

PJ FAC 979

Final Report to
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
SCIENCE AND TECHNOLOGY DEVELOPMENT PROJECT
POLLUTION RESEARCH

January 1979 - January 1981

A. F. Bartsch
Contract No. AID/NE/C-1574
Tunisia

Introduction

This final report is submitted in keeping with Article I.D.3 of Contract No. AID/NE/C-1574 Tunisia, which specifies that it (the report) "shall summarize the Contractor's activities, and services provided, make recommendations for the Laboratoire Central, and provide recommendations and preliminary design of follow-up action suggested after the two-year period."

Project Number 5, Pollution Research, one of several that constitute AID Project No. 664-0300, is described in the Project Grant Agreement as follows:

"In order to obtain precise information on which to base policies, procedures, and regulations to combat the threat of pollution from industry, which is already significant, the Laboratoire Central plans to create a model pollution control laboratory in its new branch in the industrial center of Gabes. A.I.D. will provide up to 16 man months of services of short-term advisors; up to 24 man months of short-term training in the U.S. for Tunisian technologists; and some specialized equipment, within the limits of the attached budget.

"The Laboratoire Central will furnish the laboratory building, basic equipment and supplies; salaries of four engineers, of two lab assistants and of non-technical personnel travel to and from the U.S. for Tunisian trainees; and transportation within Tunisia for U.S. consultants."

In addition to actions in support of the Project by A.I.D./Tunis staff prior to date of the above-cited contract, a visit to Tunisia by U.S. short-term advisor, Francis M. Middleton, from April 21 to May 5, 1978, resulted in several significant recommendations related to: conduct of the Project, training for key laboratory staff from Gabes, equipment to be acquired, literature needed, and initial programs to consider. As a response, preliminary steps were taken by A.I.D./Tunis to purchase several items of equipment, and to assemble biographic data for four prospective trainee candidates. Concurrently, construction of the laboratory building at Gabes by GOT had moved forward so that interior finishing was approaching completion in early January 1979. Equipment items of wide variety, purchased by the government of Tunisia, were placed in storage at Laboratoire Central, Tunis, awaiting shipment to Gabes. In summary, this was the status of the Project when the Contractor arrived in Tunis in early January 1979 for the first of five visits in support of the Project.

The precise historical background leading to establishment of the Project is not clear and does not appear well-documented in the Agency files. In any event, sometime after the Stockholm Conference in 1972 the Ministry of Industry, Mines and Energy¹ initiated construction of the Gabes laboratory to be an annex of the Laboratoire Central in Tunis. This action predates the establishment of Project Number 5 as described in the Project Grant Agreement. Among the actions to be taken by A.I.D., as represented by the efforts of the

¹Now the Ministry of National Economy.

Principal Advisor (Contractor), were the following:

1. assisting the Laboratoire Central annex at Gabes, hereafter referred to as the Gabes laboratory, in becoming effectively prepared to take on the functions of identifying and measuring sources of pollution, especially from industry, and evaluating their impacts on the environment. Specific actions toward reaching these goals included:

a. advising on selection and purchase of specialized equipment, its upkeep and repair;

b. advising on training needs both in-country and in the U.S. for the Tunisian engineers assigned to the laboratory;

c. advising on acquisition of books and journals for a pollution library;

d. assisting in organization (of) information and data exchange with relevant U.S. and international agencies, e.g., Environmental Protection Agency (EPA), Foreign Agricultural Organization (FAO), etc.

e. assisting the laboratory in defining its tasks, e.g., making a survey of Tunisian pollutants, particularly from industry, designing, scheduling, and managing laboratory projects, settling (sic) environmental standards, establishing effective cooperation with government agencies, industry, and the public;

f. assisting the Laboratoire (sic) Central in the organization of its pollution research laboratory;

2. assisting, when requested by the GOT in setting environmental standards, establishing effective cooperation with government agencies, industry, and the public, in developing economically feasible regulations, laws, policies and procedures for the control of pollution;

3. assisting the laboratory in short- and long-term planning for the expansion of laboratory activities, and the creation of new pollution laboratories in other cities;

Toward these objectives, the Principal Advisor visited Tunisia five times during the periods shown and reported the principal activities and issues in Progress Reports 1 through 4:

Trip 1 - January 7 - February 27, 1979,

Trip 2 - October 3 - November 15, 1979,

Trip 3 - January 4 - February 8, 1980,

Trip 4 - April 11 - May 2, 1980,

Trip 5 - October 25 - November 16, 1980.

This report is no more than a brief summary for the total period for which more detailed coverage of events may be found in the Progress Reports cited. They are available for examination in offices of A.I.D./Tunis.

The principal actions taken in support of the Project both within Tunisia and at home in the U.S. between trips fall into three main discussion topics-- getting the Gabes laboratory operational, participating in the planning, arrangements and execution of a seminar on "The Prevention and Control of Pollution in Industrial Zones," and focussing on the pollution status in the country and the related Tunisian laws and organizations.

The Gabes laboratory -- making it operational

This topic embraces cited items 1, a-f given above. By January 1979, the building to house the Gabes laboratory had been constructed and needed only some interior finishing and the correction of a few structural deficiencies to make it ready for use. Now, twenty-two months later, the laboratory still is not effectively functional. It cannot, by itself, conduct meaningful industrial waste surveys to identify and determine mass discharges of air and water pollutants, or carry out field studies to assess the impacts on the environment and public health. In my judgment, the impediments that held back proper function and attainment of a reasonable target capability as a laboratory involve a number of causes that relate in varying degrees to equipment, books, staffing, training, program execution, and leadership and organization. Each will be dealt with in summary fashion.

