

Advisory Review of the EIAs for  
Taparura Town Development,  
Sfax, Tunisia

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**Advisory review of the EIAs for Taparura Town Development  
Sfax, Tunisia**

Advice submitted to FMO Finance for Development - ORET Programme to Mr. A. van Elteren by a working group of the Commission for Environmental Assessment in the Netherlands.

the technical secretary



Petrie van Gent

the chairman



Klaas Jan Beek

Utrecht, July 13, 2006

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## 1. INTRODUCTION

### 1.1 The Initiative: Taparura Town Development, Sfax, Tunisia.

The *Société d'Études et d'Aménagement des Côtes Nord de la Ville de Sfax* is the proponent of the Taparura Town Development project, to be developed in Sfax, Tunisia. The proposed project includes a number of subsequent activities.

1. cleaning of a currently polluted area of more than 300 ha. Until the end of the 1980s a fertiliser company has dumped phosphor-gypsum, a residue from phosphate fertilisers production from rock phosphate. The factory has been dismantled. The polluted materials are largely stored in an old deposit and are partly spread over neighbouring coastal area, above as well as below mean sea level;
2. concentration of polluted materials at the location of the actual deposit, and isolation of the deposit. This new deposit will have a diameter of about 900 m and a height of about 16 m and will be covered with a topsoil layer to allow for the development of a city park on top of the waste dump;
3. sand mining to refill the excavated areas (Taparura phase I) and reclamation of a new area of land of about 175 ha (Taparura phase II). Sand will be mined in the Kerkannah channel at some 15 km offshore. Top soil will be mined on land.
4. the new and clean land will allow for further development of the city centre of Sfax. Future activities include: housing schemes, economic activities, tourism, beach and open-sea activities and the related infrastructure.

For the project the Tunisian Ministry for Development and International Coordination received a loan of € 34 million from the European Investment Bank. The total projects costs are estimated, according to different sources, from 98 million Dinar (€ 60 million; [www.leconomiste.com.tn](http://www.leconomiste.com.tn)) to US\$ 150 million (€ 125 million; [www.nwp.nl](http://www.nwp.nl)).

For this project a number of EIA studies have been carried out. According to the actual (2005) Tunisian decree for EIA, EIA reports (type B) have to be prepared for the hazardous waste facility, the sand mining off shore and on land (> 300.000 tonnes/year), the tourism facilities (> 1000 beds) and the housing schemes (> 20 ha).

A Netherlands dredging company planned to carry out a number of the project activities, comprising the removal and storage of the polluted material, the reshaping and isolation of the deposit, the sand mining (off shore and on land) and the land reclamation. The company applied for the

ORET<sup>1</sup> (a grant for the Tunisian government), but in the end withdrew its application.

Under the agreement between the Netherlands Ministry of Foreign Affairs and the Netherlands Commission for Environmental Assessment (NCEA), environmental assessments for projects applying for ORET-funding are eligible for review by the NCEA. Based FMO's request, the NCEA prepared an Advisory Report. Following the withdrawal of the ORET application, the request for advice was also cancelled. However, FMO will make an attempt to hand over the Advisory Report including the Commission's recommendations to the Tunisian government to allow them to use them to their benefit.

## 1.2 Request of FMO and Involvement of the Commission

In October 2005, FMO invited the Netherlands Commission for Environmental Assessment<sup>2</sup> (see letter in appendix 1) to provide an advice regarding the following questions:

1. do the documents provide an adequate description of the possible environmental and social consequences of the project?
2. are the described measures adequate to meet international IFC/World Bank guidelines?

FMO requested the Commission to carry out a desk study without a site visit. FMO also indicated to focus the review on the activities for which the ORET-grant has been applied (sanitation, deposit, sand mining and land reclamation). In case the Commission had observations on aspects beyond the focus area of the requested review, but relevant to the project, the Commission was welcome to provide these observations.

After an exploratory meeting, organised by FMO in October 2005, the dredging company provided additional documentation. In January 2006 the Commission had received the following documents from FMO (details in appendix 2):

- three EIA reports for the sanitation and storage activities, the dredging and land reclamation activities and the subsequent town development plan;
- a site selection report for the mining of topsoil to cover the new deposit
- a report with technical provisions (Cahier des Clauses Techniques Particulières); and
- two "working documents" prepared by the ORET-applicant and the consortium of executers.

