First Progress Report to

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

SCIENCE AND TECHNOLOGY DEVELOPMENT PROJECT

POLLUTION RESEARCH

Visit to Tunisia - March 25 - April 11, 1983

A. F. Bartsch

Contract No. NEB-0300-S-00-3026-00

Tunisia

Introduction

This progress report is submitted in keeping with Article I.C., of Contract No. NEB-0300-S-00-3026-00.

With reference to the specified Scope of Work, the Contractor has addressed several of the listed work elements, as well as others not mentioned--the latter identified as Elements VIII and IX below--while in Tunisia from March 27 to April 9, 1983.

The Scope of Work stated in the contract follows:

The Contractor shall work with personnel of the Government of Tunisia Directorate of Environment, Standards and Quality Control[1], Ministry of National Economy, to review:

1. existing data on industrial pollution in Tunisia (Element I),
2. existing regulations for control of industrial pollution (Element II),
3. the plans and priorities of the Government of Tunisia for future control of industrial pollution and development of regulations and enforcement programs (Element III).

The Contractor shall also advise the Office of Environment on legislation, regulations and policies for environmental protection to aid in the choice of practical procedures for the national campaign against industrial pollution (Element IV), advise and assist on establishment of a pollution control reference library (Element V), and advise on establishment of a program of practical training in the U.S. for personnel of the Office of Environment (Element VI).

The Contractor is expected to discuss and agree with the GOT and USAID/Tunis on a schedule for subsequent visits (Element VII).

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

Provide scientific guidance in connection with planned commercial ports at Cape Serrat and Zarzis (Element IX).

Under terms of the contract, the Contractor works primarily with the Tunisian industrial pollution control agency. The OESQC reports to the Tunisian Ministry of National Economy. Its duties and responsibilities are the following:

- Develop the legislation pertaining to industrial pollution and ensure its enforcement
- Promote specific studies and participate in pollution control related meetings
- Publish memoranda and annals related to those studies and meetings

[1] In this report referred to as: Office of Environment, Standards and Quality Control = OESQC

- Ensure the updating and enforcement of the legislation relative to the classified industrial plants

- Develop the legislation relative to industrial standards and ensure its enforcement

- Ensure the creation of quality control laboratories within the industrial plants

- Carry out punctual control of the quality of industrial products

- Participate in international meetings on standards, quality control and weights and measures

- Manage the personnel which are appropriated to it.

The Department of Environment, Standards and Quality Control is divided into two divisions:

1. The Division of the Environment : Includes three offices.

(a) The Office of Classified Establishments which is in charge of the legislation related to the classified industrial plants and its enforcement.

(b) The Office of Safety in charge of:

- ensuring the enforcement of the legislation related to hazardous industrial equipment

(c) The Office of the Environment and pollution control in charge of the following:

- developing the legislation related to industrial pollution and ensuring its enforement,

- centralizing, using, or disseminating all information related to industrial pollution,

- initiating, promoting, and coordinating studies related to the programs or projects which seek the control of industrial pollution,

- reviewing the requests for industrial agreements, i.e., locating and the impact on the environment, and

- ensuring the development of the industrial zones.

2. The Division of Industrial Standards : Includes two offices.

(a) The Office of Standards is in charge of the following:

- establishing the set of laws related to industrial standards and ensuring their enforcement,

- encouraging and coordinating the initiative and taking the necessary action to establish standards, in collaboration with the organization which is either specialized or interested in the subject matter.

(b) The Office of Quality Control is in charge of the following:

- establishing the set of laws dealing with control of manufacturing and ensuring their enforcement,

- ensuring the creation of offices which are in charge of quality control within the industrial plants and establishing a file for each industrial unit.

In the format followed in this First Progress Report, each Work Element will be discussed in the same order as given in the contract.

Element I. Review of Existing Data on Industrial Pollution in Tunisia.

At present, the GOT Office of Environment, Standards, and Quality Control (OESQC) is collecting data on Tunisian industries through use of multi-page questionnaires. When fully executed, the questionnaires provide, in considerable detail pertinent information on given industries, their products, raw materials, processes, wastes and waste disposal. This information will serve as the basis for a preliminary inventory of the country's industrial waste production, potential industrial hygiene problems and environmental pollution. Generally, the questionnaire forms are sent directly to the companies with a request to provide the indicated information and return them. This procedure has resulted in an impressive percentage response from the companies. The executed form for Societe Tunisianne De Levure is attached as an example (Attach. I).

To facilitate consolidation and review of existing industrial data and also to serve the purposes of the International Environment and Development Service program (IEDS) of the World Environment Center (WEC) (see Item III, page 5), a format for a "Summary of Industry Problems" was developed jointly with OESQC (Attach II). This Summary is discussed further in Element III.

Element II. Review Existing Regulations for Control of Industrial Pollution.

This work Element and Element IV are so closely related that they are discussed together at this point.

In January 1980, a U.S. Short-Term Advisor with long and varied experience in environmental pollution and its control in the U.S.[1] looked

[1]Professor Gerard A. Rohlich

at the problems, programs and laws as they then existed in Tunisia. Since that time, the GOT has taken new steps to deal with environmental pollution and appears to be moving forward with a new enthusiasm and strength. Nevertheless, the Summary and Recommendations in the Advisor's report (copy in USAID/Tunis files) may still be of some interest today as one piece of background information from which new efforts under Element II may be launched.

