PD-AAQ-099 37077

Final Report to

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

SCIENCE AND TECHNOLOGY DEVELOPMENT PROJECT

POLLUTION RESEARCH

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A. F. Bartsch

Contract No. 664-000-S-00-4014-0

Tunisia

Introduction.

This final report is submitted in keeping with Article I-C-1 of the Contract and follows the same format as the earlier Progress Reports. It includes actions taken and progress accomplished during the term of the Contract, including trips to Tunisia during the periods March 2-19, 1984, April 20-May 6, 1984, and September 6-22, 1984.

During the September visit, as in earlier ones, meetings were held on several occasions with Mr. Rachid Tekaya and his staff to discuss and develop action programs related to IEDS[1] and other work elements stated in the Contract. Variously present at these meetings were the following persons:

OESQC[2]	AID/Tunis
Mr. Rachid Tekaya, Director	Dr. A. F. Bartsch
Ms. Bouraoui Oum-el-Khir	Ms. Deborah Prindle
Mr. Salah Rhaiem	Mr. Mohamed Ali Hassairi
Mr. Naceur Jebali	Mrs. Bonnie Anderson (Translating)
Mr. Daoud Bouazza	

On September 11, 1984, a meeting was also held at the office of the Society for the Promotion of the Lake of Tunis to discuss current activities in the Lake of Tunis restoration program. From this and subsequent meetings by Short Term Advisor Dr. G. F. Lee, a request for AID technical assistance on the Lake of Tunis is anticipated.

In addition, two inspection tours were made--one around the Lake of Bizerte to permit a more educated consideration of a water pollution survey at the south end of the lake, and the other--a guided boat trip on the Lake of Tunis to more clearly understand the lake restoration program and better anticipate the result.

I wish to express appreciation to Mr. Tekaya and his staff for the courtesies shown me during these three visits and to compliment them on their actions toward correcting industrial pollution in Tunisia.

Element 1: Review existing data, regulations, plans and priorities to control industrial pollution.

The most important activity in Element 1 during the Contract period concerns the IEDS program. It is appropriate, therefore, to look back at actions that have occurred as a result.

[1] International Environment and Development Service of World Environment Center (WEC).

[2] Office of Environment, Standards and Quality Control, Ministry of National Economy.

Looking Back.

a. Surveys to date.

Since the inception of the IEDS program, eight surveys have been carried out in Tunisia as follows:

- Yeart Plant at Beja, May 1982.[1]
- Pulp Mill at Kassarine, May 1982.[1]
- El Fouledh Steel Mill at Menzel Bourguiba, October 1982.
- Phosphate Ore Plant at Moulares, October 1983.
- Phosphate Ore Plant at Redeyeff, October 1983.
- Oil Refinery at Bizerte, July 1984.
- Textile Mill at Sitex, October 1984.
- Textile Mill at Siter, October 1984.

The El Fouledh Steel Mill at Menzel Bourguiba deserves special mention. On April 30, 1984, a meeting was held at the mill to discuss the IEDS survey report and related matters. Management, while agreeing generally with the report and its recommendations, was deeply concerned by the costs of corrective action that were indicated.

Nevertheless, El Fouledh management indicated a willingness to move forward to correct its waterborne waste problems but has not done so because, without similar action by the City of Menzel Bourguiba, little of benefit to the Lake of Bizerte would be accomplished. As a stimulus to joint action by the City and the company, I was asked if AID could give advisory guidance to a survey of all the waste impacts in the area on the Lake and to indicate the needed abatement measures from both major pollutant sources. I replied essentially as follows:

1. If properly executed, a survey of the type proposed could be very helpful in determining the remedial steps needed on the part of the City and El Fouledh;

2. Because of the interfacing jurisdictions, several organizations would likely and properly participate in the planning--including: OESQC, AID/Tunis, El Fouledh, City of Menzel Bourguiba, Ministry of Health, and perhaps others;

3. Consideration and/or planning for such survey should be postponed until preliminary training of OESQC staff in sampling, analysis and interpretation techniques has been completed in September 1984.

A survey of the south end of the Lake of Bizerte is now in the early stages of consideration, and may be initiated in 1985 (See page 7).

[1] These were one-day plant visits and not of the intensity of typical present IEDS surveys.

b. Corrective Actions Resulting From IEDS Surveys.

Except for improvements in good housekeeping and maintenance as mentioned for the Beja yeast plant and the Kassarine pulp mill in the First Progress Report, there appear to have been only limited responses to the waste control recommendations in IEDS survey reports. While a desire for corrective action to curb industrial pollution is an inherent element of the OESQC policy, lack of available financing is the paramount impediment to effective forward movement The El Fouledh steel mill is a typical case in point.[1]

c. Prospects for Funding.