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, A.I.D./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.

It was agreed that Laboratoire Central would purchase the remaining equipment identified to be needed for the specified array of pollution-related analyses, including one organic carbon/total carbon analyzer and the equipment needed for sampling air- and waterborne wastes emanating from industrial sources. The carbon analyzer had not been purchased as of November 1, 1980.

So far as concerns the pollutant sampling equipment, following is a brief history of events. In February 1979, it was understood that Laboratoire Central would purchase all equipment for sampling both air- and waterborne wastes. Assurances were given that purchasing would proceed without delay. Largely to avoid repeated and continuing program delays, by January 1980, since no action had been taken, it was agreed that A.I.D./Tunis would purchase selected air sampling equipment while Laboratoire Central would do the same for a minimal array for sampling waterborne wastes. Toward this objective, information on models, vendors, prices and numbers needed was provided by letter in March 1980 for suitable samplers. Although the air sampling equipment was ordered soon enough and was available for the demonstration survey at Gabes in October 1980, delays of various kinds prevented the waterborne waste sampling equipment from reaching Gabes in time. Today the laboratory is equipped with a minimal array of air- and waterborne waste samplers. Some experience has been gained by Gabes laboratory staff, but there has been neither training nor experience with the water equipment.

The physical plant still has some of the same deficiencies cited in earlier reports more than a year ago--even dangerous ones that are simple to correct. Even now Laboratoire Central has not met all of its equipment purchase responsibilities or has done so with such delays that effective program execution has not been possible.

Books. A number of publications vital to the functions of the Gabes laboratory were purchased by A.I.D./Tunis. Numerous other publications covering many environmental pollution subjects were obtained at no Project cost. In March 1979, contacts were made with information officers of several U.S. agencies to request that pertinent publications be sent to Tunisia for inclusion in the library of the Gabes laboratory. Telephone or personal contact was made with the directors of all 15 EPA research laboratories describing the need and requesting that pertinent publications be provided. It has been estimated that about 1000 pounds of reports and other publications have been received. Most of them have been transferred to the Gabes laboratory. It is understood that lists of publications available from these EPA sources will be sent forward routinely in the future.

5

It is my experience that an activity such as this is not self-perpetuating. The flow of information will dry up if the Gabes laboratory does not establish its own continuing communication with these sources. To date, this has not been done.

My Second Progress Report, for the period October 3 - November 15, 1979, presented a comprehensive list of "Suggested Books for Laboratoire Central at Gabes." In each subject category, the publications were given a priority number. Priority 1 included books and journals that are almost indispensable to a laboratory of this kind; Priority 2 were ones that would be used with some frequency; and Priority 3 were those that would be worthwhile additions but perhaps not used with great frequency. To my knowledge, not a single book has been ordered during the year since the list became available.

Staffing. Staffing the laboratory has been a continuous struggle from the outset. At least in part, this appears to derive from the following factors: (a) reluctance of Laboratoire Central Tunis staff to move to Gabes because of the less attractive living conditions there, the limited freedom to exercise work initiative under the tight day-to-day control from Tunis, and the lack of some inducement for moving in the form of increased salary and reimbursement for moving costs; (b) the practical necessity to recruit in the limited personnel market in Gabes; and (c) the lack of training or experience with environmental pollution problems in Tunisia. The highlights of staffing follow.

In February 1979, Laboratoire Central and A.I.D./Tunis concluded documentary arrangements to accommodate special environmental training in the U.S. for four Tunisian engineers. It seemed quite clear at the time that they were to be the "four engineers" mentioned in the Project Grant Agreement and would become the vanguard of the Gabes laboratory staff (see First Progress Report). Today, none of the four are stationed or working as real members of the Gabes staff--in a sense, the value of the specialized training has been thrown away so far as the Project and Tunisia are concerned. This matter is discussed more fully in the Second Progress Report.

On November 9, 1979, Mr. Bouhalila and I discussed at some length the staffing needed to make the Gabes laboratory an acceptably functional institution. He requested that I provide recommendations on the size and qualifications needed for the projected laboratory program. My recommendations, contained in a letter of the same date (Attachment 1), have been given only a token response so that today the laboratory has only a skeletal staff that is woefully inadequate. While there may be seven or eight people at Gabes, only two are technically trained--Rachid Gannouchi and Mohsen Berkhaïs. Other persons sometimes come from Tunis to work for short periods. Among them are some of the four sent to the U.S. for training, but they are briefly there only when there is a special need. Consequently, the visitors' work week is only four days long after allowing for travel time, and they are not, by any standard of judgment, real members of the Gabes laboratory staff. It is unthinkable that the Gabes laboratory can ever move forward as a truly functioning facility as long as this staffing problem continues.

6

Short-term advisors working at Gabes in October 1980 were especially impressed by the two staff members mentioned above. Early in 1980, Mr. Berkhais went to the United States to attend training courses in sampling technology for gaseous and particulate emissions from industrial plants. These courses, sponsored by the U.S. Environmental Protection Agency in North Carolina, were followed by special training in Ohio. It is apparent that Mr. Berkhais was a successful student and derived great benefit from the training experience.

