



European Investment Bank

Complaints Office

CONCLUSIONS REPORT

Complaint SG/E/2009/05

**South Sinai Power Plant
Nuweiba, Egypt**

07 December 2009

External Distribution

Complainants: Members of the Nuweiba Community
Project Promoter: Ministry of Energy, EEHC, PGESCO

Internal Distribution

President
Vice Presidents Brooks, de Fontaine Vive
Secretary General, DG Strategy and Corporate Centre
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Attachments: Report from Marine Biodiversity Expert
Report from Social Expert
Report from Tourism Expert
Resumes of the 3 independent Experts

This report has been translated into Arabic. In case of discrepancy between the Arabic and the English version, the latter prevails.

CONCLUSIONS REPORT

South Sinai Power Plant – construction of a 750MWe natural gas-fired combined-cycle power generation plant in Nuweiba, Egypt

Complainants: Members of the Nuweiba Community - managers/owners of hotels, scuba diving centres, beach side camp owners, citizens of Nuweiba, local NGO, tourist operators, resident EU citizens and representatives of the 2 Bedouin tribes (Muzeina and Tarabin)

Date received: 19 May 2009

1. Complaint

- 1.1. Since 19 May 2009, the EIB Complaints Office (CO) has received 24 different complaints about this project, coming from managers/owners of hotels, scuba diving centres, beach side camp owners, citizens of Nuweiba, local NGO, tourist operators, resident EU citizens and from local communities including the 2 Bedouin tribes (Muzeina and Tarabin). An on-line petition to the Egyptian government to stop the project has raised more than 2.300 signatures. For reasons of confidentiality and in order to protect the complainants, they will be referred to as “The Complainants”.
- 1.2. The Complainants affirm that *“Nuweiba is one of the most picturesque parts of the whole southern Sinai peninsula, has an excellent and unique potential, is home to two major Sinai Bedouin tribes, and has an almost unique, relatively undisturbed underwater marine life”* and do raise serious concerns.

2. Allegations

- 2.1. ***Lack of proper public consultation*** – the public meeting was held in Sharm El Sheikh, 160 Km away from Nuweiba. No locals, foreign investors, Bedouin representatives or anybody else living in the Nuweiba area were informed nor invited to the meeting.
- 2.2. ***No proper consideration given to local economy, tourist resources and local communities*** - The ESIA considers Nuweiba as Industrial area. According to The Complainants, Nuweiba is a residential area, home to many Egyptian families, European foreigners and two Bedouin tribes with over 5000 individuals, some living as close as 50m to the planned construction site. There are residential houses, small hotels and tourist companies in direct vicinity of the supposed plant site, some of which have been there for over 20 years. The Bedouins see the proposed Power Plant as an imminent threat to their livelihood, as their main sources of income are tourism and fishing. In their opinion, the Power Plant would mean the end of tourism in the area, and the changes in fish population that would result from the Power Plants emissions, would also destroy their second way of surviving.

- 2.3. ***No proper consideration given to preservation of local biodiversity and marine habitats*** - The ESIA states that there are no significant marine habitats in the area worthy protecting, the biodiversity is poor and there is no sensitive eco system present. According to The Complainants, the Nuweiba coral reef areas, and even the areas that consist of sand and sea grass, are inhabited by rare species like sea horses, ghost pipefish and uncountable invertebrates that have long been extinct in other Red Sea resort areas, due to pollution and change of aquatic eco systems. Many of those species live and breed predominantly in areas with sea grass and sand, as the organisms' camouflage mechanisms rely on this specific environment. Apart from this, there is an intact coral reef directly affected from the planned coolant system, which lies directly south of the 'Nuweiba Village Hotel', and the attached 'Scuba College Nuweiba' diving centre. Should the plans go ahead, this area would be immediately destroyed.

3. Claim

- 3.1 Complainants claim that the EIB should hold the approval for this project and ask the promoter and competent local authorities in Egypt to carry out proper public consultation of the main local stakeholders and to relocate the Power Plant.

4. South Sinai Power Plant Project

- 4.1. This project concerns the construction of a 750MWe natural gas-fired combined-cycle power generation plant in Nuweiba, Egypt, 200 Km north of Sharm-el-Sheik on the east coast of South Sinai, Aqaba Gulf. The promoter is Egyptian Electricity Holding Company (EEHC) and its 100% subsidiary, East Delta Electricity Production Company, under the aegis of the Ministry of Electricity and Energy.
- 4.2. The project involves the construction of a new 750 MWe natural gas-fired combined-cycle power generation plant on the Red Sea (Gulf of Aqaba) coast in the town and near the port of Nuweiba, about 175km northeast of the city of Sharm El Sheikh. The location has been selected to benefit from existing high voltage transmission lines, nearby natural gas pipelines as well as supplies of cooling water from the Red Sea, taking into account environmental considerations. The project responds to the rapidly increasing demand for electricity in Egypt and especially the regional demand in the Sinai Peninsula, which is at present relying on imports from other parts of Egypt and on obsolete oil-fired generation.
- 4.3. The selected site is in Nuweiba. "Nuweiba is a coastal town in the eastern part of the Sinai Peninsula on the coast of the Gulf of Aqaba. Nuweiba lies on a large flood plain measuring about 40 km² sandwiched between the Sinai mountains and the Gulf of Aqaba, and is located some 150 km north of Sharm el Sheikh, 465 km southeast from Cairo and 70 km south of the Israel–Egypt border separating Taba and Eilat, it is also to the north of Abu Galloum national park. Nuweiba means, "bubbling springs" in Arabic. The 7-km long stretched settlement developed from a barren isolated place with no infrastructure into a promising and attractive tourist destination. Nuweiba is just recently discovered by tourist investors establishing hotels along the coastline connecting it with Taba in the north and Dahab in the south. The city is divided into three parts. From southward you'll find the port, the city and Tarabin. Historically, the area is inhabited by two different Bedouin tribes: the Tarabin to the north, and the Maizena, some 8 km to the south. Since the Six Day War when Israel captured the area, Nuweiba Town sprung up just 1.5 km south of Tarabin, under the Israeli name, Neviot. After the departure of the Israelis, the town expanded and Nuweiba Port, some 7 km to the south, was established and developed, with several car ferries now running every day to Aqaba in Jordan, and with a small town growing up around itself. Nuweiba castle (or Newibah castle), built on top of the remains of a still older castle in 1893, has been proposed as a UNESCO World Heritage site. Between the town and the port are a strip of modern hotels, such as the Swisscare Nuweiba Resort Hotel or the Hilton Nuweiba Coral Resort, catering to beach holiday makers and divers, and especially those seeking a restful, relaxing stay in beautiful surroundings." (Sources: Wikipedia and Wikitravel). All along the entire stretch of Nuweiba coast are camps and family owned hotels, mostly owned by Bedouins as well as several diving and snorkelling facilities.
- 4.4. "Nuweiba is famed for its beautiful beaches and laid-back lifestyle. The town is divided up into three parts: the port, the tourist village and, in the north, the Bedouin town of Tarabin where the ruins of a Mamluk fortress lie concealed in the palm groves. But the sea and beaches are especially attractive: they are largely deserted just a short distance from the town. Snoozing in the shade of palm trees, scuba diving or snorkelling around the coral outcrops with their playful shoals of fish and occasional (small) sharks; feasting in the village - Nuweiba is a peaceful paradise for holidays with that special extra." (edited by the Egyptian tourist authority)

5. The CO investigation

- 5.1. On 16.06.2009 the EIB Board of Directors postponed approval of the South Sinai Power Plant, on the basis of pending complaints on the project and recognised difficulties with environmental and social impacts which, as indicated in the proposal for financing, required additional ESIA work and adequate public consultation.
- 5.2. In accordance with the Complaints Mechanism Policy the EIB Complaints Office conducts a first internal investigation in order to ascertain the compliance of a project with EIB policies and procedures. This internal investigation was followed by a first stakeholder's engagement: and the various complainants were contacted in order to clarify the complaint and to obtain more detailed information; EEHC was also contacted and asked for opinion and feedback regarding the complaint.
- 5.3. As a result of this internal investigation and initial stakeholder engagement the CO concluded that more information was needed and conducted an initial fact finding site visit. The objective of the fact finding mission was to listen and obtain information for the compliance review, with a view to ascertain if there was room for mediation or problem solving. A first site visit was conducted and meetings were held with both complainants, project affected people, the Egyptian environmental agency responsible for issuing the environmental permits and approval of the ESIA as well as with representatives of EEHC and PGESCO.
- 5.4. As a result of the initial CO investigation and fact-finding mission, it was considered that the concerns raised by a large number of Nuweiba project stakeholders were serious and need to be examined further. Indeed, these concerns relate to issues that have not been fully tackled by the current project ESIA. For this purpose, according to the EIB Complaints Mechanism Policy and to its procedures, and in agreement with The Complainants and EEHC, the CO commissioned an independent expert review. According to the established Terms of Reference, three experts were required to analyse in their own area of expertise: the biodiversity impacts on the sea waters (Aqaba gulf); the economic impact on the local tourist industry; the social impact on local communities, particularly the Bedouins.
- 5.5. The independent assessment started on 21/09/2009 with a visit to Egypt from 15 to 23/10/2009 by the CO and the team of independent experts. The visit to Nuweiba and Cairo was the occasion to speak to many project affected people, to review the site extensively and to hold meetings with authorities and the promoter. Based on this visit as well as on the review of all available documentation, the 3 experts prepared their own independent reports, which are attached to this report.
- 5.6. The Complainants also lodged a complaint with the African Development Bank's (AFDB) Independent Recourse Mechanism (IRM). After their initial fact-finding mission it was decided to hold a scoping meeting to see if mediation between the requesters and AFDB would be possible. On basis of an invitation by the AfDB IRM, the CO attended this meeting as an observer on 25 and 26/10/2009n.
- 5.7. Both, EEHC and The Complainants, have agreed to accept the final outcome of the EIB Complaints Office investigation and of the Independent Experts assessment. EEHC and the Egyptian authorities have acted responsibly by deciding to await the outcome of ongoing studies and discussions before proceeding with the project implementation.
- 5.8. Upon consultation with the CO, The Complainants agreed and respected to not engage with the national or international press regarding this particular project during the ongoing investigation.

- 5.9. The stakeholders involved in the CO investigation – complainants and promoter – have been given the opportunity to comment on the final draft of this Conclusions Report.

6. Summary of findings

General

- 6.1. The EIB has a good and long-standing relationship with EEHC, which is one of its main promoters in Egypt. Since the start of EIB lending in Egypt in 1979, the Bank has extended 14 loans totalling over EUR 1.4bn to EEHC and its predecessor, the Egyptian Electricity Authority, for the expansion of electricity generation and transmission infrastructure. There is no doubt that the proposed combined cycle power plant will be state of the art with EEHC using the latest technologies available. It is also acknowledged that EEHC has an excellent track record in terms of technical capacity and of project management capabilities.
- 6.2. The initial location of the project, for which the EIB services performed a formal appraisal with a positive conclusion by the end of 2007, was on the other side of the South Sinai, on the Red Sea (Suez Gulf) coast about 60 km northwest of the city of Sharm el Sheikh and 20 km south of El Tor. This was a greenfield site, on an uninhabited section of the Suez Gulf, where the only existing structures are the land intake facilities of small offshore oilfields some 3-5 km north of the site, situated some 1.5 km from the shoreline on a wide, non-vegetated sand plateau. The sea near this site was described as deeper than other possible sites along the coast, resulting in more effective thermal mixing of the power plant cooling water and the sea water and smaller, more localised impacts on the sea flora and fauna. The preliminary ESIA indicated that the project is not expected to have a significant adverse impact on local residents or the environment and that overall, the social and environmental impacts of the project are expected to be acceptable, subject to satisfactory completion of the ESIA procedures.
- 6.3. The project EISA for the Nuweiba site did not take into consideration impacts on local tourism and gave little consideration to social impacts considering them as positive. Moreover, the methodology used to catalogue marine life in the area and assess possible environmental impacts on the marine biodiversity raised some doubts. Also, classification of the proposed site as industrial looked controversial.
- 6.4. Moreover, the public consultation meeting in Sharm El Sheikh was held without informing or prior contact with the local Nuweiba community, which is not in compliance with EIB and the AFDB, who require a formal public consultation meeting to be held in Nuweiba inviting all the affected stakeholders explaining the impacts, mitigation and benefits of the plant. EEHC has organised two private meetings with selected representatives of the Nuweiba community and met with a rather strong opposition to the proposed location for the Power Plant. Although invited, the CO and the AFDB services were asked not to participate in the second private meeting.
- 6.5. These shortcomings (6.3 and 6.4) had been identified during the EIB appraisal of the project and the EIB requested on 30.03.2009 and on 03.05.2009, EEHC to carry out complementary ESIA work and public consultation in Nuweiba. The EIB decided the conclusion of the ESIA process, to the EIB's satisfaction, to be a condition for signature of a loan contract.
- 6.6. The Complainants and all members of Nuweiba community contacted and/or interviewed by the CO clearly expressed that they are very concerned with the possible negative impacts of the Power Plant on their livelihoods. All of them made clear that they are looking for the common good of Egypt and very well understand the national importance of

providing electricity and that they are only in disagreement with the proposed location of the Power Plant. The Complainants and the members of the Nuweiba community contacted and/or interviewed felt marginalised and excluded by the fact of not having being consulted prior to the decision to build the Power Plant in Nuweiba. The CO noted the reasonableness of the concerns expressed and unreasonable allegations were never put forward.

- 6.7. The CO asked the promoter to meet with, and subsequently met supporters of the project while in Nuweiba. Among supporters present at that meeting were members of the Nuweiba Community as well as others from outside Nuweiba- from Taba, Dahab and El Arish. Some Bedouins were present at that meeting. Only four spoke indicating that they would support the project “provided that there are no negative impacts”. It is worth noting that other Bedouins present in the room remained silent. One who endeavoured to ask questions about the possible negative impacts was summarily dismissed and subsequently left the meeting.
- 6.8. It is worth underlining the importance of the moderation and mediation exercised by Mr Sherif El Ghamrawy regarding The Complainants and the Nuweiba community in general. His presence and his words were key to calm down exalted voices and to ensure that the expression of concerns was done in a firm but polite and moderate manner in full respect of the applicable laws, regulations and customs. His moderator role was widely recognised by all parties concerned.
- 6.9. It is the CO firm opinion that a substantial number of members of the Nuweiba community are opposed to the location of the project. Indeed, the majority of the members of the City Council of Nuweiba, the local administration consultative body, have expressed their formal opposition to the proposed location of the Power Plant and there are various formal resolutions/communications from this City Council rejecting the proposed location of the Power Plant. Members of local administration have also declared to consider the possible impacts of the Power Plant as disastrous. However, the CO cannot take a position on whether the majority of the Nuweiba community is against or in favour of the Nuweiba location.
- 6.10. The CO takes the also view that any pressure put on local communities to change their minds to accept/refuse the Nuweiba location, either using rewards or fears of consequences, will further stress the already fragile communities and create cleavages that would not help to find a solution acceptable for all parties involved. Therefore, all efforts should go into dialogue and common understanding.
- 6.11. Further to the CO site visit, and on the basis of dialog with, and recommendations from, the independent social expert as well as previously requested by the EIB services, on 04.11.2009 EEHC provided a draft Resettlement Policy Framework (RPF) and the Environmental and a draft Social Management Plan (ESMP) for the project. This could represent a good starting point establishing a proper framework, but it must be noted that this would only be the first step of a long and heavy process of dialogue and problem-solving.

Environmental impacts

- 6.12. The coastal and marine environment of Nuweiba is still relatively pristine. The coral reef and seagrass communities are assessed as healthy, diverse and highly resilient having adapted to periodic natural stressors (wadi floods, earthquakes, bleaching events, invasions of corallivorous organisms, diseases..). These qualities characterize “hotspots” of biodiversity in the realm of protection of ecosystem integrity and the management of natural resources. Such a hotspot would serve as gene bank facing the decline of coral

communities in the region and in the world. However if impacts, such as planned in the power-plant project, are continuous, and above a certain threshold, they would destroy these communities even if these are highly resilient and endowed with such ecologically adaptive characteristics.

- 6.13. The presence of endangered species of the IUCN - World Conservation Union has been recorded in the area, the internationally important and endangered species of the IUCN - World Conservation Union, mainly green turtles *Chelonia mydas* and hawksbill turtles *Eretmochelys imbricata*. A scientific and touristic scoop comes with the presence on the Nuweiba site of a mimic octopus *Thaumoctopus mimicus* (Norman and Hochberg, 2005) which has never been recorded in the Red Sea. There is also the confirmation of the discovery of a new species of clam, *Tridacna costata*.
- 6.14. Presently local activities in Nuweiba seem adapted to the carrying capacities of the marine ecosystems. Thus the site, in the context of expanding urbanization and recreational uses of the coastal and marine environment of the Egyptian Gulf of Aqaba, is of national and regional importance in terms of conservation and sustainable development.
- 6.15. The terrestrial environment in Sinai is of high value with the creation by the Government of Egypt of a network of 5 protected areas covering the desert, coastal, and marine ecosystems and remaining available for traditional uses by the local population of Bedouins. This network includes the full marine environment of the Gulf of Aqaba and a length of about 30km in the Gulf of Suez, including the coastal setback, up to 200m inland. The responsibility for the management and the control of these protected areas, covering about 50% of the South Sinai Governorate, lies in the Nature Conservation Sector of the Egyptian Environmental Affairs Agency and is ruled by law 102 on Protectorates and law 4 on Environment. Accordingly, for the marine environment is subject to a zero discharge policy and none of the coastal activities related to tourism has an impact on the marine environment: sewage water is collected and treated inland and desalination brine is normally re-injected inland at depth avoiding impact on the marine environment.
- 6.16. The expected changes in the marine environment are not properly and precisely described in the ESIA document. Concerning the planned power-plant, possible major impacts have been identified due to water temperature increase, change in the salinity, modification of water circulation, high currents (inlet and outlet), change of water quality, turbidity and sediment transport
- 6.17. The change in water circulation could cause a major impact on benthic communities, in particular in settlement pattern of numerous marine benthic organisms with planktonic stages in their life cycle. It could also induce vertical mixing and thus rise the primary productivity which consequently could change planktonic community structures and diversity. Finally, it could increase the loading of fine sediments in the water column and therefore increase turbidity. These processes would seriously damage marine sensitive habitats such as coral reef communities and associated habitats. The impact would be more severe close to the pumping sites.
- 6.18. Moreover, there can be synergetic effects of combined impacts on the environment. The increase of temperature added to the presence of chlorine, to a low Ph, and during the summer months, can create locally the conditions for the total destruction of marine life over important areas, the departure of pelagic fishes and in the vicinity of the sources of impact, eutrophication and the development of jelly fishes, algal bloom, diseases and outbreaks of corallivorous species. These processes could be toxic to marine organisms and human beings.
- 6.19. Because of the lack of accurate data provided by the ESIA concerning the impact on the marine environment at the planned site, and according to the Bank's Guidelines, the location of the power plant cannot be accepted until sufficient detailed information on the baseline data and assessed impacts based on scientific evidence are provided. As the site

for pumping and discharging is located in the marine area under the responsibility of EEAA Nature Conservation Sector as part of the National Park of Egypt dedicated to conservation and supporting tourism and local populations, the precautionary principle should be applied and a detailed ESIA provided otherwise the project should be relocated at a less sensitive area.

- 6.20. In addition, the ESIA will have to include a monitoring plan for all relevant parameters, on land and at sea and to prepare an emergency plan for all situations related to the land and sea aspects as the area of Nuweiba is a tourism centre with numerous visitors in increasing numbers from Egypt and abroad eager to visit a pristine place of Sinai still in harmony with the nature.

Impacts on the tourist industry

- 6.21. The project town of Nuweiba is located at the shores of the Gulf of Aqaba some 170 km north of Sharm el Sheikh and 70 km south of Taba. In the 1990s Nuweiba became a popular resort for earthbound tourism, mainly from Israel. But also European independent travellers - often staying in basic beach camps- came to enjoy partying, the marine life in the Gulf and the desert.
- 6.22. At present, there are four star-rated hotels (939 rooms) and six un-rated hotels (569 rooms) in the wider Nuweiba area. These facilities account for some 2% of all overnights in South Sinai. In addition, there are about 100 basic sea side camps (app. 2,500 huts) which are mainly used by independent, young and eco-minded travellers. Most of the camps are run by members of the two local Bedouin tribes.
- 6.23. Apart from beach tourism, Nuweiba is an ideal starting point for excursions and maritime explorations. Bedouins dominate the excursion/safari business. Popular among travellers are camel and jeep safaris to natural and historical sites in Sinai's interior. Expatriates own some hotels and/or operate local diving centres.
- 6.24. The 28 months construction period will require a workforce of up to 3.000 people. As most of the needed qualifications are not locally available, the vast majority of the workers will have to be brought in from other parts of the country. This "import" of labour will create temporary demand for accommodation, thus giving local hotels a secured income for a limited time.
- 6.25. However, the traditional tourism will suffer under the construction. Increased traffic and transport activities will disturb tourists. If not carefully managed, the large influx of outside workers could create tensions between them and locals/tourists. There is a danger that during the course of construction the image of Nuweiba as a quiet tourism destination will suffer.
- 6.26. It is understood that the plant's technology will be state-of-the-art. This means that the air and noise emissions will be within tolerable limits. However, the major blow for local tourism will be the "visible pollution" of the plant. The plant's dimensions are of such a magnitude that it will be seen from all over Nuweiba. A computer modelling shows its dramatic visual impact and that it can not be mitigated by any camouflaging measures. The dominating sight of the plant will destroy the image of Nuweiba as a tourism resort. The question is whether or not this image flaw can be contained to the Nuweiba town or it will also harm tourism in other coastline locations.

- 6.27. As a consequence of the plant's existence, international tourism in the area will decline dramatically. Foreign travellers always have a chance to select alternative destinations without any major impairment. In future, hotels and service providers will have to adapt to the new situation either by targeting the smaller transit traveller's market, closing operations or relocating.
- 6.28. Therefore, the Impact of the power plant on local tourism will be severe. International leisure tourism will suffer most as Nuweiba's image will change from a holiday to a more "industrial" destination.
- 6.29. In contrast to volume-driven tourism being offered at Sharm el Sheikh and Taba, the Nuweiba region without the proposed power plant could become a nucleus for the development of modern eco-tourism. Currently this is a fast growing niche market with great future prospects. The development of eco-tourism would help to diversify the mass tourism strategy and thus make tourism in South Sinai as a whole more sustainable.
- 6.30. The Nuweiba region's natural beauty and its local and indigenous population with a long tradition of living in harmony with nature, are valuable assets for the emergence of eco-tourism. Such a new direction of development should include the camp and safari operations which of course have to be substantially upgraded and expanded to meet international standards.
- 6.31. Decision makers may argue that at present Nuweiba accounts only for a fraction of the total South Sinai tourism and that other locations have a greater potential for expanding mass tourism. However, the key issue is to find the best strategy for tourism development in South Sinai.
- 6.32. For a more diversified and balanced product portfolio, it would be advisable to develop eco-tourism as a complementary product line to mass tourism. This is a fast growing niche market with great future prospects. As long as the power plant is not built, the wider Nuweiba area seems to be a good location for this purpose. By applying a bottom-up approach, eco-tourism could start. The region's unspoilt natural beauty and its local and indigenous population with a long tradition of living in harmony with nature are valuable assets for the development of authentic eco-tourism.

Social impacts on the Nuweiba community

- 6.33. The predominant view of the complainants was that, while electricity was important, the proposed electricity plant should be located elsewhere. They argued that it was unlikely to provide appropriate employment opportunities and was likely to marginalise further their livelihood strategies.
- 6.34. While the **direct** social consequences of the proposed plant have been perceived to be minimal, the **indirect** social consequences are likely to be considerable. It would seem that little attention has been paid by the sponsors to the local context and to the particular histories and cultures of the inhabitants of the Nuweiba area. Early and meaningful involvement of local residents has been lacking. As a result of this, attitudes against the project appear to have hardened.
- 6.35. There is a real likelihood that such polarised attitudes will further harden and tensions increase again, unless a more inclusive and representative consultation process is

pursued. It is clear that tensions need to be lowered. Informed, engaged and constructive consultations need to take place. To succeed, a meaningful and informed engagement, between the local populations and the electricity company, will require an extended time period. The CO considers that the outcome of this engagement will be far from certain. Given current opposition, the sponsors may wish to reconsider the decision to build in Nuweiba.

- 6.36. The ESIA submitted to support the project is most detailed in its analysis of the physical and natural environment. It is largely silent in its treatment of the social and cultural environment into which the electricity plant will be introduced. The report is disconnected from the wider discussions associated with regional developments envisaged for the area and that might take advantage of the increased supply of electricity.
- 6.37. While it may be the case that no 'indigenous populations' are affected and thus that no special privileges for such groups are to be found within Egyptian regulations, it is evident that many of the families living adjacent to the proposed power plant are vulnerable and poor and in need of specific attention and support. It is also evident that they see themselves as a distinctive group. It is also evident that the Electricity Generating Company could more systematically contribute and significantly support the development of a more unified and sustainable plan for the region.
- 6.38. The project cannot be isolated from overall developments of the region of which it is likely to be a major part, nor from the particular characteristics of this sensitive area.
- 6.39. The responses of the sponsor to the complaints to date have not been very forthcoming and relevant expertise within the company needs strengthening to handle the changing international approaches to stakeholder consultation that are currently increasing in importance.
- 6.40. Prior to proceeding with the project it is recommended that serious attention be given by the concerned national authorities to the integrated sustainable development strategy being developed for South Sinai of which Nuweiba is an integral part, and the place of the proposed power plant in that strategy.
- 6.41. The likely impact of uncoordinated development on local populations is that tourism will be adversely affected. If Nuweiba is to retain the emphasis on low-cost tourism that is a major source of employment for the local population, and if it is to develop diversified sustainable eco-tourism as part of an integrated regional development strategy, then the visible presence of a large power plant will be a major deterrent. The developments that will inevitably follow the construction risk the further marginalisation of a large proportion of the local Bedouin population and be accompanied by attendant increases in existing tensions.
- 6.42. Additionally the EEHC should give greater attention to the development of its community liaison and external outreach policies and programmes.

