




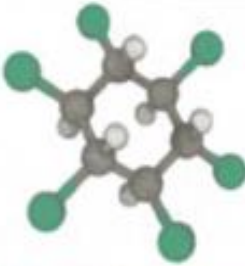



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Environmental and Social Impact Assessment (ESIA) for the Disposal of Obsolete Pesticide Stockpile in Al- Adabeya Port, Suez - Egypt



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PART I

**Environmental and Social Impact Assessment (ESIA)
for the Disposal of Obsolete Pesticide Stockpile
in Al- Adabeya Port, Suez - Egypt**

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EXECUTIVE SUMMARY

1. Background:

Egypt has large stockpiles of obsolete pesticides that have deteriorated over the years. These materials are considered as hazardous waste. As reported by the Egypt Sustainable Persistent Organic Pollutants (POPs) Management Project (P116230), there are 18 specific sites of obsolete pesticides (OP) in Egypt and could be a candidate for the treatment and disposal. Based on the available data, the total amount of obsolete and POPs pesticides ranges between 2,250 and 4,600 tons. From this amount, the amount for POPs pesticides ranges from 250 to 1,500 tons. A POPs site can have one or more sources of contamination.

The strategic objective of the environmental policy in Egypt is to introduce and integrate environmental concerns relevant to protecting human health and managing natural resources into all national policies, plans, programs and projects of the national development plan. The medium-term objective is to preserve natural resources, biological diversity, and national heritage within a context of sustainable development. The short-term objective is to reduce current pollution levels, minimize health hazards and to improve the quality of life for citizens and residents in Egypt.

Environmental protection has assumed increasing importance in Egypt over the last 20 years, as a result of improving public education and awareness, leading to pressure on the government to take action, increasing privatization of the industrial sector, and thus greater accountability, and pressure from donors to ensure that their projects are environmentally sustainable and to assist Egypt in modernizing its environmental management systems. The Government of Egypt (GOE) is strongly committed to controlling industrial discharges as well as to stricter and more consistent monitoring of all factors that influence drinking water quality and urban air pollution.



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It ratified the Stockholm Convention for the management of Persistent Organic Pollutants (POPs) in May 2002.

The proposed POPs Project triggers two environmental safeguards policies: (i) Environmental Assessment, and (ii) Pest Management. The results of the equivalence assessment showed that the World Bank's EA policy and the Egyptian safeguards systems on EA and Pest Management, as amended through 2009, are nearly fully equivalent. The major gaps are to issue a regulation clarifying that all POPs sub-projects will be subjected to an EIA and prepare TORs or specific guidelines for such EIA ([Annex 1](#)). Also, the legal and regulatory framework should be brought into full consistency with the Stockholm Convention and other conventions applicable to POPs and to which Egypt is a party. These gaps can be implemented as part of overall Project implementation.

Accordingly, the Government of Egypt (GOE) drafted a National Implementation Plan which includes: (1) the management and environmentally sound disposal of PCBs and obsolete pesticides; (2) institutional and regulatory strengthening measures as well as (3) awareness building and stakeholder involvement activities.

To help achieve these goals, the Egyptian Environmental Affairs Agency (EEAA) requested the World Bank to prepare a GEF project that would focus on all three POPs categories as well as build capacity. Based on this request, a project proposal was submitted and approved for funding under the Global Environment Facility in June 2009. The project aims to support the GOE in the management of obsolete pesticides and POPs and PCBs, and proposes to invest in some pilot sites as demonstration of good practices.

Al Adabeya Port is one such identified pilot site. The project is essentially a clean-up Project which brings substantial environmental and health benefits. However to ensure that all project activities are undertaken in an environmentally and socially sound manner, there is need to undertake an Environmental and Social Impact Assessment (ESIA) and/or Environmental and Social Management Plan (ESMP) for each activity.



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Al Adabeya Port storage facility in Egypt was built in 1975 and dedicated for the storage of dry bulk. It is situated about 125 km east of Cairo easily reachable by good condition highway, The nearest larger city is Suez city in Suez governorate (17 km to the North). The storage is an open yard designed for temporary storage of shipped goods. The yard has two gates one of them (at the NE corner of the yard) is the emergency gate.