Mr. Gannouchi has been identified as a most probable candidate to receive special training in sampling technics for waterborne wastes. Because Laboratoire Central purchased flow recorders and water samplers from the Manning Company of California, operations and maintenance training in their use is available at their factory at no charge. The status of plans for Mr. Gannouchi or an alternate to take advantage of this training is not known to me, but appeared unclear at the end of October 1980. It is important that this training be accomplished as soon as possible so that the laboratory will have the beginnings of a capability to measure and sample waterborne industrial waste flows as it now does for airborne emissions.

Training. The following members of the Laboratoire Central staff were sent to the U.S. for training:

Mohamed Ben Othman	Tunis
Salah Turki	"
Mohamed Belgacem	"
Moncef Haddad	"
Ridha Bouhalila	"
Mohsen Berkhais	Gabes

Program Execution. During my first visit to Tunisia early in 1979, Mr. Bouhalila and I jointly developed a framework of activities, goals and time schedule for the Project. The framework included seven items for action, but the ones identified as Phases I, II, and III¹ in Attachment 2 represent the work elements we designed to launch the Gabes laboratory into the field of industrial pollution detection and assessment. They were purposely designed to serve as a strong training experience, beginning at an elementary level and increasing in complexity with each succeeding step.

The purpose of Work Step A was to assemble all available information related to industrial and other pollutants entering the environment in the vicinity of Gabes. The assembled information was to serve as a basis for the design of Step B. For no obvious reason the work was initiated four months late, missed the completion deadline and largely failed as a training experience.

The most important element of Work Step B is the industrial waste survey of the ICM plant at Gabes to serve as the first of a series. The principal objective was to identify, measure and sample actual waste emissions at their sources. Samples of such wastes were to be analyzed to identify and measure

¹ Hereafter referred to as Work Steps A, B, and C to avoid confusion with the Project's budgeting Phases I and II.

components that may be significant pollutants. Work Steps A and B were to help provide a basis to establish a baseline of pollutant discharge conditions in the Gabes area at the present time.

Work Step B was first attempted in October 1979 and was aborted for lack of equipment, preparation and personnel. In the months that followed, efforts continued toward the goal of reaching a state of preparedness that the ICM survey could move forward. My Third Progress Report, for January 4 - February 8, 1980, sets forth on page 3 the actions needed to be taken by Laboratoire Central in preparing for Work Step B. It is quoted as follows:

"Because of the past slippages in inaugurating activities at the Gabes laboratory and in keeping pace with program activities delineated in the First Progress Report, a realistic view on ways to now capture a needed momentum includes the following recommended steps:

(1) Complete the staffing of the laboratory in keeping with Mr. Bouhalila's letter of January 31, 1980, letter (Attachment 1).

(2) Assure that all laboratory deficiencies cited in the Second Progress Report are corrected.

(3) Continue with plans for Mr. Gannouchi to attend training courses in the United States on air and/or waterborne waste sampling technology. If possible, air sample training should be immediately preceded or following by training in the use and maintenance of waterborne waste sampling equipment.¹

(4) Get all analytical equipment into operation and gain experience and proficiency in using it. This includes:²

(a) Make-up and standardization of solutions required for use with all analytical instruments, including the gas chromatograph, atomic absorption spectrophotometer (AA) and Technicon. This is estimated to require no less than one month of effort.

(b) Repeated familiarization analyses of Gabes drinking water using gas chromatograph, AA, and Technicon.

(c) Analysis of samples from available streams and the sea. These samples should be collected in glass and kept refrigerated. Analyze repeatedly to ascertain degree of reproducibility of the analytical results.

(d) Analysis of industrial wastes. These wastes can be sampled where they flow from ICM to the sea. All analyses within the capability of the equipment should be done. Prepare milli-equivalent balances (i.e. cations = anions) for each sample analyzed.

¹

Manning offers such training at no cost at its Santa Cruz, California, location.

²The following schedule was developed jointly with Short-Term Advisor No. 1 (Mr. Krawczyk).

8

(e) Manual analyses--at least for alkalinity, pH, conductivity, and dissolved oxygen.

(f) Analyses for total organic carbon and inorganic carbon.

(5) Prepare specific plans and schedules for the first industrial waste in-plant survey to be carried out at Gabes in September 1980. Guidance on this activity will be provided by Mr. Krawczyk, Mr. Darvin, Short-Term Advisor No. 4 (a specialist in waterborne waste sampling), and by me.

In early September, the first real investigative activities will begin at the Gabes laboratory. The inaugural action will consist of the first full scale within-plant waste sampling campaign and mass balance analysis. The ICM plant at Gabes has been selected for this first effort. This action, however, will be possible and effective only if the following critical elements are brought together:

(1) Air and water sampling and flow measuring equipment available and ready for use;

(2) The equipment specified to be purchased by Laboratoire Central is on hand;

(3) Practiced analytical capability at Gabes and on-the-spot help of Short-Term Advisor No. 1 during the course of this first in-plant survey.