7. Conclusions and Recommendations

- 7.1 In the remit of the CO intervention under the EIB Complaints Mechanism it is worth stating that, further to the compliance review, the objective of such intervention is to find the best solution possible to address the concerns raised by complainants and project affected parties whilst at the same time protecting the reputation of the EIB as well as that of the promoter by finding mutually agreeable solutions that properly mitigate those concerns.

7.2 According to the CO investigation, which is supported by the 3 independent experts, the concerns expressed by the complainants are well founded. Under present conditions, if the Power Plant will be constructed in the proposed Nuweiba location, the damage to the environment and the local tourist industry as well as the negative social impact on local communities would be serious and could be irreparable. The CO considers that these could lead to violence and conflict in the area.

- 7.3 Therefore, the possibility of further measures regarding environmental and social impacts, to the satisfaction of the EIB and including adequate mitigation, compensation and relocation could be investigated. This would imply start building trust and holding extensive and meaningful discussions and dialogue with the project affected community in order to adequately and satisfactory address all environmental and socio-economic related issues.
- 7.4 It is not part of the CO remit to identify such measures, and this would probably go far beyond the responsibilities of the promoter, the Egyptian Electricity Holding Company. Indeed, given the nature, extent and scope of such measures, as well as the strategic choices involved, this would fall into the remit of the Egyptian authorities.
- 7.5 However, it is the CO opinion that such a process, given the type of negative impacts and at this stage of an extensive mistrust, may take 1 to 2 years without any guarantee of a positive outcome.
- 7.6 It is of paramount importance for the good functioning and effectiveness of the EIB Complaints Mechanism, that project affected people have the right to express their opinions and to complaint. Project affected people in general, and complainants in particular, when expressing divergent views and/or complaining about projects financed by the Bank should not suffer from exercising this right

7.7 Based on the investigation conducted, information gathered and analysed, the findings supported by the 3 independent expert reports, and the current lack of trust within the Nuweiba community, the CO took the view that it would not be possible to agree EIB financing for the South Sinai Power Plant Project in Nuweiba, under the present circumstances.

7.8 EEHC and the Egyptian authorities have been informed of the CO findings, conclusions and recommendations above, which they have contested. On that basis, and considering the Bank's position not to consider financing for the project at this juncture, EEHC and the Egyptian authorities decided to withdraw the request for EIB support towards this project.

- 7.9 The EIB could consider providing EEHC with Technical Assistance providing project related capacity building facilities within the EEHC and PGESCo in the fields of sustainable development and corporate social responsibility.



F. Alcarpe
Principal of the EIB
Complaints Mechanism
22/04/2010



E. de Kruijff
Head of Complaints Office
22/04/2010

Annex I to the Conclusions Report

**Assessment of the impact on the marine biodiversity of the power plant
planned by EEHC in Nuweiba, southern Sinai, Egypt**

**Conducted on behalf
of the Complaints Office of the
European Investment Bank**

By

Dr Virginie Tilot

November 2009

The objective of the field mission was to examine, with a team of experts, in Nuweiba, South Sinai (Egypt), the site of a 750MWe natural gas-fired combined-cycle power generation plant planned by the Egyptian Electricity Holding Company (EEHC) and the East Delta Electricity Production Company, under the aegis of the Ministry of Electricity and Energy.

The objective of this expertise concerns the assessment of the impact on the marine environment of a 750MWe natural gas-fired combined-cycle power generation plant planned by the Egyptian Electricity Holding Company (EEHC) and the East Delta Electricity Production Company, under the aegis of the Ministry of Electricity and Energy. This assessment is based on:

- a review of the documents produced for the Environmental Impact Assessment drafted by the Power Generation Engineering and Services Company,
- a review of available information on the topic and the site in the Gulf of Aqaba,
- a field survey of the coastal and marine environment concerned by the power plant project,
- interviews with EIB relevant services in Luxembourg and with the EIB team on the field,
- interviews with project promoter officials and relevant Egyptian authorities, in Cairo and in the Gulf of Aqaba,
- interviews with local stakeholders, including complainants, concerned by the use of coastal and marine resources at this site and its immediate surroundings.

This report succeeds to a preliminary evaluation which was open to discussion. The participatory approach enabled to better draw a final assessment and propose recommendations.

Executive summary

This review of the Environmental Impact Assessment of a 750 MWe power plant in Nuweiba, Gulf of Aqaba (Egypt) drafted by the Power Generation Engineering and Services Company highlights the main characteristics of the marine context and a detailed description and mapping of the planned location which were not emphasized in the Environmental Impact Assessment.

The coastal and marine environment of Nuweiba is still relatively pristine. The coral reef and seagrass communities are assessed as healthy, diverse and highly resilient having adapted to periodic natural stressors (wadi floods, earthquakes, bleaching events, invasions of corallivorous organisms, diseases...). These qualities characterize "hotspots" of biodiversity in the realm of protection of an ecosystem integrity and the management of natural resources. Such a hotspot would could serve as gene bank facing the decline of coral communities in the region and in the world.

However if impacts, such as planned in the power-plant project, are continuous, and above a certain threshold, they would destroy these communities even if these are highly resilient and endowed with such ecologically adaptive characteristics.

The presence of endangered species of the IUCN - World Conservation Union has been recorded in the area, the internationally important and endangered species of the IUCN - World Conservation Union, mainly green turtles *Chelonia mydas* and hawksbill turtles *Eretmochelys imbricata*.

A scientific and touristic scoop comes with the presence on the Nuweiba site of a mimic octopus *Thaumoctopus mimicus* (Norman and Hochberg, 2005) which has never been recorded in the Red Sea. There is also the confirmation of the discovery of a new species of clam, *Tridacna costata*.

Presently local activities in Nuweiba seem adapted to the carrying capacities of the marine ecosystems. Thus the site, in the context of expanding urbanization and recreational uses of the coastal and marine environment of the egyptian Gulf of Aqaba, is of national and regional importance in terms of conservation and sustainable development.

The terrestrial environment in Sinai is of high value with the creation by the Government of Egypt of a network of 5 protected areas covering the desert, coastal, and marine ecosystems and remaining available for traditional uses by the local population of Bedouins. This network includes the full marine environment of the Gulf of Aqaba and a length of about 30km in the Gulf of Suez, including the coastal setback, up to 200m inland.

The responsibility for the management and the control of these protected areas, covering about 50% of the South Sinai Governorate, lies in the Nature Conservation Sector of the Egyptian Environmental Affairs Agency and is ruled by law 102 on Protectorates and law 4 on Environment.

Accordingly, for the marine environment is subject to a zero discharge policy and none of the coastal activities related to tourism has an impact on the marine environment: sewage water is collected and treated inland and desalination brine is normally re-injected inland at depth avoiding impact on the marine environment.

Fisheries are allowed only for Bedouins and the catches are recorded and management is a responsibility of the NCS in coordination with the local Bedouin authorities.

According to the lack of accurate data provided by the EIA concerning the impact on the marine environment at the planned site, the location of the powerplant cannot be accepted

until sufficient detailed information on the baseline data and assessed impacts based on scientific evidence are provided.

As the site for pumping and discharging is located in the marine area under the responsibility of EEAA Nature Conservation Sector as part of the National Park of Egypt dedicated to conservation and supporting tourism and local populations, the precautionary principle should be applied and a detailed EIA provided otherwise the project should be relocated at a less sensitive area.

In addition, the EIA will have to include a monitoring plan for all relevant parameters, on land and at sea and to prepare an emergency plan for all situations related to the land and sea aspects as the area of Nuweiba is a tourism centre with numerous visitors in increasing numbers from Egypt and abroad eager to visit a pristine place of Sinai still in harmony with the nature.

Main characteristics of the coastal and marine environment of the South Sinai peninsula

The following elements are developed with scientific evidence as they were not emphasized in the Environmental Impact Assessment drafted by the Power Generation Engineering and Services Company.

The **Gulf of Aqaba** is **internationally renowned** by the scientific community for its **uniqueness**. It is the most northernmost tropical sea ecosystem. Its oxygen-rich water has a constant temperature of 21-24 °C. Its relative isolation, and physical conditions which range from nearshore shallows to depths of over 2,000 meters in the central rift (Edwards and Head, 1987) have given rise to an **extraordinary range of ecosystems and biological diversity** (Sheppard *et al.*, 1992; Tilot *et al.*, 2008a; 2008b).

The **Gulf of Aqaba** is about 200 kilometers, longer and shorter than the Gulf of Suez, (5 to 26 km wide) and much deeper, reaching about **1,850 meters in the central basin** (conversely the Gulf of Suez is shallow with an average depth of only 40m in average). Its width ranges from 25 kilometers in the south to 16 kilometers in the northern parts. On almost the entire coastline of this gulf, the coastal fringing reef grows luxuriously, varying in width from 10 to 100 meters depending on the slope gradients at the shelf edge. The Egyptian coast of the Gulf of Aqaba (part of the Afro-Syrian Rift system) is formed mainly of uplifted fossilized corals followed by a sandy area varying in width and surrounded in most cases by mountains (mainly granite). In contrast, the Gulf of Suez coast is mainly sandy, composed of soft sediments interrupted in certain areas by small rocky formations. The bottom morphology is smooth in general and turbidity is higher due to frequent re-suspension of bottom sediment. These conditions combined to lower water temperatures restrict the development of coral reefs which have a different structure and benthic composition from the rest of the Red Sea (Edwards and Head, 1987).

The **air temperature** ranges between 9°C to 44°C in the **northern part** of the Gulf of Aqaba which receives about **25 millimeters of rain per year** between September and March, while the rest of the coast is virtually rainless, receiving an occasional shower of a few millimeters every several years. Such low rainfall is accompanied by low humidity for most of the year, except for periods in winter when it reaches about 70 percent in the south (Edwards and Head, 1987).

The **seawater temperature** remains constant with 21.5°C below a depth of 200 m and varying from 20°C in January to 27°C in August at the surface. Tides are semi-diurnal with a range from 30 to 100 cm. Given the very high evaporation rates (200 centimeters per year in the Gulf of Aqaba and 235 centimeters per year in the south) and the lack of freshwater input, the Gulf of Aqaba could be considered the **most saline water body in direct contact with world oceans**. **Salinity** ranges from 43 ppt to 44 ppt from south to north, and reaches about 43 ppt in the Gulf of Suez due to high evaporation rates and the extensive salt layers below the bottom. **Currents** recorded as 15-20 cm/s follow in general the **north-western winds** which are at an average velocity of 7-12 km/h. However the flow is reversed in March and April when southern winds with storms (Azyab) occur during the Khamasin season (Edwards and Head, 1987; Paldor and Anati, 1979).

The Gulf of Aqaba supports a **dense faunal and floral population** of more than 100 species of corals, 800 species of fish and hundreds of species of crustaceans and molluscs in a **fragile environmental equilibrium**. It is considered as an **important repository of marine biodiversity** and contains **some of the world's most important coastal and marine habitats and resources** including representatives of several **endangered species**. Species **endemism** in the Gulf of Aqaba is extremely **high**, particularly among reef fishes and reef-associated invertebrates (Edwards and Head, 1987). All these elements constitute the

international importance of the **conservation value of the marine and coastal habitats of the Gulf of Aqaba** (Jeudy de Grissac, 1999).

Among the most notable characteristics of the Gulf of Aqaba, is the **extraordinary range of ecosystems**: an arid coastal zone, coastal wetlands, mangroves, seagrasses and coral reefs. These ecosystems have also an **important role in protecting and stabilizing the coastline and serving as buffer to changes in water quality**.

A series of studies have described the structure and zonation of **coral communities** in the Gulf of Aqaba (Head, 1987; Loya and Slobodkin, 1971; Loya, 1972; Mergner and Schuhmacher, 1974; Kotb *et al.*, 1996, 2001; Tilot *et al.* 2001; 2008a; 2008b). The coral reef communities of the Gulf of Aqaba are composed of approximately 209 hard corals species (some 20 being endemic to the area) and 16 soft coral species representing the **highest diversity in any section of the Indian Ocean** (Wilkinson, 2008). The warm water and absence of freshwater input provide very suitable conditions for coral reef formation adjacent to the coastline. Coral reef communities provide space, food and shelter for a large and diverse fauna and flora population. In the northern part of the Gulf of Aqaba the coast is fringed by an almost continuous band of coral reefs which physically protects the nearby shoreline, except for wadi (temporary rivers) deltas, alluvial fans, where the input of sediment creates shallower habitats with bays favorable to seagrass beds and patch reefs. Further south, the coastal shelf becomes much broader and shallower and the fringing reefs gradually disappear to be replaced by shallow, sandy shorelines and mangroves. Coral reefs become more numerous offshore in this part of the Region and occur as offshore patch reefs and reefs fringing islands.

Various studies describe reef fish assemblages in the Red Sea and Gulf of Aqaba (Botros, 1971; Fishelson *et al.*, 1974; Head, 1987; Ormond and Edwards, 1987; Roberts and Ormond, 1987; Roberts *et al.*, 1992; Roberts and Polunin, 1992; Khalaf and Kochzius, 2002; Tilot *et al.*, 2001; 2008a; 2008b). From the **1280 fishes species** recorded in the Red Sea (Khalaf and Kochzius, 2002; Randall, 1994), only **around 200 species** are recorded in the northern part of the Gulf of Aqaba. A typical pattern is observed in the Gulf of Aqaba, species richness first increases from the shore to the reef-edge and continues to increase to depths of 10-15m before decreasing again. Abundance follows a similar pattern but peak abundances are generally found close to the reef-edge (often due to schooling planktivorous fishes) in shallower water than maximal species richness. Groupers tend to be located in the fore-reef whilst surgeon fishes are more common in shallow regions. Pomacentridae appear the more abundant and Labridae and Pomacentridae dominate in terms of species richness.

Fishes play an important role in a number of reef processes: defense of feeding territories by herbivorous species causing increased rates of carbon fixation, heavy grazing by fish and echinoderms resulting in dominance by nitrogen fixing blue-green algae and foraging migrations by fishes forming important pathways of nutrient transfer within and among reef habitats (Sheppard *et al.*, 1992). In the gulf of Aqaba, deep water species are found closer to the surface than elsewhere in the Red Sea, e.g. the flashlight fish *Photobleraphon palpebratus*, the angelfish *Holocanthus xanthotis*, the butterflyfish *Chaetodon paucifasciatus*. This characteristic has been attributed to temperature (Ormond *et al.*, 1984), it could be also due to a niche expansion in the absence of certain competitor species (Diamond, 1984). Many other species have vertically shifted distributions. Also some species are restricted to the Gulf of Aqaba such as the damselfish *Chromis pellaoura*.

Concerning **echinoderms**, nearly 200 species have been recorded for the Red Sea among which 56 species in the northern part of the gulf of Aqaba (2 species of crinoids, 10 asteroids, 10 ophiuroids, 12 echinoids,).

Seagrass beds in the northern part of the gulf of Aqaba are located in shallow and sheltered waters such as lagoons, sharms (drowned wadi mouths), and mersas (shallow embayments) because of the soft-bottom sediments found in these areas. Of the 11 seagrass species in the entire Red Sea, the commonest species are *Halophila stipulacea*, *H. ovalis*, *Halodule uninervis*, *Thalassodendron ciliatum* and *Syringodium isoetifolium*. In the Gulf of Aqaba, five or six species may be found among which *Halophila stipulacea*, *H. ovalis* and *Halodule uninervis*. The productivity of seagrass beds is greater than comparable areas of both coral reefs and mangroves. Their abundance along the Red Sea is indicative of a highly productive ecosystem. Seagrass roots stabilize sediments, and in conjunction with associated ecosystems, protect the coastline.

The common inhabitants of seagrass beds of the Gulf of Aqaba are Mollusca (*Anadara antiquata*, *Botula cinnamomea*, *Cerithium rupelli*, *Circe calipyga*, *Circe corrugata*, *Conus arenatus*, *Conus tessulatus*, *Glycymeris pectunculus*, *Muricodrupa fuscillum*, *Nassarius concinnus*, *N. protrusidens*, *Natica gualteriana*, *Pinna muricata*, *Strombus fasciatus*, *Strombus gibberulus*, *Strombus mutibilis*, *Strombus tricornis*), Crustacea (*Alpheus* sp., *Clibanarius* sp., *Paracleistostoma* sp.), Echinodermata (*Tripeneustis gratilla*) and Polychaeta (*Notopygos variabilis*).

Water currents are reduced in the vicinity of seagrass beds leading to the deposition of fine sediments and the clarifying of surrounding waters. Many marine animals rely upon seagrass beds for shelter and food, including water birds, fish and crustaceans, and the internationally important and **endangered species** of the IUCN - World Conservation Union, dugongs and green turtles. Five species of marine turtles have been recorded in the red sea among which the green turtle *Chelonia mydas* and the hawksbill *Eretmochelys imbricata* are the most important. Commercially important fish and crustaceans use seagrass beds as nursery grounds, which are also mostly appreciated by juveniles for food and shelter.

There are also **strong connections between seagrass beds and nearby coral reefs**: nocturnally active fish migrate at night from the reefs to the seagrass beds to feed; dead seagrass leaves carried offshore in currents become food for pelagic and fauna inhabiting deeper marine habitats.

Concerning marine mammals, there are at least 9 **dolphin species** present in the Red Sea, the most common are spotted dolphins and bottlenose dolphins. Dolphins eat saltwater fish and cephalopods, such as squid or octopus. The false killer whale has been recorded as well but more South in the Red sea.

Another distinctive characteristic of the Gulf of Aqaba is the existence of an **arid coastal zone** which consists of a flat coastal plain of varying width which is often bordered by extensive mountain ranges. The coastal plain in many areas is dominated by large alluvial fans, such as in Nuweiba with Wadi Watir delta, characterized by a seasonal discharge of water in a limited series of flood flows. Close to the shore, the coastal zone is dominated by salt tolerant vegetation which grades into arid adapted plant associations.

Areas adjacent to springs or other sources of permanent water are traditionally characterized by **oasis type vegetation and fauna** which are unique in their adaptation to stressful environmental conditions. They are characterized by a biodiversity which far surpasses that of surrounding areas often including species endemic to the Region. Their areas of distribution are usually very limited and some of the species are relicts of taxa which were more widely distributed in the geological past. Open freshwater bodies are the breeding sites of insects and attract large numbers of reptiles, birds and mammals.

The shallow waters adjacent to reefs and islands and the wetlands (including mangroves) provide ideal habitat for a **large number of resident and migratory bird populations**. Some of the important resident species include the lesser flamingoes *Phoenicopus minor* and the yellow-vented bulbul *Pycnonotus xanthopygos*, while important wintering species include the greater spotted eagle *Aquila clanga*, white-eyed gull *Larus leucophthalmus* and the greater and lesser sand plover *Charadrius leschenaulti*, *C. mongolus*. The Gulf of Aqaba is a flyway for many species of birds (about 2 million individuals) which seasonally migrate between Europe and Africa.

The natural resources of the Gulf of Aqaba are vital to the livelihood of coastal populations. They support them for thousands of years and nourish the development of a maritime and trading culture linking Arabia and Africa, Europa and Asia. The aridity of the coastal zone has historically concentrated human settlement near available water supplies and created a **traditionally heavy reliance on the marine environment** as a source of food.

Fisheries are an important source of employment in the Egyptian Red Sea. Artisanal fishermen use a range of gear including longlines, handlines, gillnets, trawls, trammel nets, tangle nets, set nets, traps and spears. More than 650 species are recorded among the 1280 red sea species, with 20 species recorded in commercial catches. Bedouin women traditionally harvest invertebrates (mostly octopus, and molluscs e.g. *Tridacna sp.* and *Strombus tricornis*) in shallow reefs using metal spears.

Although the Gulf of Aqaba is still one of the least ecologically disturbed marine areas compared to other enclosed water bodies, it is **under the rapidly growing pressure of urban, commercial and maritime activities, mainly for touristic and recreational purposes** in the southern Sinai Peninsula. Until the 1970s South Sinai lacked any large settlement, and these reefs were unexploited, save by a few Bedouin tribes who fish there mainly during the summer. Since then, however, the attractions of scuba diving and snorkeling have stimulated a dramatic expansion of the once Bedouin villages of Sharm El Sheikh, Nuweiba, Dahab and Taba into major tourist resorts. By 1990 South Sinai was

receiving 160 000 tourists per year (Hawkins and Roberts, 1994; Jeudy de Grissac, 1999), but by 2002 this number had risen to 1.7 million per year, and by 2003 to 2 million per year, of whom most were concentrated in and around the coastal city of Sharm El Sheikh (Jeudy de Grissac, 1999; SEAM, 2004b; Jobbins, 2006).

Consequently the **Egyptian authorities have considered maintaining the quality of reefs as critical to the economic growth of the region.** They understood that living marine and coastal resources need to be managed effectively so that their long term sustainable use would be ensured. And that it should be done within an integrated approach and increased public awareness about the value of the marine environment promoting habitat and resource conservation. Accordingly a network of marine protected areas has been established on basis of Law 102/1983 and its accompanying decrees. This large marine protected area covers the whole of the Egyptian Gulf of Aqaba's reefs and coastline with the strict enforcement of zero discharge policies, the prohibition of coastal alterations, the regulation of artisanal fisheries and the achievement of consensus on management issues with resident communities and stakeholders. The network includes Ras Mohamed National park, Nabq Protectorate, Abu Galum Protectorate, Taba Protectorate and Saint Katherine Protectorate (Jeudy de Grissac, 1999; Pearson and Shehata, 1998; Galal et al., 2002; Tilot, 2007b).

Despite protective measures there has been concern that the rapid development of the coast is having both direct and indirect impacts to the area's marine environment. In particular, studies have recorded damage to corals by divers and snorkelers at the most popular sites (Hawkins and Roberts, 1992a,b, 1993, 1994; Medio and Ormond, 1995; Leujak, 2006). At Sharm El Sheikh the reef areas that are most heavily used by visitors have higher numbers of broken hard coral colonies, loose coral fragments and partly dead corals than do less heavily used areas (Hawkins and Roberts, 1992b; Medio, 1996; Leujak, 2006).

Over-fishing poses "a threat to Egyptian coral reefs through an increase in commercial fishing and heavy trawling in the Gulf of Aqaba, along with poaching in no-take zones. Fisheries in the Red Sea are predominantly seasonal and occur during the spawning seasons of the most valuable commercial fishes. Presently these stocks are under serious threat of depletion" (Kotb *et al.*, 2008). "**Destructive fishing** results from local fishermen, migratory fishermen from other provinces, and visiting fishers from the Nile Delta who use purse-seine nets during the fishing season and then return to their home villages. The traditional local fishers are increasingly abandoning fishing for more lucrative opportunities in the dive industry or in hotels. Newcomers who replace them have less knowledge about the local ecology and often use unsustainable fishing practices, resulting in an increase in habitat destruction from net damage. Also, traditional local fishing knowledge is being irreversibly lost" (Kotb *et al.*, 2008). As priority is given to conservation and tourism activities, fisheries in the Gulf of Aqaba are limited to Bedouins using traditional tools. Catch are recorded and management decisions are taken jointly between the Local Bedouin representatives of each tribe and the Nature Conservation Sector local representation in Sharm El Sheikh.

Shark fishing and sea cucumber collection are more recent threats to Egyptian reefs." The insatiable market for shark fins has induced sharp increases in shark fishing which introduces a conflict with tourism. Sharks in the Egyptian Red Sea constitute a very high commercial resource for tourism as they represent the main attraction for divers (an individual shark at the valuable diving site of Brother Island exceeds \$300,000). The Egyptian government issued a decree banning shark fishing on the Egyptian Red Sea coast in 2004" (Kotb *et al.*, 2008). "After sea cucumbers were depleted in many other parts of the world a small-scale fishery began in Egypt in the late 1990s. By 2000 the sea cucumber fishery had increased greatly because of high prices. In April 2000 the Red Sea Governorate banned sea cucumber fishing in coastal areas under its jurisdiction, however, the sea cucumber fishery was re-opened in 2002 despite the efforts of Egyptian Environment Agency and the Governorate to retain the ban. Between 2001 and 2004 extensive fishing of sea

cucumber resulted in serious depletion of the natural stocks and 5 commercial species have disappeared completely from many reefs. (139 tons in 2001, PERSGA/GEF, 2002). All Egyptian authorities agreed to completely ban sea cucumber fishing in 2004 (Kotb *et al.*, 2008).

In addition, natural stressors occurred recently in the area, including earthquakes (1993, 1995, 1997 (Abdel Fattah *et al.*, 1997; Shaked *et al.*, 2004)), rainwater (wadi) floods carrying sediments (1971, 1972, 1990, 1996, 2002, 2005), coral diseases (Antonius, 1995), sporadic coral bleaching events due the trespassing of certain thresholds of temperature of surface waters over a certain period of time combined with very low tides (2002, 2003, 2005), corallivorous crown-of-thorns (COTs) starfish *Acanthaster planci* outbreaks in 1994 and 1998 (Salem, 1999), corallivorous gastropod *Drupella cornis* invasions (Schuhmacher, 1992). The first COTs outbreak was relatively minor, whereas the 1998 outbreak was extensive and probably continued through 1999 and 2001 although major control programs were implemented (PERSGA, 2008). More generally, across the most popular tourist sites, the loss of live coral cover owing to the activities of visitors might have amounted to as much as 20% of original cover (SEAM, 2004a).

As marine and coastal ecosystems are **open systems**, being linked by water circulation, any decline in health of one ecosystem will affect the others, **even at distance**. **Physical destruction**, changes in water quality such as raised nutrient levels, and changes in salinity and temperature high levels of sedimentation, and changes in water currents can all **damage coral reefs and associated ecosystems**. Recovery, through new growth and larval settlement, requires a variable (1-5cm/year for hard corals in northern Gulf of Aqaba) amount of time and freedom from chronic stress.