A search for funding support has included an approach to the World Bank. In September 1983 Mr. M. M. Mahjoub, then Director of OESQC, visited the Bank to explore financing of projects to control industrial pollution. On August 16, 1984, a follow-up letter of inquiry on the subject was sent to the World Bank by Mr. Tekaya. In September a personal contact with the World Bank environmental unit in Washington, D.C., by Dr. W. Bassow[2] brought forth an informal indication that Tunisian proposals to finance and purchase industrial pollution control equipment will be considered favorably.

As requested, assistance is being given to Mr. Tekaya on strategy, procedures, and format to follow as a means to move forward with a formal proposal for specific projects. Appropriate background documents and directives will be sent direct to OESQC by the Bank upon request of WEC.

With encouraging prospects of financing by the World Bank, the IEDS program now takes on a more visible and far reaching importance. Undoubtedly, the recommendations for corrective actions contained in the survey reports, as well as the reports themselves, will give strong support to Tunisian proposals for financing.

d. Training activities proceeding from IEDS.

Early in the year USAID suggested that visits to appropriate U.S. industries by staff members of Tunisian counterpart industries might be a worthy training exercise and help facilitate pollution control actions.[3] Subsequent discussion of this idea with officials of the El Fouledh steel mill led to a favorable reaction and arrangements for training visits by two members of the staff resulted.

Mr. Rabia Mokhtar, Acting Director of El Fouledh, and Mr. Abderrazak El Mili, Director of Fluids and Energy, spent two weeks in the United States, from September 23 to October 6, 1984, studying waste management practices in

[1] See Second Progress Report, page 2.

[2] President, World Environment Center (WEC), N.Y.

[3] See First Progress Report, page 6 and Second Progress Report, page 5.

the steel industry. They were hosted by Bethlehem Steel in Bethlehem, Pennsylvania, and visited several other companies including Koppers, Calgon and LTV facilities at Aliquippa. They also met with Pennsylvania pollution control officials.

The visitors' reaction to the study tour was notably favorable. This feeling is reflected in a letter of appreciation from Mr. Mokhtar to Dr. Bassow. The sense of the letter is given here as Attachment 1 in free translation to English by Dr. Bassow.

The development of itinerary, arranging visits with U.S. industries, and hosting the visits generally was led by the WEC. The itinerary is attached.[1]

Looking Forward.

a. Training in support of IEDS.

Early in the evolution of the IEDS a flow of communication steps and related actions was foreseen and set down as "Communication Steps for the IEDS Program" (Attachment 1 of the First Progress Report). It is reproduced here as Attachment 3. Experience to date shows these communication steps to be appropriate and workable. Attention is invited to the "(Summary)" in Step 1 which serves an especially important purpose in triggering action toward arranging a survey. Once it reaches the hands of WEC, it is sent to member U.S. industries as the only descriptive information at hand to indicate the existence and nature of a Tunisian industrial waste or hygiene problem. Study by industry of this Summary of Industry Problems clarifies what is needed and helps to identify the most suitable experts to visit the industry in question to carry out an IEDS survey.

Experience has shown that the gathering of information on Tunisian candidate industries and incorporating it into a precise Summary of Industry Problems is an OESQC function that requires improvement. The Summary serves such an important purpose in relation to Step 1 (Developing preliminary assistance plan) of the Communication Steps for the IEDS Program that training help in this area is indicated. It was therefore planned that a U.S. Shortterm Advisor would work with staff of OESQC to provide on-the-job training in information collection, assembly, interpretation, and Summary preparation. One area identified to receive special attention is preparing the statement of what is really needed in a survey. This is found under the heading, "The of assistance desired from International Environment and Development Service WEC, i.e., what are the specific problems to be solved."

This training was scheduled to be provided by U.S. Short Term Advisor, Mr. Allen Cywin, during the period October 15-25, 1984. Industries from which information was to be gathered, assembled, summarized and interpreted for this training exercise are:

[1] Attachment 2.

Les Ciments de Bizerte, Bizerte.
Les Ciments Artificiel Tunisiens, Tunis.
Savomene Africaine, Megrine.
Etablissements Abdelmoula, Den-Den.

Unfortunately, air schedule delays on two successive days made it impossible for the Advisor Cywin to meet the work commitments in Tunis and the trip was cancelled by him. The issue of providing training to OESQC staff in this subject area by a different Advisor or some other means will be newly discussed with Mr. Tekaya during a visit in January 1985.

b. Textile Mills:

Societe des Industries Textiles Reunies, Siter
Bir Kassaa, and
Societe des Industries Textiles Reunies, Sitex
Ksar-Hillal.

On April 27, 1984, a meeting was held in OESQC Offices to discuss problems at the two above cited industries. Present were officials of the company, OESQC, and AID/Tunis. Problems of concern and proposed corrective assistance discussed are stated on page 3 of the Second Progress Report.