It is estimated that about 220 tons of obsolete lindane, have been stored at the Al Adabeya Port since 1998. These obsolete stockpiles are packed in 25 kg heavy paper bags supported by a plastic outer wrapping and stored in 10 standard 20 feet containers occupying an area of 5,850 square meters (225 x 26 m).

The soil in the yard has not been sampled to establish the effect on the soil quality especially the content of chlorinated pesticides. The levels of exposures of the stored pesticides are unknown. There are records of the levels of radioactivity direct where pesticide containers are stored. Detailed inventory is needed and therefore all the containers have to be inspected. Meanwhile, the Chemical Weapons Sector has analyzed the contents of the containers through its accredited laboratories.

It is understood that the obsolete and POPs pesticides may be stored in a substandard way and limit. There may be possibility of emissions as a result of high ambient temperatures; however there are no environmental records. The proposed project involves the handling, packaging, transporting and disposal of these hazardous stockpiled pesticides, as well as the remediation of any site contamination, if required.

Consequently, the Environmental and Social Impact Assessment (ESIA) was prepared for the implementation of the National Implementation Plan in the country. The major aim of ESIA is to put in place a decision making tool for environmentally sound management of obsolete lindane stockpile in Al Adabeya Port, Suez.



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2. Environmental Legislation and Institutional Framework:

Egypt has a number of instruments for sustainable development guidance in the country in terms of policy, legal and institutional arrangement. The national policies, strategies, acts and the institutional framework as well as international conventions and treaties that underpin the management of obsolete pesticides were taken into account in developing ESIA. The following are some of the key policies that are relevant to ESIA: Egyptian Environmental Law 4/1994 amended by law no.9/2009, Environmental impact assessment executive regulations, Hazardous Wastes Regulations, Law 48/1982 Regulations, law 48/1982 amended executive regulations with decree 92/2013, Agricultural Laws & Ministerial Decrees related to pesticides, Ministry of Manpower Law (Law 137/1981).

In addition to policy and legal instruments, the some regional conventions were taken into account: Bamako convention on the ban of the import into Africa and the control of trans-boundary movement & management of hazardous wastes within Africa, it was signed by Egypt in 30/1/1991, entered into force in 12/5/1994 and ratified in 15/5/2004.

The international conventions that were taken into account include the Basel Convention for the Control of Transboundary Movements of Hazardous Waste and their Disposal (1989), The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Egypt did not ratify this convention till now); and the Stockholm Convention (2001) on Persistent Organic Pollutants (POPs).

3. Inspection of Lindane Containers:

In order to avoid damage during shipment of obsolete lindane containers, the container should, however, be properly inspected. Comibassl International has been inquired to carry out full inspection to ensure that the containers are suitable for carrying this shipment. The condition of the containers has been visually verified by surveyors of



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COMIBASSL and found to be structurally sound and suitable for carrying shipment of lindane.

4. Description of the Proposed Project Site:

The site area is flat, paved and occupying an area of 5,850 square meters (225 x 26 m). This area belongs to the General Company for Silos & Storage (GCSS). The site of the stockpiling of obsolete lindane visited is in very good condition in terms of the paved ground and the location relative to the activities in the port. In terms of security, the site, where the stockpile is located, is completely fenced. The 10 lindane containers are safely stacked on the paved ground. In each container, the obsolete lindane bags are stacked in such a way that the upper one third of the container is free. Most of the containers were sealed intact, while each of the 10 containers contains one or two damaged bags which are not efficiently sealed or repacked and kept haphazardly due to the opening during previous sampling activities carried out by the Chemical Weapon Sector and the Egyptian Atomic and Energy Authority (EAEA), thus giving a bad smell.

5. Description of the Existing Environment – Baseline Data:

Information was gathered on the existing physical environment, particularly as related to climate, geology, geomorphology, soils, hydrology and drainage.

Soils from the obsolete pesticides yard and from adjacent locations were sampled for grain size analysis to determine soil textures and estimate soil infiltration rates. Moreover, soil samples will be analyzed for their pesticides (especially lindane) to indicate whether soil is contaminated by obsolete pesticides or not and to determine which isomer of lindane contaminate the soil.

