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PADCO

PLANNING AND DEVELOPMENT COLLABORATIVE INTERNATIONAL, INC.

HG-005
Private Participation in Environmental Services

FEASIBILITY STUDY: CONTRACTING OUT OPERATION AND MAINTENANCE OF THE SE-1, SE-2, AND SE-3 LIQUID WASTE TREATMENT PLANTS

Final

Prepared for

United States Agency for International Development
Regional Housing and Urban Development Office
Near East and North Africa

Prepared by

PADCO/EICO

Larbi Khrouf
Denis Lapointe

15 March 1995

PROVIDES GOVERNMENTS AND PRIVATE CLIENTS WITH SERVICES IN PLANNING, HOUSING, MANAGEMENT, FINANCE, ECONOMICS, ENVIRONMENT, GEOGRAPHIC AND OTHER INFORMATION SERVICES, AND TRAINING.

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1 Executive Summary

The objective of this study is to assess the feasibility of a pilot project in contracting out operations and maintenance (O&M) of the SE-1, SE-2, and SE-3 sewage treatment plants. The study was financed under the Private Participation in Environmental Services (PPES) program, a joint effort of the Government of Tunisia and the United States Agency for International Development.

The specialists first carried out an evaluation of the current condition and operation of the facilities concerned. The equipment in the treatment plants was found to be generally worn out. Energy costs are therefore high. In addition, spare parts are hard to find. The plants are overloaded during the peak tourist season.

In spite of these problems, the plants still manage to attain acceptable levels of the main pollution parameters, especially BOD_5. This attests to the strong performance of the current the National Sanitation Agency (ONAS) O&M teams.

The specialists then ascertained the size and skills of the O&M teams and the rolling stock used to operate the facilities in question. Current costs were assessed.

To assess the feasibility of the proposed contracting out pilot project, the specialists defined criteria for the public sector, the private sector, and the users. Next, productivity increases were estimated for the different cost components. With respect to personnel, the study team determined that the contractor could reduce costs by 20 percent. Productivity increases related to rolling stock were estimated at 11 percent.

A certain number of financial assumptions were used during the preparation of the pilot project budget. The budget indicates that by contracting out O&M to a private firm, ONAS can reduce O&M costs by 7 percent. This reduction takes into account the costs of managing the contract, as well as an acceptable profit margin for the private firm.

The condition of the treatment equipment, to the extent that it makes cost savings more difficult, could limit the overall performance of this pilot project. Nevertheless, the project is capable of satisfying ONAS, private sector, and user criteria, and is therefore considered technically, organizationally, and financially feasible.

2 Introduction

The Government of Tunisia (GOT) is seeking to increase private sector participation in the management of environmental facilities, particularly in urban areas. Within this effort, ONAS, one of the primary actors in the sector, is working specifically to involve the private sector in the financing, operation, and maintenance of liquid waste facilities.

In August 1994, a market study carried out in the context of the PPES program, a joint effort of the Government of Tunisia and the United States Agency for International Development (USAID), identified the potential role of the private sector in the liquid waste field. The study showed that contracting out the operation and maintenance of liquid waste facilities to

private firms is one of the scenarios most likely to produce improvements in quality and reduction of service costs in the Tunisian context.

Based on the conclusions of the study, ONAS decided to carry out two pilot projects to contract out operations and maintenance of 1) a liquid waste network and 2) one or more treatment plants and their associated pumping stations.

This study, also financed by the PPES program, evaluates the feasibility of the pilot project to contract out O&M of a group of treatment plants to a private firm.

3 Objectives and Terms of Reference

The objective of this study is to assess the technical, financial, and organizational feasibility of the pilot project to privatize the operation of three treatment plants and eight pumping stations in the cities of Nabeul and Hammamet, located in the Nabeul District of ONAS' Northeast Department. The study analyzes the costs and benefits of delegating service to a private company from the perspective of the public sector, the private sector, and the users. The selection of these plants was the joint decision of ONAS and the Tunisian Ministry of the Environment and Regional Planning.

This feasibility study begins with an assessment of the operating performance of the ONAS-operated treatment plants. Specialists evaluated the condition and performance of the treatment plants and their pumping stations, the performance of the teams responsible for their operation, and the main constraints to O&M.

The specialists also examined management, administration, and maintenance costs incurred at the main office, department, and district levels to assess the total public sector O&M cost of operating the facilities.

The specialists compiled a list of all the tasks performed by the different administrative units of ONAS to ensure the operation of the plants, and identified the employees who carry out the work.

The specialists, using the information contained in the market study to define the project criteria, then proposed ways in which these tasks can be divided between ONAS and the private developer so as to best meet the feasibility criteria.

Cash flow analyses were used to assess profit margins and changes in total cost.

The specialists also examined the different ways ONAS employees currently operating the treatment plants could participate in the privatization process, and proposed methods which are most likely to benefit all the concerned parties.

4 Project Description

The facilities selected by ONAS, in conjunction with the Ministry of Environment and Regional Planning and USAID, for the pilot project include the residential wastewater treatment plants SE-1, SE-2, and SE-3, located in the Nabeul District in ONAS' Northeast Department.

In addition to the three plants, eight (8) pumping stations, which pump the wastewater collected by the network to the treatment plants, are included in the pilot project.

The locations of the treatment plants selected to participate in the project are as follows:

SE-1 The southern Hammamet treatment plant is at the Hammamet exit off of GP1 near the Moussa wadi in which the effluent and non-reusable wastewater are discharged.

SE-2 The Hammamet treatment plant, built in the tourist area of Nabeul-Hammamet (sub-zone 2), is on the MC28 highway between Nabeul and Hammamet, 100 meters down the paved road running from the Grand Hotel to the Hotel Mediterranean. The effluent which is discharged into the Zemmech wadi can be used for local agricultural needs, e.g., irrigation, as required.

SE-3 The Sillon-Ville (Nabeul) treatment plant is 400 meters from the Sillon City Hospital and approximately 200 meters from the MC28 highway. The effluent is discharged into the El Melah wadi.

A project to channel effluent from the SE-2 and SE-3 treatment plants into a 2.5-kilometer marine discharge extension was scheduled to be completed in 1994 and should be operational by June 1995.

The three treatment plants are all in a tourist area. Plants SE-1 and SE-2 primarily serve hotels, while SE-3 serves the residential zone of Hammamet and the Beraket Essahel area.

The pumping stations serving the three treatment plants are no more than 1-2 kilometers away and are easily accessible.

The biological treatment at all three plants is similar, although SE-3 uses a different model of aerator.

Table 1 outlines the treatment process used in the three plants.

Table 1
Type of Treatment by Treatment Plant

Type of Treatment	SE-1			SE-2			SE-3		
	Type	m^2	m^3	Type	m^2	m^3	Type	m^2	m^3
Pumping									
From pumping stations	x			x			x		
Pre-treatment									
• Debris removed mechanically by a curved drying rake	x			x			x		
• Grit removed in a circular basin	x			x			x		
• Grease removed and pre-ventilated	x	254	100	x		100	x		100
Treatment									
• Primary (circular clarifier with rakes)	x		570	x	254	570			
• Secondary: medium-load activated sludge. Conventional oxidized aeration using surface aerators	x	364	860	x		1279	x		2000
• Secondary: (circular clarifier with rakes)	x		979	x	346	979	x	333	570
• Treated water recycled (possible)	x								

Type of Treatment	SE-1			SE-2			SE-3		
	Type	m^2	m^3	Type	m^2	m^3	Type	m^2	m^3
Sludge Treatment & Handling									
• Airlift used to recycle biological sludge	x			x			x		
• Excess biological sludge forced into primary sedimentation or aerobic stabilization	x			x		1234	x		
• Aerobic stabilization of sludge	x		760	x			x		
• Sludge thickening	x						x		140 (2)
• Stabilized sludge spread on drying beds	x	3168 (22U)		x	3740 (26U)		x	720 (8U)	

Table 2 lists the characteristics of all three treatment plants.