During the following weeks, the plan of response was modified to become a more typical on-the-spot IEDS-type survey. Accordingly, R. K. Bishop, Senior Process Engineer, and Mr. Rafael Gonzalez, Marketing Manager, International Group, both of Calgon Corporation of Pittsburgh, Pennsylvania, went to Tunisia at the end of September. During a 5-day on-site visit the effluents from these two plants were evaluated and advice provided. At the Siter plant the principal question related to type of equipment to purchase for treatment and recycle of water. At the Sitex plant focus was on processes to recover indigo dye and water for recycle from producing blue denim for jeans.

c. Cement plants.

Of the six cement plants in Tunisia, all apparently suffer from poorly operating electrostatic precipitators with resultant dust losses. Discussions of this problem with OESQC confirms a joint view that a most beneficial IEDS survey should include two parts. The first part would be a survey in each of two cement plants, one at Bizerte and one at Tunis. The second part would consist of a training course for electrostatic precipitator operators from all six Tunisian cement plants. The course would probably be held at the cement plant in Tunis and would last no more than a couple of days.

It is anticipated that these surveys and the training seminar will take place in early January 1985.

d. Olive oil plants.

The plants at Megrine and Den-Den cited on page 5 are on equal priority with the two cement plants also cited. They also are projected for survey in January 1985, but to attain this schedule, a Summary of Industry Problem must be provided by OESQC as soon as possible.

e. Yeast plant.

In May 1982, L. W. Patterson of Tenneco, Inc., visited the yeast plant at Beja and prepared a brief report including recommendations. This activity initiated the IEDS program in Tunisia. Since the time of that visit, the strong and weak waste streams have been segregated, apparently to facilitate future treatment, but it is not clear that this action was a direct response to the Patterson recommendations. OESQC has expressed a feeling that a greater depth full-scale IEDS survey would be desirable. However, not completely clear is the real nature of the specific problem to be addressed. To seek clarification on this question Mr. Michael Ishismoto visited the plant in July after finishing his survey of the oil refinery at Bizerte. Recommendations resulting from his visit are expected momentarily. If a typical IEDS survey is indicated, it will be incorporated into the new IEDS schedule.

f. New IEDS schedule.

In the light of past activities and changing priorities, adjustment in the IEDS schedule was made on September 19, 1984. Under the adjusted schedule the cement plants at Bizerte and Tunis and the oil processing plants at Megrine and Den-Den are equally at the top of the priority list. It is proposed that every attempt be made to complete IEDS surveys on the four plants by the end of January 1985. It is understood that the order of action as between cement and oil plants will be determined by the availability of industrial experts. I have been advised by Dr. Bassow of WEC that candidate experts knowledgeable in electrostatic precipitator and other cement production problems already have been identified. It appears likely at this time that the cement plants will be surveyed first.

Finding experts among U.S. industry to address the olive oil plant problems may prove difficult. To our knowledge there are no olive pressing plants in the U.S. Perhaps when we know more about the plants and their problems when the Summaries become available, U.S. industries with similar process and problems may yield prospective experts.

It is a mutual view with OESQC that Tunisian industries remaining on the priority list after the cement and oil plant surveys are completed should be examined for the purpose of arranging them in a new priority order. The plants of such concern are the following:

1. Societe des Ciments de Gabes, Gabes. (Cement, clinker production). Electrostatic filters do not work properly. Air pollution.

2. Industries Chimiques Magrebines, Gabes. (Sulfuric acid, phosphoric acid, triple superphosphate, calcium phosphate production). Wash water, acids, sulfur oxides, fluorine, gypsum are problems, as is dust.

3. Societe Industrielle D'Acide Phosphorique et D'Engrais, Sfax. (Sulfuric acid, phosphoric acid, triple superphosphate). Acids, fluorine gas and dust are problems.

4. Penarroya Tunisie, Societe Miniere et Metallurgique de Tunisie, Tunis. (Lead and silver production from ores). Dust and heavy metals housekeeping are problems.

5. Industries Chimique du Fluor, Gabes. (Aluminum fluoride). Hydrofluoric acid, gypsum, calcium fluoride are lost.

6. Resources Tunisie, Gabes. (Monoammonium phosphate). Monoammonium phosphate dust and washwater, phosphoric acid, ammonia are problems.

7. Societe Granuphos, Sfax. (Phosphate fertilizers, ammonium sulfate, potassium chlorate). Problems from dust, combustion gases, ammonia. Water is recycled.

8. Societe Tunisienne D'Engrais Chimiques, Gabes. (Superphosphate). Problems from fluorides, dust, high water temperature.

9. Tanneries Megisseries du Maghreb, Grombalia. (Leather from goat, sheep and cowhides). Waste water should be purified for use in irrigation.

10. Tannerie Moderne de la Manouba, Manouba (Tunis) (Tanning, finishing, specialty leather products. Waste water.

11. Offshore Drilling.

12. Slaughterhouse.

13. Cheese Production.

14. Paints and Inks Production.

Unforeseen actions deriving from IEDS.

a. Lake of Bizerte Study.