" SUMMARY AND RECOMMENDATIONS

The Tunisian Government has undertaken an active program directed to the improvement of the environment by establishing environmental divisions within each ministry and expanding the facilities of the Laboratoire Centrale at Gabes. The principal thrust of the program thus far has been in the control of water pollution and several laws have been enacted or are proposed for such control. As yet specific legislation for air pollution control has not been enacted.

The rapid increase in industrial development and concentration of population and industry has intensified pollution problems particularly in the larger urban areas. To keep pace with these problems it will be necessary to expand the present program by increasing the number of technically trained personnel for the successful implementation of the water and air pollution control program.

In the present legislation for water pollution control there is a division of responsibility amongst the several ministries concerned with problems in this area. A National Commission on the Environment has been established to coordinate the efforts of the various ministries and is in the early stages of its deliberations.

There are a number of studies and reports and considerable data on water quality and water pollution pertaining particularly to the Coastal Zone and the Lake of Tunis. There is need for additional monitoring and surveillance of the ambient water and air quality as well as from point sources of pollution.

Governors and their representatives in the various states visited expressed genuine interest in control of environmental quality.

Recommendations

It is recommended that:

1) The National Commission on the Environment be the principal body responsible for developing and proposing policy, regulations, and procedures for implementation of air, water, and land pollution control programs to insure that such policies, regulations, and procedures are consistent.

2) Legislation be developed for air pollution control. Suggestions

for such legislation are provided in a subsequent section of this report.

3) A Water Pollution Control Board be established with authority to make final decisions with regard to water quality criteria and standards and effluent limitations. The Board should consist of from five to nine members perhaps chosen from the membership of the National Commission on the Environment.

4) A central data bank be established for compilation of data presently available in the various ministries and agencies pertaining to water quantity and quality. Uniform reporting forms and procedures should be developed. A similar data bank should be established for air quality data.

5) Water quality standards be established for different regions of the country considering the local political, economic and social factors.

6) A continuing program on a regular basis be established for training and upgrading technical and professional personnel engaged in environmental quality programs."

The review of existing regulations contemplated under this element of work will be accomplished largely with the help of a U.S. Short-Term Advisor who is especially experienced and skilled in this area of environmental protection. The advisor will also provide in-depth counsel for two other areas in which a need was expressed by OESQC: (1) how to proceed more effectively in Tunisia's pollution control efforts in the light of the day-to-day managerial procedures, principles and practices that have been used and found effective for industrial waste pollution control; and (2) the philosophy, procedures, and required technical basis for promulgating and establishing standards and criteria of quality to protect the environment. While obviously, the basic circumstances for efforts to protect the environment are not necessarily the same in Tunisia and the U.S., the technical and procedural principles are sufficiently similar to offer promise of success in this approach.

The Contractor will prepare a Scope of Work concerning the anticipated activities stated above so that contract negotiations with the candidate[1] can begin during the first week of June 1983. It is planned that the U.S. Short-Term Advisor will perform these services in Tunis during the period August 22 through September 5, 1983.

Element III. Review Plans and Priorities of GOT for Future Control of Industrial Pollution.

This work area is a broad and continually evolving one. So far, the main thrust by the Contractor has been in actions supporting the International Environment and Development Service (IEDS) program of the World Environment Center (WEC).

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[1] Mr. Donald Dubois, former EPA Regional Administrator, Region X, Seattle, WA.

1. About the World Environment Center[1]:

"The Center's INTERNATIONAL ENVIRONMENT & DEVELOPMENT SERVICE makes the technical skills of the private sector available to developing countries to solve their environmental problems. The new five-year program will be funded equally by the U.S. Agency for International Development and U.S. industry which will provide staff time and services. The project will send highly qualified experts--without charge--to eligible Third World countries requesting such assistance. The experts will diagnose site-specific problems and recommend remedial action.

"Eight corporations--mainly members of International Environment Forum--have already agreed to participate in the service: Dow Chemical Co., EG&G Inc., General Mills, Koppers Co., Tenneco Inc., Texaco, 3M Co., and Utah International. Other corporations are expected to (and already have (AFB)) join(ed) them.

"Tunisia is the first country to request such assistance. The service will eventually expand to other countries in the Near East and other geographic regions."

2. Pilot Program.

Two test projects have already been completed in Tunisia. The first consisted of one-day inspections at two industries--Societe Tunisienne de Levure, Beja, and Societe Nationale Tunisienne de Cellulose, Kasserine. The second project was a more comprehensive survey at El Fouledh, Societe Tunisienne de Siderurgique, at Menzel Bourguiba.

L. W. Patterson, manager of Environmental Affairs, Engineering for Tenneco Inc., made the surveys at the Beja yeast plant and the caustic-chlorine plant at the Kasserine paper mill and submitted a separate report on each. These activities can certainly be viewed as a successful first effort. The observations reported from the study at the yeast plant have led to a conclusion by OESQC that a full scale IEDS study should be carried out to identify the corrective actions needed and the relative costs of available alternatives. Plans for such a full scale survey are now being discussed by OESQC, AID, and IEDS looking toward action in Tunisia within the next two or three months.