Table 2
Technical Characteristics of the Treatment Plants

Characteristic		SE-1	SE-2	SE-2
General	Completion	1980	1980	1981
	Location	Hammamet	Hammamet	Nabeul
	Treatment (water)	Activated sludge, medium load	Activated sludge, medium load	Oxidation channel
	Treatment (sludge)	Aerobic stabilization	Aerobic stabilization	Aerobic stabilization
	Clientele (%)			
	• Residential	14.3	66.4	23.4
	• Tourist	76.2	28.8	76.6
	• Industrial[1]	9.5	4.8	0.0
Design	Volume (mc/day)	4,208	5,146	3,500
	Organic load (BOD_5/day)	1,321	2,206	700
	No. users	24,500	40,800	26,000

[1] According to ONAS codification, industry includes such activities as restaurants, hair dressers, etc.

Characteristic		SE-1	SE-2	SE-2
Performance (1993)	No. rain days	19	25	29
	No. days stopped	0	0	4.0
	Annual volume (mc)	1,032,303	1,308,955	793,168
	Daily volume (mc)	2,828	3,586	2,197
	% capacity - volume	67	70	63
	Maximum load (mc/day)	5,098	5,562	4,140
	% max. load	121	108	118
	Average org. load (mg/l)	792	1,554	503
	% organic load	60	70	72
	Average BOD_5 influent (mg/l)	280	433	229
	Average BOD_5 effluent (mg/l)	27	13	14
	Load - BOD_5 Kg			
	• influent	792	1,554	503
	• effluent	76	46	30
	• efficiency (%)	90	97	94
	Kwh/year	589,319	1,022,319	298,300
	Kwh/day	716	1,508	473
	Kwh/BOD_5 eliminated	2.25	1.86	1.75
	Sludge produced			
	• wet (mc)	7,660	9,735	5,200
	• dried (mc)	797	934	218
	Grit recovered/year	36	125	34
	Debris (mc/year)	11	37.2	20.6
	Recycled water %	53.8	0	0

Table 3 identifies the pumping stations that serve each treatment plant.

Table 3
Pumping Stations

Treatment Plant	Pumping Station
SE-1 (Hammamet)	R1-1 R1-2 R1-5 (on the plant site)
SE-2 (Hammamet)	R2-2 R2-3 R2-5
SE-3 (Sillon-Ville Nabeul)	R3-5 R3-6 (university campus)

A diagram describing the distribution of the different treatment plants and pumping stations can be found in Annex A.

Table 4
Technical Characteristics of the Pumping Stations

Station	No. of pumps	Liters/sec.	H.M.T./m	Power (Kw)	Pipe to plant	Equipment		
						Elect. gen.	Overflow	Pump
R1-1	3	70	22 00	22	200 AC	60 KVA	1	Flygt
R1-2	3	68		30	300 AC	90 KVA	1	Mengin
R1-5	2	25		31	200 Steel	None	0	Flygt
R2-2	3	100		75	350 AC	200 KVA	1	Mengin
						None		
R2-3	2	40		37	250 AC	None	1	Mengin
R2-4	2	58		37	250 AC		1	Mengin
R3-5	2	90		55	400 AC	88 KVA	1	Mengin
R3-6		25						

Table 5
Wastewater Volume by Zone

Zone	Volume		% change
	1992	1993	
Zone 1 (SE-1)	933,589	1,414,407	51
Zone 2 (SE-2)	1,570,776	4,408,849	117
Zone 3 (SE-3)	933,892	1,918,249	105

5 Assessment of the Treatment Plants

5.1 Technical Aspects

5.1.1 Current Condition and Performance of the Facilities

Overall, the treatment plants and pumping stations are operational and meet the norm for BOD_5 elimination. However, although the civil engineering is in good condition, the facilities are almost 15 years old and most of their equipment is worn out.

During the peak tourist seasons, the facilities generally operate on overload and are ill-equipped to handle the problems caused by increased amounts of detergents and grease. Furthermore, the increasingly high concentrations of chemicals from hotel laundries push COD (chemical oxygen demand) concentrations beyond authorized limits.

Except for the rare case of those facilities which have been recently overhauled, the mechanical equipment at these plants is old and the replacement parts needed to guarantee their maintenance are not readily available. The work needed to keep the facilities in good condition is expensive and requires the manufacture of custom replacement parts.

According to the operators, in particular the plant foremen, the lack or poor condition of treatment monitoring equipment means that the plants are run by eye.

Although the plants more than adequately attain BOD_5 reduction requirements, the overall energy cost of this performance appears high in comparison with the national averages published by ONAS for similar treatment plants. Their high energy costs make SE-1, SE-2, and SE-3 some of the most expensive plants to operate in Tunisia.

All three plants are located either in or near urban areas or institutions, and the odors emanating from some of the plants are a nuisance.

The difficulties in obtaining replacement parts apply to the electronic controls, electro-mechanical parts, and laboratory equipment needed to correct or regulate the treatment procedures. In some cases, facility operations are further hindered by administrative problems, such as month-long delays in acquiring replacement parts.

The operators, under such conditions, provide an exceptional yield to maintain treatment procedures and comply with minimum effluent conditions in the case of normal operating loads.

5.1.2 Problems and Constraints

Although the treatment plants are generally operational, and BOD_5 reduction performance is for the most part good, the current facility operators have identified a number of problems common to all three plants:

- Pumping stations feed all the treatment plants, since none of the treatment plants are fed by a gravity-flow network. As a result, the wastewater arrives unevenly.
- When the different pumping stations operate simultaneously, their total pumping capacity exceeds the plant's capacity. This causes problems during the secondary sedimentation phase. At other plants, the pumps are over-sized.
- During the high tourist season (June, July, August, and September), the treatment sludge can not be adequately sedimented. In order to reduce high SS concentrations in the secondary clarifier, plant operators accelerate the sedimentation of suspended solids by adding liquified lime, a prohibitively expensive practice.
- None of the plants has a generating set. Although electric power failures are usually short when they occur, a generator would ensure uninterrupted operations.
- None of the plants has a spark suppressor.
- In general, and particularly during the tourist season, grease and detergent which accumulates in the plants' influent affects its treatment efficiency. Poor grease management by the hotels causes repercussions throughout the treatment chain.
- The high concentration of detergents and chemicals from hotel laundries affects the plant effluent's COD concentrations. During the peak season, plant operators are unable to comply with effluent standards of 90 ppm.

- Faced with the high cost of potable water, some of the hotels use sea water for diverse domestic tasks. This water is then discharged into the wastewater network and carried to the treatment plants. Salt water in the plants causes corrosion and lowers efficiency.
- The plants are operated by eye, since most of the electronic controls, such as the oximeters, BOD, PH, etc., are nonfunctional.
- Laboratory testing is generally done twice a week by a central ONAS laboratory located 30 kilometers from Hammamet. The fact that the results are not available until one week later limits their usefulness in regulating the treatment procedure.
- Most of the plants' mechanical equipment was acquired at the time of construction (early 1980s). The French company that manufactured the equipment has since gone bankrupt and it is no longer possible to purchase original replacement parts. All major repairs, therefore, require the production of custom parts.
- During the peak tourist season, the plants lack adequate space for sludge drying beds.

The specialists also identified problems specific to each of the plants:

SE-1 Plant

- The poor design of the static stabilized sludge thickener causes it to operate inefficiently. Excess sludge must be manually transferred to the thickener and the drying beds.
- The influent load exceeds the capacity of the facility's design conception during the peak season (4,200 m3/d). In 1994, for example, it treated 5,500 m3/d. When this occurs, it is impossible to ensure compliance with effluent requirements.
- When the plant operates on overload, sludge bulking occurs. The sludge does not settle and stabilizes inefficiently.
- The influx of detergents and chemicals used by hotel laundries hinders the treatment process during the tourist season in particular, a period when COD reduction outputs fail to comply with the norm.
- During the tourist season, surface material appears when the amount of time wastewater remains in the secondary clarifier is inadequate.
- During the peak season in particular, it is difficult to regulate the influent flows.
- The mechanical controls, in general, do not function. Both the oximeter and flow meter at the plant's effluent outlet are defective.
- Metal surfaces which come in contact with wastewater and treated water, especially during the secondary sedimentation stage, are corroded.
- The plant's internal laboratory does not possess any measuring equipment or tools.
- The plant's energy output of 2.25 kwh/kg per BOD is one of the worst of all the ONAS-operated plants.
- The space for drying beds is insufficient.
- The influent temperature frequently exceeds 70° C (the volume of laundry wastewater can reach 200 m3/d).