By the end of January the Commission had composed an expert working group (see appendix 2), carrying out the review.

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<sup>1</sup> ORET: Ontwikkelings Relevante Export Transacties / Development Related Export Transactions

<sup>2</sup> Henceforth referred to as 'the Commission'

## 1.3 Framework of the Review

FMO has requested the Commission to carry out the review according to international IFC/World Bank guidelines. It should be clearly stated that the reports have not been prepared according to these guidelines. In the Commission's review, reference has been made to the international guidelines, whenever the Commission succeeded to retrieve those. When these guidelines are not available or applicable, the Commission has referred to Dutch guidelines or standards or has expressed an expert judgement.

The Terms of Reference for the EIA reports have not been available to the working group. On the web-site of the *Agence National pour la Protection de l'Environnement* (ANPE) several sectoral guidelines are available (see: <http://www.anpe.nat.tn/fr/telechargement.asp>), but not for the EIA reports the Commission has reviewed. Moreover, these sectoral guidelines correspond to the former EIA-decree (dated 1991).

The review has been described in accordance with the main activities under the ORET-grant:

- removal of the polluted soils and cleaning of the polluted area;
- storage of the polluted material and isolation of the deposit;
- sand mining, refill of the excavated area, land reclamation and coast line stabilisation.

The main findings and recommendations are summarised in Chapter 2. More detailed observations and recommendations are given in Chapter 3. Some observations regarding the subsequent city development are given in the last chapter.

Disclaimer:

FMO has requested a desk review of the documents. ANPE has been contacted by telephone and email on the sectoral guidelines for the project and regarding a (possible) formal decision on the location of the waste deposit. We also asked for ANPE's opinion of the EIA reports. So far no answer has been received.

From the major EIA report, pages were missing (see appendix 4). Some recommendations mentioned in this report may have been discussed on these pages.





## **2. MAIN FINDINGS AND RECOMMENDATIONS**

The Commission has reviewed the provided documents regarding the Taparura project proposal, concerning the pollution removal and storage, sand mining and land reclamation.

With regard to the location of the deposit in the city centre of Sfax, the Commission is of the opinion that the reports<sup>3</sup> do neither credibly and verifiably describe the environmental and social consequences of this site selection, nor provide the information on the basis of which alternative locations have been discarded. In view of the long-lasting land use limitations, that need to remain enforced, and the fact the deposit is surrounded by expanding residential and business areas, the Commission considers the assessment of location alternatives essential to FMO decision making. The Commission recommends to provide the information that verifiably substantiates the alternatives for the deposit site selection.

Taking the above into consideration, the Commission has reviewed the adequacy of the environmental and social impact assessments in the studies for the proposed activities. No review was possible of the EIA for the mining of topsoil to cover the deposit, for this EIA is still under preparation. Also, no review has been made for the delineation of the exact area (distribution and depth) for excavation of polluted material and for sand mining, as these too yet have to be determined as part of the project.

With exception of the site selection aspect mentioned above, the Commission concludes that the studies contain the essential information on environmental and social impacts of the mentioned elements, necessary to proceed to decision-making.

Nevertheless, the Commission recommends to consider some issues for further improvement of the assessments, before cleaning and dredging activities start, as these may lead to substantial environmental and social benefits or minimisation of risks of the Taparura project. The major issues are:

- Environmental and social information is very fragmented over a large number of studies, that moreover have been compiled over an extended period of time. This leads to poor accessibility and readability of the studies, because of which the Commission recommends to write a good summary synthesis for decision makers and public.

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<sup>3</sup> and the additional information received from PDG of the Société d'Études et d'Aménagement des Côtes Nord de la Ville de Sfax with a citation from a complementary EIA study, prepared by SCET and NEDECO in 1995: « La méthode du déplacement du dépôt a été exclue du contrat du Bureau d'Etudes. Déjà, dans les phases précédentes cette phase III des études, il y avait consensus sur le fait qu'on ne déplace pas la pollution et que cette solution coûterait dans les 100 million de Dinars, rendant ainsi hasardeuse la faisabilité économique du projet ».