As pointed out earlier (page 2), the idea of a survey to determine the remedial steps needed by the El Fouledh steel mill and the City of Menzel Bourguiba to eliminate their pollution contributions to the Lake of Bizerte arose at a meeting on April 30, 1984. Further reflection confirmed the feeling that such a survey would be very valuable not only because of the prospect of resulting pollution abatement but also because it would demonstrate the good that can be accomplished when organizations work together. Based on knowledge then available, the survey envisioned was broadened to give it a regional scope that would encompass the whole lake. To get a better understanding of what this would involve, a reconnaissance survey was made around the lake on September 17, 1984. Present were:

Ms. Deborah Prindle, AID
Mr. Salah Rhaiem, OESQC
Dr. G. F. Lee, AID
Dr. A. F. Bartsch, AID

In summary, observations were the following:

(1) Waterborne wastes from the El Fouledh steel mill enter the lake through at least two outfalls and perhaps also by leaching and seeping from a solid waste dump abutting a wetted area. The most obvious aspect in the lake is a sizable area visibly colored--probably by iron oxide.

(2) Some years ago a modern style secondary sewage treatment plant served the City of Menzel Bourguiba. The plant was reported to have been built by the steel mill to permit using the treated sewage, after sand filtration, as a source of industrial water supply. This practice was terminated some years ago, and today the City's sewage is discharged directly or indirectly to the lake by at least two different routes. It appears that rejuvinating the abandoned plant would be as costly as building a new one.

(3) At the City of Bizerte direct sewage discharges are evident. A survey is not needed to establish what corrective steps are needed. The oil refinery--Societe Tunisienne de Raffinage (STIR)--is understood to discharge directly to the Mediterranean and thus does not directly affect the lake.

(4) Two types of commercial fishery operations are located along the eastern shore of the lake. One is a shellfish farming enterprise that has been in existence for many years. Oysters and mussels are produced in large quantities by the suspended culture technique employed in many parts of the world. It appears to be highly successful here. The company experienced a shellfish mortality about 10 years ago, the cause of which was determined to be an infectious epidemic. The other operation is a more traditional fishery for mullet and several other species of fin fishes. While the annual yield is not known, the number of one and two-man boats seen verifies the economic importance of the fishery.

Apparently no studies have been done to determine if wastes discharged at the south end of the lake reach the fishing grounds or have any effect on the fishery.

(5) Except for a catamaran sail boat leaning against a lakefront building near Menzel Bourguiba, there was no indication of recreational use of the lake.

The knowledge gained from seeing the lake and shore at several points on its perimeter stimulated two conclusions. First, the magnitude of the undertaking and the generally inoffensive quality of the water environment in the northern two-thirds of the lake eliminate a full lake survey from consideration. Second, it would be worthwhile to consider a survey of the south end of the lake, to include examining the impacts of wastes from El Fouledh and the City of Menzel Bourguiba and to determine if pollution from these sources affects the fishery areas to the east and north.

More detailed information and proposals for action in this matter are provided in the trip report (page 13) by U.S. Short Term Advisor, Dr. G. F. Lee.

b. Coastal Region Where Tourist Business Is Important.

Based on the experience to be gained if a survey of the south end of the Lake of Bizerte is undertaken, it would be worthwhile to take a second step and consider a similar survey in a small coastal area that is important in tourist trade. The concept and objectives of such a demonstration survey and the considerations to be used in evaluating prospective candidate sites should be subjects for discussion with OESQC early in 1985.

c. Brochure.

To facilitate informing industry management and goverment officials in Tunisia (and other IEDS-participating countries) about the IEDS program, WEC is preparing a brochure that will soon be available in French. Advice has been provided by the Contractor on the concept and content of the brochure, and help with editing continues.

Element 2. Advise on legislation, regulations and procedures for environmental protection, and assist in establishing a training program for OESQC staff.

a. Air Pollution Law.

The efforts of the GOT toward controlling industrial pollution have concentrated thus far on the water pollution aspect. There has been lesser effort in the air pollution area. Tunisia does not now have codes and regulations for air pollution similar to those for water pollution. AID advice and technical assistance in formulating an air pollution law could be made available if desired.

b. Training.

During the past year several training activities were planned jointly with OESQC. They are given here in summary.

(1) As a follow-on to the provision to OESQC of several pieces of portable analytical equipment, training was provided by a U.S. Short Term Advisor during the period September 10-20, 1984. The training included equipment use and maintenance, sampling techniques, and data interpretation. Site of the training was the El Fouledh steel mill where waste streams and points in the lake were sampled. A more detailed account of this training activity is given in Dr. Lee's trip report.