SE-2 Plant

- During peak hours, sludge backs up in the secondary clarifier, which causes a permanent problem of floating debris in the tank.
- The automatic opening of the clarifier's sludge evacuation sluice gate does not work. As is the case for all the mechanical controls at the treatment plants, replacement parts have been ordered but not received.
- Hotels located near the plant have repeatedly complained of strong odors at the plant's entrance caused by septic wastewater which has been pumped several times. ONAS intends to cover the pre-treatment facilities and clean the extracted interior air.
- The grease remover is continuously covered with grease because of the area's high level of hotel activity.
- A problem regulating the plant's influent load hinders the overall treatment process.
- Sludge backs up when it is now allowed to remain in the secondary clarifier for the proper amount of time.
- The capacity of the aeration system appears to be insufficient to oxidize peak loads.
- The aerators used to stabilize sludge are frequently blocked.
- Metal parts, including galvanized ones, are eroding due to exposure to water.
- The plant does not have sluice gates at the opening of each force main.
- The electronic flow meter at the plant's effluent outlet does not have a recorder.
- The plant's laboratory monitoring equipment does not work.
- The exhaust pump to drain grit-removal drain water does not function.
- The pre-treatment facility sluice gates are, on the whole, not watertight.
- The number of drying beds is insufficient.

SE-3 Plant

- Adequate space for drying stabilized sludge is not available.
- The position switch of the mechanical bar rack at the plant entrance is broken. Replacement parts were ordered several months ago, but have yet not been received.
- The equipment is worn out and breaks down regularly; the booster, the valve, and the pre-aeration attachments need replacement.
- The recently installed oximeter does not work.
- The conduit's brush aerator uses two Passavant surface brushes which are activated by belt-powered motors. Repairs on these systems are time-consuming and expensive, and replacement parts are not available.
- Metal parts which come into contact with wastewater or treated water corrode, particularly during the secondary sedimentation stage. The clarifier's overflow walls must, as a result, be replaced at least twice a year.
- Sedimented water flows into the filter of the secondary clarifier unevenly because of the poor positioning of the overflow's corroded interior wall, which has to be replaced.

- The automatic controls of the electric sluice gate which evacuates sludge from the secondary clarifier do not work; the sluice gate must therefore be operated manually. Replacement parts have been ordered but not yet received.
- Surface sludge accumulates during drying at the center of the secondary clarifier.
- The electronic flow meter of the plant's effluent outlet does not work.
- Although two overflow sludge racks were built to contain excess sludge during the high season, the remaining available surface is insufficient in the summer months.
- Although the plant laboratory has sufficient equipment, the most important measuring tools do not work, in particular the portable oximeter and the BOD incubator.
- The sludge expands in the summer.
- The capacity of the sludge recirculation pumps is insufficient in the summer.
- Floating material has to be extracted from the thickeners by hand.

The team also visited the pumping stations, for which the general comments are the following:

- In certain cases, the poor positioning of the static grit removers limits their efficiency and makes upkeep difficult.
- The plants do not all have generating sets.
- Existing generating sets do not switch on automatically in the event of a power failure.
- Generally, the stations need to be overhauled, with the exception of R1-2, rehabilitated in 1991.

In addition, the following station-specific problems were observed:

R1-2 Pumping Station (serving SE-1)

This station is one kilometer from the SE-1 treatment plant. Its proximity (30 meters) to the main building of a hotel complex hinders its operation. Numerous complaints have been made about its functioning. The station includes three pumps, a generating set, and a manual bar rack. The electric pump control panel was recently replaced. The particularities of this station are as follows:

- An inert screen provides protection against jamming.
- The manual sludge rack basin is 10 meters deep, which makes cleaning difficult.
- The generating set, which needs to be overhauled, switches on manually.
- The electric control cabinet heats up, and has to be ventilated in the summer.

R2-2 Pumping Station (serving SE-2)

This station is three kilometers from the SE-2 treatment plant, and includes three pumps. Its overflow gives directly onto the beach. The pumps are installed in dry dock. The station has a three-rake manual bar rack, which is difficult to maintain and operate. The station also has a Berliet/Leroy Somier generating set which has to be switched on manually. The major problems of this facility include:

- An inert screen provides protection against jamming.
- The layout of the pumps and the set up of the influent and effluent pipes are poorly designed, causing suction when the pumps are switched on. Since the pumps do not switch on automatically, the risk of influent being discharged onto the beach is a frequent problem.
- Mengin pumps are no longer sold in Tunisia and their maintenance frequently involves adapting replacement parts. Furthermore, there is no reserve stock of parts to cushion problems in the case of pump failure.
- The manual bar rack has to be replaced yearly because of corrosion.

R2-2 Pumping Station (serving SE-2)

The superstructure of this dry dock station does not permit placing the command panel in the station's dry well, thereby causing a problem with dampness. The upkeep of the station's manual bar rack is inconvenient because of the depth and narrowness of the manhole. The sluice gate is broken.

R3-5 Pumping Station (serving SE-3)

The station is approximately one kilometer from the SE-3 plant and is located a few hundred meters from the sea. The pumps are installed in a dry well. The inside building has structural beams from which winches can be installed to maintain the pumps. The station has a mechanical sludge clarifier that operates fairly well. The debris is transported to a public landfill 20 kilometers from the station. The station also has a 88 KVA generating set. The problem areas of this station are the following:

- The two Mengin pumps used at the station are no longer sold in Tunisia and replacement parts cannot be found. Their upkeep is expensive and requires a lot of adaptation.
- The pumps at this station only operate one at a time and are alternated to save wear. The switching between pumps is done manually.
- The generating set and the pumps are not automatically relayed and the switching has to be done manually.
- The station is not enclosed and, therefore, is unprotected.
- Although the pumps switch on automatically, the inefficiency of the automatic switch reduces the station's output. The switching of the pumps is not done automatically.
- During periods of heavy rainfall, the pumps have to be manually shut off to avoid carrying rain water into the treatment plants. The water level consequently rises in the pumping station's wells and is evacuated by its overflow. The pumps are switched on after the effect of the rain on the networks has passed.
- An inert screen provides protection against jamming.

5.2 Financial Aspects

The specialists examined the direct and indirect operating costs of the SE-1, SE-2, and SE-3 treatment plants and the eight pumping stations that serve them. The team analyzed the 1992 and 1993 operating budgets, and the estimated operating budgets for 1994 and 1995. The

specialists scrutinized the documents used by ONAS to prepare the operating budgets for the centers and treatment plants. Numerous meetings were held with ONAS main office, department, district, and center personnel in order to verify the findings of the cost evaluation.

It is difficult to evaluate the cost of equipment ONAS used to operate the participating facilities because the Northeast Department fleet is also used for O&M of other non-project facilities (plants, pumping stations, etc.). The specialists evaluated the total rolling stock expenses, which are presented in Table 6. In order to calculate the equipment costs related to each facility, the experts developed allocation keys: first, the ratio of plant O&M activities to all activities carried out by the department, and then the ratio of O&M of the plants in question to O&M of all treatment plants run by the department. Taking into account a seven-year depreciation period, the part of the department's annual rolling stock costs which applies to the project facilities is 13,720 Tunisian dinars (TD).

Table 6
Rolling Stock Expenses

Type	Unit cost	No.	Total cost	Treatment cost	Pilot facility cost
Tractor	17,000	2	34,000	8,500	6,715
Van	35,000	6	210,000	53,500	41,475
2 door pick-up	17,000	4	68,000	17,000	13,430
4 door pick-up	20,000	1	20,000	5,000	3,950
Car	15,000	3	45,000	11,250	8,888
Truck	50,000	1	50,000	12,500	9,875
Motor bike	1,200	6	7,200	1,800	1,422
Total			**434,200**	**108,550**	**85,755**
Depreciation (7-year term)			**69,472**	**17,368**	**13,720**

An examination of the work force of the participating plants was carried out and verified by the ONAS department personnel. Table 7 shows the ONAS work force which operates and maintains the facilities in question.