- Investigate, as part of the final delineation of the area to be excavated, the existence of pollution in the area bordering the B3 area at the sea side (see map on p. 16 of the general EIA report). Information in the studies indicate the possibility of significant pollution (depth 0,75 m) in the area and, if so, extending cleaning to this area may have significant environmental benefits.
- Investigate the environmental consequences and limitations of the presence of the polluted material in the harbour area for future city developments.
- Clarify the quantity of sand needed for land reclamation activities in the Taparura project. Currently different reports mention different quantities and the overall quantity of sand needed is not calculated. This is important to determine the overall impact.
- Look at possibilities for sand mining to a larger depth than proposed, to minimise the affected surface area in the Kerkannah channel, and thus the ecological impact.
- Make a detailed inventory, parallel to the study on areas for sand mining, of the presence of sea grasses and corals not yet surveyed, how these may be affected and the consequences of protection laws.
- Verify the period during which young turtles occur in the dredging zone, in order to establish a dredging scheme that minimises impact on these turtles.

The project proposes a monitoring plan during both implementation of the project as well as after land reclamation. The Commission recommends to include in this plan the following additional issues:

- leaching of toxic materials during the wet excavation;
- leakage of toxic materials from the bottom of the waste deposit;
- functioning over a long time period of the isolation sheet surrounding the deposit and of the ground water control system;
- possible uptake of heavy metals and radioactivity through the root systems of vegetation in the soil layer on top of the deposit;
- the radioactivity from the isolated deposit.

In chapter 3 the background of these recommendations is described, as well as some minor issues.

Although strictly speaking not part of the review, on request of the FMO the Commission has examined the environmental and social assessment of the future city development. An overall conclusion is that the current EIA report is too limited and needs further detailing (chapter 4).

### **3. OBSERVATIONS AND RECOMMENDATIONS IN DETAIL**

#### **3.1 Cleaning of the Polluted Area**

##### ***The activity***

The area, mainly polluted with phosphor gypsum from an ancient fertiliser factory, is estimated to be more than 300 ha. Phosphor gypsum contains heavy metals, produces radioactivity and creates an acid environment. Part of the phosphor gypsum is stored in an old deposit; the remainder is spread around the deposit, along the coast and partly below mean sea level. The polluted soil material outside the actual deposit will be removed to depths varying between 25 and 225 cm. The complete excavation area will be separated from the sea with a sheet piling screen in order to be able to pump out the water. Then, the dried polluted material can be removed and stored. Storage will be done in an isolated deposit at the location of the actual deposit. The sheet piling screen will be removed after the cleaning operation.

##### ***International guidelines***

IFC/WB guidelines do not have guidelines indicating to which level the actual pollution has to be cleaned. Therefore the “common-sense” ALARA-principle (As Low As Reasonably Achievable) is applied. Sanitation of all soil material that exceeds the MAR-ecology (Maximum Admissible Risk / Dutch norms; allows for ecological development of the most sensitive species, not hindered by residual pollution), is an implementation of the ALARA principle. The Commission is of the opinion that the application of this principle is justified in this situation, that it is a good solution for the problem and with a reasonable balance between costs and benefits.

##### ***Area to be excavated***

The area to be excavated is shown on p. 16 of the EIA report. The area has been calculated using a simple method. The final area and volume to be excavated is still to be determined in the first stage of project implementation, as described in the *Cahier des Clauses Techniques Particulières*. This will be based on a soil sampling raster of 200 m x 200 m to roughly determine the borders and afterwards in a finer raster along the border of the full area to be excavated and along the borders of the areas to be excavated to different depth. The Commission expects that this research will result in reliable figures to determine the polluted material to be finally excavated. The Commission suggests to pay special attention to area B3, to be excavated to a depth of 0,75 m. This area is located at the sea side of the outer border of the proposed area to be excavated according to the actual plan. The documents indicate the possibility of significant pollution in the area. Extended cleaning in this area may have significant environmental benefit.

- **Recommendation 1:** collect information on the presence of polluted material just outside the B3 area and decide on whether this should be excavated.

### ***Pollution in the harbour area***

The Commission has noted that the harbour area, south of the area where polluted material will be removed, will not be cleaned. This area is polluted by the same residues of the fertiliser factory plus a lot of waste and pollutants from the other activities. This could potentially hamper future city developments.

- **Recommendation 2:** argument more in depth to which extent the non-removal of the pollutants in the harbour area may contradict with the foreseen developments in the city centre as part of the development plan for the Greater Sfax.