International and regional conventions and national legislation concerning the preservation of the biodiversity

Before ratification of the UNCBD, Egypt ratified many agreements and conventions including:

- Convention on the preservation of fauna and flora in their natural state, London, 1933 (ratified in 1936).
- Agreement on establishing general fisheries council for the Mediterranean, Rome, 1951.
- International Plant Protection Convention, Rome, 1953.
- International Convention on preventing oil pollution into the seas, London, 1963.
- Phyto-sanitary Convention for Africa, Kinshasa, 1968.
- African Convention on the Conservation of Nature and Natural Resources, Algeria, 1968 (ratified in 1972).
- Convention for the Protection of the Mediterranean Sea against pollution, Barcelona, 1976 (ratified in 1978)
- Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973.
- Protocol concerning Mediterranean , especially protected areas. Geneva, 1983 (ratified in 1986)
- Convention on Wetland of International Importance, especially Waterfowl Habitat (RAMSAR), (Rasmsar, Iran, 1972), (ratified in 1988)..
- Convention of the Conservation of the Migratory Species of Wild Animals (CMS), Bonn, 1979 (ratified,1982).
- United Nations Convention on the Law of the Sea. Montego Bay, Jamaica, 1982 (ratified in 1983)
- Regional Convention for the Protection the Environment of the Red Sea and Gulf of Aden. Jeddah, 1990.
- Convention on Biological Biodiversity, Rio de Janeiro, 1992. (ratified in 1994).

After ratification of the UNCBD Egypt involved in some other related agreements and conventions such as:

- Agreement on the Establishment of the Near East Plant Protection Organization, Rabat, Morocco, 1993 (ratified in 1995).
- International Tropical Timber Agreement. Geneva, 1994 (ratified in 1996).
- Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, Barcelona, 1995.

The main national laws related to preserve biodiversity are the following:

-The agriculture law, Law No. 53/1966: It was the main legislation protecting the wildlife, especially, birds useful to agriculture and certain endangered mammals and reptiles (chapter 3).

-The fisheries law, Law No. 124/1983: Especially in the parts concerning sustainable fisheries. The General Authority for Fisheries Resources Development (GAFRD) is the responsible body to implement this law.

-Law 102/1983 for Establishment of Protected Areas: It is the most valuable law for conserving the nature in Egypt. This law established the legal framework for the creation and management of protected areas. Egyptian Environmental Affairs Agency (EEAA) is the competent authority responsible for implementing this law. Law 102/1983 and its accompanying decrees provide the Egyptian Environmental Affairs Agency with the necessary legal instruments to declare protected areas, equip these with suitable resource management and conservation measures and establish and enforce regulations to safeguard protected areas. "The declaration of networked Protectorates on the Gulf of Aqaba has in effect established a large marine protected area (MPA), covering Egypt's Gulf of Aqaba littoral zone in its entirety realising Government objectives with the full protection of coral reefs and associated marine ecosystems on the Gulf of Aqaba, the strict enforcement of zero discharge policies, the prohibition of coastal alterations, the regulation of artisanal fisheries and the achievement of consensus on management issues with resident communities and stakeholders. The Gulf of Aqaba Protectorates Development Programme owes its success to proper integrated coastal zone management, strong legislation, unwavering Government support and the establishment of functional partnerships with the local community" (Pearson and Shehata, 1998; Shehata, 1998). **Presently, a total of 100% of the marine environment and the Egyptian shoreline of the Gulf of Aqaba** (the setback being 200m maximum according to the type of coasts) in addition to about **50% of the terrestrial** environment of the Southern Sinai Region is protected. The network of Protectorates encompasses : Ras Mohamed National park (Decrees 1068/1983 and 2035/1996), Nabq Protectorate (Decrees 1511/1992 and 33/1996), Abu Galum Protectorate (Decrees 1511/1992 and 33/1996), Taba Protectorate (Decree 316/1998) and Saint Katherine Protectorate (Decrees 613/1988 and 940/1996). Also 30km of the Gulf of Suez, are protected under this legislation (Fig 1). The International Maritime Organization (IMO) has plotted the boundaries of the marine protected areas on the navigation maps as areas to be avoided. In spite of these efforts, some accidents have happened resulting in damage to coral reefs. A damage evaluation system has been developed on an economic basis. The EEAA applies the principle 'polluter/owner pays' to all accidents (Shehata, 1998).

Moreover, the law 102/1983 specifically prohibits any action that may lead to the extermination, damage or alteration of any organism, system or formation considered as a habitat for the living terrestrial and marine resources of the protectorate. It also prohibits the introduction of exotic species and the removal of any organisms or materials found in the protected area. The law forbids any activities, actions or experiments in areas adjacent to a protected area that would affect the environment of the protected area or the processes within it without the express permission of the concerned administrative body.

-Law 4/1994 for Environment: It is supportive to Law 102/1983 especially in the areas outside the declared protected areas. Although Law 4/1994 is focused mainly on pollution issues in air, land and water, many provisions have implications for nature conservation and hunting management in Egypt as Article 26 which forbids hunting, shooting and catching of species listed by the Agriculture Law No. 53/1966 or by Egypt participated international conventions such as CITES and IUCN. The main articles concerning development and environment are those stipulating that an Environmental Impact Assessment (EIA) is

obligatory to obtain a license for projects and establishments. The EIA should follow the guidelines determined by EEAA in agreement with the administrative authority.

On the Gulf of Aqaba, Law 102, which is a powerful executive law, is applied. The wide range of articles of Law 4, which is a coordinating law, are exploited. By enforcing the two laws, all the main coastal activities can be regulated and proper integrated coastal management objectives implemented.

- Other numerous local ministerial decrees related to the UNCBD are established and implemented. They deal with: regulating fishing activities, forbidding shark fishing, strengthening the environmental law enforcement, protection of coral reefs, environmental risk assessment, forbidding trade in coral reef fishes for aquarium, in shells and other coral reef organisms, forbidding sea cucumber fishing, minimizing the pollution...

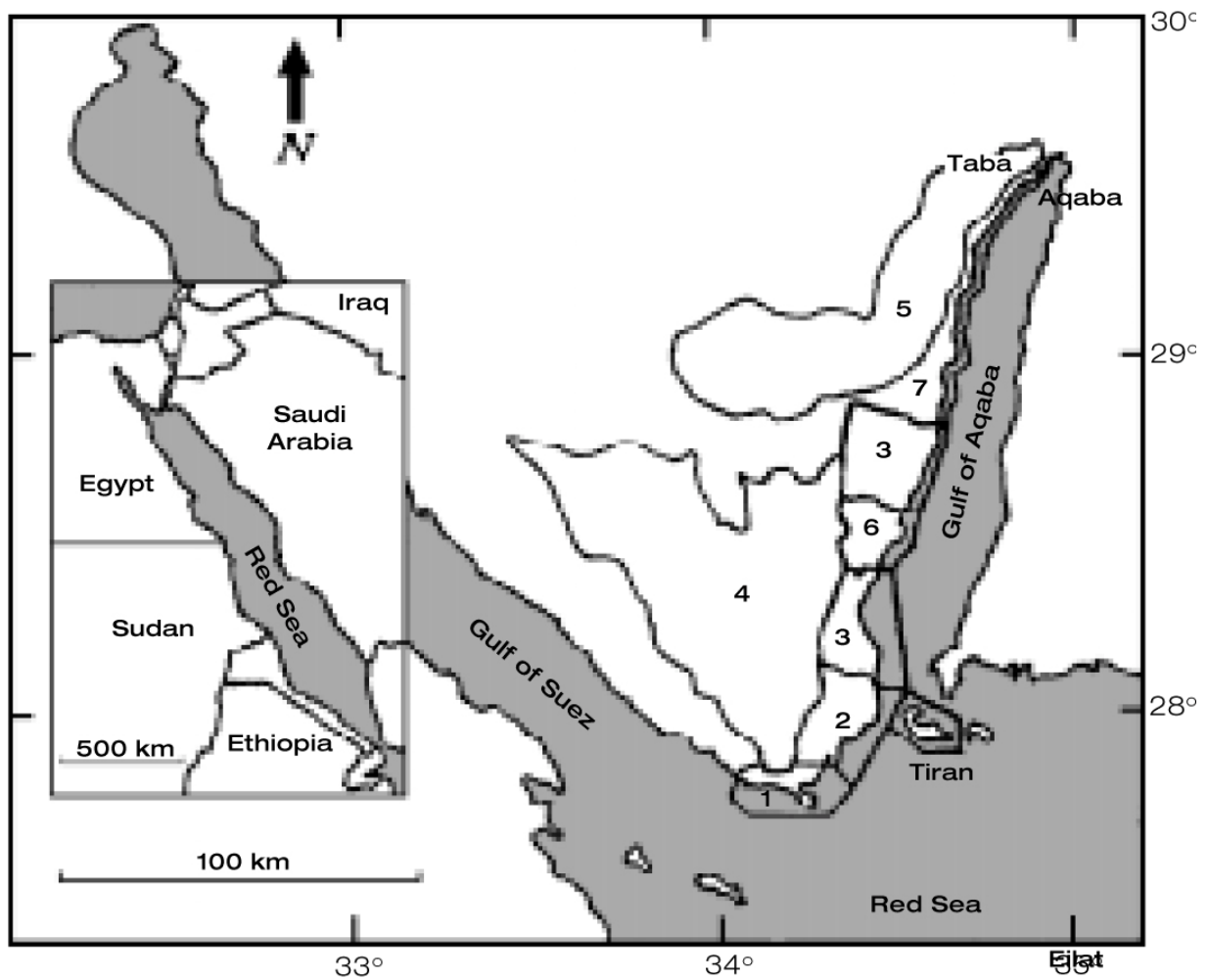
Recent improvements of the Egyptian legislation have been achieved by:

- the revision of the Egyptian Constitution, in 2007, with the introduction of a new specific provision on environmental protection. In particular, Article 59 specifying that Environmental protection is a national duty and the Law shall regulate measures necessary to maintain good environment,
- in 2007, a decree of the minister of Justice establishing the institution of environment Benches in each Governorate of the Arab Republic of Egypt,
- in 2009, Environmental Law N°4/1994 (Promulgating the Environment Law and its Executive Regulation Law) is amended by Law N°9/2009 in which the Egyptian environmental legislation is strengthened and updated. In particular there is an increase of prohibited acts in protected areas (Art. 29), such as trading and offering to sell all endangered living organisms of fauna and flora species and the strengthening of protection measures and penalties against any kind of violation in the territories of Protected Areas. The amended Environmental Law No. 9 of 2009 was the next step to keep pace with the new constitutional amendments by modification of the Environmental Law No. 4 of 1994.

Egypt is one of the first Arab and African countries that created a National Commission on Sustainable Development. The framework has been completed and it is currently under preparation for a strategy of sustainable development. At legislative level, a separate article in the Egyptian Constitution was included, stating that "Environmental Protection is a national duty".

Fig. 1 (Pearson and Shehata, 1998). The Southern Sinai Protectorates, Sector of the Egyptian Environmental Affairs Agency.

- 1: Ras Mohammed National Park.
- 2: Sharm el Sheikh Protected Coastline.
- 3: Nabq and Abu Galum Managed Resource Protected Areas.
- 4: St Katherine Protected Area.
- 5: Taba Natural Monument.
- 6: Dahab Protected Coastline.
- 7: Nuweiba-Taba Protected Coastline.

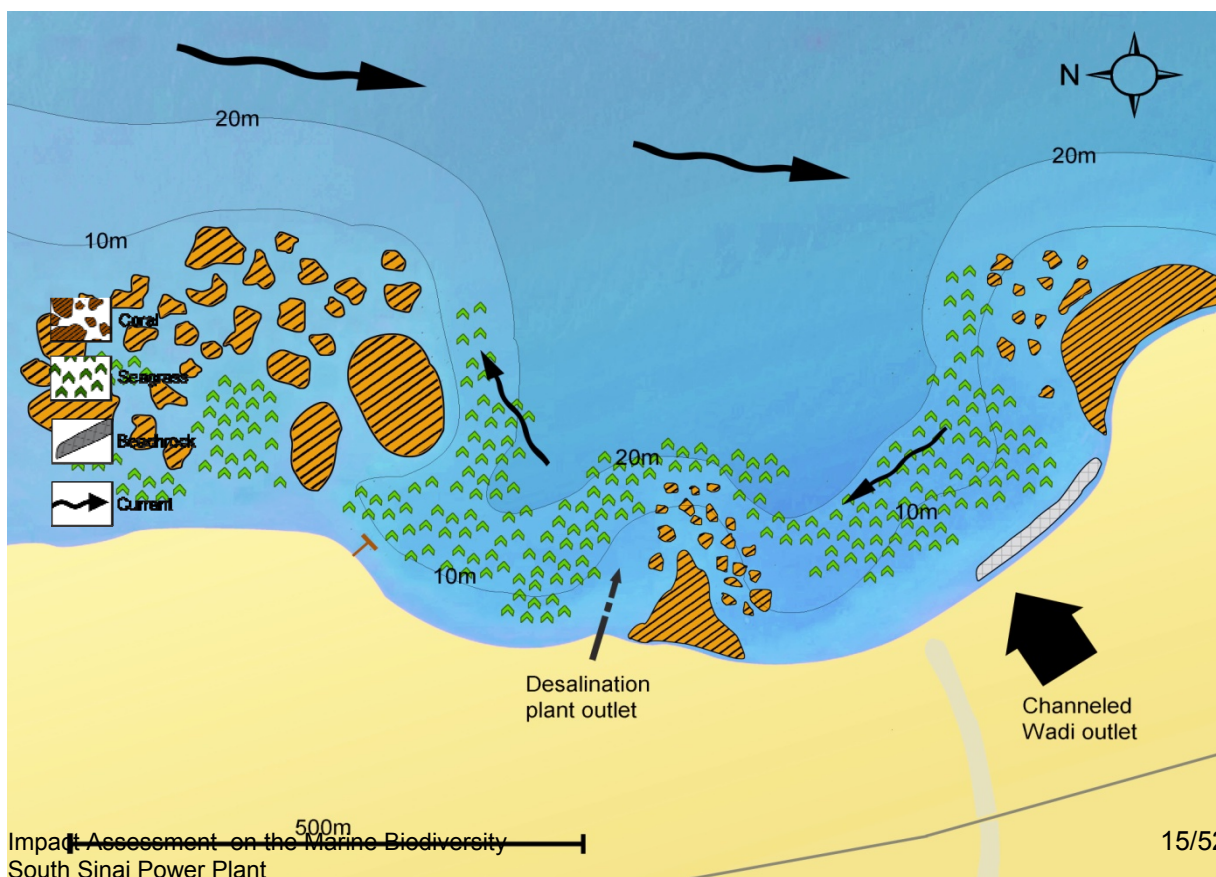


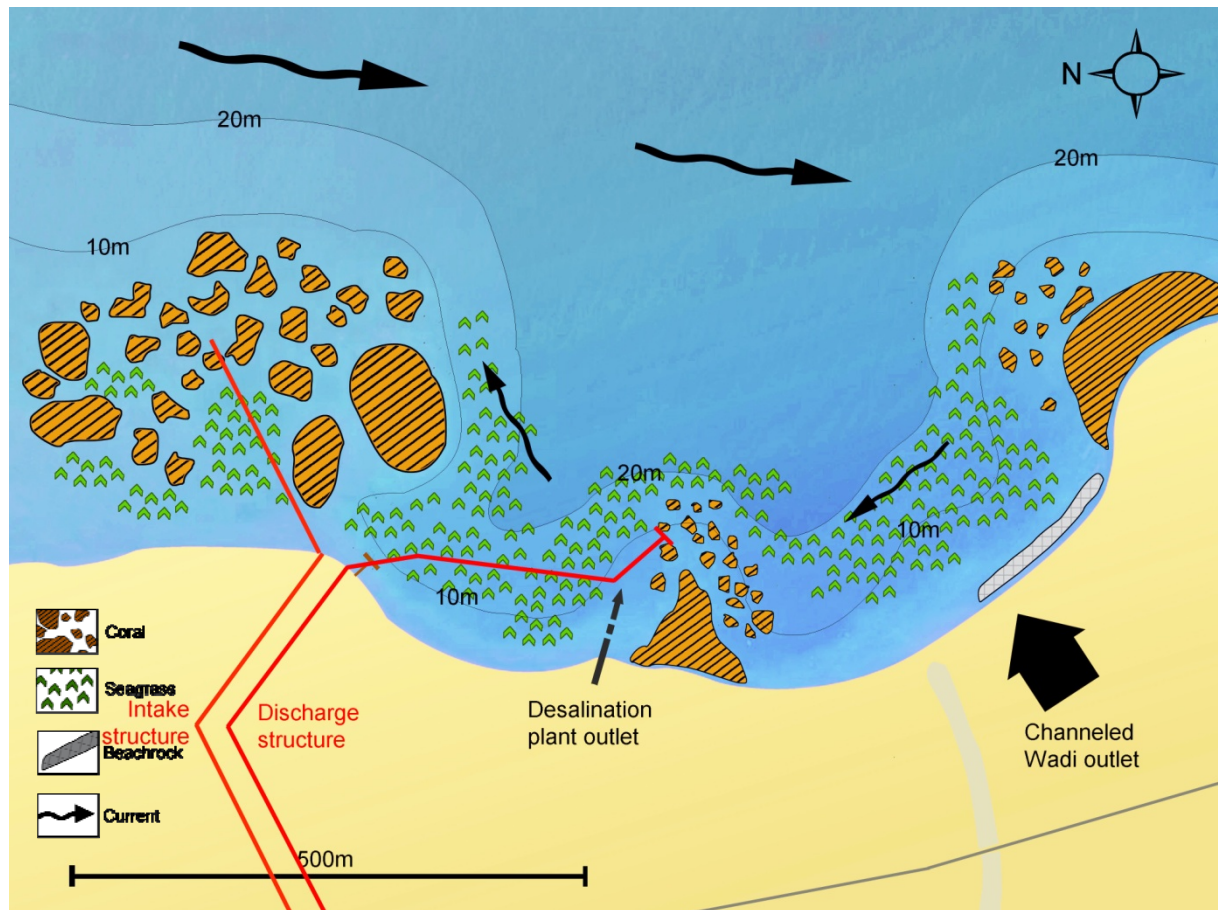
Maps of the study site in Nuweiba

Maps of the study site with the location of the different marine habitats and the planned inlet and outlet maps (2 scenarios) in reference to 2 different documents presented by EEHC and PGESCO. A third scenario, developed during the EIA performed by PGESCO, is analyzed during the dives (see description detailed further



in the document







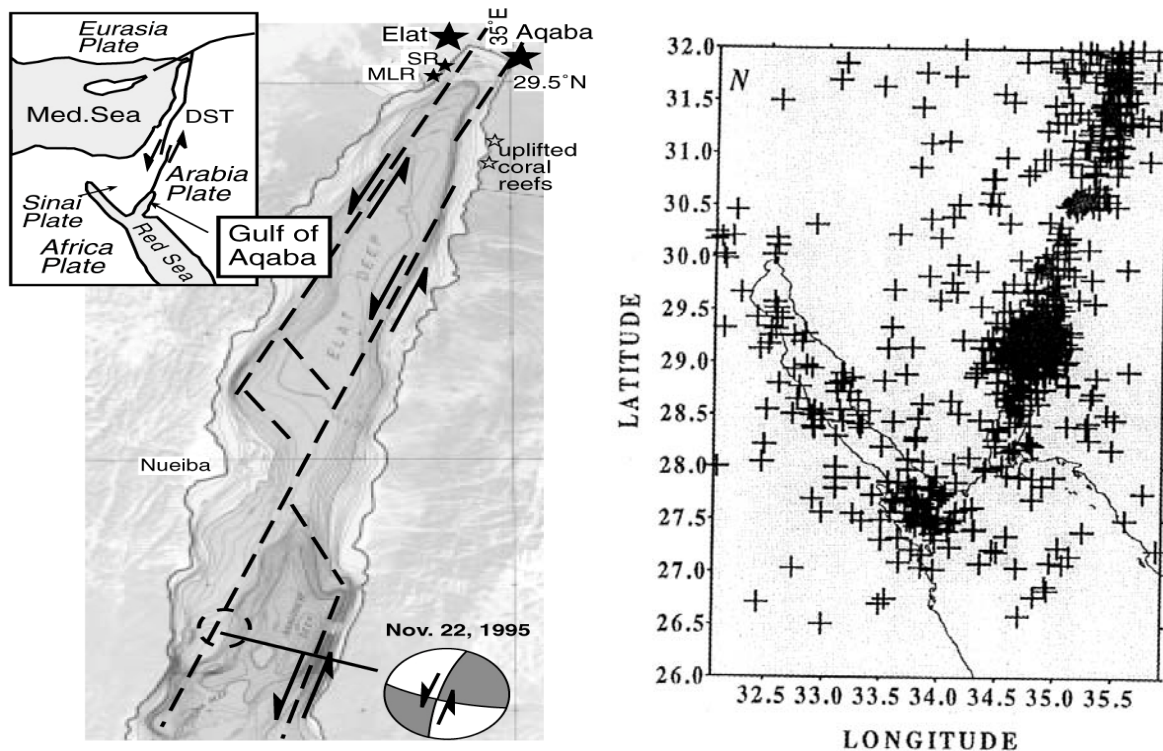
Description of Nuweiba marine environment

The coastal and marine environment of Nuweiba is still relatively pristine as the whole coast of the Sinai Peninsula apart areas where urbanization, tourism and recreational activities are more concentrated. This is the result of a decision of the government to prioritize in South Sinai **the protection of the environment and the sustainable development of tourism** and serves as model for the country, and the region, which has often fostered development to the detriment of environment especially in coastal areas.

Presently local activities in Nuweiba seem **adapted to the carrying capacities of the marine ecosystems**. Thus the site, in the context of expanding urbanization and recreational uses of the coastal and marine environment of the Gulf of Aqaba, is of **national and regional importance in terms of conservation and sustainable development**.

Nuweiba area, in particular at the planned site area, is an exception to the general pattern observed along the northern part of the coast of the Gulf of Aqaba as it is a wadi delta, **alluvial fan of Wadi Watir**, where **flash floods** occur regularly. There the fringing reef is broken in a system of bays with sand bars, patch reefs on sand and large seagrass beds. A big beach rock bank lies parallel to the shore (see map). The fact that Nuweiba is located in a wadi bed and delta is a **risk factor for the installation of a power-plant**.

The **Watir catchment covers 3100 km²** of very rugged mountainous terrain draining through a 20 km long canyonlike trunk stream to the Gulf of Aqaba. The floods in Wadi Mikeimin are typical of a geomorphologically efficient flood (Baker *et al.*, 1988; Schick *et al.*, 1997). Wadi Mikeimin is a 12.9 km² tributary of the major drainage artery of southeastern Sinai-Wadi water. Detailed analyses of one typical big flood event in 1971 and 1972 have been achieved by Lekach (1974) in Baker *et al.*, 1988. **Major floods in 1990, 1996, 2002, 2005** were of the same type. Results can help debating on the risks and impacts of future floods. Thus in 1971, Wadi Mikeimin, after a highly localized rainstorm, deposited overnight a 6200 m³ fan that completely obstructed the channel of Wadi Watir at their confluence. A flood reconstruction estimated **the peak flow at 91.9 m³/s**, which dissipated completely into the sandy bed of the large Watir, whose catchment was unaffected by the event. A detailed analysis of high-water marks within the Mikeimin catchment indicated that one of its two main tributaries, drainage area 5.5 km², had a peak discharge of 83m³/s. "Supercritical flows with surface velocities of about 5m/s, surges of 12m/s occurred about once a minute during high flow in the 1972 flood. Standing waves in rows of up to 8 and reaching at least 1m in amplitude above the average water surface were quite common. Distances between neighboring crests were 4-5m as these were sometimes moving very slowly downstream. The hydrograph of the event shows a series of very short flood peaks rising within 1-3 min from insignificant flow levels to peaks of 80-320m²/s and a near-immediate abrupt recession. The total flow volume of the Watir was 5.5x10⁶ m³. Some of the flood peaks in the Watir must have been also due to nonsynchronous tributary input, an effect accentuated by the irregular pattern in time and space of the storm that generated the flood "(Lekach, 1974 in Baker *et al.*, 1988).



The Gulf of Aqaba is the locus of **extensive seismic activity** (GII, 1996; Pinar and Turkelli, 1997). The epicentral distribution of the 1993 and 1995 sequences tend to concentrate as a cluster around the area between, 28.5°-28.7°N and 34.5°-34.7°E. The aftershock distribution shows a clear NNE-SSW trend (Abdel Fattah *et al.*, 1997). The last large earthquake (MW 7.1) occurred on 22 November 1995, off the town of Nuweiba at the central part of the Gulf of Aqaba (Shamir, 1996; Baer *et al.*, 1999). The Nuweiba earthquake caused significant damage along the Gulf of Aqaba from Eilat and Aqaba in the north to Nuweiba and Dahab in the south (Al-Tarazi, 2000). Various rockfalls, liquefactions and slip features were also reported along the coast; The 1995 Nuweiba earthquake induced a wave that washed over the shores of the Gulf of Aqaba. (Wust *et al.*, 1997; Klinger *et al.*, 1999). Evidence of this earthquake can be seen underwater on the reefs, mainly on the big massive colonies (Tilot, pers. obs.). Tsunami and seiche waves often accompany large earthquakes. Evidence shows that reefs along this stretch of the Gulf of Aqaba coastline are episodically destroyed and rejuvenated. Nuweiba is very close (South-eastern part of the underwater wadi fan) to the epicenter of seismic activities in the rift area (Abdel Fattah *et al.*, 1997). This is also a **risk factor for the planned power plant project**.