Table 7
Personnel Expenses

Job Description	SE-1	SE-2	SE-3	Pumping stations	Total	TD/year	Total cost
Center manager	1	1	1	0	3	9,750	29,250
Operator	1	1	1	0	3	7,150	21,450
Full-time worker	3	3	3	0.5	9	4,550	40,950
Part-time worker	2	3	2	0	10	1,800	12,600
Guard	1	1	1	0	7	1,800	5,400
Total	**8**	**9**	**8**	**0.5**	**25.5**		**109,650**

In calculating ONAS' operating expenses for the years 1992, 1993, and 1994, we took into account the breakdown of the diverse service and management costs incurred by the main office and the field offices.

Annexes D and E provide existing O&M cost data for each treatment plant and the group of pumping stations.

Organizational Aspects

ONAS performs the following tasks as part of the operation and maintenance of the pilot facilities:

Equipment Maintenance

- Upkeep of electro-mechanical and hydraulic equipment (lubrication, oil change, adjustment)
- Upkeep of the mechanical and structural parts of the wastewater pre-treatment and treatment systems (small-scale repairs, cleaning the grit remover, bar rack, and grease remover basins, the ventilated basins and/or ducts, the clarifier, the aerators, etc.)
- Upkeep of electrical and monitoring systems
- Electrical transformer unit upkeep
- Upkeep of building and fence (paint work, gardening, general maintenance)
- Upkeep of sounding rods and recorder
- Meter and recorder reading
- Upkeep of drying beds, clearing and dumping of dried sludge
- Upkeep and general functioning of the treatment process
- Upkeep of rolling stock

Analysis and Measurement

- Sampling and laboratory testing
- Flow measurement and recording
- Treatment process adjustments and optimalization

Administrative Tasks

- Relations and meetings with the local, regional, and national authorities: Ministry of Health, Ministry of the Environment, ANPE (National Environment Protection Agency), Ministry of Agriculture, the Regional Agricultural Development Commission, etc.
- Relations with consumers of treated water and sludge
- Receipt of complaints
- Customer relations
- Daily, monthly, and yearly reports
- Management of local premises and file-keeping
- Security
- Staff management
- Mail processing
- Budget preparation

6 Feasibility of Contracting Out

6.1 Criteria

The market study on the potential role of the private sector in liquid waste management in Tunisia identified the criteria that would justify delegating liquid waste services to a private firm and would satisfy the public sector, the private sector, and the user. The criteria for each of these sectors follows.

Public Sector

- **Reduction of service costs.** Delegating certain tasks to a private company must bring about a general reduction of service costs. That is, the sum to be paid to the private company to provide a given service must be less than the cost currently incurred by the public body.
- **Improved output.** The efficiency of a private company operating under competitive conditions must lead to an appreciable improvement in the output presently achieved by the public body.
- **Improved service quality.** The private company must be able to provide a better service than its public sector counterpart.
- **Specialization of human resources.** Delegating certain repetitive tasks to a private company must lead to increased specialization within the state body's staff.

- **Mobilization of additional capital.** Transfer to a private company of responsibility for financing large investments must lead to the increase of new capital to be used to improve liquid waste services in Tunisia.
- **Increased financial independence of ONAS.** Private sector participation aimed at reducing service costs and mobilizing additional private capital must diminish ONAS' financial dependence on the central government budget.

Private Sector

- **Profitability.** The specific conditions of delegating service must allow the private enterprise to generate an acceptable profit margin.
- **Predictability.** The delegating of service to a private company must be done in a context of detailed knowledge of the condition of the facilities to be operated, tasks to be carried out, required returns, and any other conditions affecting private sector responsibilities over the entire duration of the contract.
- **Durability.** Each model market must meet the above-mentioned criteria over the medium- and long-term.

Users

- **Improved service quality**. The private company must be able to provide better service quality than its public sector counterpart.
- **Speed of service delivery**. The private company operating a liquid waste facility must be able to deliver service more rapidly than its public sector counterpart.
- **Cost stability and reduction**. Delegating tasks to a private company must lead to a reduction in service costs.

Entrusting the service contract to a private company to operate one or more wastewater treatment plants and its collection pumping stations must therefore satisfy at least the large majority of the above criteria.

6.2 Contractual Framework

The contractual framework of the project is that of a service contract. A model contract for contracting out treatment plant operation and maintenance was drafted as part of the PPES program. After it has been modified by the team of experts and ONAS personnel to take into account the particularities of this project, the model contract will form the basis of the tender and contract documents.

6.3 Breakdown of Duties: Private Sector - ONAS

The privatization project includes transferring certain operating activities from the public sector to the private sector. ONAS will, however, retain responsibility for certain management and monitoring tasks, since it remains answerable to its customers and the local and national authorities.

In order to clarify the responsibilities of each actor, Table 8 synthesizes the breakdown of the tasks performed by each of the participants involved in project implementation.

Table 8
Distribution of Operation and Maintenance Tasks

Task	Responsible party	
	ONAS	Private firm
Equipment maintenance		
Upkeep of electro-mechanical and hydraulic equipment (lubricating, oil change, adjustments)		•
Upkeep of the mechanical and structural parts of the wastewater pre-treatment and treatment systems (small-scale repairs, cleaning the grit remover, bar rack, and grease remover basins, the ventilated basins and/or ducts, the clarifier, the aerators, etc.)		•
Upkeep of electrical and monitoring systems		•
Electrical transformer unit upkeep		•
Upkeep of building and fences (paint work, gardening, general maintenance)		•
Upkeep of sounding rods and recorder		•
Meter and recorder reading		•
Upkeep of drying beds, clearing and dumping of dried sludge		•
Upkeep and general functioning of the treatment process		•
Upkeep of rolling stock		•
Analysis and Measurement		
Sampling and laboratory testing		•
Flow measurement and recording		•
Treatment process adjustments and optimalization		•

Task	Responsible party	
	ONAS	Private firm
Administrative Tasks		
Relations and meetings with local, regional, and national authorities: Ministry of Health, Ministry of the Environment, ANPE (National Environment Protection Agency), Ministry of Agriculture, the Regional Agricultural Development Commission, etc.)	•	•
Relations with consumers of treated water and sludge		
Receipt of complaints	•	•
Customer relations	•	
Daily, monthly, and yearly reports		•
Management of local premises and file-keeping		•
Security		•
Staff management	•	•
Mail processing	•	•
Budget preparation	•	•

6.4 Financial Analysis

6.4.1 Identification of Savings: Private Sector - ONAS

Personnel

An examination of the human resources used to operate the treatment plants and pumping stations has shown that the work force is not excessively large. However, personnel reorganization and increased specialization will yield savings for the private firm. The implementation of these changes will be easier for the private company, since the rules that govern the management of its personnel are less stringent. The private company will rely on the involvement and versatility of its employees at all levels to carry out its mandate successfully.

Examination of the private company's personnel needs to perform the tasks for which it will be responsible was carried out and then approved by the participating plant foremen. Table 9 shows the results of this study and compares the number and cost of ONAS' personnel with that of the private company.

Table 9
Private Sector and ONAS Operations Personnel

Job description	ONAS							Private		
	SE-1	SE-2	SE-3	Pumping station	Total	Unit cost	Total cost	Nbr	Unit cost	Total cost
Center manager	1	1	1	0	3	9,750	29,250	1	13,000	13,000
Operator	1	1	1	0	3	7,150	21,450	3	8,000	24,000
Full-time worker	3	3	3	0.5	9	4,550	42,870	6	5,500	33,000
Part-time worker	2	3	2	0	10	1,800	12,600	6	2,000	12,000
Caretaker	1	1	1	0	7	1,800	5,400	6	2,000	6,000
Total	**8**	**9**	**8**	**0.5**	**25.5**	--	**111,930**	**19**	--	**88,000**

The private firm will therefore be able to realize a reduction in personnel costs of approximately 21 percent.

Rolling Stock

The specialists also calculated the level of savings that the private firm can attain with respect to rolling stock used for operation and maintenance. The private company will acquire only what is absolutely necessary, and will resort to subcontractors to ensure the maintenance of its vehicles. The private firm will also have to lease specialized vehicles, such as the combined or the aspirator, along with the personnel needed to operate the equipment, to avoid depreciation costs for what may only be limited use.

The assessment demonstrates that when it comes to the Northeast Department, ONAS' yearly depreciation expense for its operating equipment is 69,472 TD and that the part of this sum that applies to operating the facilities in question is 13,720 TD, or 20 percent of the total amount. Table 10 compares this figure with the yearly depreciation expenses for the equipment the private company will need to use to operate the facilities, that is, 12,192 TD. The productivity gain for this line item is therefore 11 percent.