After translation to French, the Patterson report on the paper mill problem was made available to officials of appropriate GOT offices and to the plant manager. Toward late July 1982, the Ministry of National Economy directed the plant manager to take appropriate action in responding to the recommendations in the report by: (1) correcting the reported mercury pollution problem as a stop-gap measure; and (2) then changing the chlorine-generating process to one not involving mercury to attain a permanent solution. It is possible that further help from IEDS will be requested as planning for the process changes moves forward.

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[1]Quoted from, World Environment Center - Report on Activities (no date).

In the second test project, E. F. Harchelroad, Staff Engineer and M. G. Morris, Manager of Air Quality Engineering at Koppers Company, Inc., surveyed the EL FOULEDH steel plant at Menzel Bourguiba during the period October 26 through October 28, 1982. Their very instructive and thorough report was transmitted to OESQC on December 30, 1982. Inquiry on April 4, 1983, as to actions taken in response to the report revealed that neither GOT nor company action apparently had yet been taken. It was learned further that the steel plant manager was slowly working his way through the report with the help of an English/French dictionary.

Perhaps here is the place to emphasize that valuable reports such as these, that obviously represent a great investment of talent, time, and dollars, must be offered in French as rapidly as possible if they are to reach a wide target audience in the GOT and industry. Only then can they stimulate timely and effective action. Translation to French should be looked upon as a normal cost in each IEDS project budget. This matter has been discussed with Dr. Whitman Bassow, President of WEC, and plans are underway to assure early translation as new reports are generated.

3. Industry Priorities.

A June 1982 listing of companies selected by the GOT for "Priority Consideration in Pollution Control" identified 23 companies or industry categories listed in order of priority for surveys or other action. The first three are the following:

a. Societe Tunisienne de Levure , Beja (yeast from sugar products). Phosphoric acid and air pollution are problems and there is a need to clean up for reuse of the wastewater in irrigation.

b. Societe Nationale Tunisienne de Cellulose , Kassarine (paper products from alpha grass). Sodium-hydroxide wastes in black liquor, and mercury from electrolysis plant are causing problems. there is a desire to reuse the water for Eucalyptus tree irrigation.

c. El Fouledh, Societe Tunisienne de Siderurgique , Menzel Bourguiba. The plant produces steel from Tunisian and Moroccan ores and scrap. Problems are caused by air pollution from the blast furnace and power plant. Gases from burning coke are to be recycled; dust is a problem.

As stated earlier, these three plants now have been entered into the GOT ongoing program for industrial pollution control and have vacated the top priority positions in the list.

In discussions with OESQC during the period March 28 through April 8, 1983, the earlier priority listing was reconsidered and revised in the light of presently available information. The next five priority industries for which IEDS projects are now contemplated for action during the period ending in June 1984 are as follows:

a. Oil Production Industry . The Elf Aquitaine facility, located in the Ashtart field in the Gulf of Gabes 75 kms southeast of Sfax, has been in production since 1974. Another offshore rig is located at Tazarka, and five or six others apparently are planned. The Elf Aquitaine site was visited on April 7, 1983, in company with Ms. Saida Zouiten of USAID and Mr. Bouraoui Dormoul of OESQC. We were impressed by the professionalism shown by the managerial staff, by the obvious good housekeeping and maintenance of the facility, and the concern shown for environmental protection.

While this facility appeared to be operating well, we heard industry opinions that there is need for a set of uniform Tunisian standards to regulate the disposal of polluting wastes from all on-shore and off-shore drilling and production operations. Such standards do not now exist but, when once established, would place all petroleum companies on an understood equal footing. Here is an area in which IEDS could provide a valuable service to GOT and industry by giving technical guidance in the development of such standards. .his question and possible participation by IEDS in a related project will be discussed with OESQC in June 1983.

b. Petroleum Refinery (Societe Tunisienne des Industries de Raffinage), Bizerte.

c. Phosphate Mine , Redeyef. At this site, phosphate ore is upgraded for shipping. Reject piles from the process are so situated that wind-blown dust is believed to cause health problems among local inhabitants.

When this problem was discussed with Dr. Bassow of WEC after my return from Tunisia, the idea evolved that IEDS might more advantageously send a team of two experts to carry out a survey, not only at the Redeyef mine, but also at an appropriate phosphate processing plant at either Gabes or Sfax. The timeliness in broadening the project scope to include the processing plant is to take advantage of the expertise of an industry consultant, Mr. John Cladakis of AMAX Inc. He could be available for seven to ten days perhaps only in mid-June. He is especially knowledgeable in both phosphate mining and processing. To proceed with this project will require timely collection of questionnaire data and preparation of a "Summary of Industry Problems" for both the mine and the processing plant so that they can be transmitted by USAID/Tunis to WEC as soon as possible.

d. Steam-Electric Power Plants at: La Goulette, Sousse, Galeca, and Rades.

e. Textile Industry - probably: Societe des Industries Reunies (Dyeing, printing, finishing cloth), Bir Kassaa, and Societe des Industries Rounies (Spinning mill), Ksar Hillal.

A "Summary of Industry Problems" will be prepared for each of the industries listed from a-e above as a step toward initiating the planning for corresponding IEDS projects.