- **Surface & Groundwater**

Surface and groundwater characteristics and flows were assessed using field investigation as well as maps, aerial photographs and data from previous reports. The baseline data



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provide a quantitative measure of the existing groundwater conditions and also provide an indication whether groundwater is polluted by lindane as a result of 16 years period of storage of obsolete pesticides (lindane) or not.

The Al Adabiya port lies at the extreme northeastern part of the Eastern Desert of Egypt. The northern part of Egypt including, the north Eastern Desert, the north Western Desert, the Nile Delta and north Sinai lie in the unstable shelf area (Said, 1962). The obsolete pesticides yard located to the east of Gebel Ataqa and to the north of the northern Galala plateau. It also lies to the north of the down streams of Wadi Hagul, Wadi Badaa and Wadi Ghweiba.

- **Geology, structure & soil**

The Gulf of Suez region form a distinct structural unit that was involved throughout time in movements that brought it under the sea for almost the entire length of its geological history.

The majority of the surficial soils encountered during the site investigation of the wastewater treatment plant (9 km to the north of the obsolete pesticides site) represent alluvial deposits, and typically comprise gravel with sand, plus some cobbles and silt.

The distribution of the seismic activity of Egypt is more affected by the distribution of the seismic stations. Recently many local seismic stations are installed in Aswan, Minya, Qattamiya, Dahashour and Hurghada, therefore many small to moderate events were recorded.

- **Rainfall & Groundwater**

Rainfall represents the main source of recharge of groundwater in this area, where rainfall intensity is about 20 mm/year. It infiltrates downward rapidly through fissures in the limestone tableland. The important groundwater aquifers in the Ain Sukhna area. The Quaternary aquifer represents the main water-bearing strata in the Ain Sukhna area. The groundwater is pumped by the companies, factories and tourism villages distributed in



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the area. It is built up of sand and gravel with clay and limestone intercalations. The penetrated thickness of the Quaternary aquifer in the mouth of Wadi Ghweiba reaches about 400 m. It decreases towards north and northeast. Groundwater in the Quaternary aquifer occurs under free water table condition. The isotopic investigation indicates that recharge of this aquifer depends mainly on the infiltration of surface runoff and upward leakage from deep aquifers. The discharge is mainly being through the pumping for different purposes. The depth to water ranges between 6.20 m and 60.20 m and the water flow direction is being towards the Gulf of Suez.

- **Flora**

The survey encompassed the northern part of Gebel El Galala El Baharya, which was found devoid of vegetation. The plant growth is, therefore, confined to the drainage system (run-off desert). The central part of the wadi bed is usually devoid of perennial plant cover and vegetation is mostly restricted to the sides. As they support a floral community comparatively richer than the rest of the plain and being easily accessible, wadis are subject to grazing and cutting.

Plant cover varies in obvious relation with the extent of the catchment area and the texture and depth of the bed cover. Several plant communities may be recognized. The dominant species include *Acacia raddiana*, *Tamarixaphylla*, *Launeaspinosa*, *Hammadaelegans*, *Anabisarticulata*, *Panicumturgidum*, *Zillaspinoza* and *Zygophyllum coccineum*.

Plants that characterize the cliffs and dry waterfalls that intercept the courses of the wadis traversing the hills, include: *Capparisspinosa*, *C. sinaica* and *Ficuspalmata*.

Fauna

Characteristic reptiles of this habitat type in the Gulf of Suez area include rock dwelling forms such as the Egyptian Gecko (*Tarentolaannularis*), the Pale Agama (*Agama agamaspinosa*) and the Sinai Agama (*Pseudotrapelussinaitus*). In the wadi beds, the



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Egyptian Dabb Lizard (*Uromastyxaegyptius*) and the Horned Viper (*Cerastescerastes*) are found. Wadis with fine sandy substrates are characterized by the presence of Nidua Lizard (*Acanthodactylus scutellatus*), while Bosc's Lizard (*A. boskianus*) is common in those with coarse sand (EEAA/UNEP, 1993).