(4) Assistance of Short-Term Advisor No. 2 to complement the training in gaseous and particulate pollutants received by Mr. Berkhaïs in the United States and to give advisory leadership during the in-plant survey;

(5) Assistance of Short-Term Advisor No. 4 to complement the training proposed for Mr. Gannouchi in waterborne waste sampling technics to be taken in late July or early August, and to give advisory leadership during the in-plant survey;

(6) Cooperation of ICM.

By the end of April 1980, there was little indication that Laboratoire Central was moving vigorously to prepare for the survey. As a result, on April 28, 1980, a meeting was held in offices of the Ministry of Foreign Affairs to examine reasons for the Project's delays and other problems, and to move toward a new agenda and schedule for the completion of Phase I. The following persons attended:



Mr. Ali Jerad	:	Ministry of Foreign Affairs
Ms. Zeinouba Khomsi	:	
Dr. A. F. Bartsch	:	Pollution Research Sub-project Principal Advisor
Mr. W. F. Gelabert	:	USAID Mission Director
Ms. Saida Zouiten	:	Science & Technology Office, AID
Mr. R. Rizgui	:	Deputy Director, Division of Environment, Ministry of National Economy
Mr. R. Bouhaïla	:	Central Laboratory
Mr. M. Ben Othman	:	Central Laboratory
Mr. M. Fatnassi	:	Central Laboratory
Mr. S. Turki	:	Central Laboratory

The resulting revised program is stated in an April 29, 1980, letter to Mr. Djerad (Attachment 3). I considered this new effort to be an opportunity for Laboratoire Central to show if it could retrieve the Project and keep it going. Unfortunately, simply postponing program actions for another of several times has not produced a more effective effort.

The ICM survey was aborted in October 1979 for lack of preparation even after two U.S. short-term advisors had arrived in Gabes thinking all preparations were in order. Again, scheduled according to the revised program for October 1980, the survey fell far short of successfully serving its intended purposes--again for lack of Tunisian preparation. Of the requirements and preparations for a successful survey as cited above, essentially none were followed, but in particular:

The laboratory staff available for the Work Step B survey was drastically inadequate and fell far short of the skill mix and numbers recommended in my staffing letter of November 9, 1979 (Attachment 1). To aggravate the staff even more, some persons at the laboratory appeared to have nothing to do while some others (not including Berkhaï and Gannouchi) disappeared for hours at a time leaving the short-term advisors to fend for themselves.

The laboratory Chief not only did not participate in the survey--and he thus lost the potential benefit from this as a training exercise--but also did not appear at Gabes at any time during the survey period. The short-term advisors uniformly had the impression that no one was in authority, no one cared, there was no leadership and the staff was no more than an unrelated group of people and not an enthusiastic team unified for a common goal. These issues are expressed in their Trip Reports filed in the offices of A.I.D./Tunis.

In spite of the fact that the survey was to be a major laboratory campaign for which obviously there was costly layout for equipment and advisor salaries and travel, processing samples collected at Sfax seemed to have first priority. As a result, U.S. short-term advisor Krawczyk, provided with no help after an aide resigned, found himself doing about 75% of the analytical work for the survey. The only possible person to derive benefit from the experience was Krawczyk himself.

It seemed evident that no prior arrangements for survey cooperation and help from ICM had been made in spite of my emphasizing repeatedly that this is a crucial need. As a result, of the three sampling holes required for air sampling--one in each of the plant's three exhaust stacks--only one became available and then only toward the end of the survey.

While the survey did generate some valuable information, it largely failed in its most important goal of providing a rounded experience and capability for understanding this most fundamental area of activity needed for an emerging environmental pollution control program and laboratory function. In addition, the shakedown of complex equipment such as the gas chromatograph, atomic absorption spectrophotometer, and autoanalyzer and learning to get the most out of them still remain to be accomplished. This should be a continuing effort. But it can never be done if the equipment is looked at only when U.S. short-term advisors are on the scene.

Work Step C was to be an assessment of the environmental impacts of the pollutants discharged in the Gabes area. It was to be based on all the information gathered in Work Steps A and B augmented by a guided program of environmental sampling. Step C will require skills, equipment and leadership that are not now available, and contemplating this new effort at any time in the near future obviously is premature.

Leadership and Organization. In establishing a new laboratory (or any similar institution), it is a customary and desirable staffing procedure to first appoint the Director, Chief, Leader, or whatever such person may be called. Such early appointment opens the way for the Chief to establish a lead role not only in staffing but in many other important functions--including equipping, program planning and budgeting, and in many ways giving life to the new endeavor. These actions, in fact, ideally are taken before the laboratory building is constructed. As long ago as January 1979, I pointed out the great advantages that would follow from such appointment. At Gabes this procedure was not followed and in fact a laboratory Chief was not appointed until January 1980.

Both of the U.S. short-term advisors who came to Gabes for the October 1980 industrial waste survey--one to give guidance in air sampling and the other in water sampling--commented in their reports¹ on the lack of effective leadership in the laboratory. They expressed concern for the apparent lack of staff motivation, lack of useful guidance from above coupled with restricted freedom to proceed at their own discretion with day-to-day tasks. That these problems existed should not be a surprise. They simply reflect, first, the apparent lack of motivation on the part of Laboratoire Central to move with enthusiasm and strength in environmental matters, and, second, the futility to attempt operating the Gabes laboratory with an absentee Chief who lives a day's travel distance away in Tunis. The failure of this arrangement became most obvious when the designated laboratory Chief failed to visit Gabes during the month-long October 1980 survey which brought three short-term advisors from the United States. Why this occurred was never clarified.