Table 10
Rolling Stock Expenses: Public and Private Sector

Type	Unit cost	ONAS	Private firm	
		Cost	Qty	Cost
Tractor	17,000	6,715	1	17,000
Van	35,000	41,475	0	0
2-door pickup	17,000	13,430	0	17,000
4-door pickup	20,000	3,950	0	0
Car	15,000	8,888	2	3,000
Truck	50,000	9,875	0	0
Motor bike	1,200	1,422	6	7,200
Radio system	5,000	0	1	5,000
Total		**85,755**		**76,200**
Depreciation (7-year term)		**13,720**		**12,192**

The first treatment plant O&M contract does not allow the private company to fully amortize the rolling stock it will have to purchase to carry out its mandate. The opening of other contracts in the same area, however, will permit the company to realize substantial savings when it comes to using its mobile fleet to increase profit margin.

Outside Services

The experiences of foreign private companies have shown significant reductions in O&M costs. Savings of up to 30 percent on energy costs are possible at treatment plant, pumping stations, and business offices which are a normal part of operating services. The specialists fixed the objectives to be attained in electricity at 40 percent and water at 10 percent. Since water is primarily used to maintain the rolling stock, a reduction in the number of vehicles needing maintenance also reduces the bill for the various items which go toward their maintenance.

It is reasonable to assume reductions in energy costs given that the three treatment plants perform at lower levels than other comparable plants. The specialists estimate that the private company would be able to reduce energy consumption uses while complying with effluent requirements in respect to BOD_5 removal. The program of cutting electrical power and alternating aerators will contribute to reducing the excessive consumption of electricity.

6.4.2 Assumptions

A certain number of assumptions have guided the preparation of the financial analysis and the project budget. In many cases, cost allocation keys were used to determine the share of costs incurred by the different ONAS administrative units that are attributable to the O&M of the pilot facilities. The relevant assumptions are as follows:

- Budget provisions for Division of Maintenance (DM) activities were taken into account, since this division is primarily associated with pumping stations and treatment plants. Budget provisions for the maintenance and upkeep of the property which is to be transferred to the private operation are included.
- Depreciation for rolling stock was established on a linear basis and for a period of seven (7) years. Interest costs for equipment acquisition have not been taken into account in the study of public vs. private sector budgets, since the savings the public sector realizes from lower interest rates goes to finance the acquisition of a greater amount of rolling stock.
- Personnel clothing expenses have been broken down by comparing the number of employees working in O&M at the relevant centers from the perspective of public sector operations and the pilot center run by a private firm. A budget of 250 Tunisian dinars per year per employee has been allocated for this line item.
- The private sector O&M budget does not include property rental expenses, since the plant office will be available for use by the private company to carry out project activities. A building maintenance budget, however, has been provided to ensure that these buildings remain in good condition throughout the life of the contract.
- The private sector operating budget also includes a 20 percent profit margin and 20 percent tax rate.
- The proportion of the Northeast Department wastewater treatment activities relating to the facilities in question was applied to a number of line items to obtain public sector operating costs specific to the pilot facilities.

6.4.3 Preparation of an Operating Budget

Using the detailed 1992 and 1993 operating cost analysis and the 1994 and 1995 budget provisions ONAS set for the treatment plants and pumping stations participating in the pilot project, the specialists developed an assessment of ONAS O&M costs related to the pilot facilities.

A percentage was then applied to each line item to account for the level of private sector savings estimated by the study team and confirmed by the center managers. In addition, the team applied the following inflation rates to the relevant line items over the five-year life of the contract:

Salaries	7% yearly
Outside services	5% yearly
Goods consumed	5% yearly

The application of these rates in the budget varies from year to year to reflect cost cycles more similar to those currently experienced by ONAS. Thus, for example, transportation expenses can be fixed for two consecutive years, then decrease substantially the third year and fourth year, and then increase again the fifth year. This approach takes into account the need for outside assistance during the first two years of the contract.

Finally, having calculated all the costs, the team of analysts examined the costs of contract management from both the private and the public sector perspectives. For the private sector, the following factors were adopted following a discussion of the guidelines and meetings with representatives of private firms:

a)	Contingency	10%
b)	Main office administrative costs	3%
c)	Local administrative costs	5%
d)	Gross profits	20%
e)	Taxes on profits	20%

The percentages of a), b), and c) correspond to values encountered in privatization contracts in other countries. It is important to point out that the low percentage of local administrative costs takes into account the fact that some of the administrative expenses, such as office supplies and the use of vehicles, have been integrated into operating expenses.

The financial analysis shows that contracting out O&M can save ONAS around 7 percent on current costs. This result includes the costs associated with the Performance Monitoring Unit (PMU), contingencies, and profit accruing to the private company.

The estimated cost of the contracting out O&M of the SE-1, SE-2, and SE-3 treatment plants and the eight pumping stations over a five-year period comes to 2,166,665 Tunisian dinars before taxes. The estimated cost for ONAS to manage the PMU (158,161 TD) must also be added to this amount. ONAS' cost can be broken down for the length of the five-year contact as follows:

Table 11
Budget Summary (TD)

Year	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Contract amount	389,999	410,961	430,325	453,828	481,551	2,166,665
PMU expenses	29,201	30,369	31,584	32,847	34,161	158,162
Spare parts (ONAS)	13,500	14,040	14,602	15,186	15,793	73,121
Total cost	**432,700**	**455,370**	**476,511**	**501,861**	**531,505**	**2,397,948**

The sensitivity analysis shows that the level of savings is more dependent on reduction of personnel costs than on reduction of equipment costs. With a personnel cost reduction of 20 rather than 25 percent, the total savings to ONAS drops to 4.6 percent. With a personnel cost reduction of 15 percent, total savings slip further to 2.6 percent. This indicates that the financial feasibility of the project depends largely on the savings that the private firm can realize on personnel costs.

The project is less sensitive to changes in rolling stock costs. When these costs rise 5 percent, total savings remains almost constant at 6.5 percent. An increase of 10 percent yields an overall savings level of 6.3 percent.

6.5 Additional Benefits

In addition to savings on operation costs, the pilot project can also generate other benefits for the public sector and the users.

In the interest of improving service quality, the private company can be entrusted with specific tasks that ONAS is unable to perform because of the breadth of its responsibilities, the overwhelming number of tasks it has to carry out, and/or the inadequacy of its human and financial resources. Through the introduction of new technology and new approaches to plant management, the private firm can also help solve some of the main technical problems, such as unpleasant odors.

Furthermore, ONAS would be able to reduce the size of its rapidly growing staff, which contributes increasingly to high costs associated with network and treatment plant management. ONAS could even envision reorganizing its employees' work assignments if O&M responsibilities for several other facilities are transferred to private companies.

The savings ONAS could make on private sector contracts would provide additional funding for new wastewater projects in currently underserviced or unserviced regions.

By mobilizing additional funds through its privatization program, ONAS would also be able to decrease its financial dependence on the central government budget and count on its own resources to implement the liquid waste management program.

6.6 Performance Monitoring Unit

A Performance Monitoring Unit (PMU) will be have the technical and administrative personnel required to perform as ONAS' representative throughout the implementation of the pilot project.

The PMU will be required to perform the following tasks:

- Implementation of the contract and coordination with ONAS' Operations Department and/or other units;
- Financial, administrative, and legal management;
- Service quality and compliance with environmental standards monitoring;
- Customer relations; and
- Coordination with the ONAS main office on studies on plant rehabilitation.

The PMU team will be made up of at least two persons: the unit chief, who will have a technical background, and an administrator. The unit must be entirely independent and must receive logistical support from ONAS.

The PMU, as ONAS' primary representative, will be in charge of customer relations. When it receives any complaints, it will communicate them to the contractor, who will take the necessary measures. In this way, the contractor will have to answer to only one person and can concentrate on performing the tasks for which he/she is responsible.

6.7 Participation of ONAS Personnel

ONAS personnel can participate in the liquid waste network privatization in two ways. First, ONAS can request that the private company offer the personnel of the concerned treatment plant the possibility of joining the new operations team. This formula is more appealing when the project treatment plants are organizationally discrete entities. The private firm would be free to offer employment to as many ONAS employees as desired and could complete his team by hiring other employees.