It is appropriate at this point to look at both a continuing problem that faces OESQC and the apparent confusion concerning the kinds of surveys that are important to environmental pollution detection and measurement. Relationship of the survey steps and kinds of equipment needed to service them should be noted also. Reference is made to comments on this subject

contained in my Final Report (March 25-September 22, 1983) under Contract No. NEB-0300-S-00-3026-00. It is quoted as follows:

"Element VIII. To advise on and expedite the procurement of simple, portable, hand-held instruments for sensing or measuring industrial pollutants.

In consultation with State and EPA practitioners in use of such equipment, the Contractor identified the most reputable instruments of these kinds and brought to Tunisia a proposed list for review with OESQC. As a result of this review, an array of instruments deemed appropriate to the agency's needs for preliminary detection and measurement of industrial pollutants was purchased by AID Tunis.

It is important to understand the role of this equipment in the order of procedures for assessing industrial pollution. As related to the responsibilities of OESQC, the total assessment can be thought of as consisting of several steps: (a) the questionnaire now used to provide the available background information; (b) the use of simple hand-held instruments to sense—and to limited extent—measure the presence of industrial pollutants; (c) as a follow-on to step (b), the use of more sophisticated sampling and analyzing equipment to verify pollutant sources and their relative significance and to measure quantities that are produced and enter the environment; and (d) surveys to evaluate environmental impacts.

Instruments intended to serve step (a) have been purchased by AID/Tunis and most of them have been delivered. They are ready to serve in this function.

A number of the more sophisticated and vastly more costly instruments that can serve the needs of steps (c) and (d) also exist in Tunisia. They are a part of the equipment acquired during the period January 1979--January 1981 when this Contractor served as Principal Advisor under an earlier contract. The following, quoted from the Final Report for Contract No. AID/NE/C-1574, summarizes these purchases by AID Tunis at a cost of about $135,000 U.S.

'Equipment. By January 1979, Laboratoire Central had ordered and received many pieces of equipment destined for use at Gabes. They were the customary items that would be found useful in any laboratory, but especially they were ones pertinent to a laboratory oriented toward the product-evaluation functions characteristic of Laboratoire Central in Tunis. The array of equipment and expendable supplies provided did not include many items vital to a pollution control laboratory. To help address this need, and in keeping with the Project Grant Agreement, AID/Tunis purchased the following pieces of costly analytical equipment:

1 atomic absorption spectrophotometer,
1 gas chromatograph,
1 Technicon autoanalyzer

Some components of this analytical equipment were damaged in shipment and others were overlooked when determining items to be ordered, but by October 1979, the three cited major instruments had been received and installed in the Gabes laboratory. With the help of A U.S. short-term advisor, the gas chromatograph and the autoanalyzer were then made at least partially functional although supplemental components were later ordered to broaden the versatility of both units. In addition, steps were taken to obtain replacements for parts damaged in shipment. As of October 1980, the atomic absorption spectrophotometer was not operational because the laboratory's compressor lacked the capability to supply sufficient volume and pressure for the oil-free and moisture-free air needed. The gas chromatograph apparently has all the components needed to analyze for chlorinated hydrocarbons and hydrocarbons, but the procedures to connect components was not known. Arrangements have since been made for direct telephone communication on this problem between Laboratoire Central and the U.S. manufacturer.'

With the industrial pollution control responsibilities assigned to OESQC, there is no question that it is only a matter of time before access to such equipment will be an important necessity. Because of the high cost of building, equipping, and staffing a pollution control laboratory and bringing it to the point of capable operation, the value of the Gabes laboratory in this context is self-evident."

(2) Prospective training of OESQC staff members in preparation of Summary (statements) of Industry Problems is discussed on page 4. As pointed out, travel difficulties led to postponement of this training, and actions to be taken as a result will be discussed with OESQC in early January 1985.

(3) The training visit by Messrs. Rabia Mokhtar and Abderrazak El Mili, both of the El Fouledh steel company at Bizerte, was carried out as planned.[1]

(4) At conclusion of the IEDS surveys of cement plants at Bizerte and Tunis, a 2- or 3-day training seminar will be offered in Tunis for waste control operators from all Tunisia cement plants. WEC has already identified candidate industrial experts to provide this service, probably in January 1985.

(5) In discussions about training in the U.S. for OESQC agency staff, the following points were established. First, there are presently no training candidates among the staff. Second, further discussion of training plans should await acquisition of additional OESQC staff. In the meantime, OESQC will undertake a training campaign for staff to attain capability in English by May 1985. Third, it was recognized that sending a single person to the U.S. for training, while exceedingly valuable, yields only a single trained person who, in a newly trained status, may leave the agency and be lost as a valuable technical resource. In light of this, it was agreed that provision of training in Tunisia has several attractive features.

[1] See page 3.