In summers 2002, 2003 and 2005 sporadic **coral bleaching** (corals lose their zooxanthellae and/or pigments) events were recorded for the first time for some coral species, e.g. *Montipora lobulata*, in the northern part of the Gulf of Aqaba (Rosenberg and Loya, 2004) and linked to global climate change and increasing ocean temperatures (in particular surface waters). Coral bleaching is a major concern among scientists and resource managers. In 1998, more than 90% of shallow corals were killed on most Indian Ocean reefs. The northern Red sea was unaffected until recently. Even with their marked temperature acclimatization, most corals in the Arabian Gulf were killed with peak SSTs (Sea Surface Temperature). Recently Eritrea's corals are affected by a massive bleaching event and do not recover as easily as usual after a couple of months each summer (Tilot *et al.*, 2008b; Tilot, pers. obs.). Until today, the northern Red Sea has remained relatively unaffected, however global warming, resulting in an increase in the frequency and intensity of world-wide coral bleaching events sets the ground for additional severe threats to the reefs which would be superimposed to their vulnerable situation.

Coral diseases (among which White Band Disease, Tissue bleaching, Shut-Down-Reaction, in reference to Antonius, 1995) are not presently recorded in Nuweiba but some occur in more northern sites of the gulf of Aqaba, close to the border with Israel, where corals suffer from a combination of impacts (oil and heavy metals pollution, solid and liquid waste discharge, coastal development, influx of nutrient from fish farms, increased sedimentation, over-exploitation of marine species, eutrophication). These impacts challenge the resilience of coral reef communities (Rosenberg and Loya, 2004). Very little is known about the ecology and pathology of coral diseases in Red Sea reefs in general. Presently in the northern part of the Gulf of Aqaba, in Eilat, an unidentified disease affects a hard coral colony *Goniastrea sp.* (Antonius and Riegl, 1997; Rosenberg and Loya, 2004).

The 1998, the coral cover in some areas of the Egyptian Red Sea has declined by more than 30% due, not to global bleaching, but to coastal development, **corallivorous starfish *Acanthaster planci***, or **Crown Of Thorns (COTS), outbreaks**, illegal anchoring, scuba diving, snorkeling and reef walking. Coral cover at 2 sites in the Gulf of Aqaba decreased from 37% to 13% between 1997 and 2002, most probably due to COTS outbreaks (PERSGA/GEF, 2004). The COTS *Acanthaster planci* outbreaks occurred in 1994, 1998 and 2001 along the gulf of Aqaba (Salem, 1999). The first COTS outbreak in 1994 was relatively minor, whereas the 1998 outbreak was extensive and probably continued through 1999 and 2001 although major control programs were implemented (PERSGA, 2008).

During the underwater surveys done recently by the author in Nuweiba, only one *Acanthaster planci* has been seen, which proves that the reefs are healthy and in good equilibrium.

Corallivorous gastropod *Drupella cornis* invasions, occurring sporadically in some areas such as in Ras Um Sidd (Sharm el Sheikh) in 1998, are often correlated to a prevalence of diseases (Schuhmacher, 1992). Generally they attack the most abundant reef-building species, *Acropora hemprichi*. Presently, these snails have not been sited in great numbers in Nuweiba.

The **bathymetry** in the Gulf of Aqaba at Nuweiba site is shallower corresponding to a sill due to the bottom topography of the Gulf of Aqaba at this site and to the input in sediment over centuries of the wadi (see Figure in Annex). This factor is **not in favor** of the installation of **inlet and outlet pipes** that should preferably be set at great depth to impact the less marine communities.

Archeological studies in the Nuweiba area display the existence of artefacts (pillars in Nuweiba and the corresponding site in Saudi Arabia, wheels of pharaoh's chariots discovered by Ron Wyatt in 1978, see Appendix) that would lead to the hypothesis that Moses crossed the Red Sea at Nuweiba to go to the Arabian peninsula (present Saudi Arabia) where waters are shallower. This **remarkable discovery is an asset for Nuweiba of national and regional importance**.

Description of the planned site in Nuweiba for the power plant inlets and outlets

Since the description of the site in the EIA is far from complete, data on the locations planned for the pipes vary as well as the information on the velocities of the flow at intake and outlet.

Therefore in order to collect sound background information, a comprehensive survey of the bay has been achieved by the author with mapping of the habitats and associated communities and current patterns. Major features appear:

The characteristics and the state of health of the coral reef and seagrass communities indicate a good health, a good capacity and a **high resilience, concepts that are presently valued in the protection of an ecosystem integrity and the conservation/management of the biodiversity** * (Tilot, 2009; West and Salm, 2003).

Traditional **measures of biodiversity** or species richness (or Whittaker's (1975) α diversity, i.e. a count of the total number of species in a sampled area) and evenness (or equitability, i.e. the proportional abundance of each species) are average compared to other sites in the Gulf of Aqaba. But as these measures of biodiversity tend to be inter-related at spatial and temporal scales and often effects of disturbances stay undetected until a very advanced stage of environmental degradation. Different measures**of biodiversity ensure more comprehensive characterization of biodiversity such as complementarity (average measure which weights the extent of evolutionary characters, species richness and/or restricted range, habitats from an area to other areas (Margules and Pressey, 2000)) and β diversity*** (estimate of spatial turnover of species along a gradient, e.g. changes of species composition from site to site (Gray, 2000)). These most probably would be **high**, according to preliminary assessments, indicating that the communities are very resistant and adapt to stressful environments with natural changes that are seasonal and periodic.

Paradoxically, a particular area can be both a '**hotspot**' and 'coldspot' of biodiversity depending on the diversity measure(s) selected as Price (2002), Price and Izsak (2005) debated on the Persian Gulf versus Chagos islands. As a consequence, some areas of the red sea could be average when characterised merely by species richness, yet they would emerge hotspots if the choice of metrics is expanded to include endemism, taxonomic distinctness and α diversity. Thus, Nuweiba could be prioritized as a hot spot and **could serve as gene bank facing the decline of coral communities in the region and in the world.**

But it is important to stress again that if impacts, such as planned in the power-plant project, are continuous, and above a certain threshold, they would destroy these communities even if these are highly resilient and endowed with such ecologically adaptive characteristics.

The presence of endangered species of the IUCN - World Conservation Union has been recorded in the area, the internationally important and **endangered species** of the IUCN - World Conservation Union, mainly green turtles *Chelonia mydas* and hawksbill turtles *Eretmochelys imbricata*

A scientific and touristic scoop comes with the presence on the Nuweiba site of a mimic octopus *Thaumoctopus mimicus* (Norman and Hochberg, 2005) which has never been recorded in the Red Sea. This octopus has been discovered in 1998 off the coast of Sulawesi in Indonesia on the bottom of a muddy river and has the extraordinary ability to imitate different animals: sea snakes, lionfish, flatfish to avoid predators. This ability of camouflage is remarkable, changing colors and patterns in order to mimic the corresponding predators of its encounters (Norman et al., 2001).

There is also the confirmation of the discovery of a new species of clam, *Tridacna costata*, differing from *Tridacna squamosa* and *Tridacna maxima*. *Tridacna costata* is less than 1% of all clams and is already threatened with extinction according to IUCN Red List. In addition, J.E.N. Veron has identified, in the Gulf Aqaba, 28 hard coral species new to the red sea (Tilot, 2003).

Most living hard coral percentages are located the furthest eastward and on the northeastern sides of the coral blocks, which could be explained by the general current pattern, coming from north to south combined to the impact of the occasional flood coming from south.

Fast growth of “new” corals (approx 4-5 years, according to the last reported Wadi flood), partially 20-30% live coral cover on reef slope up to 100% on coral blocks, in deeper depth,

The growth of hard corals on the artificial reefs laid out in 2007 by Scuba college is relatively fast (around 5 cm per year, which is quite impressive).

Extensive seagrass meadows, with 4 different species, *Halophila stipulacea*, *H. ovalis*, *Halodule uninervis* and *Syringodium isoetifolium*.

Large fish communities, healthy indicators species, undisturbed behaviours are observed.

High diversity and abundance is displayed mainly when depth increases.

Beach rock exists, over the whole length parallel to the coastline. On overhangs are fixed many ascidians *Didemnum*, *Dendronephthya*, *Plumaniidae* black coral, antipatharian (black corals)..

The desalination outlet that is observed is illegal (unless authorized by EEAA/NCS) as it crosses the setback and discharges in shallow waters warmer waters (>1°C) warm brine and treatment chemicals (chlorine and anti-scalants). The impact is obvious, the area in proximity is azoic. In general such discharges may cause bleaching and mortality of corals and diseases to the fish stocks. Although this is only a localized phenomenon, it may intensify with time.

*The concept of Ecosystem's health refers to its current state or condition at a point in time. The ecosystem's capacity makes reference to its potential for continued self-development, regeneration and evolution under normal circumstances (Kay and Regier, 1999). The concept of ecosystem resilience is the capacity of complex systems with multiple stable states to absorb disturbance, reorganize, and adapt to change by eventually shifting into alternate states (Folke *et al.*, 2004). It is central in the context of how coral reef ecosystems relate to disturbance in an increasingly human-dominated environment. Instead of focusing on the recovery of certain species and populations within disturbed sites of individual reefs, spatial resilience refers to the dynamic capacity of a reef matrix to reorganize and maintain ecosystem function following disturbance. Managing for resilience in dynamic seascapes not only enhances the likelihood of conserving coral reefs, it also provides insurance to society by sustaining essential ecosystem services.

The temporal and spatial scales of disturbances will determine the faculty of ecosystems to regenerate or change to an extent that the original pristine state will never be recovered (Berkes *et al.*, 2003) and the consequences for management are crucial as it is easier to sustain a resilient ecosystem than repair it once shifted. During the post impact phase, changes in species composition occur often favoring short-lived species that can quickly colonize after disturbances (Hughes *et al.*, 2003). These alternate states can be maintained by density-dependent mortality (e.g. owing to altered predator-prey ratios) or by density thresholds required for reproductive success (Cury and Shannon, 2004). As emerging

multidisciplinary approaches stress the importance of assessing and actively managing resilience, it is likely to be important to have extensive buffer zones, for added robustness and 'insurance'.

****Over the past decade, a suite of more intuitive/comprehensive average measures reflecting complementarity, relatedness (□ diversity), similarity (taxonomic distinctness) and other 'average' measures, have been developed (Warwick and Clarke, 2001) to measure biodiversity over both small and large spatial scales.**

Assessment of different possible impacts on the marine environment:

The expected changes in the marine environment are not properly and precisely described in the EIA document. The first column indicates the parameters needed for a proper evaluation. The second column includes the information found in the EIA document, in particular in paragraph 103, 111 and 113. The third column specifies EIB's comments with scientific evidence.

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Parameters	Description in EIA by PGESCO	Comments by EIB
Biological survey of the area	Wrong assessment of coral and seagrass communities, absence of detailed survey and mapping of the site	Essential for the EIA, a complete survey has to be achieved at the different potential sites.
Water temperature (annual variation)	General data provided. Site data only in July 2008	Need winter evaluation and maximum expected at site for evaluation of normal conditions for species
Outlet water temperature	Paragraph 103 indicates an increase of 9 degrees between inlet and outlet	Max value acceptable is 3°C over the max natural value (Sheppard <i>et al.</i> , 1992). If more, most of the species will die.
Salinity (annual variation)	General data provided. Site data only in July 2008	Summer and winter data needed
Outlet salinity	No information	Necessary for evaluating the impact on species
Waves and swell	No information in particular maximum during winter storms	Necessary for the calculation of the stability of the underwater structure and fixation system. Impact on surrounding environment cannot be appreciated

Current at site (annual variation)	Only in summer, July 2008 and winter data is essential. Only at mid-depth need for surface and bottom with a maximum of 60cm/s on 18 July 2008	Needed all year and specially winter. If speed is 60cm/s in summer, winter can be double and infrastructure will have to stand this impact. Also necessary for calculation of minimum value in summer for modelling. Important to calculate the plume and the extended impact that can usually reach at least 1 km. Model to be prepared according to state of the art (Numerical model system Mike)
Flow at intake	No information, could be of 15m ³ per second	To be provided for evaluation of impact on sediment, species and on safety of nautical activities
Current at outlet sea bottom (annual variation)	Only in summer, July 2008, and at mid depth with a maximum of 60cm/s on 18 July 2008 and numerous data around 20cm/s	Important to calculate the plume and the extended impact that can usually reach at least 1 km. Model to be prepared according to state of the art (Numerical model system Mike)
Flow at outlet	No information, could be of 15m ³ per second	Needed for calculation, with normal operation and by pass in emergency. Important for evaluation of impact on sediment and species in the vicinity (turbidity)
Chemicals in outlet	The presence of chlorine is indicated without value to reduce the fouling	All data have to be precisely defined as they are necessary to evaluate the impact on fauna and flora. Numerous species are exclude by chlorine presence until more than 1km from the outlet (Nour El Din, 2004),
Ph of the outlet	Paragraph 103 is expected between 6 and 9	Acidification Ph6 can have an important impact on marine species and in particular on carbonate shells or skeleton.

Turbidity of outlet waters	No information	Turbidity could be linked to the quality of the outlet or to the disturbance of the sea bottom by the outlet
Noise and vibrations	Information on noise and vibration but not on the propagation in marine environment	Noise and vibrations at sea can have impact on marine mammals and other species and can be an issue on the fixation of larvae
Fixation of intake in the marine environment	No information	Necessary to evaluate the impact during construction and the operation. Need to calculate the stability according to existing currents and waves at the site
Fixation of the outlet in the marine environment	No information	Necessary to evaluate the impact during construction and the operation. Need to calculate the stability according to existing currents and waves at the site

The different elements presented in the Table are discussed hereafter:

Impact of water temperature increase

The EIA indicates a discharge of cooling water with an **increase of 9 C°**. An increase of temperature of more than 3 C° can be lethal for most of the organisms when they are at their upper limit of acceptability (Sheppard *et al.*, 1992). For pelagic species, the immediate reaction is to move away. For the benthic species, such a temperature will mean temporarily (in summer) or permanent death and disappearance of the area.

For coral reefs, **bleaching and death** occurs with a **rise of temperature trespassing a threshold of around 34°C** over the maximum acceptable during the year (in summer) and for a **continuous period of time** trespassing the seasonal periodicity. Indeed, if the impact were only seasonal, as in the marine plateau of 100km in Eritrea where most of the 250 islands are located, the marine organisms, in particular coral reef communities prove to be highly resilient by adapting to the stress and recuperating after 2-3 months (Tilot *et al.*, 2008b).

The **impact of the inlet and outlet flows** of the planned pipes in shallow waters over several °C and a **continuous period of time** would **be lethal to most living organisms** in the bay and over a distance from the impact up to 1 km or more according to the flow and the directions of the currents as the extension of the thermal plume can be modified.

Shallow reef flats which are subject to periodic exposure at low tide and water temperatures varying between 16°C and 40°C are **more vulnerable to additional environmental stress**

(Sheppard *et al.*, 1992). Even low levels of turbulence may cause heavy sand –scour in shallow water, reducing the growth of corals and other benthic organisms on which many fish depend. Algae are most productive in shallow waters due to higher levels of illumination and herbivorous species (surgeonfishes and parrotfishes) are most abundant in these shallows. Plankton is also most abundant in shallow water (<10m) and planktivorous fishes tend to be located in upcurrent areas to exploit the resource prior to depletion by others (Hamner *et al.*, 1988). Piscivores, the largest proportion of the biomass of fishes, are related to prey distribution, e.g., groupers are more abundant on the fore-reef where there is a peak in abundance of fish, especially planktivores. Most of reef fishes respond to predators by seeking refuge within the reef framework. Foraging migrations constitute an important link between ecosystems (Meyer and Schultz, 1985), such as for the outer-slope and lagoon zones, e.g., grunts and snappers which feed over sandy areas or seagrass beds by night and rest over large coral heads by days (Ogden and Quinn, 1984). Corals grow much faster where schools are stationed as there is fertilization (transfert of nitrogen and phosphorus) by faeces (Meyer *et al.*, 1983).

Impact of change in the salinity

As the water salinity can change during the cooling process, an **impact** could be expected at the discharge **as species are reluctant to increase or decrease in salinity**. The result will be a death of the existing communities to be replaced by more adapted species. A complete study is necessary.

Impact of modification of water circulation, high currents (inlet and outlet)

The knowledge of the water circulation in the area, in normal conditions and in the presence of extreme events (tide, currents, swell) is essential to evaluate the area impacted by the change in temperature of the water at the outlet and its diffusion. Such an evaluation is usually provided through a complete analysis of the site during summer and winter conditions and the modeling of hydraulic aspects of the circulation of cooling water in the marine environment from the outlet to the surrounding area. This could be done using an uni, bi or tri dimensional model of the type Mike normally a standard for outlets of cooling water discharges. As indicated in different documents (Nour El Din, 2004; Zahid Ahmed *et al.*, 2001), the impact can reach important distances according to the flow of water at the outlet and has a temporary or permanent impact according to the local conditions up to a distance of 1500m

The change in water circulation will cause a **major impact** on benthic communities, in particular in **settlement pattern of numerous marine benthic organisms with planktonic stages** in their life cycle. It would also induce vertical mixing and thus rise the primary productivity which consequently would change planktonic community structures and diversity. Finally, it would increase the loading of fine sediments in the water column and therefore increase turbidity. These processes would seriously damage marine sensitive habitats such as coral reef communities and associated habitats. The impact would be more severe close to the pumping sites.

Impact of the change of water quality

The EIA indicates the addition of chlorine for reducing the fouling by organisms at the outlet pipe and the occasional presence of other pollutants. There is no indication on the treatment of the intake pipe but it will be subject to the same risk of fouling. As for the temperature, the presence of chlorine can be lethal for numerous organisms and a reason for others to move

from the area. As indicated in Nour el Din (2004), the impact of chlorine on benthic communities can be effective up to at least one kilometer from the outlet according to the local conditions.

When both temperature and the presence of chlorine are increased, the cumulated effects can concern an area of at least 1km radius and as the inlet and outlet are separated of 500m only. In addition, there is a risk for the power plant that in summer, when water circulation is much slower in this part of the part, the water discharged with an increase of 9°C would be pumped again into the station.

Impact of turbidity and sediment transport

Turbidity (increase the sedimentation rate and the loading of fine sediments in the water column) could be of great importance as it would seriously **damage the living processes** of marine sensitive **ecosystems** such as coral reefs and associated habitats. Also **sedimentation rate** has **major influences on coral community composition** which in turn influences fish assemblages through deterministic habitat effects (Sale, 1980). Almost all reef fishes have a pelagic larval dispersal phase, feeding on plankton for days to weeks before settling onto the reef (Roberts, 1991). This **pelagic phase** is **decisive** stage in the **life history** as larvae have small energy reserves and are extremely vulnerable to predators. Suspended inorganic particulate matter may reduce feeding efficiency of some species since larvae respond to food particles only over short distances and thereby increase mortality (Sheppard *et al.* 1992).

Impact of noise and vibration

In reference to the EIA report for the combined cycle power plant at Jertoved, Croatia, the existing power plant generates high levels of noise and vibration when in operation. The vicinity of the power plant is categorized by the regulatory authorities as Zone 2, for which the maximum permissible noise levels are 55 dB(A) during the day and 45 dB(A) during the night at the residences. Noise levels generated by the existing power plant operation range from 52 dB(A) in the centre of the Jertovec village to 60 dB(A) some 50 meters from the power plant fence. These values exceed the limits allowed by the regulations both in the day and at night time.

Concerning the planned site at Nuweiba, **noise and vibrations** would probably **disturb the fauna in the coastal and marine environment** and migrating birds. Marine wise, it could affect in particular marine mammals, such as dolphins, sea-turtles and pelagic fish as well as the life cycle of coral reefs and seagrass communities (e.g. spawning, nurseries).

Impact of the construction and the presence of infrastructures son the sea

There is no information on the type of pipes, there size and their length, the way they are buried or laid at the surface of the sea bottom, on their **impact** on the currents and the **circulation of the water** in the area, on their impact on the **navigation**, nautical sports and the **traditional fishing activities** by the Bedouins. Neither is there any information on the impact of marine life on these structures (fooling can be very important in hot water). Most probably they would not have the purpose of artificial reefs, as put forward in the EIA, as the conditions of discharged water would be lethal to most organisms. All these elements have to be provided as they will have a strong impact on the marine environment, underwater landscape and the economic activities taking place in the area.

Impact of the loss of the economic value of living marine resources and the deterioration of natural coastal habitats

The economical value of **living marine resources** and coastal habitats of the Egyptian coast of the Gulf of Aqaba, especially coral reefs, seagrass beds communities and beaches, is the **backbone of tourism development in South Sinai** and an important contribution to the national income. As former quoted e.g., an individual shark at the valuable diving site, in the offshore islands, exceeds \$300,000, which represents more than 30 thousands time more than killed to sell on the market.

Synergetic effects of combined impacts

There can be synergetic effects of combined impacts on the environment. The increase of temperature added to the presence of chlorine, to a low Ph, and during the summer months, can create locally the conditions for the **total destruction of marine life over important areas**, the departure of pelagic fishes and in the vicinity of the sources of impact, eutrophisation and the development of jelly fishes, algal bloom, diseases and outbreaks of corallivorous species. These **processes could be toxic to marine organisms and human beings**.

In a softer scenario, the shift in the trophic composition of the ichthyofauna formerly planktivores on the shallow slope of disturbed reefs in the northern Gulf of Aqaba which could be due to the independence of planktivores from the benthic substrate in terms of food availability.

Also, changes in the fish communities in the northern Gulf of Aqaba due to industrial activities combined with other impacts (coastal constructions, sedimentation, nutrient input, algal growth, coral destruction, heavy metal load) can cause: a reduction in fish abundance, a decrease in total abundance of invertebrates and fish feeders, a change in trophic composition with an increase in total abundance of herbivorous and detritivorous fishes.

Conclusion

According to the lack of accurate data provided by the EIA concerning the impact on the marine environment at the planned site, **the location of the powerplant cannot be accepted until sufficient detailed information on the baseline data and assessed impacts based on scientific evidence are provided**. As the site for pumping and discharging is located in the marine area under the responsibility of EEAA Nature Conservation Sector as part of the National Park of Egypt dedicated to conservation and supporting tourism and local populations, the precautionary principle should be applied and a detailed EIA provided otherwise the project should be relocated at a less sensitive area.

Recommendations:

- to investigate more appropriate technologies that are fully respectful of the marine and coastal environment as there is a zero discharge policy covered by law 102.
- As the description of the different sites during the selection process has not been comprehensively achieved, one would recommend to investigate the marine environment in these areas.
- Background information leads to consider sites, in the Gulf of Aqaba, where depths are greater, coastline abrupt, rocky substrates, coral reefs and seagrass quasi inexistent or quite impacted by industrial activities and coastal development. These factors would be more

suitable to the conditions required for the installation of outlet and inlet pipes at greater depths with minimum impact on the marine environment.

- The desalination outlet presently located in the planned location of intake and outlet pipes is illegal as it crosses the setback and discharges in shallow waters, warmer hypersaline waters ($>1^{\circ}\text{C}$) with brine. The impact is obvious, the area in proximity is azoic. The techniques applied presently for desalination plants in Southern Sinai recommend to pump seawater at 150m in the ground at proximity of the coast and to inject the discharged water with brine at greater depths, at 200-300m. This outlet should be relocated. A study is recommended to verify if Nuweiba could follow the same procedure if the geomorphology of the site would be favorable.

- to conduct regular cost-effective assessments/monitoring* strategies of the coastal and marine environment that would establish with a sufficient degree of accuracy and precision the abundances of corals and reef fish on key reef sites in South Sinai, and assess whether these amounts were likely to present a significant change from historical values (Price, 2004; Price *et al.*, 1998; Tilot, 2003; 2007b; Tilot *et al.*, 2001; 2008a).

*Proposed strategy of monitoring of the coastal and marine environment:

- a. Digital **video-photography assessments of corals** and other benthic habitats will be conducted on primary and secondary transects, and the imagery analyzed (using the AIMS 5-dot method¹). The use of video-photography which can with the latest digital equipment (in underwater housing) be used to record larger areas more quickly and more accurately than former photo quadrat methods. Two meters wide video-transects with the camera pointed directly down perpendicular to the reef will be filmed along transect lines and subsequently analysed using the AIMS 5-point method¹. In addition a standard protocol in which the camera will be held at about 5 m and orientated at an angle to the reef will be used to record the general landscape along the 200m long transects used for counts of fish and large invertebrates. Video-photography will be supplemented by the use of the most current protocol for rapid assessment of coral reef systems^{1,2,3,4} in order to facilitate comparison with other studies.
- b. **Fish and large invertebrates:** fish in 4 different related groups of families (butterfly-fish & angel-fish; snappers & emperors, groupers, trigger-fish & puffer-fish) which are of key ecological or commercial importance will be counted by underwater visual census (UVC) along 10 m wide, 200 m long band transects at 4 different depths, 1 (mid-lagoon), 3, 10 & 17 m; very large invertebrates including sea urchins, the coral eating crown-of-thorns starfish (*Acanthaster planci*) and giant clams (*Tridacna sp.*) will be recorded along the same transects.
- c. **Oceanographic and climatic conditions** will be measured during the surveys and whenever possible, additional data will be collected.

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Appendix 1

Observations (families and genus of most common species at all 3 dive spots within the planned locations in the bay)

Seagrass

Extensive seagrass meadows, with 4 different species, *Halophila stipulacea*, *H. ovalis*, *Halodule uninervis*, and *Syringodium isoetifolium*.