In this context, ONAS can initiate incentives aimed at assisting its personnel make the transition from the public sector to the private sector. An ONAS employee, for example, who has been offered employment by a private company could accept on the condition that ONAS agrees to rehire him/her within a given amount of time, should the employee wish to return to the public sector.

A second way ONAS can participate in the privatization process would be to encourage its employees to create new small and medium enterprises (SME). The experience of the current employees would bode well for successful management of wastewater facilities. This approach has the advantage of allowing ONAS to reduce the size of its labor force over the long run.

Sensitizing and encouraging ONAS' personnel to the privatization process can take several forms. First, ONAS can grant advantages to bidders which include former or current ONAS

employees; this approach, however, might lead to accusations of preferential treatment. Along similar lines, ONAS could make its rolling stock available on a rental or rental-purchase basis to allow some employees to bid on contracts without having to make major investments. Such an initiative would reduce the initial expenses associated with starting up a new private company of the SME type in this specialized area.

As ONAS continues to privatize O&M functions, it would be beneficial to initiate a program to make employees aware of the business advantages offered by the private sector. It would be premature, however, to initiate such a program before the pilot experience is fully underway.

In the specific case of the SE-1, SE-2, and SE-3 treatment plants and their eight collection pumping stations, defining responsibilities is clear-cut since each station serves a specific clientele and has its own personnel. The transfer of a part of the present work force from public to private employment would appear easy to manage where the solicited employee would accept joining the private company. It is clear that not all of the employees who work at the treatment plants can be hired by the private firm. The firm will want to reorganize its work force to reduce its overall size; this might entail delegating more responsibility to certain employees, while making sure that there is no duplication of effort.

ONAS can also envision reassigning part of its work force to other zones which have not been privatized; this would not be difficult given the number of as yet unfulfilled requests from other service departments for additional employees.

7 Effluent Requirements

The study entitled *Analysis of Standards and Definition of Performance Requirements for the Liquid Waste Sector in Tunisia* demonstrated the need to define effluent performance requirements for each of the plants transferred to a private company. These requirements can differ from national effluent requirements.

The SE-1, SE-2, and SE-3 treatment plants have two distinguishing elements:

1. These treatments plants were designed to treat only organic pollution and include no equipment for treating other types of pollution, such as toxic solids, nitrogen, phosphate, and other elements listed in the national standards which are not directly related to organic pollution standards.
2. During the peak tourist season, the three treatment plants operate to the point of saturation when it comes to volume and pollution loads.

The first point makes it difficult to require the private contractor to comply with parameters other than BOD, COD, and SS, since it will not be given the means to do so. The contractor will be required, however, to provide ongoing measurements of these parameters (see the standards study for the required frequencies of these readings) and to inform ONAS of any anomalies observed in the quality of the untreated wastewater so that ONAS can rapidly intervene. Since ONAS remains the owner of the treatment plants, ONAS is legally required

to discharge effluent which complies with all of the required standards. As part of the pilot project, ONAS only contracts out to the private company that part of its mission that involves eliminating biological pollution to produce effluent which complies with the contractual obligations; ONAS will not contract out to a private company the task of making effluent comply with all the other parameters. The private company consequently need not worry about noncompliance with those parameters that are not specified in the contract. To prevent the contractor from increasing the concentration of certain parameters by adding chemicals to the treatment process, however, any modification to the initial procedure must be initially approved of by ONAS.

Furthermore, because the plants operate at saturation point on a seasonal basis, when a specific level of saturation is reached, some of the basic contractual requirements may be relaxed.

The tables in Annex G recapitulate the periods during which the volume capacity of the three treatment plants was exceeded in 1992 and 1993.

For the SE-1 plant:
The maximum volume attained during the above-mentioned period exceeded the capacity of the treatment plant by 20 percent. The BOD load exceeded the plant's capacity by 25 percent.

For the SE-2 plant:
The maximum volume attained during the above-mentioned period exceeded the capacity of the treatment plant by 200 percent. The BOD load exceeded the plant's capacity by 33 percent.

For the SE-3 plant:
The maximum volume attained during the above-mentioned period exceeded the capacity of the treatment plant by 70 percent. The BOD load exceeded the plant's capacity by 200 percent.

Given these considerations, we suggest that the effluent contract requirements be based uniquely on the following parameters:

- BOD < 30mg/l
- COD < 90mg/l
- SS < 30mg/l

The acceptable total daily load discharge into a natural environment is defined in Annex C of *Analysis of Standards and Definition of Performance Requirements for the Liquid Waste Sector in Tunisia.*

The treatment plant monitoring programs will conform to those set up in Annex E of the same study.

The private contractor may relax standards when the daily load of BOD_5, COD, and/or SS exceeds a certain saturation level in relation to the measurement values.

We propose that when the loads reach twice the measurement values, the contractual requirements would be one and a half times the base values mentioned above. When they exceed 200 percent of the treatment plant affluent load, the operator will no longer be held to the contractual requirement.

Furthermore, the discharge of raw wastewater into the receiving environment by storm overflows or pumping station or treatment plant outlets can only be tolerated during a storm in which the rainfall exceeds 1 mm. When a breakdown occurs at a pumping station or treatment plant, the overflow can only be operated when the nature of the breakdown is unforeseen and is not the result of operator negligence and when the operator has immediately taken the necessary measures to repair the breakdown as quickly as possible.

8 The Request for Proposals

The three treatment plants and eight pumping stations will constitute one Request for Proposal (RFP), so that the contractor can attain a certain economy of scale and the RFP will attract contractors of a certain size and experience.

The study team recommends that the RFPs for the treatment plants and pumping stations be issued at the same time as the RFP for the network pilot project.

We would also recommend leaving a period of at least two months between the time the RFP is sent out and the final submission date to allow for more publicity and to leave Tunisian firms adequate time to form partnerships with international companies.

Before sending out the RFPs, and in the interest of giving all interested parties the same advantages, we would recommend inviting potentially interested firms to a guided visit of the treatment plants and pumping stations. This visit would be followed by a meeting during which the bidders would be able to ask questions about the contract and tender documents; the answers would be given either on site or sent to the firms afterwards. Minutes of the meeting would be drawn up and sent to all the bidders.

9 Conclusion and Recommendations

The project to transfer responsibility for O&M of liquid waste treatment facilities to a private firm is a viable venture for both the private and public sector participants.

A financial analysis of the project's operating budgets shows that ONAS can reduce its overall operating costs of these facilities by 7 percent, while the private firm makes an acceptable profit. The savings would come primarily from reductions in energy consumption and reorganization of personnel.

Despite this conclusion, it should be pointed out that the choice of the Hammamet zone is a problematic one in that all the facilities, structures, and other equipment serving this area are old and worn out. The condition of the equipment complicates the operation of the facilities, limits the efficiency that the private firm can attain, and makes the evaluation of the pilot project more difficult. The authors of this study, while confirming the technical and financial feasibility of this project, want to emphasize also that the choice of more recently built treatment plants would lead to more significant savings and a more positive evaluation of the pilot project.

In the contract clauses, it would be in the interests of both parties to make a provision for extension of the contracts beyond the termination date for a specific or to-be-determined duration.

A seminar could be organized during contract implementation for the personnel of other ONAS-managed treatment plants, so that they may benefit from the developments and skills of the private firm.

Finally, rehabilitation of all the participating works should be planned in view of the new operating conditions. In some cases, equipment for tertiary treatment should be installed. The mechanical equipment should be replaced by newer, more efficient and cost-effective equipment. Personnel should have available the tools necessary to monitor all aspects of the treatment procedure.