¹W. Yake. Trip Report. October 1980.

C. Darwin. Trip Report. October 1980.

No attempt was made to discuss organization for the Gabes laboratory because: (a) the mix of total activities including environmental pollution and more traditional Laboratoire Central functions was not delineated; (b) staffing was delayed for so long a time; and (c) there was no Chief to take the lead in organization.

The Seminar - "The Prevention and Control of Pollution in Industrial Zones"

On several occasions early in 1980, Mr. Bouhalifa and I discussed plans for Laboratoire Central to hold a conference on environmental pollution. Many options were examined so far as concern goals, subject coverage, time, place, and audience. It was felt that the principal goal was to provide new and broadened information and viewpoints on environmental pollution and its control to high level members of government, industry, and education.

The seminar was held at Gabes on November 11-14, 1980. Except for the opening session, the attendance varied between 45 and 60--many of the attendees being students. Few high level representatives of government were present. Many presentations on environmental concerns in Tunisia were given by Tunisian participants. Some fourteen technical lectures on industrial wastes and waste treatment were given by three U.S. short-term advisors: Davis L. Ford; Charles R. Barden; and Gerard A. Rohlich.

Pollution Status and Related Tunisian Organizations.

This subject is related to item *g* of my contract that states that I should--

assist, when requested by the GOT [in setting environmental standards, establishing effective cooperation with government agencies, industry, and the public] in developing economically feasible regulations, laws, policies and procedures for the control of pollution;

In the Second Progress Report, it was stated, "The objectives reflected in item *g* can only be reached through the effective convergence of many elements of action, thought, politics and good will. Influencing how they come together can be successful only through the exercise of patience, foresight, respect, and diplomacy. One of the elements that will affect this outcome is certainly the Gabes experience--how well it corrects pollution, how well it helps industry without being unreasonably dictatorial, how well it helps people, how well it can broaden its scope to respond to national needs. Another element is the assessment and broadened awareness of the pollution status in Tunisia and a forecast of where the country is going in this regard. Today these elements do not exist."

As a first response to item *g*, a contract was negotiated with Professor Gerard Rohlich as a short-term advisor to carry out some of the functions cited above. This activity took place in Tunisia during January 1980. It consisted of four principal discreet work elements pursued, in part jointly, by Professor Rohlich, Mrs. Zouiten, and me. These elements are outlined below:

(1) Visits to pertinent units of the Tunisian government to ascertain assigned responsibilities, resources, interests, capabilities and programs related or with potential to relate to the control of environmental pollution. We are thankful to Mr. Bouhalila and to Mr. Mondher Ben Hmida for arranging appointments for these visits and to the following officials for so graciously receiving us and giving freely of their time and thoughts:

- January 9, 1980: Mr. Ridha Bouhalila
Director of Laboratoire Central
Ministère de l'Industrie des Mines
et de l'Energie
Rue El Jawaher Lu1 Nebrou
Tunis
- Mr. Mondher Ben Hmida
(also January 23)
Attaché de Cabinet auprès
de Premier Ministère
Premier Ministère
La Kasbah
Tunis
- January 10: Mr. Hassen Boussoffara
Chef de Cabinet
Ministère de l'Industrie,
Mines et Energie
La Kasbah
Tunis
- Mme. Hedia Baccar
Directrice du Sous Direction
de l'Environnement
Sous Direction de l'Environnement
Ministère de l'Agriculture
Rue Alain Savary
Tunis
- Mr. Salem Bel Hadj Ali
Directeur de l'Institut National
Scientifique Technique
d'Océanographie t de Peche
INSTOP
Salamboo
- January 12: Mr. Romdhane Errahli
Gouverneu de Kasserine
Gouvernorat de Kasserine
- January 14: Mr. Mohamed Habib Hammami
Responsable à L'Office National
d'Assainissement
O N A S
Gabes
- Mr. Mamou
Chef de l'Arrondissement
Direction des Ressources en
Eau et en Sol
DRES
Ministère de l'Agriculture
Gabes
- Mr. Mohamed Jegham
Gouverneur de Gabes
Gouvernorat de Gabes
Gabes
- January 15: Mr. Mohamed Habib Tounsi
Gouverneau de Sfax
Gouvernorat de Sfax
Sfax
- Mr. Abdelmajid Taktak
Chef du Service des Affaires
Sociales
Gouvernorat de Sfax

January 19: Mr. Raouf Tabka
 Secrétaire Générale
 Gouvernorat de Bizerte
 Bizerte

January 21: Moncef Kaak and Nessima Ben Hamida
 Sous Direction de l'Environnement
 Ministère de l'Industrie des Mines et
 de l'Energie
 La Kasbah
 Tunis

January 22: Zakaria Ben Mustapha
 Commissaire de la Pêche
 Ministère de l'Équipement
 Avenue Habib Gourguiba
 Cite Jardin
 Belvedere
 Tunis

Khelil Bousnina
 Engineer in Charge of Pollution
 Agence Foncière Industrielle
 78, Rue de Syrie
 Tunis

Mr. Khaled Ladjimi
 Président Directeur Général
 Agence Foncière Industrielle
 A.F.I.
 78, Rue de Syrie
 Tunis

- (2) Analysis of existing environment-oriented laws of Tunisia.
- (3) As specifically requested by the Tunisian government, review of proposed water pollution control legislation and standards.
- (4) Reconnaissance and summary assessment of obvious pressing pollution problems in Tunisia.