4. Communications.

The IEDS program combines the participation of several organizational entities, including OESQC, Tunisian companies, USAID/Tunis, USAID/Washington, WEC New York, U.S. industries and perhaps others. Distance and language certainly will affect the ease and speed with which IEDS business can be carried on. To minimize these impediments, a preliminary communications scheme has been developed jointly with OESQC. The scheme contemplates six steps of activity from the inception of a project idea to the end of a project, including report distribution and follow-up:

Step 1. Developing a preliminary IEDS plan.

Step 2. OESQC formal letter request for IEDS assistance.

Step 3. IEDS assistance provided in Tunisia.

Step 4. Pre-departure seminar in Tunisia attended by representatives of Tunisian company, OESQC and USAID/Tunis.

Step 5. Report prepared by U.S. industry experts provided in both French and English.

Step 6. Follow up and action by Tunisian company and/or GOT.

The communication actions to be taken at each step are summarized in Attachment III and are self-explanatory. Preliminary agreement with the scheme has so far been given by OESQC, USAID/Tunis, USAID/Washington, and WEC. Very likely, adjustments in communications will be made as program experience indicates desirable.

Element IV. The Contractor shall also advise the Office of Environment on legislation, regulations and policies for environmental protection to aid in the choice of practical procedures for the national campaign against industrial pollution.

Element IV is discussed jointly with Element II (see page 3).

Element V. Advise and assist on establishment of a pollution control reference library.

In keeping with discussions of this subject with OESQC, the Contractor has proposed, and with agreement of OESQC, is taking the following actions:

1. Prepare a list of the 10-12 most up-to-date, useful text books that cover the following major subjects:

Principles of Environmental Pollution Control.

Clean processes for industry.

Air pollution and its control.

Water pollution and its control.

Solid wastes and their control.

Industrial air pollutants.

Industrial water pollutants.

Industrial solid wastes.

Survey techniques for airborne wastes.

Survey techniques for waterborne wastes.

This list will be reviewed with OESCO during the first week in June 1983. If approved, immediate procurement steps will be taken by USAID/Tunis.

2. The need in OESOC for publications by U.S. industry that relate to industrial wastes, waste handling, treatment and pollution prevention and control was discussed with Dr. Bassow of WEC. At the moment it appears likely that at least some industry reports of this kind will be made available to both OESOC and Tunisian industries as a functional element of the IEDS.

3. U.S. Environmental Protection Agency.

Every two months the EPA issues an ORD (Office of Research and Development) Publications Announcement. It describes its function and the publications as follows:

"The Environmental Protection Agency's Office of Research and Development announces the availability of printed publications on a wide range of environmental topics. As a part of EPA's efforts to make available better information for environmental decision making, we are offering the following types of publications at no charge.

" Project Summaries are short synopses of key findings of project reports. These reports present the results of recently completed research, development and engineering work. The summaries convey the essence of a project in terms comprehensible to the technical community at large. The complete reports are available only from the National Technical Information Service.

" Research Summaries are issue- or problem-oriented summaries of EPA's research activities in a particular area. They include distilled

descriptions of all of our major research projects which address the subject of the booklet.

" Decision Series documents are carefully crafted to address major environmental issues and concerns. They present a concise and clear statement of the scientific facts as known to major experts in the research community. These documents are aimed at decision makers involved in the formulation of environmental research policies.

" Program Summaries and Plans go into significantly more programmatic detail than the above-mentioned reports and are intended to convey both the substance and the organizational structure of the research program. They are designed to satisfy those whose interest in our program requires a greater level of detail.

"The ORD Publications Announcement is published quarterly to provide interested parties with access to the broad range of currently available documents produced by the Office of Research and Development. It will be mailed upon request to individuals who may wish to order this material. Orders are filled until the supply of a particular report is exhausted.

"The following pages list titles of publications that are available in each category: Project Summaries are subdivided by subject area. Publications announced for the first time are displayed in bold type. To order any publication, circle the corresponding order number on the order form at the back of this Announcement and return the entire back page, with your mailing label attached, to:

ORD Publications
P.O. Box 14249B
Cincinnati, OH 45214

Allow four weeks for delivery."

Arrangements are being made to have copies of the Announcement sent routinely to OESOC at the following address:

Direction De L'Environnement, Normalisation et Controle Qualite

Ministere De L'Economie Nationale
La Kasbah

Tunis, Tunisia

Once copies of the Publication Announcement are received routinely, it will be possible for staff of OESOC to be aware of new U.S. research findings and to order desired publications directly. In the meantime, the Contractor will bring select sample publications to OESOC in June 1983.

4. Efforts are underway to obtain from the National Academy of Science and from the National Bureau of Standards available publications

that relate to the areas of interest and responsibility of OESOC.

ELEMENT VI. Advise on establishment of a program of practical training in the U.S. for personnel of the Office of the Environment.

Tentative plans have been developed jointly with OESOC for training of three staff members. The following Preliminary Drafts, that are used as first steps in the planning process, summarize the scope of training contemplated:

Mr. Mohamed Mouldi Mahjoub , Director, OESOC

Period of Training: three weeks, August 1-22, 1983

Scope: The principal thrust of this training will be to seek benefit from the operating experiences in the United States as its laws, organizations and programs to deal with environmental pollution were put into place. At least some of this experience will be applicable to the challenges and problems that face Tunisia as it goes forward with its own pollution control activities. Visits with selected officials in EPA and state regulatory agencies will give opportunities to explore these subjects with professionals who deal with them on a daily basis.

