticides, iron and steel, leather tanning, paper and paints, metals melting and foundry and electronics and asbestos industry.
- Agricultural activities, such as fertilizers, pesticides and their empty containers.
- Therapeutic, research and laboratorial activities, such as wastes generated by health care institutions, laboratories and research centers activities.
- Service activities, represented in the sludge resulting from treatment plants of wastewater mixed with industrial effluents.
- Domestic activities, such as dry batteries, domestic pesticides containers, syringes and expired drugs or their remains.
- Byproducts of oil extraction and refining, and military operations such as land and sea mines and expired ammunition.



Different Hazardous Wastes Generation Estimated Quantities

### 11-e State Efforts in Hazardous Wastes Management

A ministerial working group was formed from the six ministries concerned with hazardous wastes and referred to in the Environment law, to review the survey of hazardous wastes types generated from all activities related to these ministries. To date, ministerial decrees on the lists of hazardous wastes generated by the ministries of Industry, Health, Interior, and Agriculture have been issued, as shown in the following figure.

Source	Total wastes Quantities (x 1000 tons)	Hazardous Wastes Quantities (x 1000 tons)
Hospitals	330.3	82.6
Basic health care units	17.4	5.2
Clinics	23.3	11.7
Veterinaries	20	10

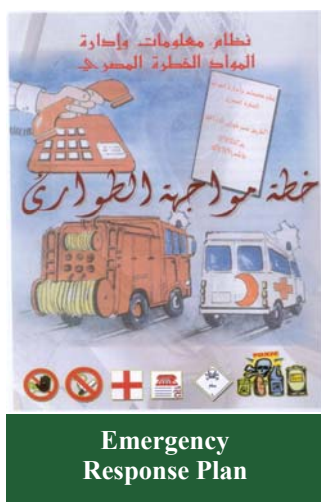
Ministerial decrees for the hazardous wastes lists for the Ministries of Petroleum and Electricity are currently in the pipeline.

A Comprehensive Information and Hazardous Wastes Management National System is being developed, supported by all technical information and guidelines for their safe handling. Moreover, the EEAA Hazardous Waste Department is participates in the work of the ministerial committee formed to set a National Cleaner Production Strategy for and in the work of the ministerial committee formed to study the proposed amendments to the Environment Law Executive Regulations, as well as the participation in issuing the first Egyptian Standard Specification for Health Care Hazardous Wastes Incinerators in coordination with Egyptian Organization for Standardization (EOS).

Ministries	Year of issuing the decree
Agriculture	2003
Industry	2002
Health	2001
Interior	1999
Petroleum	Ongoing
Electricity	Ongoing

In addition, the Ministry of State for Environmental Affairs has issued the guidelines for hazardous wastes temporary storage and the chemical compliance for these wastes, guidelines for the licenses for all integrated management components and the guidelines for hazardous wastes classification and identification from any source. Manuals on the design, implementation and operation of hazardous wastes safe disposal sites are currently being developed. There

are no landfills for the final safe disposal of hazardous wastes, except the site established by Alexandria Governorate, funded by the Finnish government, and the landfill of the Egypt Chemicals Company in Alexandria for the disposal of mercury. However, this landfill is currently closed and monitored for any emissions.



The Ministry of State for Environmental Affairs has initiated the implementation of a program for supporting the Governorates by providing them with medical hazardous wastes incinerators, and implementing a needs assessment survey for each Governorate. Contracts were concluded with Military Factory 45 for the initial production of 15 incinerators. The Ministry will participate in developing and producing these incinerators locally through reviewing their technical specifications and conducting the necessary measurements to ensure their compliance. The Ministry is also developing and implementing a number of training courses on the safe management of medical hazardous wastes. The state is implementing a number of integrated hazardous wastes management projects, including:

### **Integrated Industrial Hazardous Wastes Management Project in Alexandria Governorate in Cooperation With the Finnish Government**

The second stage of Integrated Industrial Hazardous Wastes Management Project in Alexandria Governorate is currently being completed through funding by the Finnish government as a model for developing the Industrial Hazardous Wastes Management System in Egypt. The project has surveyed the industrial hazardous wastes generating facilities in Alexandria. A site was selected for the landfilling of these wastes after treatment through establishing a chemophysical treatment unit for treating industrial non-organic wastes, while conducting EIA studies to avoid the negative impacts of the project. This project helped in creating national staff cadres qualified in this field, and the employment of young technical cadres that were trained domestically and abroad.