Fish

Muraenidae (*Gymnothorax* sp., *G. monochrous*, *G. nudivomer*; *Siderea* sp., *Siderea grisea*)

Ophichthidae (*Callechelys* sp., *C. marmoratus*)

Synodontidae (*Synodus* sp., *S. variegatus*; *Saurida* sp., *S. nebulosa*)

Atherinidae (*Atherinomorus* sp., *A. lacunosus*)

Belonidae (*Tylosurus* sp., *T. choram*), in schools

Anthennaridae (*Antennarius* sp., *A. nummifer*, *A. commersoni*)

Holocentridae (*Sargocentron* sp., *S. spiniferum*; *Myripristis* sp., *M. murdjan*)

Fistulariidae (*Fistularia* sp., *F. commersonii*)

Sygnathidae (*Corythoichthys* sp., *C. schultzi*, *C. flaviofaciatus*; *Trachyrhamphus* sp., *T. bicoarctatus*)

Scorpaenidae (*Pterois* sp., *P. volitans*, *P. radiata* ; *Dendrochirus* sp., *D. brachypterus*, *Scorpaenopsis* sp., *S. barbata*, *Synanceia* sp., *S. verrucosa*)

Serranidae, Epinephelinae (*Aethaloperca* sp., *A. rogaa*; *Cephalopholis* sp., *C. argus*; *Epinephelus* sp., *E. variola*, *E. chlorostigma*)

Serranidae, Anthiinae (*Pseudanthias* sp., *P. squamipinnis*)

Pseudochromidae (*Pseudochromis* sp., *P. fridmani*, *P. springeri*, *P. flavivertex*, *P. olivaceus*)

Priacanthidae (*Priacanthus* sp., *P. hamrur*)

Apogonidae (*Apogon* sp., *A. pselion*, *A. fragilis*; *A. fraenatus*; *Archamia* sp., *A. fucata*; *Cheilodipterus* sp., *C. arabicus*, *C. lineatus*)

Haemulidae (*Plectorhinchus* sp., *P. gaterinus*, *P. gibbosus*; *Diagramma* sp., *D. pictum*)

Lutjanidae (*Lutjanus* sp., *L. fulviflamma*, *L. ehrenbergii*)

Caesionidae (*Caesio* sp., *C. suevica*, *C. striata*, *C. lunaris*)

Lethrinidae (*Lethrinus* sp., *L. nebulosus*; *Monotaxis* sp., *M. grandoculis*)

Sparidae (*Diplodus* sp., *D. noct* ; *Acanthopagrus* sp., *A. bifasciatus*)

Nemipteridae (*Scolopsis* sp., *S. ghanam*, *S. bimaculatus*)

Pempheridae (*Parapriacanthus* sp., *P. ransonneti*, *P. vanicolensis*)

Mullidae (*Mulloides* sp., *M. vanicolensis*; *Parupeneus* sp., *P. forsskali*)

Pomacanthidae (*Pygoplithes* sp., *P. diacanthus*; *Pomacanthus* sp., *P. maculosus*)

Chaetodontidae (*Chaetodon* sp., *C. fasciatus* ; *Heniochus* sp., *H. diphreutes*)

Pomacentridae (*Amphiprion* sp., *A. sebae*; *Chromis* sp., *C. dimidiata*; *C. pelloura*; *C. viridis*; *C. marginatus*; *Dascyllus* sp., *D. aruanus*; *Abudefduf* sp., *A. vaigensis*; *Amblyglyphidodon* sp., *A. flavilatus*; *Chrysiptera* sp., *C. unimaculata*; *Pomacentrus* sp., *P. sulfuratus*)

Labridae (*Bodianus anthoides*; *Xyrichtys* sp., *X. pavo*, *pentadactylus*; *Paracheilinus* sp., *P. octotaenia* ; *Cheilinus* sp., *C. lunulatus*, *C. digrammus*, *C. mentalis*; *Gomphosus* sp., *G. caeruleus*; *Labroides* sp., *L. dimidiatus*; *Labroides* sp., *L. quadrilineatus*)

Scaridae (mostly juveniles) (*Chlorurus* sp., *C.* ; *Hipposcarus* sp., *H. harid* ; *Scarus* sp., *S. ghobban*, *S. gibbus*, *S. niger*)

Mugilidae (*Crenimugil crenilabis*)

Sphyraenidae (*Sphyraena flavicauda*)

Carangidae (*Carangoides ferdau*)

Pinguipedidae (*Parapercis hexophthalma*)

Blennidae (*Ecsenius gravieri*; *Meiacanthus nigrolineatus* ; *Plagiotremus tapeinosoma* ; *Cirripectes castaneus*)

Tripterygiidae (*Helcogramma steinitzi*)

Gobiidae (*Amblyeleotris sungami* ; *Cryptocentrus caeruleopunctatus* ; *Ctenogobius feroculus* ; *Valenciennesia puellaris* ; *Amblygobius hectori*)

Acanthuridae (*Acanthurus nigrofusus*; *Zebrasoma xanthurum*, *Naso unicornis*)

Bothidae (*Bothus pantherinus*)

Soleidae (*Pardachirus marmoratus*)

Balistidae (*Pseudobalistes fuscus*, *Rhinecanthus assasi*, *Sufflamen albicaudatus*)

Monacanthidae (*Stephanolepis diaspros*, *Paraluteres prionurus*)

Ostraciidae (*Ostracion cubicus*, *Tetrasonus gibbosus*)

Tetraodontidae (*Arothron hispidus*, *A. stellatus*; *Torquigenes* sp.; *Canthigaster valentini*)

Diodontidae (*Cyclichthys orbicularis*)

Invertebrates

Mollusca

Muricidae (*Murex ramosus*)

Cassidae (*Cassis cornuta*)

Patellidae (Patella)

Vermetidae (Dendropoma)

Conidae (Conus)

Chromodorididae (Chromodoris)

Phyllidiidae (Phyllidia)

Tridacnidae (Tridacna)

Pteriidae (Pteria, Pinctada)

Crustacea

Hippolytidae (Lysmata)

Stenopodidae (Stenopus)

Diogenidae

Trapeziidae

Ocypodidae

Cirripedia (Tetraclita and Tetrachthalamus)

Polychaeta

Serpulidae (Spirobranchus)

Sabellidae (Sabellaster indica and Indian sabella)

Echinoderms

Crinoidea (Oligometra)

Holothuroidea (Holothuria edulis, H. astra)

Echinoidea (Heterocentrotus, Echinometra, Echinotrix, Diadema)

Tunicates

Ascididae (Styelidae, Polycarpa, Eusynstyela, Didemnum)

Porifera

Negombata, Aaptus, Suberites, Pione, Stylissa, Hemimycele, Mycele, Ciella, Siphonochelina, Callyspongia

Cnidaria

Hydrozoa : Millepora dichotoma, Platyphylla

Plumulariidae

Scyphozoa

Cassiopeia andromeda

Nausithoe

Anthozoa

Tubipora musica

Rhytisma fuluum

Sarcophyton

Dendronephtya

Lithophyton

Xenia

Antipathes (under overhang of beachrock, usually just show up below 30m)

Cirripathes

Cerianthus

Palythoa

Entacmea

Heteractis

Stichodactyla

Cryptodendron

Pocillopora

Seriatopora
Stylophora
Astreopora
Montipora
Acropora
Goniopora
Porites
Cocsinaraea
Gardinoseris
Pachyseris
Pavona
Galaxea
Fungia
Mycedium
Favia
Goniastrea
Platygyra
Lobophyllia
Plerogyra
Tubastrea
Turbinaria

Description of underwater surveys on the site of planned inlet and outlet pipes

HOUSE REEF SOUTH (dive 1, 17/10/2009)

Ocypode saratan on beach, intertidal

Diving visibility 6-10m

first quarter

sandy, fine mud, slope

seagrass 0-10m (photos 001-007)

artificial reefs (jeep, 2 metallic structures disc shape on top of each other) (photos 008-022)

008-022 artificial reefs, first reef

023-024 sand, seaurchin, seagrass

025-032 second reef, jeep

033-041 seagrass with soft corals on ropes

042-044 desalination outlet with brine

045-048 artificial structure with soft corals and mollusks

049 sand where desalination plant outlet with brine, worms in sand

050-051 sand and some seagrass

052 shallow dead reef with soft coral, shrimps and fish

074 sandbar

Particular species (in order of appearance)

Stephanolepis diaspros (seagrass) and Trachyrampus bicoarctatus

school of juvenile fish Heniochus (seagrass), school of juvenile Parupeneus

small coral block :

hard corals: Stylophora pistillata, Tubipora musica

soft corals: Sarcophyton

Dendrochirus brachypterus

The Platform artificial reefs:

Rhytisma fulvum

Hard corals: Platygyra sp., Favia, Acropora

Soft corals : Litophyton, Siphonochalina siphonella, Polycarpa

Holothuria edalis

Canthigaster margaritata or Paraluteres arquatus

Torquigenes flavimaculatus (plenty around 5 cm)

Canthigaster coronatus

Second quarter :

Patchy reef, sandy areas in between (30% live coral) 10-20m

075-083 shallow dead reef with dominance of soft corals

Particular species (in order of appearance)

Sabellaria pinnatifida

Corythoichthys cf. schultzei

Pteropoda aegyptiaca

Pinna margaritifer
Myscale fistulifera, *Nausithoe punatata* (or *Pteria*)
Esscenius graviei
Lutjanus
Sarcophyton big and mauve
Juvenils Bodiarus anthioides
Tetraomus gibbosus (sandy area)
 Small school of *Sphyaena flavicauda*
Amblyeleotris sungami/stenitoides
Acanthopagrus bifasciatus
Pseudochromis flavivertex
Paracheilinus octotaenia
Variola louti
 A lot of soft corals *Sarcophyton*
 Some hard corals *Acropora*
Ciscinaraea
 Skeleton of sea turtle
 Fish *Cheilinus lunulatus*

Third quarter :

Patchy reef, sandy in between (15-7m), most coral growth (about 60% living cover)
 084-093 deeper reefs with higher percentage of live hard corals and great abundance of fish
 094-100 Seagrass on sand and reef patches with pearl oysters, higher percentage of live hard coral communities
 101 old fish trap
 102-181 reefs with higher percentage of live hard coral communities and great abundance of soft corals, schools of fish, big fungia (dating from before the mass death of the reefs probably by siltation when flash floods), high percentage of soft corals
 182-193 overhang and caves
 194-195 wreck with metallic structure

Mycedium, *Galaxea*, *Pachyseris*, *Negombala* or *Iotrochata*, *Pione* (*Clione*) cf. *verstifica*
Sargocentron
Antennarius
Cirripathes arguina or *spiralis*
Lobophyllia
Gonopora, *Stylissa cartei*, *Lutjanus bengalensis*, *Cryptocentrus cryptocentrus*, *lusamate*
ambioenesis
Synanceia verrucosa
Acthaloperca rogae
Eusynstyela misatiensis, *Phyllida varicose*, *Chromodoris quadricolor*, *Cryptodendron adhaesiva*

Fourth quarter:

sandy slope, seagrass (7m-0)
 196 sand
 197-203 seagrass dune parallel to coast and slope
 204-205 rare seagrass
 206-212 small reef patches and beachrock
 213-216 seagrass with bunches of coral

Juv. *Ostracion*,
Redfex forskoehlii

Callechelys marmorata (4 ind), Hermit crabs (Diogenisae)
Lunistor (Muster?)pavo

HOUSE REEF NORTH (dive 2, 17 10 2009)

visibility 10-15m

First quarter:

Sandy entrance, some seagrass and small coral patches (0-4m)

001-003 Seagrass

004-014 beachrock, small patches of reefs on sand, overhang, dead reef

015-017 slope, seagrass, steep slope, sand

Cyclianthys spilostylus

Arothron hispidus

Pocillopora (with *Drupella*)

Later bigger reef patches and reef slope (1-8m)

018-054 dead reef with some coral colonies and soft coral

Heterocentrotus mammilatus (10% live coral)

Xenia umbellate

Paraprianthus ransonneti

Parupeneus cyclostomus (juv. and more adults)

Suberites clavata (visible at about 20cm)

Acanthaster planci (at 7m under cave, diameter 20-25cm)

Coris aygula (juv.)

Diagramma pictum (about 30cm)

Epinephelus tauvina

Arothron diadematus

Tubastrea micantha

Gymniothorax griseus

Palythoa tuberculosa

Callyspongia

Polychaeta 'spagetti worm'

Second quarter:

shallow reef pillars/islands with sandy areas in between (like labyrinth) (1-6m)

(90-100% live coral cover) very diverse corals

063-188 reefs with sand patches, often including sragrass

Chaetodon autsriacus

Juv. Clorurus sordidus

School of Sphyraena flavicauda

Big Porites colonies (6m depth), P. lutea, nodifera, Fungiidae,

Acanthurus nigrofusus

Millepora platyphylla

Monotaxis grandoculis

Gomphosus caeruleus (females and males)

Third quarter

Same as second quarter, additionally some seagrass patches

Big group of sarcophytos

Zebrasoma xanthurum

Hipposcarus harid

Holothuria astra

Entacmea quadricolor

Pocillopora

Stylophora

Astreopora

Acropora

Goniopora (big colonies)

Gardinoseris or Goniostrea

Platygyra

Favia, Plerogyra, Lobophyllia, Mycedium, Porites

Fourth Quarter

Mainly sandy slope and seagrass, some coral patches

189 sediment with mounds, blocks of dead reefs with soft corals

206-216 seagrass with holothurians and typical organisms

Cerianthus, Holothuria athra, Echinothrix diadema, juv. Conus textile

CHANNELLED WADI, PLANNED OUTLET (FIRST SCENARIO, PGESCO) **(dive 3, 18 10 2009)**

001-002 seagrass

003 location according to the coast of the beginning of the dive

004-020 Edge, overhang of beach rock sidewalk

021-043 seagrass with relatively high amount of solid waste

044-050 bits of dead reef colonized by soft corals

051 seagrass with mounds

052-057 dead reef with some healthy live hard coral colonies and soft corals

058 dead reef

059-078 some live coral patches interspersed with sand patches

068 nets

079 fish Cargangoides ferdau

080-097 higher abundance of fish and soft corals and recolonizing hard corals

098-099 Seagrass with mollusks including big Cassis cornuta

100-114 reef patches of dead corals and higher abundance of soft corals and recolonizing hard corals

115-116 patches of dead corals

117-121 more hard coral recolonization

122-139 more regrowth of hard corals on reefs

140 close up of soft corals

143-145 old nets and seagrass

Underwater films

Start at House reef south artificial reefs [matches Dive 1 photos 008-022 artificial reefs, first reef](#)

023-024 sand, seaurchins, seagrass [matches Dive 1 photos 023-024 sand, seaurchin, seagrass](#)

025-032 second reef, jeep reefs [matches Dive 1 photos 025-032 second reef, jeep](#)

033-041 seagrass with soft corals on ropes [matches Dive 1 photos 033-041 seagrass with soft corals on ropes](#)

1:33 seagrass communities [matches Dive 1 photos 033-041 seagrass with soft corals on ropes](#)

1:53 sandy slope on the planned position of the intake pipes, close to desalination outlet with brine [matches Dive 1 photos 049 sand where desalination outlet with brine](#)

2:21 seagrass with some coral communities and dead reefs (Acropora), relatively high abundance of fish communities [matches Dive 1 photos 050-051 sand and some seagrass](#)

2:55-4:50 reef between planned intake and outlet pipe (first scenario told to Mike) on sandy bottom, abundance of soft corals, further down slope with seagrass, underwater dune parallel to beach [matches Dive 1 photos 052 shallow dead reef with soft coral, shrimps and fish](#)

8:50 3rd dive channelled wadi area of the planned outlet pipe (first scenario told to Mike) sand and seagrass .

10:10 solid waste in seagrass (flushed by wadi when flash floods) [matches Dive 3 photos 021-043 seagrass with relatively high amount of solid waste](#)

11:22 reef south of planned outlet (dixit Mike, former location indicated by the company) dead reef with soft corals and rarely small hard coral colonies [matches Dive 3 photos 100-114 reef patches of dead corals and higher abundance of soft corals and recolonizing hard corals.](#)

12:10 small crustacean in sand

13: 30 bigger coral patches, mainly dead, with nets [matches dive 3 photos 115-116 patches of dead corals](#)

14:40 relatively higher abundance and diversity of hard corals, abundance of soft corals [matches Dive 3 photos 117-139 more hard coral recolonization](#)

15:36 schools of diverse fish communities, Anthias..

16:17 sandy bottom, seagrass and big shell Cassis [matches Dive 3 photos 098-099 Seagrass with mollusks including big Cassis cornuta](#)

16:25 sandy bottom and coral patches, abundance of soft corals and big Fungia and other mushroom corals, large colonies of soft coral, [matches Dive 3 photos 102-181 reefs with higher percentage of live hard coral communities and great abundance of soft corals, schools](#)

of fish, big fungia (dating from before the mass death of the reefs probably by siltation when flash floods), high percentage of soft corals

17:22 large colony of massive hard coral

17:29 reef with higher densities of soft corals and large colonies of hard corals Porites and branched corals, Turbinaria,

18 30 schools of barracudas

18:30 Millepora acropora, Fungidae porites

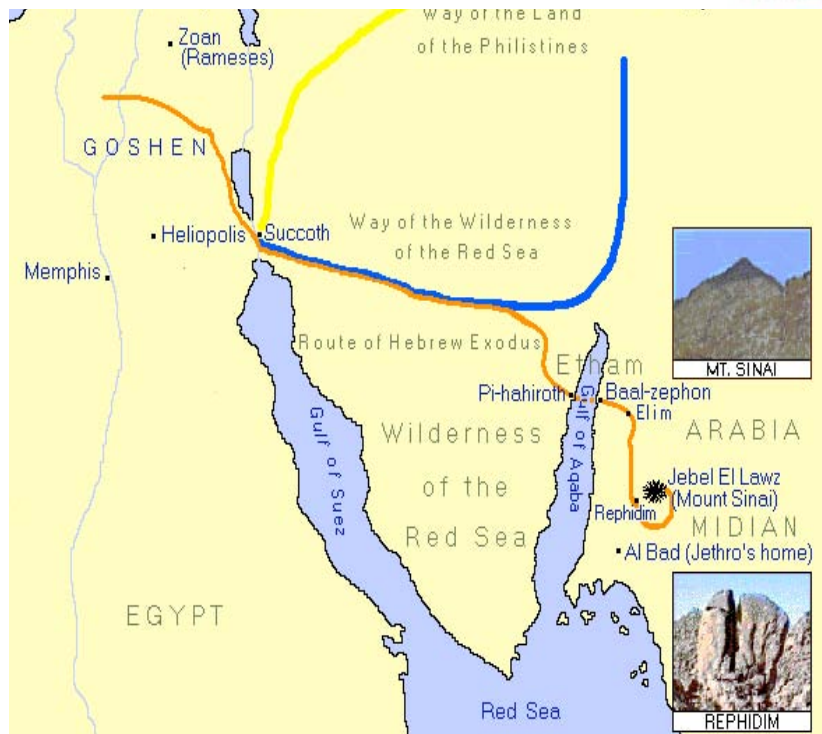
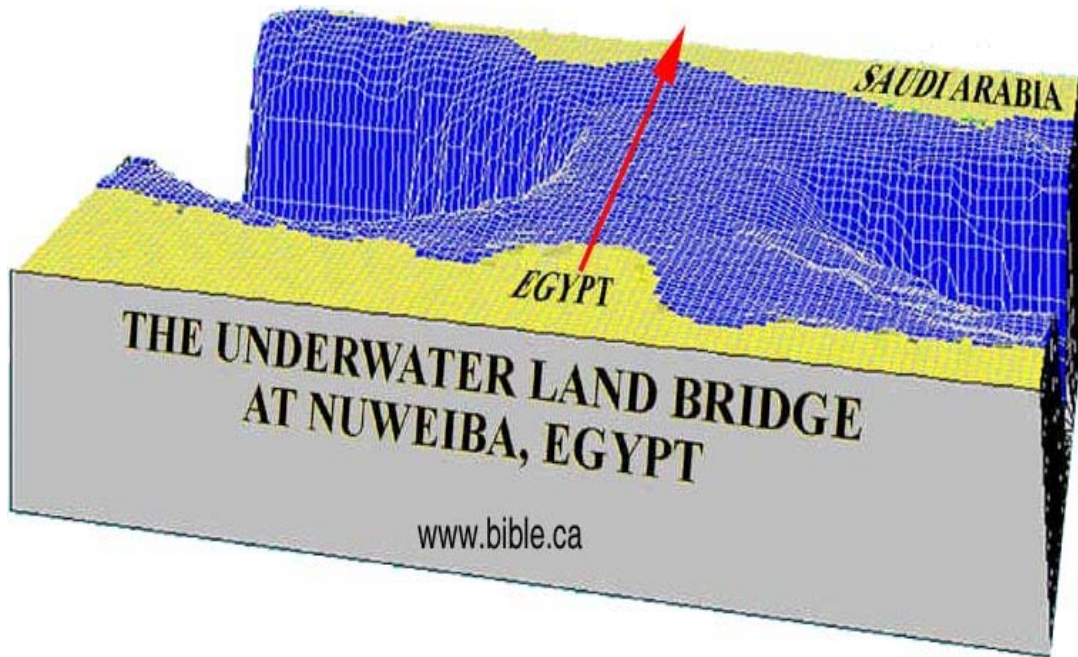
18:48-18:56 net [matches Dive 3 photo 068 nets](#)

18:56 seagrass area and sand [matches Dive 3 photos 206-216 seagrass with holothurians and typical organisms](#)

19:06 beachrock close to planned outlet, it forms a sidewalk parallel to coastline with specific fauna on edge and overhangs and cryptic fauna in darker places [matches Dive 3 photos 004-014 beachrock, small patches of reefs on sand, overhang, dead reef](#)

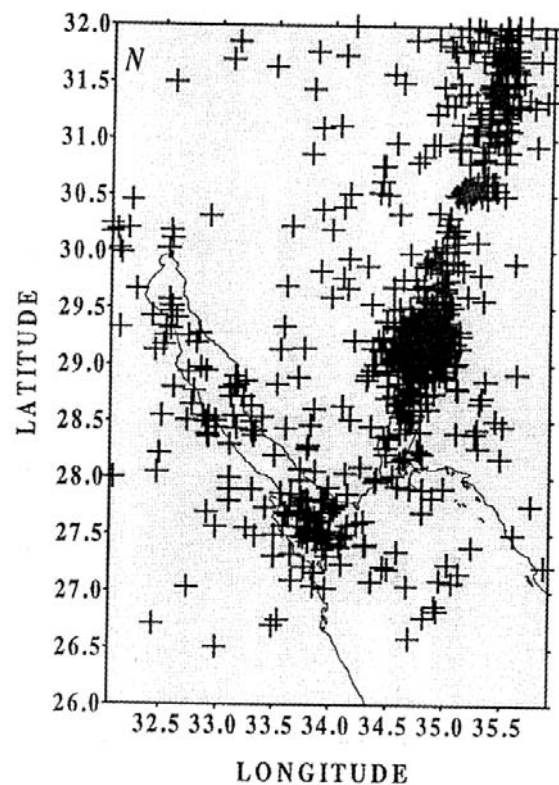
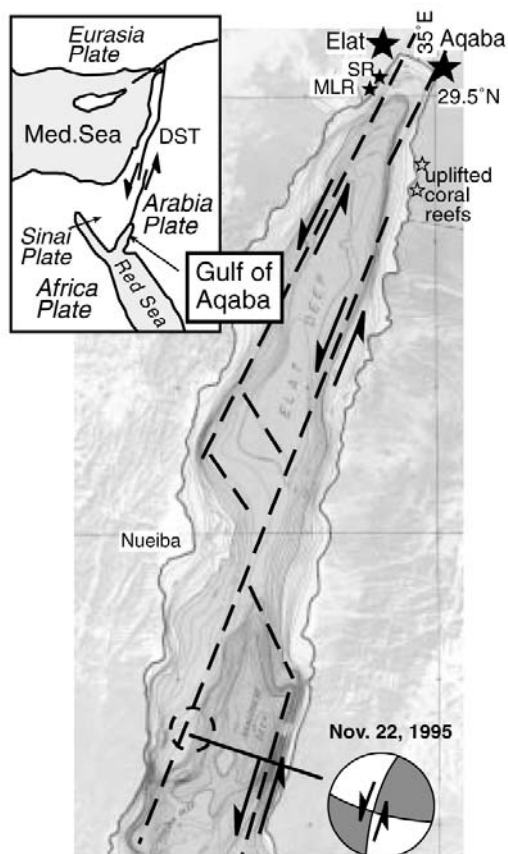
Appendix 2

Sonar depth measurements reveal an underwater landbridge between Egypt and Saudi Arabia





Bathymetric chart of the Gulf of Aqaba showing the location and solution of the for the period March 1903-December 1993 sinistral 1995 earthquake east of the town of Nuweiba,



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Annex II to the Conclusions Report

Report on the proposal for the development of the Nuweiba Power Plant, South Sinai, Egypt: consideration of socio-economic issues in the preparation of the Environmental Impact Assessment prepared by the Power Generation Engineering and Services Company (PGESCO).

**Conducted on behalf
of the Complaints Office of the
European Investment Bank**

by

**David Marsden
Consultant, Social Assessment Specialist,**

November 2009.

Executive Summary

Major Issues.

1. **Prior to proceeding with the project it is recommended that serious attention be given by the concerned national authorities to the integrated sustainable development strategy being developed for South Sinai of which Nuweiba is an integral part, and the place of the proposed power plant in that strategy.**
2. **The likely impact of uncoordinated development on local populations is that a) 'Riviera' type tourism will displace the 'niche' tourism that currently exists, or b) the existing 'niche' tourism will be adversely affected. This will probably result in the further marginalisation of the Bedouin populations and be accompanied by attendant increases in existing tensions.**
3. **Additionally the EEHC should give greater attention to the development of its community liaison and external outreach policies and programmes.**

The predominant view of the complainants was that, while electricity was important, the proposed electricity plant should be located elsewhere. They argued that it was unlikely to provide appropriate employment opportunities and was likely to marginalise further their livelihood strategies.

While the **direct** social consequences of the proposed plant have been perceived to be minimal, the **indirect** social consequences are likely to be considerable. It would seem that little attention has been paid by the sponsors to the local context and to the particular histories and cultures of the inhabitants of the Nuweiba area. Early and meaningful involvement of local residents has been lacking. As a result of this, attitudes against the project appear to have hardened.