### ***Execution***

The EIA report indicates that excavation of the polluted materials outside the actual deposit will be carried out mostly under dry circumstances. Measures are foreseen to prevent pollution from spreading through the environment and to prevent unnecessary nuisance (including dust). The Commission expects the proposed measures to be adequate. However, as not all material can be excavated under dry conditions, spreading of the pollution may take place through the water and into the sea.

- **Recommendation 3:** monitor closely possible leaching of pollutants and polluted silts during implementation of the excavation and dredging works, to enable appropriate action when needed.

## 3.2 Storage of the Polluted Material

### ***The activity***

The removed polluted soil material will be stored at the location of the actual deposit, where a large part of the polluted material is already concentrated. This deposit will be isolated. A recommendation with regard to the location of the deposit has been discussed in Chapter 2.

The deposit has an isolating clay layer at the bottom. According to the studies, the improved deposit will be isolated by a vertical screen consisting of high density polyethylene in a bentonite clay pile all around. The deposit will have a diameter of about 900 m and is expected to become about 16 m high. The height may be adapted, based on the final quantity of polluted material to be stored. The top will be covered by an isolating layer, which will then be covered by a topsoil layer, to allow the growth of a vegetation and the development of a city park. A drainage system will be installed to keep the ground water level in the deposit lower than the surrounding area. This system also allows for easy check of pollution in water that is pumped out of the isolated deposit.

### ***International guidelines***

IFC/World Bank guidelines do not give strict norms and guidelines for the rehabilitation of this kind of deposits. However, they give some points of departure: impacts have to be minimised, with a focus on reducing seep-

age and the movement of materials to the surroundings. The proposed activities meet these points of departure. Additionally the Commission has the following observations.

### ***Isolation of the deposit***

It is indicated that the deposit will be isolated by a vertical screen of a combination of high density polyethylene packed in bentonite around the deposit. This is a way to safeguard the stability of the deposit and the isolation of the polluted materials for a long time period. In the technical provisions for the Taparura project, a minimum of 100 years life time expectancy is indicated for the isolation of the deposit<sup>4</sup>. The isolating characteristics of the screen are supposed to persist over this time period, but it has not yet been proven in practice as the material is relatively new.

■ **Recommendation 4:** monitor over a long time the isolation of the deposit, to be able to act adequately in case the isolation is not satisfactory. It should be clear which authority has to act in case the isolation at a any moment in time turns out to be insufficient.

### ***Drainage system***

To prevent the isolated deposit filling up with irrigation and rain water (though annual rainfall is low) a drainage system will be installed at the sides of the deposit. Drainage water will be analysed for pollution on a regular basis to monitor its quality. There are no provisions to monitor the seepage through the bottom of the deposit, though at present there are indications the groundwater around the deposit is already polluted through seepage.

■ **Recommendation 5:** take adequate provisions to be able to act, in case the drainage water from the foreseen drainage system turns out to be polluted. This includes storage of the pollutants and the proper, adapted management of the deposit. Extend the proposed monitoring system with options to check the quantity and the quality of the water leaking through the clay layer at the bottom of the deposit.

### ***Fertile soil layer on the deposit***

The deposit will be covered with a fertile soil layer to allow for the development of a city park with leisure functions. Construction on top of the deposit is not allowed because of the radon radiation (see below). Part of the park will be covered with vegetation. The proposed depth of the top layer is 80 cm, which should allow for the rooting system to develop. Looking at the climate it is expected that this vegetation will root deeply, for the plants to be able to find enough water. It is even possible that the roots will reach the polluted materials. If this happens, heavy metals and

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<sup>4</sup> In the Dutch context a life time expectancy of 10.000 years is requested for this kind of deposits, to avoid that problems from the polluted materials to be passed on to future generations.

radioactive material can spread through the falling flowers and leaves, branches and trunks.

- **Recommendation 6:** examine the feasibility of the 80 cm layer in relation to the foreseen vegetation. Monitor whether through deep rooting, the vegetation will take up heavy metals and radioactivity from the polluted materials.

### ***Mining of the fertile soil***

There is a site selection report for the locations for mining of rock/stone construction materials and the fertile soil to cover the deposit. These sites are selected some 20 km outside the city of Sfax. The site selection report indicates that an EIA report for the mining activity still has to be prepared, in accordance with the EIA legislation in Tunisia. Some elements of the Terms of Reference for this EIA are already mentioned in the provided documentation. The Commission gives some additional recommendations for the ToR.