In addition, orientation visits to the U.S. National Bureau of Standards will facilitate a basis for continued communication and interplay of value to the activities of the (Tunisian) Office of Standards and Control.

Mrs. Nessima Rejeibi , Specialist, Chemical and Petroleum Industries, OESOC

Period of Training: Six weeks, September 17 - October 28, 1983

Scope: Trainee will participate in the first two weeks of a course, "International Waste Water Systems and Operations Maintenance and Management," offered by Layton Associates International Inc., of Neosho, Missouri. Specific subjects to be covered are the following:

Week 1

"Orientation to Municipal Wastewater Treatment" (5-day course)
- Characteristics of Municipal Wastewaters
- Objectives of Wastewater Treatment
- Purpose and Principles of Unit Processes
- Design Factors
- O&M Considerations
- Essentials of Performance Testing
- Analytical Methodologies
- Plant Staffing and Laboratory Considerations

Week 2

Course work and site visits concerning biological wastewater treatment including:

- Aerated - Non-Aerated Lagoons
- Trickling Filters
- Rotating Biological Contactors
- Activated Sludge Plants
- Oxidation Ditches
- Advanced Wastewater Treatment Systems
  - Coagulation
  - Mixed-Media Filtration
  - Disinfection with Ozone and Ultra-Violet Light

Trainee will then undertake "on-the-job" type orientation and training related to wastes production, handling and environmental problems within the oil production, refining, petrochemical and associated industries. This part of the training program will take place at selected plants that will best reflect problems and solutions most germane to the petroleum industry in Tunisia, i.e., onland and offshore drilling and pumping, and refining operations similar to those in the Societe Tunisienne d'Industrie de Raffinage at Bizerte. The final selection of host industries and the specific itinerary will be developed jointly with the help of the World Environment Center. In addition, trainee will meet with appropriate EPA officials to learn about oil spill contingency plans, actions and experiences.

This part of the training will cover a four week period at locations to be selected.

Mr. Bouraoui Darmoul , Deputy Director, OESOC

Period of Training: Six weeks, September 17 - October 28, 1983

Scope: Trainee will attend a six-week course, "International Wastewater Systems and Operations Maintenance and Management," offered by Layton Associates International Inc., of Neosho, Missiouri. For the first two weeks the course includes classroom orientation to municipal wastewater treatment and site visits to several plants. The following three weeks include attendance at the 56th Annual International Water Pollution Control Federation Meeting in Atlanta, Georgia, a short course in treatment plant trouble shooting, and visits to sites of waste recovery and land disposal. The last week of the course, covering a variety of subject matter, will be modified to include visits to appropriate EPA laboratories and offices to learn about water quality criteria and standards.

Whether Mr. Darmoul and Mrs. Rejaibi will be able to follow the training programs in the timeframe outlined will depend upon a budgetary

question not yet resolved. The question is this--although funds are available in the current (U.S.) Fiscal Year budget to cover the pertinent training costs, these funds cannot be carried forward to cover costs incurred after September 30, 1983, unless a special permissive ruling is made. Such ruling has not yet been made (as of April 22, 1983). If the funds cannot in fact be "carried over," training plans will be adjusted so that training is completed before the end of the Fiscal Year.

Element VII. The Contractor is expected to discuss and agree with the GOT and USAID/Tunis on a schedule of subsequent visits.

Two visits, agreed to by the principals shown above, will be made before the end of the U.S. Fiscal Year 1983:

June 3-12, 1983,
September 9-19, 1983.

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

The Contractor, in consultation with State and USEPA practitioners, will identify the most reputable instruments of these kinds and will bring to Tunisia in June 1983 a proposed list for review with OESOC and purchasing action by USAID/Tunis.

Element IX. Planned commercial ports at Cape Serrat and at Zarzis.

GOT is planning the construction of two major deep water commercial ports to serve the growing industrial development of the country. One port is to be located on the north coast at a site to the west of Bizerte at Cape Serrat. The other will be located south of the Island of Djerba at Zarzis. Scientific assistance and input will be provided to the GOT in formulating the final wording of a Request for Technical Proposal (RFTP) that will be used to move forward with environmental impact studies at these two sites. Scientific editing of a draft proposal will be completed during June 1983, and the RFTP will be issued in the U.S. probably in December. It is now planned that responding proposals will be evaluated and a successful candidate selected in March 1984. Technical assistance will be provided to the GOT in connection with this latter phase of the project also.

Work under Element IX will be authorized by a separate and specific contract.

Attachment I

ENQUETE POLLUTION

I - **ORGANISME :**

om et raison Sociale : SOCIETE TUNISIENNE DE LEVURE

Localisation : - GOUVERNORAT DE BEJA - VILLE DE BEJA - Route de Tabarka

Branche d'activité : - INDUSTRIE ALIMENTAIRE

- Nombre d'emplois (par catégorie)

	Techniques	Administrati
A) Permanents :		
- Manoeuvre	22	3
- Ouvriers	21	8
- Cadres moyens	5	4
- Cadres supérieurs	2	1
B) Stagiaires :	4	
C) Occasionnels	6	
D) Apprentis :	1	
	61	16
		77

PROCEDE DE FABRICATION

La fabrication de levure de Boulangerie se fait en plusieurs étapes dont les principales sont : La préparation du milieu propre à la culture de la levure, la culture de la levure proprement dite, la séparation et le stockage, la filtration le conditionnement et le stockage de la levure produite.