There is a real likelihood that such polarised attitudes will further harden and tensions increase again, unless a more inclusive and representative consultation process is pursued. It is clear that tensions need to be lowered. Informed, engaged and constructive consultations need to take place. To succeed, a meaningful and informed engagement, between the local populations and the electricity company, will require an extended time period. The outcome of this engagement will be far from certain. Given current opposition, the sponsors may wish to reconsider the decision to build in Nuweiba.

The EIA submitted to support the project is most detailed in its analysis of the physical and natural environment. It is largely silent in its treatment of the social and cultural environment into which the electricity plant will be introduced. The report is disconnected from the wider discussions associated with regional developments envisaged for the area and that might take advantage of the increased supply of electricity.

While it may be the case that no 'indigenous populations' are affected and thus that no special privileges for such groups are to be found within Egyptian regulations, it is evident that many of the families living adjacent to the proposed power plant are vulnerable and poor and in need of specific attention and support. It is also evident that they see themselves as a distinctive group. It is also evident that the Electricity Generating Company could more systematically contribute and significantly support the development of a more unified and sustainable plan for the region.

The project cannot be isolated from overall developments of the region of which it is likely to be a major part, nor from the particular characteristics of this sensitive area.

The responses of the sponsor to the complaints to date appear cursory and dismissive. There is little relevant expertise within the company to handle the changing international approaches to stakeholder consultation that are currently increasing in importance.

Introduction

A visit to the Nuweiba area was undertaken by the social assessment specialist (October 15 – 23, 2009) as part of a team convened by the Complaints Office of the European Investment Bank. Meetings were held with the sponsors, the Egyptian Electricity Holding Company (EEHC), and the Power Generation Engineering & Services Company (PGESCO), and with members of the local population in favour of the project, in both Nuweiba and Cairo. Meetings were also held in Nuweiba with some of the complainants and with members of the two dominant local Bedouin groups, the Tarrabin and the Muzayna¹. The predominant view of the complainants was that, while electricity was important, the proposed electricity plant should be located elsewhere. They argued that it was unlikely to provide appropriate employment opportunities and was likely to further marginalise their livelihood strategies. There were allegations that unwarranted pressure was being put on some concerned individuals to accept the proposed power plant. The arguments of those in favour of the proposed plant focused on employment opportunities that would result from the project and on the development of tourism in the Nuweiba area. These were outlined at a meeting convened by the sponsor.

The arguments of those opposing the proposed plant centred on;

- the lack of information on and involvement in project preparation to date;
- the lack of participation by the local population;
- the negative effects associated with the in-migration of large numbers of construction workers;
- the particular nature of tourism development in the Nuweiba area;
- the dependence of Bedouin on fishery resources and the possible negative impacts on the local marine biodiversity,
- the negative impact on the Bedouin's livelihoods.

These were outlined at a meeting convened by some of the complainants.

While the **direct** social consequences of the proposed plant have been considered to be minimal – only 3 directly affected persons/interests have been identified – there are likely to be wider localised disturbances to the livelihoods of those living adjacent to the proposed site. No specific details of how those directly affected will have their livelihoods restored, nor under what terms they will be compensated have been provided and limited discussion with project affected persons have taken place.

However, the **indirect** social consequences are likely to be considerable. It would seem that little attention has been paid by the sponsors to the local context and to the particular

¹ . A series of 9 meetings were arranged with a variety of local residents and concerned citizens between 16 & 19 October, 2009 in the Nuweiba area. These included meetings with the complainants, PGESCO, camp and hotel owners/managers, city council (Majlis Mahala) members, local businessmen, a local employee of the ministry of social affairs, local female residents. It should be noted that in all public meetings held and in all lists of signatures generated (by both the complainants and the proponents) there was a paucity of female signatures/participants. It should also be noted that, while every attempt was made to meet with as wide a variety of concerned citizens as possible, four days is a short period of time in which to build a strong picture of local attitudes towards the project. Discussions were dominated by those who held strong feelings either for or against the proposed plant.

histories and cultures of the inhabitants of the Nuweiba area. Early and meaningful involvement of local residents has been lacking. Plans for the power plant only became known to them in May 2009 and were, by then, considerably advanced. As a result of this, attitudes against the project appear to have hardened.

This is partly the result of a prevailing 'top-down' approach to local development planning on the part of government and its agencies, and partly the result of the suspicions of local populations, with their own particular identities and attitudes to governmental programmes that seem to have had the effect of marginalising them further. Entrenched attitudes on both sides hinder negotiations to find solutions/reach a compromise. There is a real likelihood that such polarised attitudes will further harden unless a more inclusive and representative consultation process is pursued. Whether the bomb attacks in the area a few years previously are associated with 'terrorist' attacks or whether they are the outcome of decades of perceived marginalisation, it is clear that tensions need to be lowered and informed, engaged and constructive consultations need to take place.

The current Environmental Impact Assessment (EIA)

The EIA submitted to support the project is most detailed in its analysis of the physical and natural environment. It is largely silent in its treatment of the social and cultural environment into which the electricity plant will be introduced. The report is disconnected from the wider discussions associated with regional developments envisaged for the area and that might take advantage of the increased supply of electricity.

The only references to social impacts to be found in the EIA are:

- a) Section 7.2.7 **Socio-economic Effects During Construction:** *"The assessment of impacts showed an overall positive impact on the local society, culture and economy. Given that the use of local labor will be prioritized during construction, no mitigation measures are proposed."*
- b) Section 7.4 **Compensation for affected parties;** *"No indigenous populations or legally entitled landowners will be affected by the development of the power plant, therefore no affected parties require compensation. Fair compensations will be paid to those who are likely to be affected by of site associated (sic)"*

While it may be asserted (in the EIA) that the overall impact on the local population is positive, and that no indigenous populations or legally entitled landowners will be affected, this ignores other perspectives both governmental in terms of development authorities and local, in terms of small local businesses, including tourism as well as Bedouin tribal interests. The EIA is limited to the specific engineering project.

The perspective of the complainants is focused on the ability of the company to deal with the large numbers of immigrant workers required during construction, given the security situation in the area and the reported negative experiences with immigrant workers associated with the recent gas pipeline construction. The complainants also assert that it is unlikely that many jobs would be given to local residents.

The historical record suggests that the local populations (particularly the Bedouin) have largely been excluded (or excluded themselves) from regular jobs in the tourist industry. Local residents indicated that they would be reluctant to work for the electricity company. They argued that the project would only benefit a small number of particular local businesses and would further marginalise the Bedouin's already subsistence-oriented livelihoods. The exclusion of the Bedouin from the residential areas in Sharm el Sheikh, and from their traditional subsistence employment as desert 'safari' operators was cited as an illustration of this marginalisation.

While it may be the case that no 'indigenous populations' are affected and thus that no special privileges for such groups are to be found within Egyptian regulations, it is evident that many of the families living adjacent to the proposed power plant are vulnerable and poor and in need of specific attention and support. It is also evident that they see themselves as a distinctive group. It is also evident that the Electricity Generating Company could more systematically contribute and significantly support the development of a more unified and sustainable plan for the region.

Background & Context of South Sinai

It is important to understand the context of the area in order to situate the attitudes of the complainants. Here, reference to the International Crisis Group's recent report on *'Egypt's Sinai Question'*, (January 2007) is made. The report highlights major tensions and conflicts in Sinai, the distinct identity of the Bedouin population, the aggravation of differences as a result of the socio-economic development promoted by the authorities since 1982 and the subsequent marginalisation of the indigenous population. The report reflects many of the points raised by local opponents of the project. The report maintains that:

"developments have offered scant opportunities to locals and often have been at their expense (notably with regard to land rights), provoking deep resentment. The government has done little or nothing to encourage participation of Sinai residents in national political life, used divide and rule tactics in orchestrating the meagre local representation allowed, and promoted the Pharaonic heritage at the expense of Sinai's Bedouin traditions"

The report recommends government to:

1. prepare, in consultation with community leaders, the private sector and donors, a comprehensive social and economic development plan for Sinai.
2. promote the participation of local communities.
3. facilitate and encourage the building of local capacities.
4. provide Bedouin communities with the tools to formulate and implement local development projects.
5. acknowledge Sinai's distinct cultural and linguistic traditions as part of Egypt's national heritage.

The project cannot be isolated from the developments of which it is likely to be a major part, nor from the particular characteristics of this sensitive area. There is a distinct lack of a unified and integrated planning framework for the region. The South Sinai Sustainable Tourist Development Plan (SSSTDP), 2007-2017, published in January 2008, indeed suggests that the current availability of electricity is adequate for the planned expansion of tourist development to 2017. The 6th National Development Plan makes no mention of electricity generation installation in Nuweiba. The SSSTDP also indicates that the Tourist Development Authority, like most other government agencies, does not have a community discussion approach prior to the implementation of development plans. *"However it has started to realise the potential threat of marginalising the local community (Bedouin) and linked this to the terrorist attacks in the region."* (#9.2.1.). Because of the fragmented ways in which different government and/or government-related institutions have dealt with the area there is no unified or sustainable development authority that can pursue a sound and sustainable policy that can take cognisance of the different elements of the development equation and situate the project in this network of intermeshing initiatives. This, as well as security concerns, appears to be the reason for the halted developments of a number of enterprises over the last decade, in the Nuweiba area.

Communal occupation –v- Individual property title

The land on which the electricity plant is to be established may have been legally acquired. This does not alter the fact that communal tenure has been enjoyed in and around the project site, by local families for generations, under the principle of **wadaa al-yad** that gave de facto property rights to local families. The market for land was regulated by local customary law until the mid 1990s when the Tourist Development Authority was given the authority to manage development in non-urban zones, the coasts and the deserts. The market was then transformed. Most locals found it harder to own land, while only a minority (not necessarily locals) were able to benefit from the changed situation. The new procedures would appear to encourage particularly intense speculation in real estate, and intense interest in particular areas to the neglect of others. Procedures for obtaining official land title are reputedly tortuous and complex. One example cited a small business owner who was obliged to pay twice for formal, recognised title to the land, once to government and then to the local de facto owners.

As the Crisis group report on Egypt's Sinai Question indicates:

"On the whole, government sale of coastal land to major investment groups during the last fifteen years has pushed local people out of the tourism development zones and closed access to the main source of income in the region. Moreover, settlement programs for the Bedouin have resulted in their gradual abandonment of pastoralism and location around the major centres of urban growth, without allowing them access to jobs generated by tourism."

On the Nuweiba coast a more or less continuous line of informal/palm hut developments now support a low cost tourist industry with various degrees of legitimacy in the eyes of the authorities, ranging from illegal and informal settlements to sophisticated 'eco-lodge' type establishments. By *de facto* if not *de jure* occupation of many of these sites, local individuals are staking a claim to future involvement in the development of the area. Their activities also support the activities of larger related families and groups who remain in the interior and are linked to the coastal enterprises that provide integral parts of their livelihood strategies.

Local Livelihood strategies

The Bedouin make up an estimated 45% of the local population and yet they have largely been marginalised from local development activity. According to the SSSTDP, *“unless they (the Bedouin) are largely and fairly included in the development process, the sustainability of tourism development will be hard to achieve.”* (#7.6.1c). Their marginalisation has both historic and cultural routes. As an indigenous group of people they have traditionally looked to the north and east to related groups in neighbouring countries and not to the ‘Pharoanic’ culture of the Nile valley. They have traditionally followed subsistence livelihood strategies, have remained largely independent and external to state efforts and thus remain disproportionately uneducated and poor. State development efforts have largely by-passed them.

Integrating different development initiatives

Some current efforts, however, such as the EU supported South Sinai Regional Development Programme, suggest that there is heightened interest in the particular cultural aspects of Bedouin society, and support for local community and small enterprise development. The objectives of that programme include:

- The promotion of sustainable, diversified and environmentally sensitive economic activities.
- The promotion of social development to meet the diverse needs of the local population and of the rapidly expanding non-local Egyptians attracted by the tourism industry.
- The development of appropriate environmental management systems to protect the fragile maritime environment, which is the region's main economic asset.
- The preservation of the cultural heritage of the region.

and project outputs include:

- The promotion of local communities (Bedouin) and their social and economic development.
- The reinforced support for sustainable tourism development through increased geographical distribution and diversification of activities, as well as the preservation of the unique cultural heritage of the region and its population.
- The reinforced environmental management and control in protectorates, municipalities and tourist facilities.
- The improved delivery of social and public services to urban and rural populations, which increases employment opportunities for local communities and in particular for women.
- The strengthening of the decentralisation process in decision making and financing.

Eco-tourism –v- the ‘gated community’ model

A specific type of informal tourism has sprung up in the area between Taba Heights and Sharm-el-Sheikh. It differs substantially from the ‘Riviera’/‘commoditized’ model that exists in the established tourist resorts and that is projected, by some, for the entire coast of the Gulf of Aqaba, (from Taba in the north to Sharm el-Sheikh in the south). According to the SSSTDP, *‘tourism industry professionals are concerned that these areas (Nuweiba and the coast to Taba) should not replicate the nature of developments that have taken place in Sharm’* (#2.22). They argue for the creation of a ‘buffer zone’ between the large scale developments of Sharm and those of Taba. The results of those developments have been to largely exclude local populations from the benefits of tourist development. The popularity of all inclusive packages restricts local small and medium enterprises from sharing the benefits of tourist revenues. Enhanced security concerns, restrictions on movements away from the coast, and the demand for the formal registration of ‘guides’, restrict the ability of the local population to benefit from tourist revenues from ‘safari’ trips away from the coast and into the desert.

The SSSTDP is concerned to avoid a ‘downward price spiral’ in tourist revenues associated with the vulnerability of the mass tourism market of Sharm, and an associated decline in standards. It is also concerned to attract permanent and engaged workers, rather than temporary migrants who tend to largely repatriate their earnings. It argues for the diversification of tourist opportunities, linked to the expansion of local businesses and employment opportunities and for the development of the distinct ‘brand’ of South Sinai that includes the distinct flora, fauna and cultural and social life of the desert. This should combine ‘niche tourism’ with commercialised tourism for the overall sustainable development of the area.

Apart from the diversification of tourist attractions in the protected areas and away from the coast, the Plan argues for the development of ‘Eco-tourism’ in areas not currently built up. These include El Tor as well as the Nuweiba-to-Taba coastline. The Plan takes Al Karma in St.Katherine’s protectorate as a possible model for an ‘eco-lodge’. Also of note in the Nuweiba area are the solid waste management activities of such NGOs as Hemaya that combine training and employment to link local populations with tourist establishments and promote sustainable development opportunities.

The approach of the East Delta Electricity Production Company

The EIA has followed applicable Egyptian legislation and EEAA Guidelines that require coordination with other government agencies. It has obtained the necessary approvals. It has also complied or indicated its intention to comply with IFC requirements for 'Phase 1 consultations'. It has publicly disclosed an English and Arabic summary of the EIA. The EIA indicates that it has utilised the EIB's Environmental Handbook (2004) in its preparation for the project. The company has followed the letter of the law and its treatment of the physical environment is detailed and rigorous.

However, in the preparation of the EIA little consideration has been given to the social impacts of the project. Without any supporting documentation, discussion, or evidence, the assumption has been made that it will provide additional employment opportunities, enhance the local skill base and attract economic investment. It also maintains that the project will create opportunities for small local businesses to service the large numbers of workers employed during construction.

Consultations have been conducted as mandated. One was initially held in Sharm el-Sheikh. Invitees were limited. Notice of the meeting did not reach many of the local complainants until very late. It is arguable whether the attendees were really representative of the local communities. The focus of attention was on the impacts on the physical environment. Some members of the local population were subsequently taken on a visit to a power plant in the north of the country where geographical conditions as well as social circumstances are very different.

The responses of the sponsor to the complaints to date appear cursory and dismissive. (The positions of both complainants and proponents, are highlighted in the document used in the mediation exercise conducted by the African Development Bank (AfDB) on October 24th October 2009) The complaints are dismissed as untrue, rather than being investigated systematically. The production, at the beginning of November, of a generic Resettlement Policy Framework (RPF), a generic Environmental & Social Management Plan (ESMP) and the establishment of a special unit at the local level to deal with social issues is a useful beginning. When the specific details of both the RPF and the ESMP, as they relate to Nuweiba, have been drafted, hopefully with the involvement of local residents, then a basis for real progress may be forthcoming. The nature, expertise and work of the special unit will need to be agreed and the personnel employed will need to demonstrate their abilities to obtain the trust of local residents. These are not outputs that can be engineered easily, especially following the history of engagements between the parties to date.

Reports from the consultation meetings suggest that the sponsor was unable or unwilling to understand the perspective represented by those opposing the project in Nuweiba. The response by the sponsor to the letter of complaint from the NGO Hemaya to the African Development Bank adopts a similar approach, indicating a lack of engagement with local concerns, however relevant these may or may not be. Assertions are made by both sides about the positive and negative social impacts on employment and on tourist development. The responses of the sponsor to the complaints to date appear cursory and dismissive. The EIA appears to have been written for the relevant authorities and for the sponsors, not to persuade the local population of its advantages. The EIB Appraisal Report dated 12/05/2009 indicates that, in terms of outreach, consultation and participation, the EIA process has not yet been concluded. Indeed, one might argue that, with the establishment of the special unit, they are now only just beginning. To date the emphasis has been on health issues associated with emissions, and on the implications of raised sea water temperatures, not on the wider social and cultural environment.

From mandated formal exercises with limited outputs to informed processual partnerships with negotiated outcomes

This social assessment suggests that there is little relevant expertise within the company to handle the changing international approaches to stakeholder consultation that are currently increasing in importance. There is no indication that the company has consulted the Environment and Social Practices Handbook of the EIB (September 2007) in the preparation of the EIA. There is no indication that the Equator Principles, the foundation for IFC Performance Standards, have been followed, with respect to public engagement and consultation. There is no indication that the company has a policy for Corporate Social Responsibility or has followed/is following international sustainability reporting initiatives (such as those of the Global Reporting Initiative). There is no indication that the company has a policy for dealing with grievances, or that it has carried out a social and/or reputational risk assessment. IFC Performance Standard 1 (PS1) concerns the establishment of a Social and Environmental Assessment and Management System which focuses on risk management. PS1, *inter alia*, includes the development of a management programme, appropriate organisational capacity, a training programme, a programme for community engagement that builds and maintains a consultative relationship, systems for periodic monitoring and reporting and an action plan for dealing with social issues that arise before and during construction.

The EIB's Social Assessment Guidance Note No. 5 – Public Consultation and Participation in Project Preparation – provides an overview of what the EIB is looking for. If the EIA process for the Nuweiba plant is to be successfully concluded then evidence of systematic and on-going engagement with the local communities, an outreach plan that supports the pursuit of sustainable development in the area, and evidence of organisational capacity being developed within the company will be important.

The availability of a 'Resettlement Policy Framework' for the El-Ain Al-Sokhna Project indicates that company is familiar and compliant with World Bank Safeguard Policies. In that Framework (#6.5) there is a recognition that "*appropriate consideration should be taken to the real situation*" and the rights of vulnerable groups such as "*the Bedwins and the Poors*". While there is likely to be very limited displacement at Nuweiba there is no indication of any consideration to the vulnerable and poor populations that live adjacent to the proposed site. Clear agreements should be documented and outreach programmes negotiated with local communities and civil society organisations to ensure that they are not disadvantaged but, rather, benefit from project outcomes. None of these concerns are directly addressed in either the RPF or the ESMP. They both remain frameworks within which local context-specific arrangements need to be worked out.

It is assumed that national labour and health and safety standards are adequate and that they meet international (ILO, WHO) standards, although no reference to company policy on these matters is raised in the EIA.

Conclusion

The likely impact of the project on local populations is that 'Riviera' type tourism will displace the 'niche' tourism that currently exists. This will likely result in the further marginalisation of the Bedouin populations accompanied by the attendant exacerbation of existing tensions. Prior to proceeding with the project it is recommended that serious attention be given by the concerned national authorities to the integrated sustainable development strategy being developed for South Sinai of which Nuweiba is an integral part and the place of the proposed power plant in that strategy. Additionally the EEHC should give serious attention to the development of its community liaison and external outreach policies and programmes. The construction of a large power plant in the area is likely to be the engine of growth for a traditional type of mass tourism that will largely by-pass the local population. The risks associated with a greater expansion in commercialised tourism in this area have been identified. If Nuweiba is to retain the emphasis on low-cost tourism that is a major source of employment for the local population, and if it is to develop diversified sustainable eco-tourism as part of an integrated regional development strategy, then the visible presence of a large power plant will be a major deterrent. The developments that will inevitably follow the construction risk the further marginalisation of a large proportion of the local population. The last few years have seen the considerable expansion in industry commitments to more sustainable and more inclusive investments. These are reflected in:

- a. the greater attention that industry is devoting, not just to physical environmental issues but also to the engagement of affected stakeholders in discussions about investment projects that are likely to impact on their lives², and in
- b. the development of in-house expertise to manage the risks associated with potentially controversial projects.

It is recommended that the company give serious attention to the development of relevant in-house expertise and to the ways in which it might systematically build up appropriate internal capacity throughout the company.

² See the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters. While applicable to Europe its provisions are increasingly being pursued globally. The Convention:

- Links environmental rights and human rights
- Acknowledges that we owe an obligation to future generations
- Establishes that sustainable development can be achieved only through the involvement of all stakeholders
- Links government accountability and environmental protection
- Focuses on interactions between the public and public authorities in a democratic context.

The subject of the Convention goes to the heart of the relationship between people and governments. The Convention is not only an environmental agreement, it is also a Convention about government accountability, transparency and responsiveness. The Aarhus Convention grants the public rights and imposes on Parties and public authorities obligations regarding access to information and public participation and access to justice. The Aarhus Convention is also forging a new process for public participation in the negotiation and implementation of international agreements.

Documents Consulted

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6. International Crisis Group, **Egypt's Sinai Question**, Middle East/North Africa Report No. 61, January 2007.
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Annex III to the Conclusion Report

**Impact Assessment of the South Sinai Power Plant at Nuweiba on the Local
Tourism Industry**

**Conducted on behalf
of the Complaints Department of the
European Investment Bank**

By

Dieter Semmelroth

November 2009

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1. EXECUTIVE SUMMARY

On request of the EIB's Complaints Department; a field mission was conducted to assess the impact of the proposed South Sinai 750 MWe Power Plant at Nuweiba/Egypt on the local tourism trade.

During the last decades, tourism in South Sinai expanded very rapidly. Hotel capacities grew at an annual rate of 19% to 58.500 rooms in 2009. These modern facilities are very much concentrated at Sharm el Sheikh and, to a lesser extent, at Taba and are serving a high-volume, price-driven segment of international tourism.

The project town of Nuweiba is located at the shores of the Gulf of Aqaba some 170 km north of Sharm el Sheikh and 70 km south of Taba. In the 1990s Nuweiba became a popular resort for earthbound tourism, mainly from Israel. But also European independent travellers - often staying in basic beach camps- came to enjoy partying, the marine life in the Gulf and the desert.

At present, there are four star-rated hotels (939 rooms) and six un-rated hotels (569 rooms) in the wider Nuweiba area. These facilities account for some 2% of all overnights in South Sinai. In addition, there are about 100 basic sea side camps (app. 2,500 huts) which are mainly used by independent, young and eco-minded travellers. Most of the camps are run by members of the two local Bedouin tribes. Authorities regard camp tourism as substandard and do not officially recognize it.

Apart from beach tourism, Nuweiba is an ideal starting point for excursions and maritime explorations. Bedouins dominate the excursion/safari business. Popular among travellers are camel and jeep safaris to natural and historical sites in Sinai's interior. Expatriates own some hotels and/or operate local diving centres.

The impact of the proposed power plant during construction and operating phase is analysed separately. The 28 months construction period will require a workforce of up to 3.000 people. As most of the needed qualifications are not locally available, the vast majority of the workers will have to be brought in from other parts of the country. This "import" of labour will create temporary demand for accommodation, thus giving local hotels a secured income for a limited time.

However, the traditional tourism will suffer under the construction. Increased traffic and transport activities will disturb tourists. If not carefully managed, the large influx of outside workers could create tensions between them and locals/tourists. There is a danger that during the course of construction the image of Nuweiba as a quiet tourism destination will suffer.

It is understood that the plant's technology will be state-of-the-art. This means that the air and noise emissions will be within tolerable limits. However, the major blow for local tourism will be the "visible pollution" of the plant.

The plant's dimensions are of such a magnitude that it will be seen from all over Nuweiba. A computer modelling shows its dramatic visual impact and that it can not be mitigated by any camouflaging measures. The dominating sight of the plant will destroy the image of Nuweiba as a tourism resort. The question is whether or not this image flaw can be contained to the Nuweiba town or it will also harm tourism in other coastline locations.

As a consequence of the plant's existence, international tourism in the area will decline dramatically. Foreign travellers always have a chance to select alternative destinations without any major impairment. In future, hotels and service providers will have to adapt to the new situation either by targeting the smaller transit traveller's market, closing operations or relocating.

In contrast to volume-driven tourism being offered at Sharm el Sheikh and Taba, the Nuweiba region without the proposed power plant could become a nucleus for the development of modern eco-tourism. Currently this is a fast growing niche market with great future prospects. The development of eco-tourism would help to diversify the mass tourism strategy and thus make tourism in South Sinai as a whole more sustainable.

The Nuweiba region's natural beauty and its local and indigenous population with a long tradition of living in harmony with nature, are valuable assets for the emergence of eco-tourism. Such a new direction of development should include the camp and safari operations which of course have to be substantially upgraded and expanded to meet international standards.

2. FOREWORD

The Complaints Department of the EIB (CDE) received a number of stakeholder complaints regarding a planned 750 MWe gas fired power station at Nuweiba with an EIB participation in the debt financing. The CDE commissioned an independent investigation into the power plant's impact on the local tourism industry, the socio-economic situation and bio-diversity. A joint field mission of the CDE and three experts was conducted during the period Oct 15 to 23, 2009.