Results of this activity are provided in detail in Professor Rohlich's report¹ filed in offices of A.I.D./Tunis, but the summary and conclusions are stated as follows:

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.

¹G. A. Rohlich. Report to U.S. Agency for International Development, Science and Technology Development Project Contract No. AID/NE-C-1670. January 1980.

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.

Conclusions

1. There is no question that the GOT is deeply concerned about Tunisia's growing pollution problems as reflected in current abatement actions, legislation already passed or contemplated, the role of the National Commission on the Environment, and the establishment of the Gabes laboratory by the Ministry of National Economy (see Also Professor Rohlich's Summary and Conclusions on page 13).

2. In the two years since January 1979, the Gabes laboratory has been moving toward becoming operational at so slow a pace as to seem inconsistent with the needs, interests, and desires of the country as stated in Conclusion 1.

3. While the Gabes laboratory now has a minimal array of equipment to conduct elementary surveys within industrial plants to assess industrial waste emissions, it does not have adequate staff, training, experience, or leadership to do so in an acceptable way.

4. Fact gathering surveys to detect and measure the environmental impact of industrial and other emissions are a logical follow-on to in-plant surveys, but presently they are beyond the scope and capability of the Gabes laboratory.

5. The Gabes laboratory staff is inadequate in the following areas: leadership, total numbers, technical training, special training in pollution control procedures, and experience or comprehensive background in environmental matters.

6. Lack of leadership in the Gabes laboratory is a serious problem. It was precipitated first by long delay and then by appointment of a Chief who resides in Tunis and visits Gabes infrequently; it is aggravated further by the failure of Laboratoire Central to delegate sufficient authority to permit the Gabes staff to move forward without restraint to accomplish even some simple tasks.

7. As an annex of Laboratoire Central, the Gabes laboratory has not been the beneficiary of aggressive or enthusiastic support toward meeting its needs in the areas of equipment, staffing, technical training, laboratory start-up, and activation of programs. There is no reason to believe that the Gabes laboratory can evolve into a reputable functioning institution as long as it remains attached to Laboratoire Central.

Recommendations

1. It is recommended that the GOT take appropriate steps to rescue the Gabes laboratory from its present stagnation and move it forward so as to help solve Tunisia's pollution problems. The following actions in Recommendations 2 through 4 should be considered.

16

2. Sever the Gabes laboratory's organizational attachment to Laboratoire Central and limit the scope of its functions to environmental pollution control.

3. Because no one ministry of the GOT has sole and exclusive responsibility for environmental pollution control, the Gabes laboratory should be considered for a broadened role of serving the pertinent needs of all of the ministries.

4. If such a broadened role were adopted, consideration should be given to the available options for organization under which the Gabes laboratory could operate, including, for example: assignment to the Environment Office of the Ministry for National Economy, or to an inter-ministerial committee appointed for the purpose, or to a committee of the National Commission on the Environment.

5. It is recommended that consideration not be given at this time to establishing additional laboratories similar to the Gabes laboratory but that intense effort be directed to making that laboratory fully functional.

6. It is recommended that Project 5, Pollution Research, of A.I.D. Project No. 664-030, be terminated without initiation of Phase 2.

7. It is recommended that A.I.D. and the GOT explore the possibilities for mutual interest in an alternate joint project that addresses more broadly than the Pollution Research Project the nation's concerns not only with environmental pollution but with other environmental problems as well.

SAT

Attachment 1

Mr. Ridha Bouhalila
Director of Central Laboratory
Ministere de l'Industrie des Mines et de l'Energie
Rue El Jawaher Lal Nehrou
Tunis

Dear Mr. Bouhalila:

During our meeting in your Office on October 9, you requested my recommendations on the size and qualifications of the staff needed for the pollution activity of the Laboratoire Central Annex in Gabes. I am pleased to provide such recommendations in this letter.

As you know, the Laboratoire Central Annex in Gabes can never be fully effective in conducting a pollution assessment program or in providing a factual basis to support corrective measures, without a specially trained full-time professional staff. The field of environmental pollution has a uniqueness that requires special training for the chemist, engineer, biologist or whatever the initial primary professional skill may be. In addition, these skill needs differ in important respects, from those required for the more traditional functions of Laboratoire Central, either at Tunis or Gabes. While the Gabes pollution program has not been planned in complete detail, the framework of activities to be accomplished in the foreseeable future is firm, i.e. Phase 2 (Industrial Waste Surveys) and Phase 3 (Environmental Surveys). The nature of these activities makes it apparent that at least the following skills must be represented in the laboratory staff to offer prospect of a successful laboratory performance:

- Skill in operation of the atomic absorption Spectrophotometry
- Skill in operation of the Technicon,
- Skill in operation of the Gas chromatograph.

It is contemplated that these three skills will be represented by three separate staff members. Each of them can function best only if trained in the applications of their skill to pollution problems. An additional staff member, perhaps the leader of the pollution activity staff, (chemist, engineer or biologist) must be knowledgeable in pollution principles,

19

Mr. Ridha Bouhalila

- 2 -

including a working knowledge of pollution types and sources, ecological effects of pollution on land, sea and rivers including plant and animal impacts, relationships to public health, and a working knowledge of remedial and preventive actions.