### **The Egyptian Environmental Policy Program (EPPP) Funded by USAID**

Through the Egyptian Environmental Policy Program (EPPP) Funded by USAID, technical support was provided to assist in activating Integrated hazardous waste management systems, as follows:

- Reviewing the Draft Hazardous Medical Wastes Management Strategy.
- Assisting in issuing hazardous wastes lists for the ministries indicated in the Environment Law.
- Issuing guiding documents in hazardous wastes classification and identification, and setting forth a system for licensing their circulation.
- Setting guidelines for transport wastes

processes and methods.

- Setting guidelines for best practices in hazardous wastes recycling and final disposal technologies.
- Promoting and developing the capacities and cadres for Integrated Hazardous Wastes Management System through implementing training courses for the relevant staff at the various ministries and organizations, as well as the staff of the different industrial sectors, in coordination with Industrial Pollution Prevention Project.
- EEAA, in cooperation with this program, has organized the first National Conference on Hazardous Wastes.

### Regional and International Role Played by Egypt in Hazardous Wastes Management

Given its regional and strategic location, Egypt was selected by the International Basel Convention Secretariat to be the host country for the Basel Convention Regional Center in the Arab region, undertaking training and transferring hazardous wastes safe management technologies at the Arab regional level. This center is one of 12 worldwide centers distributed in accordance with the UN geographical distribution. A framework agreement was concluded among the Convention Secretariat, the Government of Egypt and the Regional Center, to give it the legal shape needed to enable it perform its vital role in the framework of the Convention. In this respect the following actions were taken:

- Participation in preparing the Center’s Work Plan and negotiating with donor countries through the Basel Convention Secretariat to provide the required funding for this plan. Approval was given by FINNIDA on funding the first three years of the Action Plan.



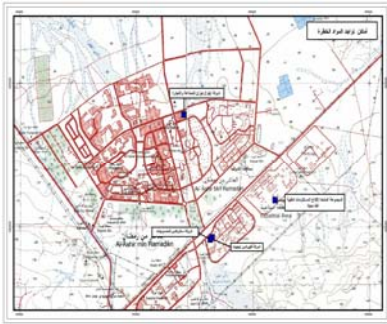
Emergency Response Sheet

- Negotiation with the Basel Convention Secretariat on the implementation of a regional pilot project to select, design, and run a safe landfill site for hazardous wastes, implemented by Basel Regional Center for The Arab Region. Negotiations were concluded by the approval on supporting the project and the project documents were submitted to the Convention Secretariat.
- Supervising the regional training program on The Control and Monitoring of Illegal Trade In Hazardous Wastes, held in Port Said Port in September 2003, with participation of 17 Arab countries.
- Negotiations are ongoing with Basel Convention Secretariat on launching a training program at the Arab region level, on responsibility and compensation for accidents resulting from the transboundary transport of hazardous wastes, with participation of relevant international organizations and international insurance companies.