I - PREPARATION DU MILIEU DE CULTURE :

Cette opération consiste à préparer des solutions nutritives destinées à alimenter la levure et lui permettre de se reproduire dans les meilleures conditions possibles de développement.

Il s'agit principalement de préparer et traiter (dilution, acidification, stérilisation et décontation) un moût de mélasse et de préparer des solutions d'éléments azotés et phosphatés, ainsi que de très faible quantité d'oligo-éléments.

Ces éléments sont soit ajoutés en une seule fois (début du cycle) soit ajouter suivant un dosage horaire établi à l'avance (fin du cycle)

II - CULTURE DE LA LEVURE ET SEPARATION :

Le procèdé de fabrication de la levure préconisé par la S.T.L est un procèdé classique de fabrication de levure sans alcool.

S'agissant de culture industrielle la production se fait en phases successives qui consistent à ensemencer une certaine quantité de levure dans un milieu nutritif approprié et de suivre son développement et sa multiplication jusqu'à épuisement du milieu et obtention de quantité de plus en plus grande. Ces différentes opérations se font dans des fermentateurs dont la dimension est fonction de la quantité de levure introduite et à produire.

A l'issue des dernières phases de culture la levure produite est séparée du milieu de culture dans lequel elle s'est développé par centrifugation sur des apparels centrifuges. Au cours de cette opération, la levure est levés à l'eau, refroidit pui stockée dans des cuves à basse température. La levure ainsi stockée se trouve en suspension dans l'eau à une concentration de 60 à 70%

Quant au milieu de culture restant, appelé également moût délevuré, il est canalisé vers un besoin à l'extérieur de l'usine.

III - FILTRATION EMPAQUETAGE :

La levure en suspension dans l'eau destinée à être commercialisée, stockée à basse température est ensuite filtrée sur un filtre à tambour rotatif pour être déshydratée puis conditionnée et stockée de nouveau dans un chambre froide à basse température prête à la commercialisation.

2.2 Matières premières et additifs utilisés dans la fabrication :

Nature et composition	Quantité / an (en kg)
1 - Extrait de malt	875
2 - Fécule de pomme de terre	40.000
3 - Sel	50.000
4 - Sulfate de magnesium	8.500
5 - Soude caustique	3.000
6 - Phosphate trisodique	0,500
7 - Formaline	700
8 - Ammoniaq	220.000
9 - Urée alimentaire	30.000
10 - Huile anti-mousse A	500
11 - Huile anti-mousse B	1.000
12 - Emulgateur J 600	1.000
13 - Mélasse de betteraves	5200.000
14 - Biotine	625 gr
15 - Acide sulfurique	55.000
16 - Phosphate monoammoniaque	70.000

2.3 Combustible utilisé :

Nature	Quantité / an
Fuel leger [illegible]	220 T,000 3000 Kl / h

2.4 - Produits semi-finis :

Nature	Quantité / an
NEANT	

2.5 Produits finis :

Nature	Quantité / an
Levure fraiche de boulangerie (Production année : 1980	2700 T / an

2.6 Consommation en eau et source d'approvisionnement

Source	m3/ jour	M3 / an	M3/unité de produit fini
SONEDE	400 -700 m3	185000 m3	60 - 70 m^3/t)

5. **Eaux industrielles** :

La levurerie rejette essentiellement des matières liquides.

Depuis son démarrage jusqu'en 1977 l'ensemble des eaux résiduaires de la levurerie étaient collectées ensemble et stockées dans un bassin de retenue pour être ensuite répandues sur champ. En effet, la S.T.L a pratiqué l'épondage sur champ de ses eaux résiduaires. Elle disposait à cet effet d'une superficie de 20 ha. Des essais de culture ont été pratiqué.

Depuis 1977 le terrain destiné à l'épandage a été repris et aménagé en zone industrielle. Les eaux de la Levurerie ont alors été évacué dans une canalisation déversant dans l'oued Bessim. La quantité d'eau ainsi rejetée était de l'ordre de 450 à 650 m^3/j.

L'analyse de ce le eau totale avait donnée les résultats suivants :

DBO_5	=	3010	mg/l	PH	= 5,5
Phosphate	=	1	"	Résidu sec à 500°c	= 1352 mg/l
Azote total	=	0,92	"	Température	= 17 - 22° c
Résidu sec	=	076	"		
Matière en suspension		15.	"		

Depuis cette date, la S.T.L a procédé à la classification des eaux résiduaires des différentes section de la levurerie.

C'est ainsi que deux catégories ont été dégagées :

1) Eaux fortement chargées :

a) Résidu des cuiseurs : 2 à 3 m^3/j

b) Eaux de séparation : 200 - 300 m^3 / j

2) Eaux de lavage autre que celles des séparateurs et eaux de refroidissement

150 - 250 m^3

C'est ainsi que l'analyse des eaux fortements chargées a donnée les résultats suivants :

DBO_5	=	14400 mg/l
Phosphate	=	Néant
Azote	=	4,23 mg/l
Résidu sec	=	12976 mg/l
Matière en suspension		466 mg/l
Résidu sec à 500°c	=	5624 mg/l
PH	=	4 - 5
Température	=	20 - 30° c

Une troisième classification des eaux sera mise en place. Elle aura pour but de séparer en deux catégories les eaux issues des séparateurs.