At Nuweiba the tourism expert held numerous meetings with stakeholders such as hotel owners, hotel managers, workers and guests as well as travel agents, diving station operators, restaurant owners and safari / excursion tour operators. In addition, meetings with local government officials, NGO representatives and employees of the sponsor and the team responsible with the project's EIA were held.

Public meetings were conducted to investigate the attitudes and aspirations of the general public towards the project. Apart from the numerous contacts with stakeholders, the Nuweiba area was intensively travelled in order to obtain first hand observations and visual impressions regarding the present status of the area and its tourism industry. Initial results of the mission were discussed in Cairo with representatives of the Ministry of Tourism, the EEAA and the sponsor.

The tourism expert wants to thank all contacted persons for the information provided and opinions expressed. He is particularly thankful for the hospitality granted and the numerous fruitful discussions.

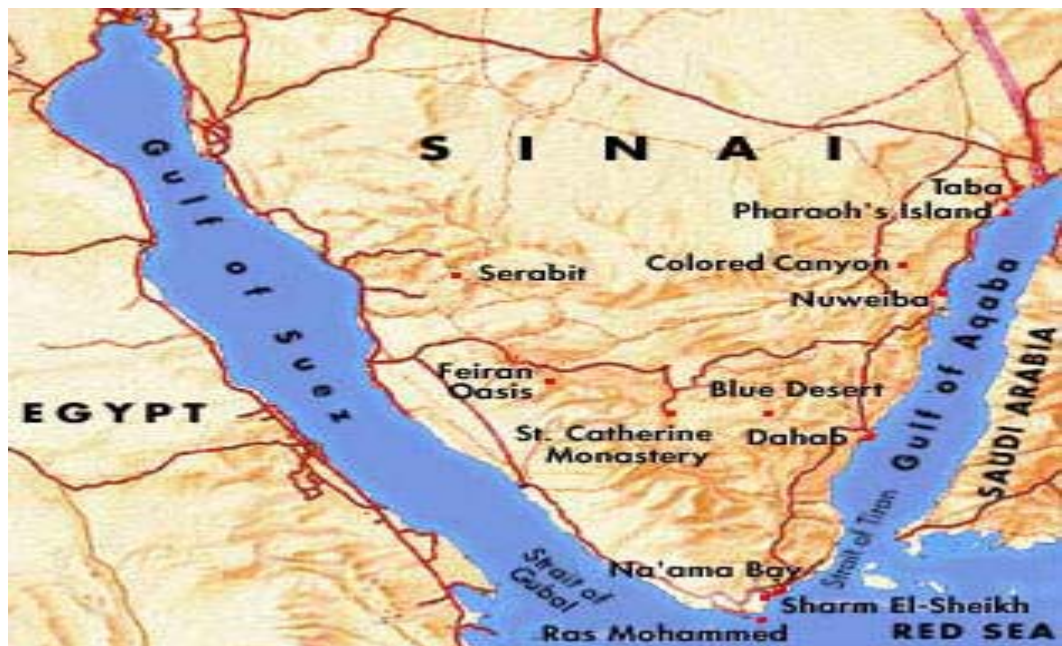
3. STATUS OF TOURISM

3.1 Tourism in South Sinai

Sinai does not have the rich oil and gas deposits that could stimulate economic development. After the return from Israeli occupation in 1982, the South Sinai coast was earmarked as a priority development zone for tourism. The destination has been marketed to investors and vacationers as the "Egyptian Riviera".

3.1.1 A Story of Rapid Growth

South Sinai provides genuine year-round destinations based on abundant sunshine which is also readily accessible to European markets. With clear water and rich marine life, South Sinai's attraction for international tourists originally was based on diving. The hinterland of South Sinai contains a range of historical, religious, scenic and natural attractions with potential for future development.



Map 1: Overview South Sinai

The rapid growth of the area as an international tourism destination is best illustrated by the tremendous expansion of its hotel capacities. In 1989, there were just 13 hotels in the region with a total of 1,150 rooms. In 2009, there are 285 hotels with almost 58,500 rooms. Between 1996 and 2009 the average annual growth rate was almost 19%. South Sinai now comprises 24% of all hotel rooms in Egypt.

Almost half of all hotels in South Sinai fall into the 5-star category, with a further 30% in the 4-star/-4-star plus grade. Sharm el Sheikh concentrates the highest number of 4 and 5 star accommodation products. Average occupancy rates in South Sinai's hotels are in the range of 60% and tend to exceed those for the country as a whole. However, these are considerably higher in Sharm el Sheikh than in all the other tourism locations in South Sinai. This development is very concentrated on Sharm el Sheikh which accounts for 83% of the available bed stock for rated hotels, followed by Taba/Nuweiba with 11% and by Dahab with 4%. For complete hotel statistics see annex A. The extensive accommodation capacities that have been and are still being developed are now serving a high-volume, price-driven segment of international tourism markets.

However, this dramatic expansion comes at a price. There is a constant strain on the natural resources and NGO's claim that the environmental bearing capacities have been exceeded. On land, infrastructure needs to be constantly expanded and upgraded. There are also questions on the prevailing current business model as the ever increasing number of highly rated hotels creates pressure on prices and profitability. In order to lessen this negative impact, the Ministry of Tourism is now considering a multi-annual programme for more sustained and eco-friendly development in Sharm el Sheikh. The latest tourism development plan (2007 to 2017) calls for a more sustained growth scenario. Instead of the continuation of rapid quantitative expansion, the plan advocates a re-orientation and a focus on quality and diversity of the tourism product.

3.1.2 Need for more Electricity Investments

The accelerated economic development requires new investments in power generation and transmission. During the period 2000 through 2010, the annual average growth rate of electricity demand in Egypt is expected to range from 6.5 to 7.5 %. According to the Electricity Holding Corporation, more than 99 % of the population are connected to the national grid.

The Delta Company is in charge of electricity generation in South Sinai. All cities in South Sinai are now connected to the national grid. South Sinai loads are mainly supplied with electricity from one or more of the following three sources: The Canal Company for Electricity Distribution; Private Sector Electricity Service Provider; and Customer (end user) self generation and distribution.

In general, tourism resorts do not have major complaints in connection with power supply, and power cuts and voltage fluctuations are rare. However, the extension of power supplies to remote areas and Bedouin settlements remains a key issue.

The country's Sixth Development Plan (2007/08-2011/12) includes provisions for the installation of a new power generation plant with a capacity of 750 MWe in South Sinai (originally to be located at Sharm el Sheikh as the main consumption centre), and a 350 MWe station at Oyoum Mousa. The investment cost of these two stations were estimated to be about LE 5 billion.

3.2 Tourism in Nuweiba

3.2.1 Nuweiba - Key Features

The project town of Nuweiba is located on the Eastern Coast of the Sinai Peninsula, 70 km south of Taba, 170 km north of Sharm el Sheikh and 110 km from the famous Saint Catherine's Monastery. Nuweiba means, "bubbling springs" in Arabic, and it is one of the Sinai's five oases, with a number of green, tree covered areas that add to a stunning contrast to the normal desert scenery and the deep blue of the Red Sea.

The municipality of Nuweiba is located on a sandy delta created by a wadi outflow of the mountainous interior. The plain has a north to south extension of almost 9 km and an east to west of up to 2 km. In the very south of Nuweiba town a settlement of the Muzeina Bedouin tribe is located. North of it the town's port area is situated, which contains the harbour and an adjacent commercial area where small scale logistic and industrial companies are located.

The beach north to the port area is designated for tourism development. This area hosts a few star-rated hotels (e.g. Hilton, Swisscare), several unfinished hotel projects, a number of beach front camps and a diving centre. In the area between the beach tourism sites and the mountain range, mixed land use dominates. According to town planning, this is a designated commercial area where the sewage treatment facility and a desalination plant are located. However, in this neighbourhood also Bedouins have erected a number of residential houses.

North of the second wadi leg, the town centre of Nuweida is located. It contains administrative buildings as well as residential quarters. Continuing north, the settlement of the Bedouin Tarabin tribe is placed with beachfront camps and

private homes on the surrounding slopes. For more information on the Bedouins culture and attitudes towards tourism see annex B.

Nuweiba Overview

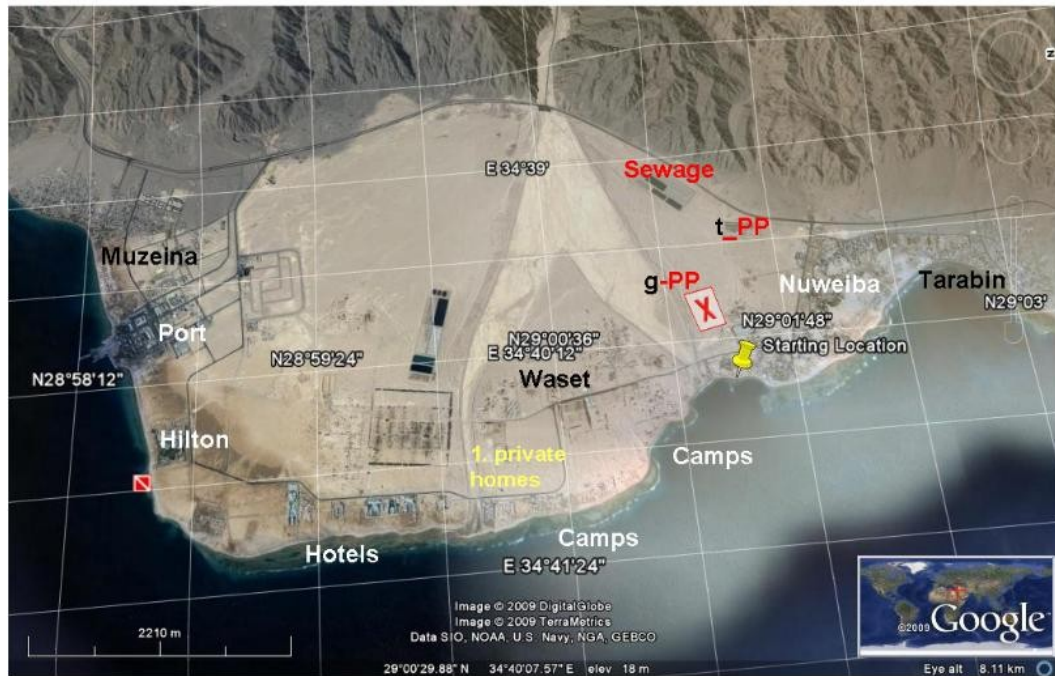


Figure 1: Nuweiba Overview

Reportedly, Nuweiba has a population of app. 5,000, of which a substantial number are members of the two Bedouin tribes living in the region. The presence of semi-nomadic Bedouins makes an exact count of the residential population difficult. Nuweiba is the regional centre for the northern Gulf of Aqaba offering essential services (e.g. hospital, schools, shopping, administrative) to its residents, tourists as well as rural populations.

Nuweiba has one of Egypt's most important ports. The harbour is key for foreign trade between Egypt, Saudi Arabia and Jordan. During Ramadan, many Egyptians and Bedouins head to Nuweiba on their way to Mecca. For tourists and foreign visitors, Nuweiba is also the easiest way to travel to the famous Jordanian historical site of Petra, and to the old cities of Saudi Arabia, on one of the daily ferries.

For many years the area north of the town up to the Israeli border was known under the name Nuweiba. However, since the new international airport near Taba is in operation, Taba has become a destination of its own. More recently, there are initiatives to rename the airport to Taba / Nuweiba in order to better promote the wider area as it was done previously.

3.2.2 History of Tourism

In the old days, the Nuweiba oasis settlement was benefiting from its central location at the coastline and its function as the gate for visitors to Sinai's interior.

During the Israeli occupation, Nuweiba was the site of a large farming settlement, which later was converted into a residence for Egyptian government officials. For a historical aerial view of Nuweiba see annex C. After the Sinai was returned to Egypt in 1982, Nuweiba became a popular place for earthbound Israeli travellers looking for camp grounds and short vacation opportunities. In contrast to the evolving mass tourism in Sharm el Sheikh, Nuweiba, up to the year 2000, was mainly a destination for individual travellers. The number of Israeli border crossings peaked in the late 1990s, when more than a million Israeli tourists visited Egypt in a single year. This boom triggered a lot of land sales and tourism development in the period 1995 to 2000.

However, in the following years, political instability in the region caused a series of setbacks such as the start of Intifada (2000), 9/11 (2001), Iraq War (2003), Nuweiba bombing (2004), Dahab bombing (2005) and Sharm el Sheikh bombing (2006). Today the outskirts of Nuweiba and the coastline north to Taba are littered with the shells of half-built resorts.

Only in 2009, tourism picked up again with a substantially increased number of Europeans visiting camps in and around Nuweiba, with a strong holiday season from Israel, and a considerable Egyptian contingent visiting in September/October.

3.2.3 Accommodation

The rapid expansion of accommodation facilities in Sharm el Sheikh, and to a lesser degree, in Taba is based on a development model whereby domestic investors buy land, construct mainly four and five star hotels and then give them for management to international hotel chains to cater to foreign volume markets.

This development pattern has not taken place in Nuweiba which is more characterized by a moderate growth of star-rated hotels as well as the availability of a considerable number of basic beach camps being owned and operated by local residents. The target market for these beach camps are alternative travellers and eco- and adventure tourists.



Figure 2: Location of Nuweiba Hotels/Camps

According to official statistics, at Nuweiba there are four hotels classified as five and four star facilities with together 939 rooms. These hotels are located either within the city limits or some 10 km to the north. They are targeting the international volume market. Within the city boundaries there are also six other hotels serving more specialist markets, e.g. divers and /or transit tourists. They are not rated according to the Egyptian hotel classification system. Those hotels have a consolidated capacity of 569 rooms. In addition, there are at least six hotels under construction (app. 1,400 rooms) with uncertain completion and opening dates. For a detailed break down of the local hotel facilities see the following table:

Table 1: Nuweiba Hotels - 2009

Hotel	Classification Stars	Location	Opening	Rooms	Occupancy (1-9/2009)	Average Room Rate (1-9/2009)
Egypt. Strand.						
Hilton Nuweiba	5	Town	1992	200	83,90%	205,16
Sonesta	5	10 km north	2004	440	57,47%	129,94
Hholiday Inn Taba	4	10 km north	2004	172	79,11%	70,82
Nuweiba Village	4	Town		127	59,12%	66,35
Subtotal star-rated				939		
Elaria		Town		200		
Swiss Care		Town	2005	48		
Regina		Town		191		
Ciao		Town		40		
City Beach		Town	1992	50		
Nakhil Inn / dreams		Town		40		
<i>Tropicana</i>	<i>Closed in 2006 !</i>	Town			86	
Subtotal Other Hotels				569		

Source: South Sinai Hotel Association

In 2009, the Nuweiba star-rated hotels show a slightly better performance (occupancy levels and average room rates) than the hotels in neighbouring Taba.

At present, the market share of Nuweiba hotels in South Sinai is only marginal. According to official statistics they account for app. 2% of the region's overnights.

Apart from the rated and unrated hotels at Nuweiba, there is also a considerable number of beach side camps offering basic accommodation. These facilities are not reflected in the official tourism statistics as they are regarded by Egyptian authorities as substandard. Another problem is that the camps which are often run by members of the Bedouin community are located on plots with unclear land titles. Formally, these properties belong to the "Tourism Development Authority" (TDA), but the agency accepts the present land use and does not enforce land clearance. So the authorities generally ignore the existence of camps. On the other hand, tax authorities are very well aware of the situation and regularly collect income tax from owners/operators of these basic accommodation facilities.

In the absence of any official figures it is hard to determine the size of the camp market. The following figures are based on data received from local sources familiar with the camp situation. The presented figures should be understood as an indication only. Within Nuweiba and the adjacent TDA areas in the north there are reportedly app. 100 camps with estimated 2, 500 huts. For a camp location map and camp views see annex D. Location information and tentative camp size is given in the following table.

Table 2: Camps in the Nuweiba Area - 2009

Location	Number of Huts
TDA area: Ras al Shitan (original Shatteen):	
Castle Beach	60
App. 10 other campsites with an average number of 30 huts per camp	300
Maagana 7km north	
Maagana 100 huts	100
Rock Sea 20 huts	20
App. 10 more campsites: average number of 30 huts	300
5 km near the check point to Nuweiba Tarabin	
App. 15 campsites	n.d.
Duna Campsites	
54 Campsites	1.350
<i>App. 250 concrete / AC rooms</i>	
Tarabin	
14 Campsites	400
<i>200 rooms with / without A/C</i>	
Total	2.530

Source: Local NGOs

The quality of the accommodation offered varies widely. Some camps provide A/C and other amenities while most offer only a very basic place to stay and sleep. Accommodation consists of simple huts with basic shower and toilet facilities. Meals are served in a central location (tent). Most camps are not connected to the grid and generate electricity with their own generators. However, typical camp guests often have different expectations from the star hotel clients. Camp guests are looking for a tranquil inexpensive place to stay where they are close to nature. Often they are also anxious to learn more about Bedouin culture.

There is hardly any historical data on camp tourism and occupancy levels. For Nuweiba accommodation facilities, the boom time were the 1990s. After some very quiet years, the business picked up in 2009. Reportedly, in the summer of 2009, in key Muzina camps occupancy was 30 to 50%. During the September to October holiday period, it climbed to about 60 to 70%. Occupancy levels in the Tarabin areas were generally lower with only two to three camps reaching the above mentioned figures.

3.2.4 Origin and Interests of Tourists

Star-rated hotels have mainly European guests all year round. In addition, particularly during holidays, there are also Egyptian guests from the Middle East. Main activities in demand are water sports (diving, snorkelling, swimming), relaxation and safaris (camel, jeep). Furthermore, excursions to historical (e.g. Saint Katherine's Monastery) and natural sites (e.g. Canyons) are popular among hotel guests. Also extended tours to Petra (Jordan) and Cairo are in demand.

While the number of guests in star-rated hotels and their activities are reflected in official statistics, such data is not available for camp tourists. The following information is based on sources working in the Nuweiba travel industry familiar with the camp situation.

According to these sources, camp visitors are predominately of international origin, mainly from Europe (Germany, UK) and Israel. They represent some 70% of the market. The balance is made up of Egyptian travellers. The interests of camp visitors vary with the season. During summer (June to September) favourite activities are beach and water sports plus safari excursions by jeep. In the winter season (September to May) adventure tours like jeep, camel treks and relaxation are most popular activities. Many guests are eco-minded and try to spend their holidays in harmony with nature. The average stay in camps is estimated to be app. 4 days.

3.2.5 Tourism Services

Apart from accommodation facilities there are also numerous other service providers involved in the local tourism trade. These are mainly diving centres, excursion tour operators, restaurants and others services.

At Nuweiba there are two major diving centres (Mike's dive centre and Emperor) which offer a full range of services for their mainly foreign clients.

The safari business is in the hands of the members of the Muzina and Tarabin Bedouin tribes. The products offered include a variety of excursions and sightseeing trips. Popular are camel excursions – ranging from half- day tours to safaris lasting several weeks. Camel safari operators normally own few animals. If the demand exceeds their life stock, they turn to their extended family in mountains to provide additional animals. This means that also Bedouins in remote areas benefit from a high demand in the safari business. Another popular product among tourists is jeep safaris. Again, Bedouins act as drivers and excursion guides. Also desert trips and desert dinners are in demand.

At present, Bedouins legally can conduct only one day safaris without any restrictions. According to Egyptian security regulations, longer safaris officially require the presence of security forces. However, based on the mistrust between the authorities and the Bedouins, safaris are carried out in the traditional way without such a security escort. Again, as in the land title issue, the Government does not enforce its regulations.

There are no detailed statistics on the number of Bedouins directly or indirectly involved in the tourism trade. However, members of the Bedouin community repeatedly stressed that at present, tourism is the most important sector for their employment and income.

Finally, in Nuweiba there are a number of restaurants and other service providers catering to tourists. Reportedly, four restaurants ([Cleopatra Restaurant](#), [Dr Shishkebab](#), [Habiba Camp](#), [Han Kang](#)) are popular among tourists. Businesses in the port area and taxis benefit from the transit traffic.

4. IMPACT OF THE POWER PLANT ON TOURISM IN NUWEIBA

4. 1 Conceptual Framework for Measuring the Power Plant's Impact on Tourism

The rise of mass tourism in South Sinai during the last decades is due to the fact that the supply of modern hotel facilities and related infrastructure expanded very rapidly. This development has been stimulated by generous tax concessions to investors (e.g. 10 year tax holiday on corporate profit). Simultaneously the Government invested large amounts into infrastructure development (e.g. airports, roads, telecommunication) to make the new destinations attractive for guests. This means, that the Egyptian authorities, together with national investors, very much control the supply side. However, this is just one condition for a successful tourism and does not take into account the emotional and subjective expectations of the foreign tourist (demand side).

However, in order to fill all these new capacities, international guests have to come in large numbers. So far, main source markets are the UK, Germany, Russia and other European countries. In these source markets, South Sinai resorts fiercely compete with other "warm" water destinations such as the Caribbean, the Canary Islands, the Maldives and other islands in the Indian Ocean as well as South East Asian coastal regions. Apart from issues of price competitiveness, the demand is also subject to other factors. External "shocks" like natural disasters (e.g. tsunami), terrorist attacks (Luxor incident), the outbreak of diseases (bird flew), certainly affect the demand for a destination. In addition, the occurrence of natural features like the mass expansion of algae in swimming waters or major construction works can temporarily or permanently damage the image of a destination.

Often tourists judge not only by actual facts but what they perceive as a potential risk for an undisturbed holiday. Therefore, the decision for or against a certain destination is not only based on facts but is also influenced by the perception / image of a destination. It is important to understand that these decision making processes happen in the source markets and cannot be controlled by authorities in the destination markets.

Based on this analysis, the impact of the power plant will be assessed not only by considering its measurable emissions on its immediate neighbourhood, but also how such a plant is perceived by foreign tourists.

4.2 Phases of Power Plant Development

The impact assessment will distinguish between two phases. These are the construction period and the subsequent operation.

4.2.1 Construction Phase

The construction phase is scheduled to last an estimated 28 months during which up to 3.000 engineers and workers will be required for the civil works, the erection and commissioning of the plant.

The plant's location and its distance to neighbouring infrastructure and residential areas are given in Figure 3.



Figure 3: Vicinity of Power Plant

4.2.1.1 Demand for Accommodation for Project Staff

The construction of the power plant will provide a great stimulus for the local economy. It is expected that local hotels will benefit as most of the engineers and professionals will require adequate accommodation. Therefore, the project company must rent a large number of rooms in the project area. This means that the contracted hotels (e.g. Hilton) will have a secured income for two to three years.

In addition, the project company has indicated that it is prepared to acquire / compensate properties which are located close to the project site (e.g. Scuba Diving Centre). As a consequence, only a few hotel and / or service providers have the prospect of receiving compensation as they cannot continue to operate in their present location or get a secured business during the plant's construction.

4.2.1.2 Construction Traffic will harm Traditional Tourism

At the same time, the construction will be a burden for traditional tourism. The construction phase will be characterized by considerable transport and building activities. These will be required in order to prepare the site, to construct access roads and an auxiliary infrastructure, to erect the foundation and flood protection works as well as the full scope of civil, mechanical and electrical works required for the two combustion turbine-generator units, one steam turbine generator, two heat recovery steam generators and a desalination unit, water intake and outlet works and all other facilities. In addition, camps and related infrastructure to house the majority of the workforce must be built. Moreover, there is need to upgrade the general transport infrastructure as all equipment items – including the very heavy ones such as turbines, steam generators - will have to be shipped either through the presently inadequate Nuweiba port or have to be transported via highways through the mountainous hinterland.

All these necessary activities will generate much local transport and traffic. According to the EIA, during day shifts, on average some 265 trips of heavy duty vehicles and construction trucks and during night shifts some 90 movements are expected.

Table 3: Estimated Power Plant Traffic Generation during Construction

Vehicle Type	Traffic Generation			
	Day Shift		Night Shift	
	Peak	Total	Peak	Total
Heavy Goods Vehicles	10	100	0	0
Construction Workers Vehicles	82	164	77	88
Abnormal Loads	0	0	2	4
Total	92	264	79	92

Source: EIA, Section 6, Table 6-25, p. 95

Most likely Nuweiba city centre will be closed for construction traffic in order to protect local businesses and the close by residential areas.

One alternative route is along the beachfront which would create enormous stress for adjacent hotels and accommodation facilities such as Hilton, Swisscare and local camps. Tourists will be bothered by traffic related noise and dust emissions. In such a scenario the affected hotels will have great problems to sell rooms – particularly those facing the road. As this situation is going to last for several seasons, guests will have to be informed in advance by their tour operators about ongoing construction. Undoubtedly, such a “nuisance warning” will have a negative effect on bookings from overseas. Hotels in the immediate project area should consider the complete withdrawal from foreign markets as international tourists are unlikely to tolerate heavy impact from construction activities.

In particular camps in the Duna area will be affected by increased traffic as the huts with a light-nature design do not protect well against excessive noise and dust. Camp guests will start to avoid this area which can no longer offer a quiet place to stay.

4.2.1.3 Construction Traffic Impact on Wider Area

While the business of hotels / camps in the direct construction / transportation zone will be seriously affected, accommodation facilities located further away from the construction site are also likely to be negatively impacted. This prediction is based on the fact that due to the plant construction, the overall heavy traffic is going to increase which makes the region less attractive to clients looking for a quiet and calm place to stay.

4.2.1.4 Impact of Construction Workers

One other aspect to be considered during the construction phase is the requirements of up to 3,000 workers. Based on the needed qualifications, work experiences and preferences to work, the overwhelming majority of these jobs

will not be filled with locals. For example, Bedouins have clearly indicated that they are not interested in manual labour and according to their education and training background, they are unlikely to be hired for technical positions. This means that the great majority of the new jobs will go to “imported” workers from other parts of Egypt.