Characteristic breeding species of birds include *Neophronpernopterus*, the Sand Partridge (*Ammoperdixheyi*), *Oenanthelugens*, *Oenanthemonacha*, Scrub Warbler (*Scotecercainquieta*), Pharaoh Eagle Owl (*Bubo bubo*), Trumpeter Finch (*Rhodopechisgithaginea*) and Pale Crag Martin (*Ptyonoprogneobsoleta*). There is a great abundance of migratory birds passing through the wadis and mountains, particularly during the autumn migration.

- **Socio-Economic conditions:**

Socio-economic status and response to project and its ESIA are influenced by a complex mix of socio-economic settings at which the project will be implemented. Thus, before the ESIA findings are presented, a brief secondary data review of socio-economic context of project area is presented such as geographic features, Population features, . Labor force, Education features, Literacy, Health features, General health indicators, Women and children health indicators, Supply services, Sanitary sewage, Energy supply, Potable water supply, Communication.

- **Radiometric survey of obsolete lindane containers**

The measured radiation dose rate found to be in the range from 0.08 to 0.029 $\mu\text{Sv/h}$ and still within the permissible dose rate based on many organizations such as International Commission on Radiological Protection (ICRP), the (US) National Council on Radiation Protection and Measurements (NCRP), the Committee on the Biological Effects of Ionizing Radiations of the National Research Council (BEIR), the United Nations Committee on the Effects of Atomic Radiation (UNSCEAR), and the Radiation Effects Research Foundation



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(RERF) Also, there is no harmful radiation effects from these containers based on the radiometric survey.

- **Inspection of the condition of containers by COMIBASSL** In order to avoid damage during shipment of obsolete lindane containers, the container should, however, be properly inspected. Comibassl International has been inquired to carry out full inspection to ensure that the containers are suitable for carrying this shipment.

The condition of the containers has been visually verified by surveyors of COMIBASSL and found to be structurally sound and suitable for carrying shipment of lindane. The complete report of Comibassl International is attached with this report (APENDIX 5.3).

6. Environmental and Social Impacts:

A variety of environmental and social impacts are likely to occur during safeguarding, transportation and final disposal of the obsolete lindane stockpile at Al Adabeya Port

A storekeeper assigned by Al Adabeya Port Authority manages the store regularly checks the lindane containers at least once per week. The guard or security is provided almost 24 hours a day. In terms of safety, no fire safety equipment was visible neither were the first aid kits or PPE for the storekeeper to use, except at the shaded store to the vicinity of the stockpile (230 m), which is belonging to the General Company for Silos & Storage (GCSS).

The main impacts will be on workers due to inhalation gases that are released by the obsolete lindane. This is mainly due to the fact that some of the pre opened bags are not sealed intact and an odor or faint smell is felt around the vicinity of the containers especially when doors are open.

There was a unanimous agreement from all stakeholders consulted during the socio-economic survey that these containers must be disposed as soon as possible to avoid its negative impacts on the human health and the environment.



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Except for the site workers all stakeholders included in the sample have university degrees. High education level usually reflects high level of awareness. Most stakeholders have years of working experience in the lindane situation of at least five years. Therefore, they have sufficient experience to allow them to have practical knowledge and better perception of the situation of the impacts of the project. The results indicated that the site workers are the only stakeholders who have regular exposure to any risks associated to the lindane.

The social survey results indicated that the site workers and supervisors are the only stakeholders who have regular exposure to any risks associated to the lindane containers. The rate of symptoms occurrence is very low for all symptoms except the eye itching which was more common. All site workers, supervisors and GCSS administration representatives stated that they always encounter a pungent pesticide smell whenever they come closer to the lindane containers. Accordingly, we can conclude that although the lindane is stored in sealed containers there still could be some exposure.

- It was found that all individuals from all stakeholders' group perceive that the project will certainly have positive impacts. These impacts are:
- Eliminate the risks of environmental pollution that would occur from the existence of these pesticides containers
- Eliminate the health impacts of the exposure to this pesticide especially on the workers at the site. Increase the sense of security for the workers in their working environment.
- Improve the work conditions at the site and reduce the occupational health hazards on the workers at the site.
- Eliminate the financial loss of the forgone rent of the space occupied by the containers
- The stakeholders suggested that to avoid any risk related to the project, the activities of disposal particularly those related to transportation need to be carefully planned.