- **Recommendation 7:** also focus the EIA on:
  - the way the quarrying will affect the landscape and ecology;
  - change in susceptibility to water erosion;
  - the safety of the truck transport of the soil material for inhabitants of adjacent villages and residential areas in the city of Sfax, as the transport density is expected to be very high;
  - nuisance of noise, dust and smoke during dumping;
  - the way the mining process will be wound up (closure of the quarries, landscape restoration).

### ***Radioactive radiation***

The mayor polluting material to be removed is phosphor gypsum (p. 24 of the EIA report). Phosphor gypsum is a source of radioactive radon gas.

In the EIA report, the radioactivity is described according to the international ICRP 60-standards<sup>5</sup>. At present Tunisian standards are not available for comparison.

The norm not to be surpassed under the ICRP 60-standards is the impact of 1 mSv/year<sup>6</sup>. Actual radiation impact at the site of the deposit is 0,55 mSv/year. Impact levels from exposure during the construction phase, future leisure activities, gardening in the city park are not expected to exceed the level of 1 mSv/year. In the EIA report it is recommended to check workers on the project site regularly for impact of radiation. In case of the construction of houses and buildings on the deposit, the radiation impact is expected to increase fourfold, to about 2,31 mSv/year, thus exceeding the norm. Therefore the construction of concrete buildings or other impermeable layers will not be allowed on the deposit. Measures will be taken to prevent spreading of radioactive material via dust during the re-

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<sup>5</sup> These standards are also integrated in Dutch norms and standards for radioactivity.

<sup>6</sup> mSv/year: Sv or Sievert is a unity of radiation, indicating the dose of ionic radiation human organs can absorb. It is an indicator for the damage to human health (in the Netherlands a person receives the mean radiation of 2 mSv per year from natural sources and 0,7 mSv per year from artificial sources).

removal of the polluted materials. Finally, the deposit need to be covered with a layer of over 30 cm thickness to avoid impact of the radioactivity, after storage of the polluted materials. A top layer of 80 cm is foreseen in the project.

The Commission observes that apparently the radioactivity of the remnants of the fertiliser production from the Tunisian rock phosphate is low, compared to other cases such as in Florida USA. During the construction phase monitoring of effects from the radioactive material will take place. The possible effects of the radioactivity remain a point of attention.

- **Recommendation 8:** monitor the radioactivity on and around the deposit after finalising its construction.



### 3.3 Off Shore Sand Mining and Land Reclamation

#### ***The activity***

Sand will be mined off-shore (12-20 km) in the Kerkannah channel from an area still to be determined in detail during project implementation. The sand is used to refill the excavated areas, where polluted material has been removed. The whole area will then be covered by a layer of about 1,5 m of sand to create new land for the Taparura city development plan. This activity comprises an area of about 300 ha. A second phase of land reclamation comprises an area of 200 ha, mainly for the development of beach and off-shore recreation. The new land will be protected to reduce the influence from sea by the construction of a sand dam and the construction of three groynes.

#### ***International guidelines***

International environmental guidelines for dredging operations are mainly incorporated in general operational policies for EIA such as the IFC Environmental, Health and Safety Guidelines for Port and Harbour Facilities and the World Bank Guidelines for Integrated Coastal Zone Management. Specific guidelines are available from the sector itself. The Central Dredging Association and the International Association of Dredging Companies have published Guidelines on Environmental Aspects of Dredging that have been applied here.

#### ***Quantity and type of sediment***

From the different documents it is not clear to the Commission how much sand extraction must take place for the two land reclamation activities (phase 1 and 2). In the documents different quantities are mentioned: 6.2 or 7.6 or 9.9 or 13.5 million m<sup>3</sup>. It is also not clear whether the smaller and larger quantities are related to the different phases or whether different studies have resulted in different data.

- **Recommendation 9:** make clear how much sand has to be mined for the different phases of the project. Be sure that the impacts of the sand mining on the natural and human environment are based on the total quantity of sand to be mined, in view of the overall impact.

#### ***Eco-efficient sand extraction***

In the first EIA reports a very large area (3000 ha) in the Kerkannah canal has been designated for the sand extraction, to be mined to a depth of approximately 30 cm. As a result, benthic communities will be entirely removed in this area: approximately 80% of the organisms live in the upper layer of the sea bottom and 20% live on the sea bottom. In later reports sand mining to a depth of 1m or 1,3 m is proposed, depending on the quantities of sand required.