ONAS should consider making the following improvements to the project facilities:

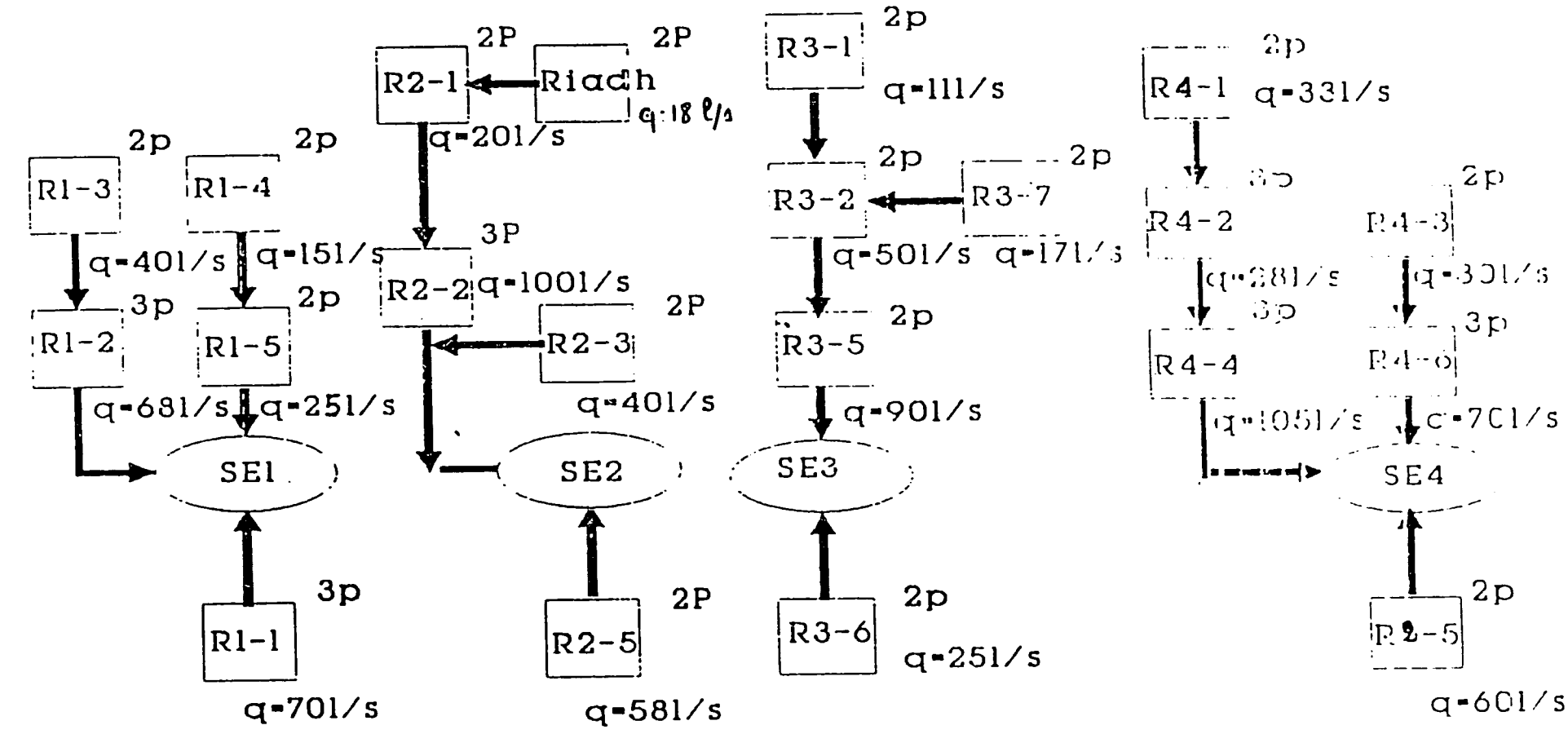
- Double the secondary sedimentation capacity by adding a second clarifier to all the stations. This would prolong the retention time and improve clarification during the high season.
- Revise and increase the volume of wastewater pumped so as to be better able to meet the increased demand during the high season. The recycling pumping systems must be replaced.
- Increase the amount of surface space to dry sludge to meet the increased demand during the tourist season.
- Rehabilitate the plant laboratory material so as to be able to monitor measurements on a daily basis.
- Provide the pumping stations with a third pump in those cases where there are only two.
- Provide the pumping stations with a completely automatic system.
- Install wall sluice gates at the pump exit of station R2-2 to correct problems caused by pump functioning.
- Construct a buffer basin in plant SE-1 to regulate the influx of wastewater into the plant.
- Overhaul all the electro-mechanical contacts to ensure the treatment plants function automatically.
- Replace the manual bar racks with mechanical units in the pumping stations where permitted.
- Either readapt the capacity of the pumping stations or reorganize the pumping between the various stations.

- Replace the manual bar racks with mechanical units in the pumping stations where permitted.
- Either readapt the capacity of the pumping stations or reorganize the pumping between the various stations.

ANNEXES

ANNEX A

Schematic Pumping Station Distribution Plan



Capacité des STEP

Qm=4208 m3/j	Qm=5146 m3/j	Qm=3500 m3/j	Qm=9585 m3/j
DBO5=1300kg/j	DBO5=2200kg/j	DBO5=720 kg/j	DBO5=5870 kg/j
Qph=486 m3/h	Qph=572m3/h	Qph=350 m3/h	Qph=948 m3/h