Four other personnel will be required, including:

Two*engineers trained specifically in industrial waste sampling and analysis technology to take the lead role in carrying out the major sampling programs. They will need the help of one*technician who also will assist at other times in bottle washing, sample handling, manual analysis and to give general assistance.

One*chemist to do manual analysis, thus giving a total staff of 8 for the foreseeable future.

I would very much appreciate your reaction to these recommendations and I would be pleased to discuss them with you if you wish.

Sincerely Yours,

A. F. Bartsch
Pollution Research Principal
Advisor.

* Tunisian equivalent of:

- 1) Ingenieurs adjoints
- 2) ~~Operator~~ F. Bartsch ~~11/9/79~~
- 3) Techniciens chimiste

cc: Director

PROG

CCFT

C&R

S&T ✓

Clearances:

PROG: ELAucher _____

S&T: SZChelbi _____

Drafted by: A. F. Bartsch:my:11/9/79
Hand-delivered by Dr. A. F. Bartsch to
Mr. Bouhalila on November 9/ 1979.

TRANSLATION OFFICIUM

9 NOV. 1979

Monsieur Ridha Bouhalila
Directeur du Laboratoire Central
Ministère de l'Industrie des Mines et de l'Energie
Rue El Jawaher Lul Mehrou
Tunis

Monsieur le Directeur,

Vous m'avez demandé au cours de notre réunion du 9 Octobre, mes recommandations concernant l'importance et les qualifications du personnel nécessaire pour les activités de l'Annexe du Laboratoire Central à Gabes concernant les problèmes de pollution. Je suis heureux de vous présenter mes recommandations dans cette lettre.

Comme vous le savez, l'Annexe du Laboratoire Central à Gabes ne peut assumer pleinement et efficacement l'exécution d'un programme d'évaluation de la pollution ou la création d'une base pour soutenir des mesures correctives sous un cadre professionnel spécialement formé engagé à plein temps. La pollution de l'environnement est un domaine unique en son genre qui requiert une formation spéciale pour le chimiste, l'ingénieur le biologiste quelque soient leurs qualifications professionnelles initiales. En outre, les qualifications requises diffèrent largement de celles exigées pour les fonctions plus traditionnelles du Laboratoire Central à Tunis aussi bien qu'à Gabes. Bien que le programme de pollution de Gabes n'a pas été établi dans tous ces détails, le cadre des activités à accomplir dans l'avenir prévisible s'avère bien solide, c'est à dire la Phase 2 (Etudes des Déchets Industriels) et la Phase 3 (Etudes de l'Environnement). La nature de ces activités fait ressortir qu'au moins les compétences suivantes doivent être présentes parmi le personnel du Laboratoire pour assurer la bonne marche de ce laboratoire.

- Compétence dans l'utilisation du Spectrophotomètre d'absorption atomique.
- Compétence dans l'utilisation du Technicon
- Compétence dans l'utilisation du chromatographe à gaz.

Ces trois fonctions seront, selon les prévisions, assumées par trois cadres distincts du personnel. Ces trois cadres seront plus compétents s'ils reçoivent une formation dans les applications de leurs compétences aux problèmes de pollution. Un autre cadre, éventuellement le chef du projet de

20

Monsieur Ridha Bouhalila

- 2 -

pollution, (chimiste, ingénieur ou biologiste) doit être versé dans les principes de pollution et avoir des connaissances pratiques sur les types et sources de pollution, les effets écologiques de la pollution sur les terres, la mer et les rivières y compris les impacts sur les végétaux et les animaux, ses rapports avec la santé publique ainsi que des connaissances pratiques des mesures correctives et préventives:

Quatre autres cadres seront nécessaires:

formes

Deux Ingénieurs adjoint/spécifiquement dans la technologie de l'échantillonnage et de l'analyse des déchets industriels pour tenir le premier rôle dans la réalisation des principaux programmes d'échantillonnage. Ils auront besoin de l'aide d'un opérateur qui devra aider, par ailleurs, au nettoyage des bouteilles, à la manipulation des échantillons, aux analyses manuelles et en tout ce qui concerne l'assistance générale.

Un chimiste (technicien chimiste) pour les analyses manuelles, ce qui donne au total, dans l'avenir prévisible, un personnel de huit membres.

Je voudrais bien connaître votre avis quant à ces recommandations et je serais heureux de les discuter avec vous si vous le voulez bien.

Dr. A. F. Bartsch
Conseiller Principal du Projet
"Recherche sur la Pollution"

21

1979

Attachment 2

January February March April May June July August September October November December

Organization									Mission Organization		
Training			Ben Othman	Turki		Belgacem	Iladdad	PA at KC	Bouhalila		
Equipment						Ship to Gabes		U.S. Advisor No. 1	Analytical start		
Publications		Continuing									
Information Exchange			Continuing								
Programs					Phase I		U.S. Advisor No. 2	Phase II			
National Effort											
Principal Advisor in Tunisia											

ll

1980

Attachment 2

January February March April May June July August September October November December

a. Organization

..... *Finalize and Adopt*

b. Training

c. Equipment

Analytical Function

d. Publications

Continuing

e. Information Exchange

Continuing

f. Programs

Gabes

Sfax

Gabes

Phase III

Sfax

g. National Effort

Principal Advisor in Tunisia

22

// -) PROCÈS VERBAL DE LA RÉUNION DU 29 AVRIL 1980

Monsieur ALI DJERAD (Direction de la Coopération Internationale
au Ministère des Affaires Étrangères).