7. Environmental and social management plan:



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The objective of the Environmental Management Plan (ESMP) for this ESIA is to provide a strategy for the management of obsolete lindane with a specific focus on safeguarding and final disposal of the obsolete lindane and lindane contaminated empty bags in order to reduce their impacts and risks posed by the stockpile of obsolete lindane.

The ESMP covered all aspect related to the safeguarding and disposal operations such as verification; repackaging operations including registration; transport; storage and also it shall address the final disposal options (local/international) of the obsolete lindane including compliance with relevant international chemical conventions. The matrix of ESMP is incorporated in Chapter VI of this report.

8. Safeguarding activities:

To ensure that all current and potential future impacts of the obsolete lindane stockpile stores and contaminated sites are covered, the ESMP will be implemented in two steps. Step 1 will focus on mitigation of effects of the current situation while Step 2 will focus on mitigation of effects of safeguarding and disposal operations.

To prevent public health and environmental hazards from getting out of hand at obsolete lindane stockpile and contaminated sites that are in critical conditions, emergency safeguarding will be carried out while awaiting the main safeguarding and disposal measures.

Before the main planned safeguarding operations commence, emergence safe guarding measures need to be taken to put an end to health and environmental risks from obsolete lindane stockpile.

After safeguarding and removal of obsolete lindane, the temporary site of lindane stockpile will need to be cleaned and/or decontaminated as soon as their use comes to an end. In the same vein, vehicles and equipment used in safeguarding and transportation activities that will remain in the country should be decontaminated. Sodium hypochlorite (NaOCl), which is the oxidizing agent of choice during clean up operations, can be used.



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9. Environmental and social monitoring plan:

Monitoring is needed to check if and to what extent the impacts are mitigated benefits enhanced and new problems addressed. Plans for monitoring have been included in the Environmental and Social Monitoring Plan. The monitoring plan as for ESMP also assigns responsibilities for monitoring activities.

Monitoring of safeguarding activities shall be undertaken by members of the Project Management Unit (PMU), local government officials will be involved in the monitoring exercise. Non-governmental Organizations and other Community Services Organizations will constitute the monitoring team for the safeguarding activities. It is anticipated that use of NGO monitors will provide an impartial assessment of the effectiveness of the proposed mitigation measures. The PMU shall identify the most appropriate national NGO to fill this role. FAO technical Support Missions monitoring and simultaneously provide backstopping advices and follow up from the FAO Headquarters etc.

One of the main objectives of the GEF project is to build on the existing capacity and to establish new capacity in each of the key components of the project. Specifically, those who will be involved in safeguarding and disposal activities as elucidated in this ESIA document need to be properly trained to enable them discharge their duties effectively, safely and in an environmentally friendly manner. In view of this, capacity needs to be developed in the following areas: Health and safety, Environmental protection, Equipment supply, Public consultation, management, Environmental policies and programs, Management and planning and budgeting. The matrix of Environmental and Social Monitoring Plan is incorporated in Chapter VI of this report.

10. Analysis of alternatives:

The two major alternatives, which have been proposed during this study and have been discussed with the stakeholders during the public consultation workshop in May and



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June 2014, are: "without project" and "with project". It must be stated that the alternative disposal options for POPs pesticides stockpiles are largely the same, however, all notable differences are highlighted below.

In principle, safeguarding is required for lindane stockpile, pesticide contaminated empty bags, contaminated equipment, pesticide contaminated wastes, and contaminated soil.

With respect to the safeguarding needs of the obsolete pesticides, implications of three alternatives were considered and analyzed. The alternatives are: i) no safeguarding action, ii) safeguarding at the current location, iii) safeguarding at the main pesticides storage facility of the Ministry of Agriculture (lindane stockpile should be transferred from Al Adabeya Port).

It is noteworthy that, unlike the options of safeguarding at the current temporary storage locations of the obsolete lindane on the yard, the option of no safeguarding action does not present any meaningful opportunities. This is understandable because the no action option simply maintains the status quo whose deficiencies are the very reason for carrying out this project.