Cette classification nouvelle des eaux de la levurerie donnera la répartition suivante :

1) Eaux très fortement chargées

a) Eaux des cuiseurs : 2-3 m3/j

b) Eaux du 1er séparateur : 70 - 80 m3

2) Eaux restantes très faiblement chargées : 350 à 450 m3

Des travaux sont en cours en vue de collecter ces eaux chargées en réseau séparé.

20

5) **Investissement :**

Pour pratiquer l'épandage des eaux résiduaires de la levurerie il a été procédé en 197[illegible] à l'acquisition
montant de : 13000 D000

et la construction d'un bassin de retenue dont le montant a été de 3.000,000 D

La Société Tunisienne de Levure ne dispose pas d'installation de traitement des eaux résiduaires proprement dite puisqu[illegible] elle a opté pour la pratique de l'épandage.

Des prospections ont été entreprises en vue de résoudre cette question notamment auprès de Scandia Consult pour l'étude et la firme SULZER en Suisse. Le manque de moyen financier n'ont pas permis à la Société Tunisienne de Levure de faire face à ces projets.

SUMMARY OF INDUSTRY PROBLEMS

Office of Environment, Standards and Quality Control - GOT

Tunisian Industries - International Environment & Development Service - WEC

Name of Tunisian Company.

Location.

Products:

Kinds

Quantities produced/day or /year

Raw Materials Used:

Kinds (include water)

Quantities/day or /year

Process(es): (Summarize).

Sources of Wastes:

Waterborne -

Origin

Characteristics

Quantity

Treatment and final disposal

Problems caused by these wastes

Airborne -

Origin

Characteristics

Quantity

Treatment and final disposal

Problems caused by these wastes

Solid Wastes -

Origin

Characteristics

Quantity

Treatment and final disposal

Problems caused by these wastes

Existing industrial hygiene (in plant) or environmental pollution problems; describe specifically but briefly.

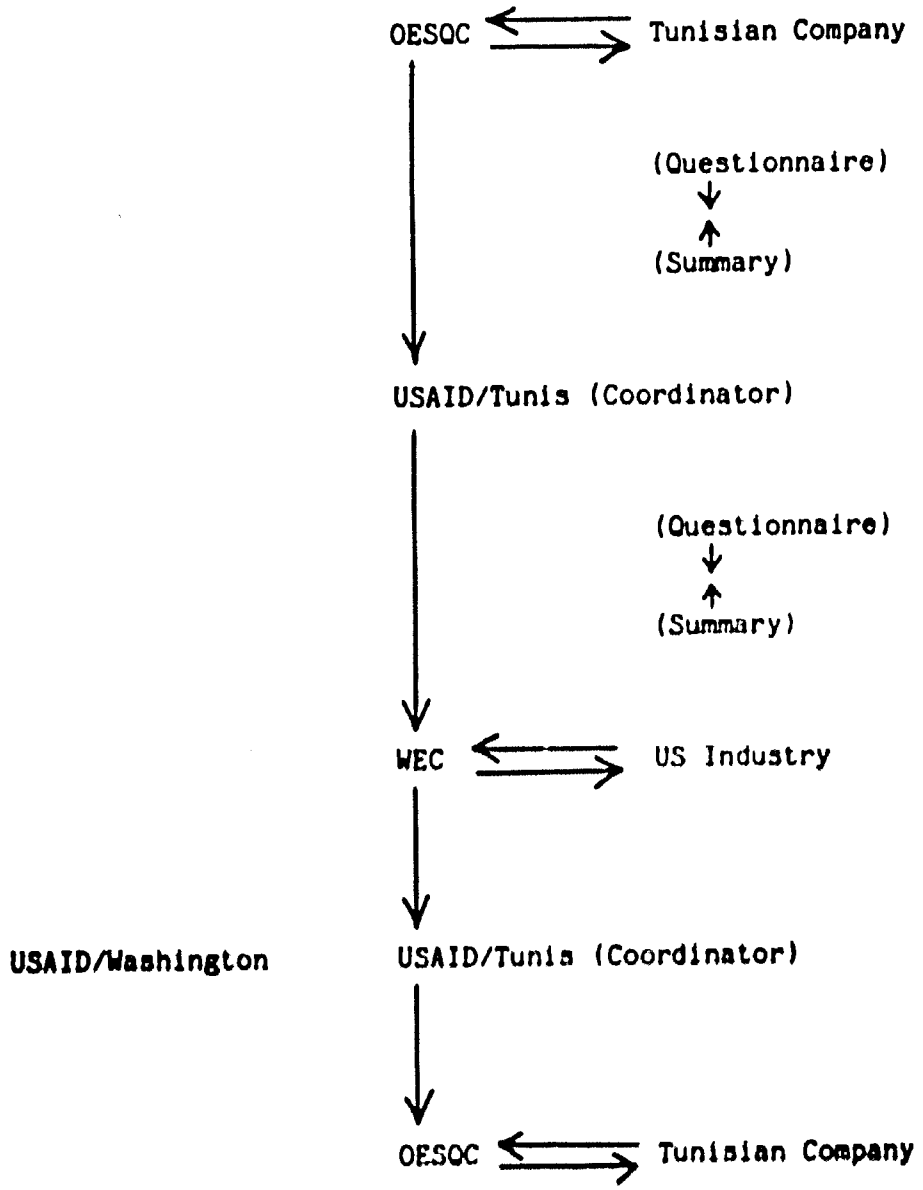
Corrective actions already taken by the Company.