((-) OBJET : Sous projet pollution, projet Science et Technologie n° 664-0300

Monsieur,

Comme suite à notre réunion du Lundi 28 Avril 1980 à 15 Heures
et suivant vos recommandations, nous avons le plaisir de vous remettre le
procès verbal de notre réunion tenue au Laboratoire Central de Tunis le
29 AVRIL 1980 à 8 H 30.

Ont assisté à cette réunion :

Dr. F. BARTSCH : Conseiller Principal du sous projet recherche sur la
pollution.

Mme S. CHELBI : Service Science et Technologie A.I.D.

Mr R. RIZGUI : De la Direction de l'Environnement du Ministère de
l'Économie Nationale (a quitté la réunion à 10 h pour
nécessité de service).

Mr BEN OTHMAN : Laboratoire Central

Mr FATNASSI : Laboratoire Central

Mr S. TURKI : Laboratoire Central

Ordre du Jour : - Révision du calendrier d'activités de la première phase
du sous Projet Recherche sur la Pollution.

Les sujets discutés lors de cette réunion sont les
suivants :

I. EQUIPEMENTS

a) Le Laboratoire Central de Tunis a préparé la liste du matériel MANNING pour l'échantillonnage de l'eau. Cette liste sera envoyée à la Société MANNING pour l'obtention d'une facture proformat au nom du Laboratoire Central de Tunis (Liste comportant 4 échantillonneurs et 2 débitètres d'une évaluation globale de 20.000 \$).

La commande de ce matériel sera faite dans les plus brefs délais.

b) Mr. M. BEN OTHMAN a remis au Dr. BARTSCH une lettre concernant l'appareil de chromatographie en phase gazeuse Tracor 222 livrée par l'U.S A.I.D.

Une copie de cette lettre est jointe à ce rapport.

c) Le problème de l'Absorption atomique Perkin Elmer Modèle 560 livré par l'U.S A.I.D. et travaillant à 110 V. 60 Hz a été soulevé.

Le Laboratoire Central a contacté Perkin Elmer pour l'envoi d'un Technicien on a été avisé par Telex de sa venue entre le 5 et le 9 Mai 1980. Il sera en mesure de voir la possibilité de sa mise en marche.

d) Le matériel demandé par l'U.S A.I.D (Absorption Atomique chromatographie en phase gazeuse, Technicon) a été réceptionné à cette date, excepté certains accessoires du technicon.

II. PROGRAMATION

La surveillance de la pollution aux I.C.M (échantillonnage Eau et Air) commencera au début Octobre 1980.

Cette date sera maintenue si aucun problème concernant l'achat et livraison du matériel MANNING ne se pose. Le Laboratoire Central avisera l'U.S A.I.D au début du mois de JUILLET des suites ^{donnés} par le contrôle de dépense et la Commission des marchés de l'achat du matériel MANNING.

A cette date le Laboratoire Central prendra une décision finale pour confirmer la date du début de la surveillance de la pollution aux I.C.M, ou en proposer une nouvelle ne pouvant dépasser le mois de novembre 1980.

Les contacts pour des conseillers à courts termes seront fait en conséquence par le Dr. BARTSCH.

Ces conseillers sont au nombre de trois.

- Mr DARVIN : Spécialiste dans l'échantillonnage de l'air pour une durée de 4 semaines.

- Mr KRAWCSYK : Spécialiste en chimie analytique
pour une durée de 2 semaines
- Mr. YAKE : Spécialiste dans l'échantillonnage de l'eau
pour une durée de 4 semaines.

III. PERSONNEL

Selon le Dr. BARTSCH la Société MANNING serait disposée en cas de conclusion du marché à offrir un stage de 2 semaines pour l'utilisation et la maintenance du matériel MANNING.

GHANNOUCI Rachid proposé pour ce stage devra donc se déplacer aus U.S.A avant Octobre.

IV. FORMATION D'UN CADRE DU LABORATOIRE DE GABES DANS LES PRINCIPES GENERAUX DE LA POLLUTION DE L'ENVIRONNEMENT.

Le Dr. BARTSCH pense qu'il serait très utile de former parmi les cadres du Laboratoire de Gabès un spécialiste versé dans les principes généraux de la pollution de l'environnement.

V. SEMINAIRES

La date du 10 au 14 NOV. pour le déroulement du séminaire à GABES est maintenu.

Nous espérons que ce procès verbal aura permis d'élucider tous les problèmes en suspens concernant l'annexe du Laboratoire Central à GABES.

Veillez agréer Monsieur, l'expression de notre sincères dévouements.

Mr. Dr F. BARTSCH
Conseiller Principal

F. Bartsch

Mr. R. BOUHALILA
Directeur du Laboratoire Central

R. Bouhalila

Mme S. CHELBI US. A. I. D

Mr. M. B. OTHMAN Laboratoire Central

Mr. M. FATNASSI Laboratoire Central

Mr. S. TURKI Laboratoire Central

S. Fatnassi
S. Turki