Considering the discussion on the rationale for establishing safeguarding at the main pesticides storage facility of the Ministry of Agriculture and Land Reclamation (obsolete lindane stockpile should be transferred from Al Adabeya Port), and based on the SWOT analysis, it is evident that the safeguarding at current store location on the yard is most favorable. This is the one recommended for adoption in subsequent decisions in this project.

It is evident from the SWOT analysis that, for transporting obsolete lindane from the shipping port to the ultimate disposal place, sea freighting is the favorable option. There is no doubt that the advantages of sea freighting over air freighting are not disputable.



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In addition to the above, it can be noted that due to the lack of incinerators that are large enough and compliant with recognized standards, destruction of obsolete lindane empty bags, and other types of wastes by incineration in Egypt, is currently not possible.

11. Environmental risk assessment:

Based on the site/field observations/investigation/survey, the analytical results of air and soil samples, the calculation of the risk factors FP and FE, and the simulation of the worst case release scenario, it has been concluded that there is a smell of obsolete lindane odor in the vicinity of the storage area and the containers that leads to minor human health and environmental risk.

Lindane may pose a hazard threatening the onsite workers and employees and those in the neighboring facilities and plants (industrial or commercial), which are in the impact zone as defined by the risk assessment. Referring to the FP (2,860,000), $FP^* = 100$ and F_E (18), the storage site of Al Adabeya Port stockpile of obsolete pesticides is considered as (Problematic).

After applying risk assessment study to manage the storage yard (contaminated site) at Al Adabeya Port, The Technical Committee decided that the Best Available Techniques (BAT) and the Best Environmental Practice (BEP) method to manage the problem is to eliminate the source/contaminant itself (Obsolete Lindane Pesticide) from contact with the receptors.

An immediate action should be taken to proceed with the proposed safeguarding activities and the final disposal of obsolete lindane through the export and dispose of them at a licensed facility overseas in compliance with the requirements of the Basel and Stockholm Conventions.



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12. Public Consultation:

Individual meetings, small and large group meetings have been conducted several times with 4-formate of questionnaires which have been analyzed. Public participation and consultation include public with different levels of education and different age range.

On Tuesday 22nd July 2014, a large public consultation meeting was conducted in the Red Sea Ports Authorities and the meeting was attended by the Governor of Suez Governorate, Director of the Red Sea Ports authorities along with about 70 attendee representing academic staff, EEAA representatives, stakeholders from many maritime companies, Al Adabeya Port workers, representative of Chemical Weapon Sector (Egyptian Army) and finally local community people and media representatives.

The Suez Governor indicated with great emphasis the importance of the study as it has put up an end to all what is being said about the presence of radioactive materials in these containers. He urged the people from the media to elucidate this point in their reports.

The main salient issues and comments raised by attendee are:

1. Delays for dealing with safe disposal and similar problems should be avoid in similar situations allover Egypt.
2. Handling these containers should be done with the highest possible precautions and safety measures.
3. The process of repacking the Lindane packs and if there are any measures proposed by the study to control and monitor this process.
4. Contingency and emergency plans to deal with the situation of any spills that might occur during the different steps of disposal especially repacking and transportation.
5. The presence of any health risks to the workers at the sites where the disposal activities take place.
6. The impacts of the storage of Lindane on the surrounding areas especially considering the long period of storage in the port.



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7. Contribution of the NGOs and if they were consulted in the study.
8. The measures that should be done if any spills occurred in the Gulf water.

All these comments and questions were answered by the consulting team. In conclusion, all public and stakeholder attendees agreed about this project and confirmed that the Disposal of Obsolete Pesticide Stockpile in Al Adabeya Port, Suez should be executed in a quick and safe manner for the sake of the public health and safety.

13. The estimated costs of implementation:

The Estimated costs of implementing the ESMP (safeguarding and destruction of obsolete lindane, contaminated soils and other contaminated material) together with the cost of the environmental monitoring plan and the training requirements are about 1,824,000 (USD).

These costs are based on all inclusive average unit rates accounting for all costs involved until the final disposal outside Egypt. The average unit rate is derived from similar cases with adjustments that take into consideration prevailing conditions.