These thoughts led to the idea of training seminars from which the entire staff and perhaps others could benefit. It was agreed that such training seminars would be worthwhile and that the first one should address the food industries, which are typical of ones that discharge organic wastes. Specifically, the agenda would include attention to the following:

1. Canning
2. Oils, soaps
3. Dairy, milk, cheese
4. Meat
5. Sugar
6. Yeast

The tone of the seminars should be keyed to industrial and regulatory circumstances as they exist in Tunisia. It is felt strongly by OESQC that there should be little or no discussion on philosophy of pollution control. Emphasis rather should be on the most practical and economical ways to deal with industrial wastes and attendant problems.

Participation of the WEC in these seminars as an adjunct of the IEDS surveys and related functions now appears likely. I will prepare a tentative agenda for the Food Industry Waste seminar for consideration by OESQC and WEC. It is proposed that the first seminar be held in Tunis in late March 1985.

Other Activities.

a. Lake of Tunis.[1]

On September 11, 1984, a meeting was held at the office of the Society for the Promotion of the Lake of Tunis of the Ministry of Equipment to obtain up-to-date information on the management plan. The following persons were present:

Lake of Tunis Office	AID/Tunis
Mr. Hechemi Kennau, Director	Ms. Deborah Prindle
Mr. Habib Ghali	Dr. A. F. Bartsch
	Dr. G. F. Lee
	Mr. Mohamed Ali Hassairi

The plan of action has largely solidified since earlier meetings. The lake restoration plan itself consists of four main elements. These are:

Step 1. To stop discharges of municipal waste waters into the Lake. This has been accomplished.

Step 2. To remove high nutrient bearing sludge by dredging from the northwest end of the lake where sewage entered for many years.

[1] See also First Progress Report, April 20-May 6, 1984, page 7.

Step 3. Improve circulation through the lake by construction of a partial north-south dike through the middle area and installation of pumps at the west end of the T.G.M. causeway to accelerate water movement into South Lake.

Step 4. In this step the shoreline will be redone to make it smooth and the adjacent onshore land suitable for development.

On September 13, 1984, it was stated in Le Temps that a contractor had been selected, presumably to carry out steps 2, 3 and 4 of the three-step program cited above. It is understood that to satisfy the contract, the phosphorus level attained in the lake must not exceed 1.5 times that in the Gulf of Tunis. Failure to satisfy this requirement will result in a penalty of 10% of the contract cost.

On September 18 a guided inspection trip was made on the Lake of Tunis by:

Lake of Tunis Office	AID/Tunis
Mr. Habib Ghali	Ms. Deborah Prindle Dr. A. F. Bartsch Dr. G. F. Lee

Observations on the Lake facilitated a better understanding of the lake restoration program. There are two conditions to be noted in the Lake which will strongly impede the Lake of Tunis becoming an attractive place for recreational activities, especially boating. One is the shallow depth, averaging about one meter; the other is the vast distribution of tubeworm coral that almost reaches the water's surface at many points.

In discussions with Messrs. Kennau and Ghali, Short-Term Advisor, Dr. G. F. Lee, has indicated the importance of using OECD[1] Eutrophication Modeling to develop the most cost-effective management plan for the Lake of Tunis. In his trip report he discusses this matter in detail (page 11) and offers suggestions for support for AID consideration.

Recommendations

1. The IEDS program has now existed in Tunisia since May 1982 and has passed through the experience and maturation of eight surveys. Growing pains have been experienced in several facets of the program. It is now an appropriate time for, and it is recommended that, an IEDS program review meeting be held in Tunis in January 1985.

2. An industrial waste-water pollution survey of the sources of pollution and their impacts in the south end of the Lake of Bizerte would have two-fold value: to eliminate damaging pollution from a valuable resource, and

[1] Organization for Economic Cooperation and Development, Paris.

to demonstrate how things get done when organizations work together. It is recommended that AID/Tunis respond favorably if a request for assistance with a Lake of Bizerte survey is received from GOT.

3. If OESQC is to effectively carry out the function of controlling industrial pollution in Tunisia, it must have either a properly equipped laboratory or a priority claim on technically sound servicing from some existing GOT laboratory. It is recommended that steps be taken without delay to make such analytical capability available.

4. Toward the objective of providing orientation and training on industrial waste problems and control needs typical of Tunisia, and to reach as many OESQC staff and others as possible, it is recommended that OESQC, AID and IEDS jointly plan and conduct a training seminar on the Food Industries with a target date of late March 1985.

5. OECD Eutrophication Modeling procedures are a well known and valuable scientific tool capable of forecasting Lake of Tunis response to the restoration plan and to guide future management activities. It is therefore recommended that AID/Tunis respond favorably to a GOT request (if received) for technical assistance and staff training in use of these procedures.

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October 18, 1984

Dr. Whitman Bassow
President
WORLD ENVIRONMENT CENTER
605 Third Avenue - 17th Floor
New York, NY 10158

Dear Sir:

On returning to Tunisia, I want to thank you on behalf of Mr. El Mili and myself for the excellent program you prepared in the field of pollution control.