For the purpose of the land reclamation coarse and medium sand is required. Therefore, the lower boundary of the area that can be mined is determined by the presence of fine sand and silt layers, occurring at depths varying from 1,3 to 2 meters according to the different reports. Before

sand mining starts, research will be carried out to delineate the final boundaries of the area to mined.

The EIA does not investigate the option that would be the most eco-efficient in locations with coarse and medium sand, down to 2 m. This practice is also applied while dredging in the canals on the North Sea in the Netherlands. Restricting the mining area by mining a smaller area to a greater depth considerably saves marine ecology.

■ **Recommendation 10:** consider, where possible, excavation of suitable sand layers in the Kerkennah Channel to the depth of the fine sand and silt layers at about 2 m depth. Increase of the dredging depth from 1,3 to around 2 m is not expected to have additional impact on coastal erosion.

### ***Sea grass and coral habitats***

According to the World Atlas of Seagrasses, four species of sea grasses reported: *Cymodocea nodosa*, *Posidonia oceanica*, *Zostera marina* and *Zostera noltii* are reported in the area. The first two are mentioned in the EIA report. Sea grasses on the sea floor create very important ecosystems, especially for fishes to lay eggs. *Posidonia oceanica* in the Mediterranean Sea is a protected species under the EU Habitat Directive.

The protection of the sea grasses is especially important in this area because large areas of sea grasses are said to be destroyed by activities of trawler fisheries, as stated in the EIA report. The Commission found several reports (Sessile mega benthic species from Tunisia littoral sites and UNEP publication) which confirmed this assumption. In a more recent publication (Ref: Gulf of Gabes Marine and Coastal Resources Protection Project) it is stated that around the Kerkennah island and in the Gulf of Gabes the sea grass areas represent a unique biodiversity reservoir, where nearly 20% of all species in the Mediterranean occur. According to the latter publication, around the Kerkennah island also corals are present, which might include red corals. The corals are not mentioned in the EIA-report.

■ **Recommendation 11:** while carrying out the mapping of the boundaries of the final areas for sand mining, complement the mapping with all sea grass species and the (red) coral deposits, to be able to avoid mining in these areas and include them, where necessary, in the foreseen monitoring programme during project implementation.

### ***Turbidity and sedimentation during dredging and land reclamation***

Turbidity and sedimentation have influence on the above mentioned sea grasses and corals. World Bank guidelines indicate that turbidity during dredging and land reclamation activities has to be monitored. Turbidity has to remain lower than 200 mg/l at 1500 m from the dredging location.

For the sea grasses there is no marginal value for the turbidity. If there is less than 15 - 25% light, then the sea grasses may die. The critical value of sedimentation is a maximum of 5 cm of sedimentation in 2 months.

For corals, however, critical values for the turbidity and sedimentation do exist: for red corals turbidity should not exceed 10 mg/l and sedimenta-

tion levels should be maximum is 0.1 kg/m<sup>2</sup>/day. The turbidity value is the monitoring value to maintain the coral community.

The EIA reports describe possible turbidity near the sea shore, which may increase up to 150 mg/l due to currents and storms. Turbidity during dredging in the Kerkennah channel is expected to be low, as long as the sand layers will be mined from the areas with coarse sand sediments.

The measures proposed for silt extraction (temporary basins and silt screens) seem adequate to deal with possible hindrance of temporary suspended silts on near-shore sea grass fields.

- **Recommendation 12:** if areas containing smaller sand fractions will be mined, the Commission recommends monitoring of the turbidity.

### ***Protected animals***

The EIA report mentions a number of protected animals including sharks, (bottle-nosed dolphin, monk seals and turtles (leatherback turtle, green turtle and loggerhead turtle). Dredging activities by TSHDs in the Kerkennah canal do not create problems for large animals. The dredging periods are adapted to reproduction periods of the fishes. However, the EIA report does not indicate this sensitive period for the small, young turtles. The latter can be monitored by deflectors, placed on the sucker heads.

- **Recommendation 13:** verify the period during which young turtles are to be expected and whether this coincides with the dredging periods.

### ***Alien species***

Dredging equipment usually is transported to the project site from other places in the world. The ships may contain foreign ballast water (fresh or salt), to provide stability to the ship while travelling. If coastal water is used, it may contain organisms. When ballast water is released, also the organisms are released.