Type of assistance desired from International Environment & Development Service - WEC., i.e., specific problems to be solved.

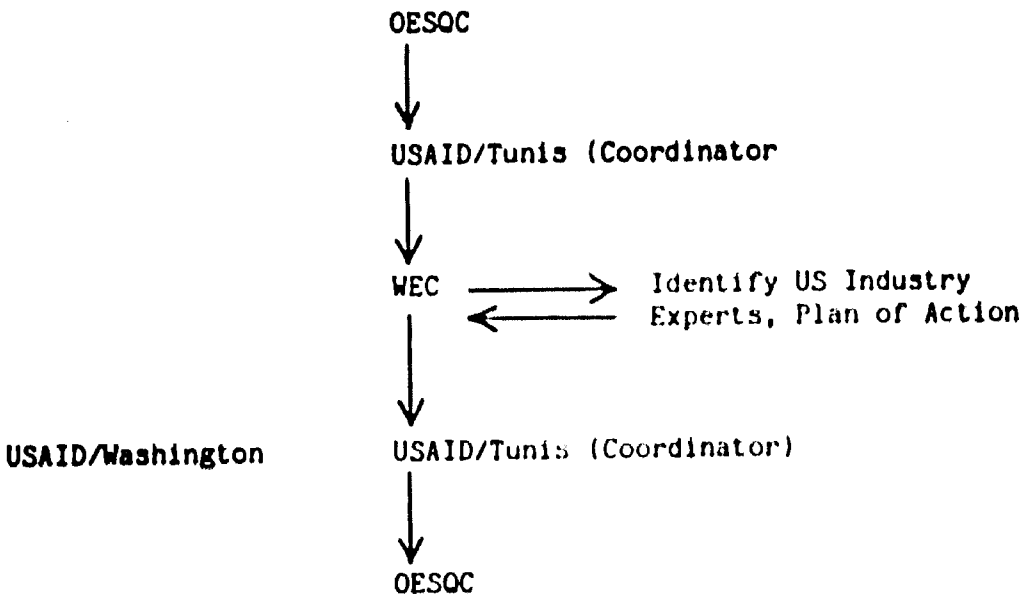
Time when assistance is desired.

DRAFT COMMUNICATION FOR TUNISIA - AID - WEC PROGRAM

<u>Step 1</u> - Developing preliminary service plan.



Step 2 - Formal Letter Request for Service.



Step 3 - Service Performed in Tunisia.

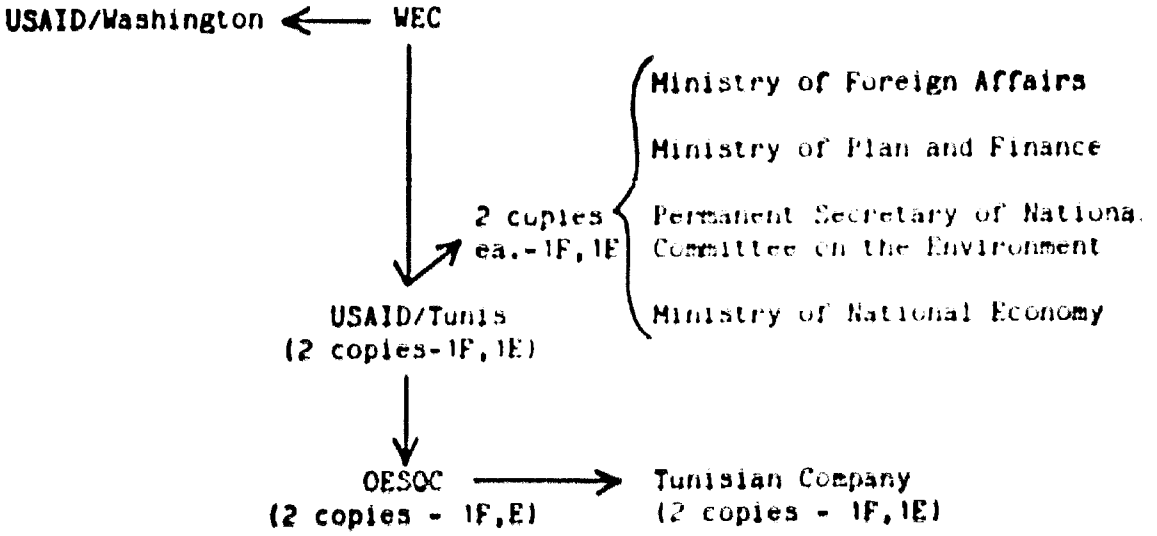
Step 4 - Pre-departure Seminar, attendance by:

Company

OESQC

USAID/Tunis

Step 5 - Report on Service Provided.



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