This visit will undoubtedly encourage us to preserve the environment in which our factory operates in accord with the means available to us at the present as we wait for a national program to treat the overall problems.

I would like to take advantage of this occasion to inform you how useful and agreeable our visit was thanks to the attention and dedication of Mr. Robert McMullen and Mr. Charles Brush, of Bethlehem Steel and Koppers respectively.

From what we have seen, I am convinced that the American experience in the field of pollution control is first rate and that the World Environment Center can play a leading role for the transfer of this experience.

Hoping that the relations between our two organizations will be strengthened, please accept, dear Mr. Bassow, our best wishes.

Sincerely,

M. Robei
Deputy Director-General

cc: Rana Harmon, U.S. AID
Dr. A.F. Bartsch
Dr. John Tessieri, Technical Advisory Board, IEDS

WORLD ENVIRONMENT CENTER

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ITINERARY

United States Study Tour

Date	Arrive	Contact Person
Sunday, September 23	JFK Airport - Air France #017 Arrival - 12:25 pm	Nancy Bruno (World Environment Center) 605 Third Avenue - 17th Floor New York, NY 10158 (212) 986-7200 (office) (516) 922-7220/7221 (home)
Sunday, September 23	Depart JFK via U.S. Air #1174Y at 3:20 pm, arrive Allentown/Bethlehem Airport at 4:05 pm	Robert McMullen Manager, Environmental Technologies Bethlehem International Engineering Corp. 701 East Third Street Bethlehem, PA 18016 (215) 694-6487 (office) (215) 865-5788 (home)
Monday, September 24	Visit to Bethlehem Steel	
Tuesday, September 25	Morning - Meeting with plant and corporate personnel Afternoon - Visit to Pennsylvania Department of Environmental Resources	
Wednesday, September 26	Morning - Visit Bethlehem plant in Steelton, Pennsylvania Afternoon - Visit to Lebanon, Pennsylvania plant	

Attachment 2

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ITINERARY

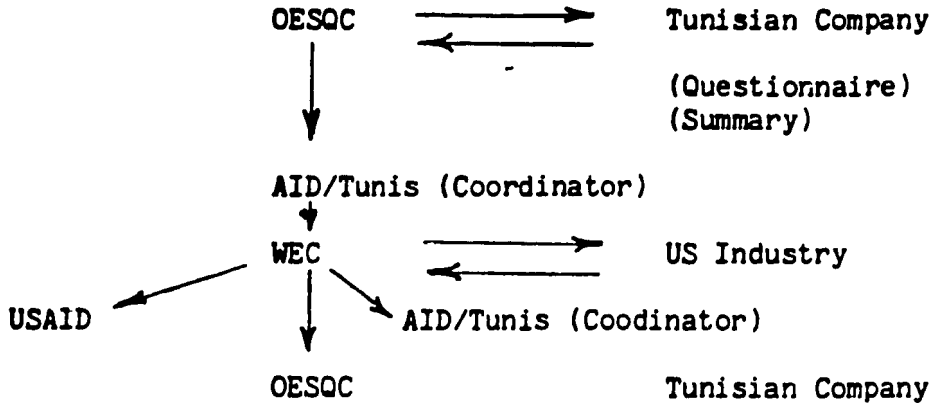
Date	Arrive	Contact Person
Thursday, September 27	Meeting with Bethlehem personnel. Evaluation of visit.	
Thursday, September 27	Depart Bethlehem 5:15 pm, arrive Washington DC (National Airport) at 5:59 pm via Freedom Air #500Y	
Friday, September 28	Washington, DC	Saida Zouiten (800) 368-5623 or (202) 966-3500
Saturday, September 29	Washington, DC	
Sunday, September 30	Depart Washington, DC at 1 pm, arrive Pittsburgh, Pennsylvania 1:50 pm via U.S. Air #45Y	Charles Brush Manager, Environmental Planning & Regulatory Analysis Koppers Company, Inc. Koppers Bldg. Rm. 1201 Pittsburgh, PA 15219 (412) 227-2877 (office) (412) 561-8517 (home)
Monday, October 1	7:30 am - breakfast with Charles Brush at hotel. 9 am - Visit Regional Health Dept.- Bureau for Air Pollution Control. Topics: Air Pollution Monitoring Techniques and Environmental Inspection Procedures of the U.S. Government. Lunch - Hosted by Koppers. Held at the Health Department. Afternoon - Tour of Pittsburgh, sponsored by University of Pittsburgh - International Visitors Bureau. Arrangements have been	