In this way, exotic, not domestic organisms can be introduced to the coastal waters of Tunisia. Very few organisms of these exotic species can survive in the new surroundings survive, because temperatures, food and salinity are less optimal. Some species, however, can grow rapidly in the new surroundings and influence other species. Worldwide the introduction of foreign species is an important environmental question. The introduction of alien species is now considered as one of the most serious threats to the biological diversity.

- **Recommendation 14:** consider preventing exotic species from being released in the Tunisian coastal waters. Empty and refill the ballast tanks in the open ocean before entering the area of Tunisia, as recommended by the UN International Maritime Organisation.

### 3.4 Social impacts of the sanitation and reclamation phase

In the documents provided to the Commission, impact on the health and safety of the project workers and the people living around the work site has been described. Possible influence of the activities on the social structures of the community in the area has not been mapped.

■ **Recommendation 15:** consider to review the impact of project activities on the following, non exhaustive list of aspects:

- existing social networks;
- the perceived and actual community cohesion;
- cultural heritage;
  
- work opportunities for the local population;
- influx of workers in the area (how many, time period);
- influence of external workers on the housing facilities, income levels, social relationships etc.

In the documents reviewed by the Commission, no reference is made to public participation during the project preparation phase and the EIA process. Based on her experience, the Commission observes that non-involvement of the local population might create unrest, a negative attitude towards the project and possibly activism, even though the results of the sanitation and land reclamation activities are supposed to have positive impact on the health and well-being of the neighbouring population. It may even impact on the integrity of decision makers.

■ **Recommendation 16:** consider to inform local population in and around the project area before project activities start.

### 3.5 Tunisian Legislation / Permits and licences

During the review the Commission has tried to check her observations with Tunisian norms and standards as prepared by ANPE. Unfortunately, the actual website of ANPE does not provide guidelines as to the sanitation, the construction of the deposit and the sand mining and land reclamation activities. New sectoral guidelines are under preparation. The ANPE has been contacted to understand their opinion and observations on the EIA reports. In the EIA report for the city development it is stated that EIA reports for the cleaning of the phosphor gypsum polluted materials deposits and the subsequent storage, as well as the off shore sand mining have been approved by the ANPE.

■ **Recommendation 17:** clarify requirements of ANPE and their opinion of the project activities and implementation.

The Commission has requested an overview of the permits and licences to be granted by the Tunisian government for the various project activities, but was not able to compile this overview.

## 4. SOME OBSERVATIONS ON FUTURE CITY DEVELOPMENT

### **The activity**

The future city development include housing schemes, economic and cultural development from local to international level, leisure and touristic activities and additional infrastructure. In the future there might even be other initiatives within the greater Sfax development plan, which are not yet specified.

FMO stated it would welcome observations regarding the EIA report for the city development plan, though this report is not part of the review. Underneath some observations and recommendations are made, based on expert judgement.

The future city development is expected to have considerable impacts on both environmental and socio-economic conditions. The actual EIA report is a good start, but needs further detailing on for example the production of litter and waste water from housing schemes and economic activities and air pollution because of increased transport movements.

Possible socio-economic impacts include effects on actual population and their living conditions and economic activities, status and type of new employment opportunities, change in local economy, change in control over resources (land, water), price levels, beach and open-sea based recreation, different accessibility of local and urban infrastructure and increased workload of the local government. The new economic activities, including tourism, will create also an influx of new people into the area: new inhabitants, new business people and tourists.

■ **Recommendation 18:** prepare complementary Terms of Reference for the further detailing of the environmental and socio-economic impacts of the future Taparura city development.

■ **Recommendation 19:** in this ToR, pay particular attention to public participation. From the reports it can be concluded that the following stakeholder groups have to be involved:

- the Sfax civil society, including representatives of those people living in the immediate vicinity of the project location;
- the Municipality;
- the business society, including real estate companies;
- the tourism sector;
- local workers associations and small business representatives
- the fisheries sector from Sfax and from the Island of Kerkennah.

It has to be carefully reviewed whether other, not yet mentioned stakeholder groups also have to be involved.

■ **Recommendation 20:** pay particular attention to the impacts of new comers to the area, i.e. business people, inhabitants and tourists and their influence on the physical and social infrastructure (cultural values; daily living patterns; existing social networks; the attitude towards the local community; the perceived community cohesion).