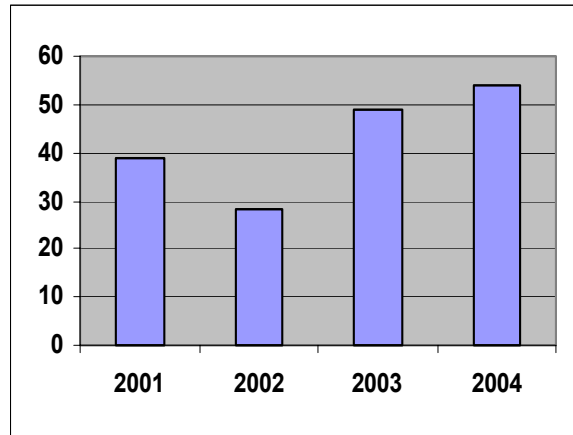
Customs Release Form





**Hazardous Wastes Storage Sites**

- In Coordination with the Suez Canal Authority, national terms and conditions were developed as addendum to those set forth in international conventions on the navigation movement of hazardous wastes carrying vessels, including:
  - Compliance with all requirements of the Basel Convention on Transboundary Movement of Hazardous Wastes.
  - Compliance with all the Suez Canal Authority regulations and requirements for the passage of ships.
  - Obtaining the Suez Canal Authority approval.
  - Sending the traffic document in advance to EEAA and the Suez Canal Authority.
  - Identifying the shipping agency in charge of shipment and all its data, and issuing the P&I certificate.
  - Pre-notifying the Suez Canal Authority of the ship's name, and the shipping date at the exporting country.
  - A ship carrying hazardous wastes containers shall leave the Egyptian ports immediately after passage.
  - Ships carrying hazardous wastes are prohibited to load and unload during their passage within Egypt's territorial waters or economic zone.



**Number of Hazardous Wastes-Carrying Vessels that Passed through the Suez Canal during 2001 - 2004**

Also, the Basel Protocol on Liability and Compensation for Damage resulting from Transboundary Movements of Hazardous Wastes and their Disposal is currently being ratified.

Egypt has also signed the Regional Bamako Convention on the Ban of Export of Hazardous Wastes to African Union Member States (the former African Nations Organization), which was ratified in May 2004.

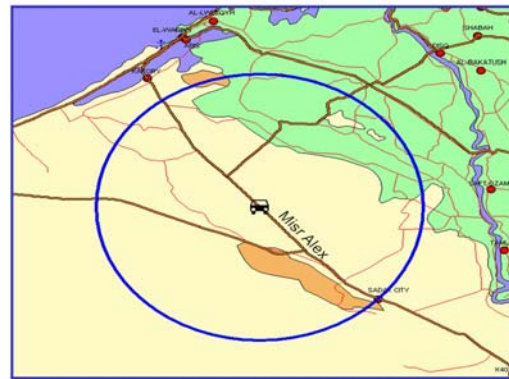
### 11-f Future Vision

The future vision for the safe management of hazardous material and wastes is determined through the identification of a clear and measurable objective, namely, establishing an Integrated Hazardous Material and Wastes Management System in a period not exceeding 5 years, including all management stages: hazardous material life cycle, generation of hazardous wastes, their collection from their sources, storage until their handling, transfer to treatment facilities, their treatment, recycling and recovery, until their ultimate disposal stage, systematically and according to priorities. These processes require building all the

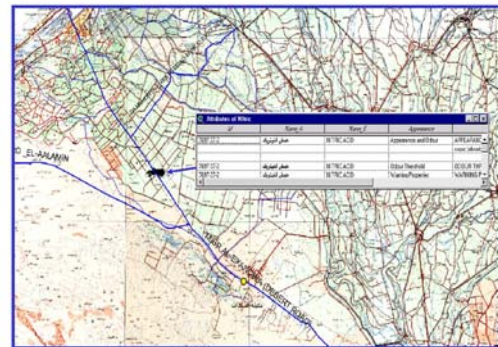
technical, legislative, institutional, financial, and human resources development aspects of the “System” within a strategic framework comprising all limitations and problems facing the Integrated Hazardous Materials and Wastes Management in Egypt, and within the existing national legislative framework, active structures, technical aspects, and technical infrastructure, as well as social aspects, awareness and knowledge levels, economic aspects, and cost transfer and recovery systems. The system also ensures the following sub-objectives:

- Creating independent integrated systems for each of the IHWMS stages.
- Taking into consideration hazardous cradle-to-grave life cycle.
- Hazardous materials and wastes risks management and assessment.
- Providing suitable facilities for the treatment and safe disposal of all types of hazardous material and wastes.
- Eliminating pollution and remediation of the degraded sites due to accumulation of hazardous wastes.
- Increasing awareness and knowledge at all levels.
- Developing the existing database and information system for hazardous material and waste.

The Specification of the Nearest Assisting Services



The Hazardous Substances Database Related with the Accident



The Specification of the Nearest Sites a Service and the Alternative Ways