ITINERARY

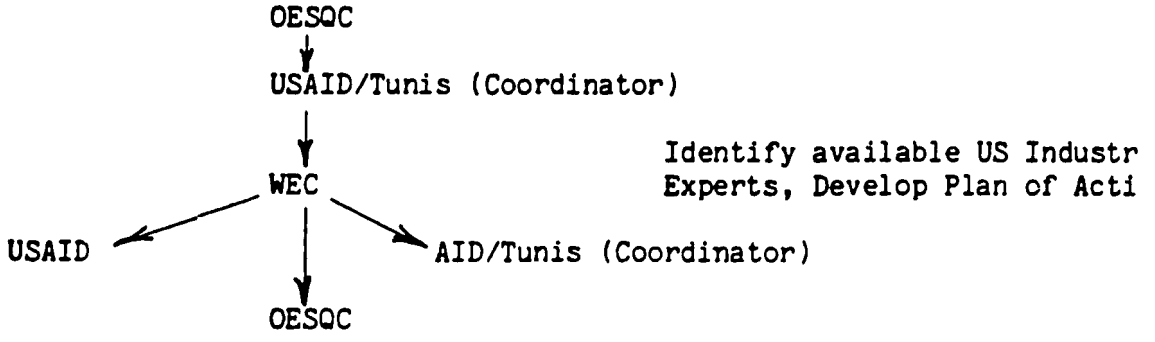
Date	Arrive	Contact Person
Monday, October 1 (con't.)	made for French-speaking guide.	"
	Dinner	
Tuesday, October 2	Morning - Visit to Raymond-Kaiser Engineering Company	"
	Afternoon - Visit to Kauffman's Department Store. Guided by the Executive Buyer.	"
Wednesday, October 3	Visit to Calgon Corp. Topics: Water and Waste Water Management.	"
Thursday, October 4	Visit to U.S. Steel	"
Thursday, October 4	Depart Pittsburgh 5:05 pm, arrive LaGuardia Airport (New York) 6:12 pm via U.S. Air #470Y	Dr. Whitman Bassow 605 Third Avenue - 17th Floor New York, NY 10158 (212) 986-7200 (212) 876-0265
Friday, October 5	Meeting: World Environment Center	"
Saturday, October 6	Depart for Tunisia	

Communication Steps for the IEDS Program

Step 1 - Developing preliminary assistance plan.



Step 2 - Formal Letter Request for Assistance.

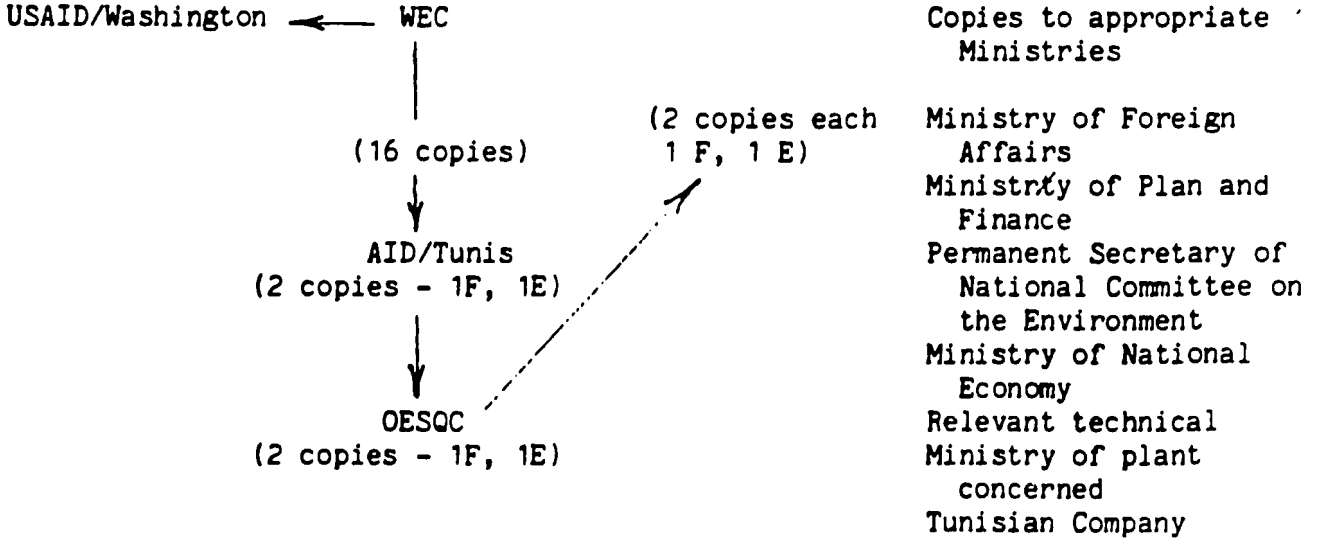


STEP 3 - Assistance (plant survey) provided in Tunisia.

Step 4 - Pre-departure Seminar, attendance by:

Tunisian Company, OESQC, AID/Tunis

Step 5 - Report on Assistance (Plant Survey) Provided



Step 6 - Follow up and action by the Tunisian Company and/or GOT.