According to the sponsor, the numerous contractors will be responsible for the “imported” workforce. This means that at present there is no clear and concise policy how to deal with the needs of the workers as well as their relationship to the community at large.

The presence of a substantial number of workers from outside the Sinai is a potential cause of conflict. During the previous construction of the gas pipeline, the then smaller workforce (800) created problems with the local population. Residents fear that the huge labour inflow required by the power plant will create problems ranging from conflicts over supplies (bread, water, and hospital facilities), recreational activities to the issue of beach access. In case such clashes occur, these will be mainly between the temporary workforce and the residential population. But there is also a danger that such conflicts could indirectly involve international tourists.

4.2.1.5 Image Flaw during Construction

Reports on the construction of a controversial power plant in a traditionally tranquil area will spread fast. Nowadays, more and more potential guests decide on their vacation based on research in the internet and on personal recommendations. If these assessments are disappointing, the image of the region suffers. Most likely, potential guests will not conduct a detailed research about which hotel / service facility is actually affected by the construction of a Power plant, but may rather decide to avoid a controversial region completely. Already in October / November 2009, the first cancellations were received by hotels, giving as a reason the assumed construction of the plant starting in 2010 (see annex E).

In such a situation, some hotels may decide to lower prices to become more attractive for budget-minded travellers. Such a policy is likely to bring back some business. However, the lasting success of such a strategy is questionable. Whenever tourism service suppliers try to overcome destination shortcomings with an aggressive pricing, such a policy shows only limited results at the bottom line. Problems are that there is a particularly fierce international competition among “cheap” destinations and that a poor destination image is hard to change.

Overall, already during the construction period there is real danger of losing international clients due to the negative impact of considerable building activities and a deteriorating destination image.

4.2.2 Operation Phase

Following the plant’s construction, its operating life is expected to be 20 to 25 years. For its regular operation with a 3 shift mode, a work-force of app. 360 engineers and workers will be required

4.2.2.1 Plants parameters

According to the project's plans, the plant will be state-of-the-art. This advanced technology will not only guarantee high power generation efficiency levels but also relatively low emissions. The calculated noise and air emission values are well within the standards required by the World Bank and the Egyptian authorities (see EIA, Executive Summary, p.15/17). One reason for achieving the low noise emissions is the design concept, which foresees that the turbines and all related heavy equipment will be housed in a concrete building preventing most noise from escaping into the atmosphere. However, the impact of the cooling water circulation on the marine environment is still under investigation.

One obvious feature of the plant is its sheer size. The two 375 MWe units will have each a stack of 90 meters in height and a diameter of app. 8 to 9 meters. The tentative dimensions of the power house are not specified but have to be large in order to host the most important noise emitting heavy equipment. The power company plans to mitigate the visual impact of this huge complex by painting the machine house in the colours of its natural surroundings (camouflage) and by planting high palm trees.

4.2.2.2 Visual Impact

The dimensions of the plant have to be put in perspective with the fact that houses in Nuweiba are generally only two story buildings (app. 6 meters in height) and even the tallest construction (the mosque's minaret) is app. 30 meters in height. Also other enterprises located in the commercial area like the desalination and the wastewater treatment plants have no high structures. So far, the only tall building in the area is a wired communication tower close to the Hilton which is said to be 90 meters in height. However, this single tower is a steel-wired, transparent construction with a diameter of about one meter.

Given the dimensions of the power plant, this complex will visually dominate the area. According to computer modelling it will be visible from all parts of Nuweiba stretching from the Muzina village in the south to the Tarabin settlement in the north. During fair weather conditions the plant will be even visible from the opposite side of the Gulf of Aqaba (Saudi coast line) which is at least some 20 km away. For a simulation of the visual impact of the plant, a simple 3-D model has been developed to generate views. For more views see annex F.

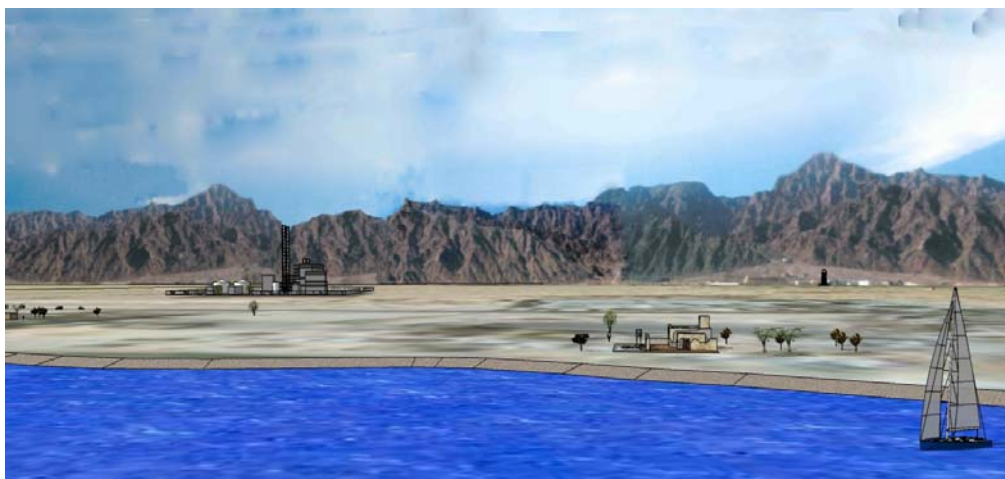


Figure 4: Simulated View from Beach Front

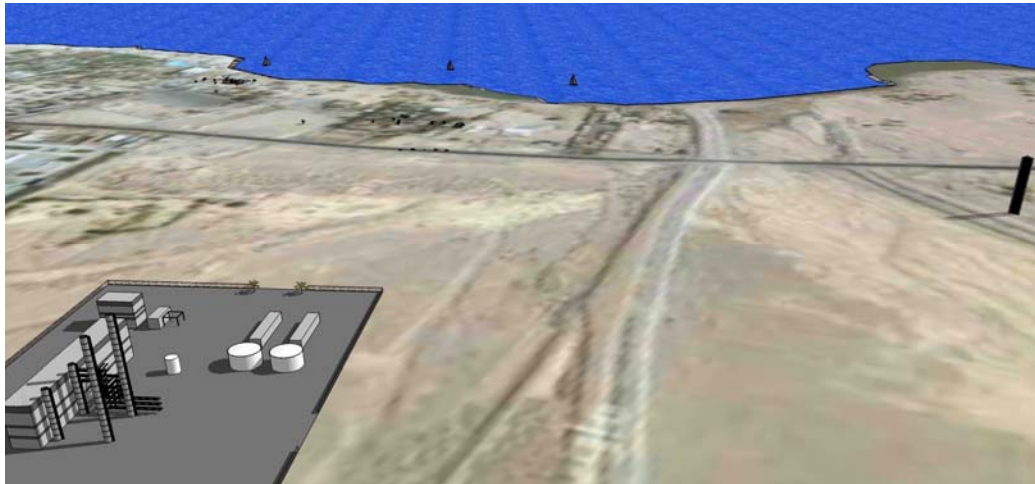


Figure 5: Simulated View towards Beach Front

However, more important for this investigation than its long distant visibility is the plant's impact on Nuweiba's tourism. As discussed above, already during the construction phase local tourism is expected to suffer due to work related activities. A completed power plant will certainly have dramatic implications.

Above all, the plant will impair the open view from the shore line towards the mountain range and vice versa. The character of the area will change as it will become more "industrial". Although most tourists will not hear or smell any emissions directly, they still may feel uneasy with such a big plant in the backyard. Again, the tourist's perception is more important than objective emission facts.

The idea to organise visits to the power plant in order to convince tourists of its clean operation is not going to work. Most travellers are looking for unspoiled beach and water holidays and are not interested in visiting close by industrial sites. They rather feel intimidated by a huge power plant next door.

In particular, the visual impact of the plant will have a detrimental effect on leisure tourism. International tourists have the free choice where to go. Why should they want to stay in a place with a huge industrial structure? There are plenty of international alternative destinations with similar attractions and price levels but without any man-made "nuisance".

The visual impairment will also make international tour operators reconsider the listing of hotels in the project area in travel brochures. Hotel bed purchasing managers of two TUI brands were given key parameters of the project to sound out what would be their reaction. They confirmed that in the case of the project's implementation it is highly unlikely that these hotels will stay in their product portfolio. This was also confirmed by contacted specialised tour operators (diving), currently featuring smaller Nuweiba hotels. They also indicated that a power plant in the planned location would be a major obstacle for future cooperation and a reason for delisting partner hotels.

4.2.2.3 Customers Compensation Rights for Visual Impairment

Another aspect is the recent enforcement of customer's rights by European Courts. These rights are especially spelled out in EU Council Directive [90/314/EEC](#) on travel, holiday package and package tours, regulating any compensation for shortcomings and irregularities that might occur during a holiday trip.

The danger that such claims turn out to be justified will make travel agents reluctant to sell a resort area with an obvious handicap.

Again, it is important to understand that potential customers will be guided away from the destination Nuweiba with a dominant power plant, long before they have the chance to see and assess the plant's visual impact on site. The image / reputation of the destination are of paramount importance for the selling process and a seriously damaged image is hard to be repaired.

4.2.2.4 International Examples of Conflicting Interests between Power Plants and Tourism

Regularly, the impact of new power plants on the environment and local communities is under scrutiny. Most power plants are being built on sites which are carefully selected to minimise the negative impact. Despite careful site selection, the location of new plants is often very controversial among different stakeholders.

Conflicts between tourism and power plants are relatively rare as power companies normally do not try to locate a new plant in an area with high recreational and tourism value. Nevertheless, recently there are a few examples of conflicting interests between promoters of conventional power generation and tourism stakeholders.

There are international examples of popular resistance based – among other reasons - on worries that new power generating facilities will harm the interests of local / regional tourism. Three case studies are presented showing how these concerns are expressed and dealt with in Germany, Australia and India. For case studies see annex G.

4.3 Impact of Power Plant on Nuweiba's Tourism

The above analysis has shown that, with the power plant in place, there is hardly any future for international leisure tourism in Nuweiba. City- and other hotels used by transit travellers may still get their share of the business. Also taxi and other services catering to the transit will survive. However, all businesses directly related to leisure guests will be hit most. Existing hotels either will adapt to transit business or be forced to relocate. Scuba diving enterprises will have to move to other locations as their clients are particularly sensitive to changes and an "industrialisation". Safari operations are more flexible as their main business is in the interior. Nevertheless, they may also decide to avoid Nuweiba with its dominating power plant.

The immediate plant's impact on tourism is related to its "visible pollution", which will be virulent at Nuweiba. In this respect it could be argued that the hotels and camps further north would not be directly affected, as from their location the plant is not visible.

As discussed above, the image of a destination is a decisive factor when choosing a holiday location. In this regard the simple question is whether or not the negative image of Nuweiba will spread beyond the city limits.

5. CONCLUSION AND OUTLOOK

The Impact of the power plant on local tourism will be severe. International leisure tourism will suffer most as Nuweiba's image will change from a holiday to a more "industrial" destination.

Already during the construction phase, increased traffic and transport activities will become a burden for holiday makers. Later, the dominant visual impact of the plant will deter tourists from spending their vacation at Nuweiba as there are numerous other unspoilt destinations to go to. Due to the predicted decline of international tourism, local hotels and service providers will be forced to concentrate on transit visitors or to relocate.

Decision makers may argue that at present Nuweiba accounts only for a fraction of the total South Sinai tourism and that other locations have a greater potential for expanding mass tourism. However, the key issue is to find the best strategy for tourism development in South Sinai.

For a more diversified and balanced product portfolio, it is advisable to develop eco-tourism as a complementary product line to mass tourism. This is a fast growing niche market with great future prospects. As long as the power plant is not built, the wider Nuweiba area seems to be a good location for this purpose. By applying a bottom-up approach, eco-tourism could start. The region's unspoilt natural beauty and its local and indigenous population with a long tradition of living in harmony with nature are valuable assets for the development of authentic eco-tourism.

For the success of such an approach it is essential to get the local tourism trade involved and empowered. Existing accommodation and services have to be upgraded and expanded to meet international eco-tourism requirements.

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Annex A

Star-Rated Hotels in South Sinai by Destination - 2009

Stars	Nuweiba & Taba		Sharm el Sheikh		Dahab		St. Catherine		El Tour		Total	
	Hotels	Rooms	Hotels	Rooms	Hotels	Rooms	Hotels	Rooms	Hotels	Rooms	Hotels	Rooms
5	8	3.219	44	21.944	2	363					54	25.526
4	9	1.788	64	18.626	3	443					76	20.857
3	10	697	51	6.660	4	569	2	240			67	8.166
2	10	674	18	1.219	13	557	3	331	2	99	46	2.880
1	5	185	2	66	8	188			2	47	17	486
under Observation	2	40	6	142	16	440					24	622
Total	44	6.603	185	48.657	46	2.560	5	571	4	146	284	58.537

Source: South Sinai Hotel Association

Annex B

Background Information on Bedouins

Bedouins are found all over the Arabian Peninsula; Syria, Jordan, Egypt and Libya, but their numbers are diminishing. They are known by their nomadic lifestyles, specific dialects, social structures and culture. It is now estimated that nomadic Bedouins constitute only 10% of the population of the Middle East, where they live pastoral lives, herding camels, sheep, goats and cattle. Few still live as their forefathers; in camel- or goat-hair tents (house of hair), raising livestock, hunting and raiding.

The Sinai Bedouins are split into roughly 10 tribes, and are currently undergoing rapid changes to their lives as a result of the increases in tourism. They have always acted as local guides, leading visitors to places of worship and interest, but have only recently begun to settle in towns close to areas with the greatest tourism, rather than live and travel through the Sinai desert. Many of these new settlers in the coastal towns however, long for the tranquillity of the desert, and it is here that they return to for retreat from the demands of their modern lives.

Along with the change of lifestyle has come a change of diet. The desert did not offer much fertile land for farming, so the traditional diet consisted of fish, milk and dates. Now however, many families grow fruit and vegetables, and eat more chicken, lamb, goat and beef. With the less active lifestyle, increases in the use of cars, and the greater ownership of western comforts such as televisions, the health and life expectancy of the Bedouins has decreased.

To the Bedouins, the most remarkable and majestic of all animals is the Camel. They are seen as a gift from Allah, providing companionship, shelter and transportation across the harsh Sinai desert, and are often used as dowry for a bride, or as a payment for acts committed against another Bedouin. Owning Camels is a sign of wealth. Camel hair is used to make clothing, blankets and tents. Bedouins drink Camel milk and feast on Camel meat. Whilst many Bedouins now own 4-W/D jeeps instead of Camels, the camel has not lost its place in their society, and now offers a further source of income for breeding, racing and predominantly for providing Camel rides and treks with the increases in tourism.

The Bedouin tribal system forms the basis of their society. Bedouins live in family groups, which when combined, form a clan. A number of clans together form a tribe. All water and pastoral land is considered to be tribal property. All members of a clan show unconditional loyalty to one another, and to their family, clan and tribe. Many Bedouins trace their ancestry back to the times of the prophet Mohammed, and believe their country, their blood lines and their lifestyle to be the most noble of all. Within this system they all enjoy support, security and protection.

The Bedouins follow a strict rule of Law; blood calls for blood. Every violation of the law, from an argument to murder, is discussed by the family and clan members, and finally the Court of Elders. They will discuss the matter for as long as it takes to reach a decision and make a final judgment on the parties involved. If a member of a clan commits murder inside the clan, nobody will defend him. In case of escape he becomes an outlaw, and is no longer protected by his fellow tribe members. A Bedouin can not survive for long in the desert without the assistance and protection of his tribe. If the murder is outside the clan, a vendetta is established, and any fellow clan member may have to pay for the crime with

his own life. A blood feud may last for many years, or can be ended with the payment of blood money, or through forgiveness by one or both parties.

Bedouins are most well known by travellers and holidaymakers for their warm welcome and hospitality. With the increase in tourism however, these attitudes have adopted. Before, a stranger would be offered tea, food and shelter for a few days without being asked for any form of payment, or any being expected. However, many tourists still paid large amounts for simple items, and slowly this came to be expected. Today, payment for a cup of tea is often expected, but this is not to say you will not often still be invited for tea or dinner with a Bedouin family as a welcome, with nothing asked in return.

Annex C

Historical Aerial View at Nueiba (app. 1980)



Annex D

Overview Camps in the Nuweiba Area



Tarabin Camp at Nuweiba



Sabana Camp

Annex E

Example of a Cancellation Note due to Power Plant Construction

From BOOKING.COM Thu 05 Nov 2009 01:16:12 PM CET Page 1 of 1

 **BOOKING.COM**
online hotel reservations

Cancellation
130724932

Fax to: Swisscare Nuweiba Resort Hotel
Attn.: Alvin James Furrer
Fax: +20693520641

Date: Thursday, 5 November 2009
Concerning: Cancellation 130724932

Dear Alvin James Furrer,

Unfortunately the following reservation has been cancelled. If you have any questions regarding this reservation, please feel free to contact us. Telephone: +44 20 3320 2610; Fax +31 (0)20 712 5606; E-mail customer.service@booking.com.

Yours sincerely, Booking.com

Reason:

The construction of the Power Station in Nuweiba there does look as if it will go ahead - probably starting before we even arrive. This would make any holiday there impossible.

Arrival:	Saturday, 13 February 2010	Number of rooms:	1
Departure:	Saturday, 20 February 2010	Number of persons:	4

Suite (4 adults) for guest Penelope Dreghorn (for 4 persons)
Room facilities: tea/Coffee Maker, minibar, shower, bath, safety Deposit Box, TV, telephone, air Conditioning, hairdryer, balcony, seating Area, toilet, bathroom, satellite TV, bath or Shower
This spacious suite can accommodate up to 2 extra beds for children aged between 5-14 years.
Meal plan: Breakfast is included in the room rate. Dinner is included in the room rate. **Cancellation:** If cancelled up to 1 day before the date of arrival, no fee will be charged. If cancelled later or in case of no-show, the first night will be charged. **Taxes:** 10 % VAT is included. 12 % service charge per room per night is included. 2 % city/tourist tax per person per night is included.

Total price for this reservation: US\$ 900

You have already received the credit-card details.

Booked by: Dreghorn, Penelope
Address: BOOKING.COM: Weteringschans 28-3
City: Guildford
Telephone: 004401483570505

Zipcode: GU1 1TX
Country: United Kingdom (gb)

- PLEASE keep your availability up to date on <http://www.booking.com/hotelaccess>
- Your hotel id is 47147 and the pincode is 3489

Annex F

Computer Modelled Views of Power Plant and Vicinity

1. View from Beach Front



2. View from Beach Front



Annex G

Background - Interest Conflict between Power Generation and Tourism

Conflicts between tourism and power plants are relatively rare as power companies normally do not try to locate a new plant in an area with high recreational and tourism value. Nevertheless, recently there are a few examples of conflicting interests between promoters of conventional power generation and tourism stakeholders.

Germany

The Danish investor “Dong Energy” plans to build a new, state-of-the-art coal fired power plant with the capacity of 1,600 MWe at Lubmin / Baltic Sea. The site is the location of former nuclear power plant that never was completed. The Lubmin region, close to the Polish border, is an area used by tourists for weekend and summer holidays.

In a tourism impact study initiated by the sponsor it is concluded that most likely the plant will be responsible for a decline of tourism in the magnitude of 10 to 30 %. In order to make up with the loss of revenues the experts propose to concentrate in future more on business travellers. The experts predict that direct implications on tourism could be limited as long as tourists would not be directly confronted with the power plant. From a tourism point of view they are not so much concerned about the impact of wads of smoke coming out of the plant than on the impact on the future image of the region which is known for its natural beauty.(see

www.mvregio.de/mvr/74600.html)

In neighbouring towns and villages a number of citizens’ action groups have been formed. Some groups have announced that they will fight in the courts against the power project.

The controversy over the project has caused considerable delays and it is not clear if and when the project will be built.

Australia

In April 2008, the “International Power of Australia” presented the plan to build a 150 MWe peaking power station at Herons Creek, app. 24 km south of Port Macquarie, New South Wales/ Australia_

nccnsw.org.au/index2.php?option=com_content&do_pdf)

The site selection turned out to be very controversial. Among other reasons the impact on local tourism was discussed. In addition to other implications, the following negative socio-economic impacts were highlighted:

- the loss of tourist business due to polluted air quality,
- potential contamination of water supply and fisheries
- the loss of jobs in tourism related industries, or other businesses non-viable due to insufficient market thresholds

As a result of the public controversy the applicant could not secure the required properties and permits and finally withdrew its application for the Herons Creek on August 22, 2009

www.ipplc.com.au/Page.php?iPageID=382)

India

The Power Company of Karnataka Limited (PCKL) plans to build a 1,000 MWe coal based thermal power plant at Chamalapura in Mysore district.

This plan sparked off strong public protests from environmentalists and also farmers of Chamalapura against the project. The opponents point out that, among other facts, the plant's site is within 25 km of the outer periphery of national parks and sanctuaries which is against the guidelines issued by the Ministry of Environment and Forests, Pollution Control Board etc.

Further the project would have an adverse effect on the tourism industry, as the proposed project is very close to the heritage city of Mysore. For the city tourism it is an important source of income and employment that should not suffer under the operation of a close by power plant.

Based on the on-going controversy of the project the Karnataka Electricity Regulatory Commission has advised the government to take a fresh look at the site decision and to re-consider the present location.

[\(www.petitiononline.com/coalbase/\)](http://www.petitiononline.com/coalbase/)

Annex IV to the Conclusions Report

Resumes from the Independent Experts

Dr Virginie M.C. TILOT

Marine And Coastal Environment/Sustainable Development And Conservation Expert

Membre correspondant de l'Académie des Sciences d'Outre-Mer

Consultant expert for Unesco/IOC

Scientific advisor nominated by the European Commission

Dr. V.Tilot has close to 25 years of experience in the areas of applied natural sciences, marine (high seas/coastal/island) ecology, coastal/ocean management and planning, marine protected areas (creation, implementation) in particular the « high seas », environmental impact studies, national and regional conservation policy, biodiversity assessment, global change assessment, Large Marine Ecosystems, coral reef ecology, fisheries, aquaculture, Integrated Coastal and Marine Area Management, oceanographic/diving surveys, Global Environmental Fund (GEF), evaluation of environmental programmes at local, national and regional scales.

Appointed by several international organisms among which different agencies of the United Nations (UNEP, UNDP, FAO, Unesco/IOC...) the European Commission, non governmental organisms (IUCN, WWF..), governmental organisms, private companies and universities, she has been working in collaboration with international (multilingual and multidisciplinary) teams in advanced scientific and technological matters and in joint projects, in particular with developing countries from small scale, site-specific projects to regional scale projects. She also was involved in more specific topics of research, teaching and training. She designed cross-sectoral strategies and integrated national and regional development strategies and prepared natural resources management and marine and coastal eco-regional planning. She achieved several analysis/evaluation/drafting of projects and large international programmes. She participated and organized several meetings and international workshops.

Her experience over these past twenty years covers different marine areas of the Atlantic, Pacific, Indian Ocean, Red Sea, Mediterranean Sea, Black Sea, North Sea, including High Seas of the Pacific and the Mediterranean Sea and coastal and terrestrial areas of more than 50 countries.

81 publications, among which 70 at an international level, relate to the different fields of experience

David MARSDEN
Social Assessment Specialist

David has been working in international development for the last 30 years. He currently works as an independent consultant with a major interest in the changing nature of monitoring and evaluation. He is a Research Associate at the School of Oriental & African Studies in London, and Associate with the International NGO Training and Research Centre (INTRAC) in Oxford. He holds a Ph.D in Social Anthropology from Durham University. Following post-graduate field work in Iran he began an academic career teaching about and training in social development in the Centre for Development Studies at Swansea University, Wales. He worked closely with the founders of [INTRAC](#) particularly on issues of monitoring and evaluation and was involved in a number of conferences and publications on these themes with them.

In 1995 he joined the World Bank and managed the Bank's first Social Development Unit, in their New Delhi office. He went on to become lead social development specialist in the South Asia region. His work with the World Bank involved considerable engagement with civil society organisations. He worked in a variety of sectors, including electricity generation, natural resource management, urban development, transport planning and rural development. In 2002 he spent a year as Research Director at INTRAC, under the World Bank's staff exchange programme. This involved capacity building of civil society organisations in the Middle East and in Central Asia. He left the World Bank at the beginning of 2005 to join the European Investment Bank in Luxembourg where he worked as senior social assessment specialist. He developed their social assessment guidance notes for use by project officers in projects outside the EU. He was closely involved in the development of their training programme on Social Assessment in close cooperation with the Civil Society group and the Corporate Responsibility group.

Current interests remain rooted in problems of developing effective monitoring and evaluation tools and in building opportunities to ensure that these remain in the hands of local groups. He is an accredited member of the [Cognitive Edge](#) network and is questioning traditional disciplinary boundaries for ways to make Anthropology more central to 'management', 'economics' and 'development'. He has worked in a variety of countries in Africa, the Middle East, South and East Asia.

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Dieter SEMMELROTH
Tourism Expert

Membership of professional bodies:
European Evaluation Society (EES)
Gesellschaft für Projektmanagement (GPM)

Mr. Semmelroth is a trained economist and sociologist who studied in Germany and Jamaica. In 1980 he started his career as an Associate Expert for the International Labour Organization. Later he worked in various capacities for international consulting firms in South America, Africa and Asia.

In 1991 he joined Preussag AG as a specialist for Project Finance. In the following years Mr. Semmelroth was involved in the developing and financing of infrastructure and industrial projects, located mainly in Russia and CIS countries. After Preussag's acquisition of TUI in 1997 he was engaged in the development of tourism products and projects.

More recently Mr. Semmelroth has been involved in the development, financing and evaluation of hotel and tourism projects in South Eastern Europe, Africa and Asia. Currently he holds the position of Senior Manager at TUI AG.