q : Débit unitaire d'une pompe

np : nombre des pompes installées

qm : débit moyen journalier

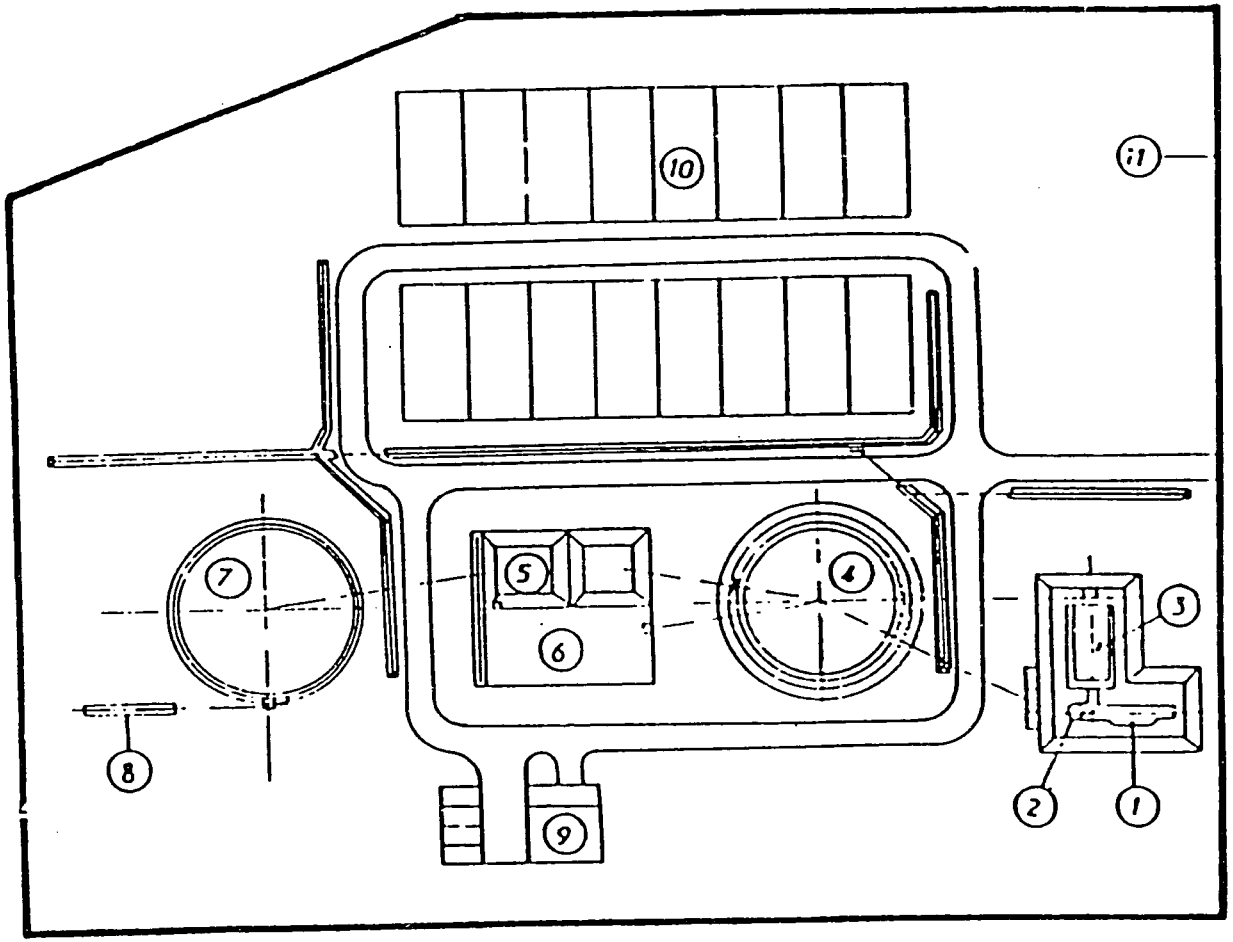
DBO 5 : charge organique

Qph : débit de pointe horaire

ANNEX B

Treatment Plant Site Plans

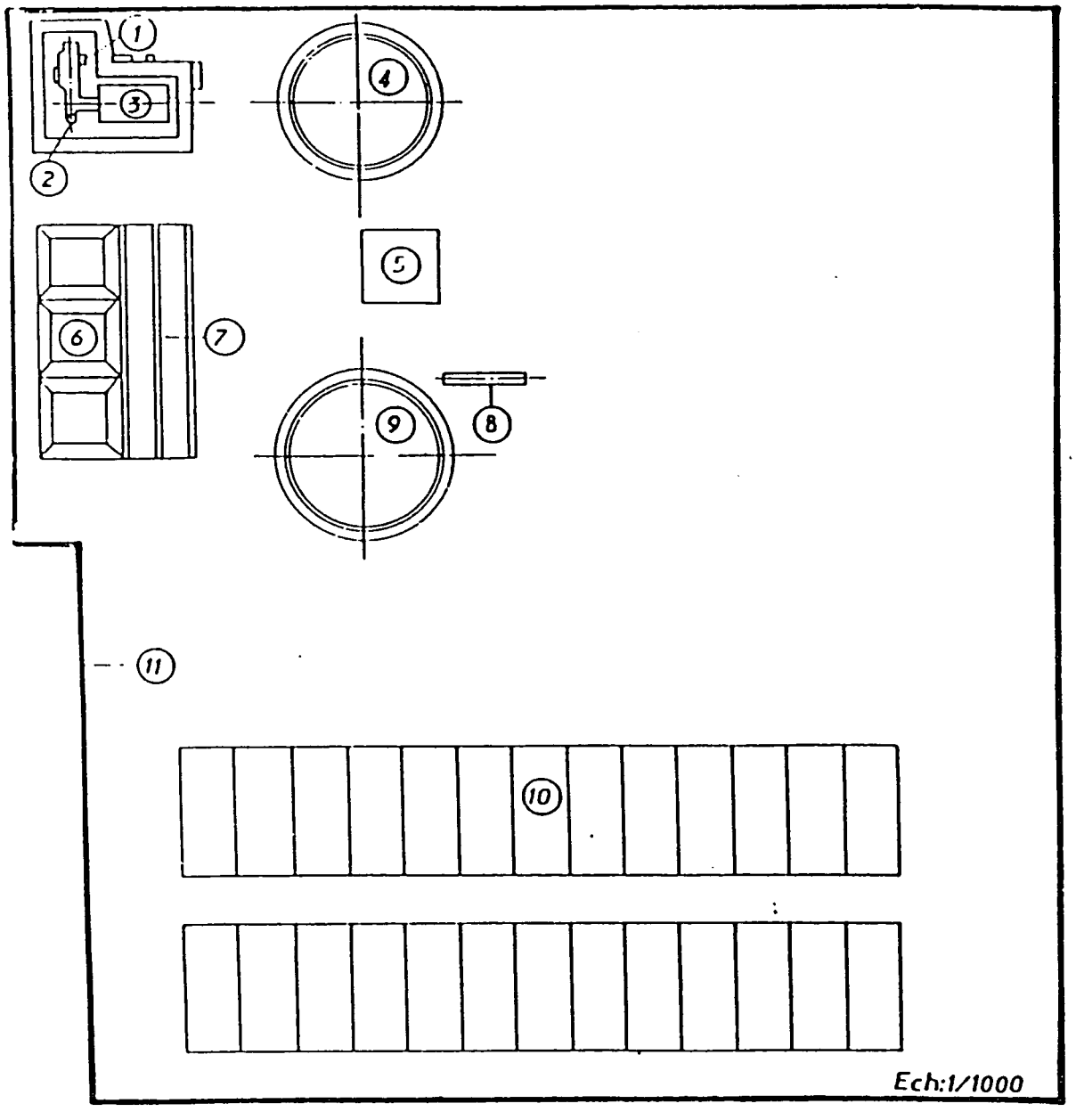
STATION D'EPURATION
SE 1



ECH : 1/1000

LEGENDE

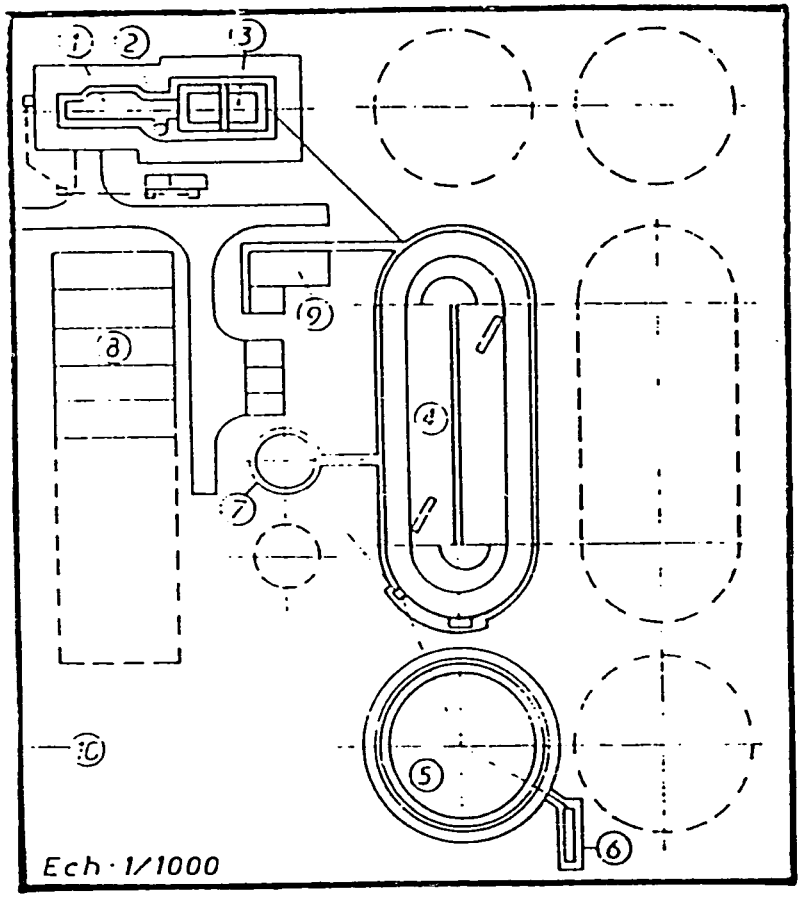
1 DEGRILLAGE
2 DESSABLEUR
3 DEGRAISSEUR PREAERATION
4 DECANTEUR PRIMAIRE
5 BASSIN D'ACTIVATION
6 BASSIN DE STABILISATION
7 DECANTEUR SECONDAIRE
8 CANAL DE JAUGEAGE
9 LOCAL D'EXPLOITATION
10 LITS DE SECHAGE
11 CLOTURE



STATION D'EPURATION
SE 2

LEGENDE

1 DEGRILLAGE
2 DESSABLEUR
3 DEGRAISSEUR
4 DECANTEUR PRIMAIRE
5 LOCAL D'EXPLOITATION
6 BASSIN DES BOUES ACTIVEES
7 BASSIN DE STABILISATION
8 CANAL DE JAUGEAGE
9 DECANTEUR SECONDAIRE
10 LITS DE SECHAGE
11 CLOTURE



STATION D EPURATION

S E 3

Legende

1 DEGRILLAGE
2 DESSABLEUR
3 DEGRAISSEUR
4 CHENAL
5 DECANTEUR SECONDAIRE
6 CANAL DE JAUGEAGE
7 SILO
8 LITS DE SECHAGE
9 LOCAL D'EXPLOITATION
10 CLOTURE
--- EXTENSION

ANNEX C

Treatment Plant Technical Specifications

Description détaillée des STEP

I STATION D'EPURATION SE-1

A TRAITEMENT DES EAUX

1 DEGRILLAGE

Grille courbe en acier galvanisé à nettoyage automatique par l'amont.
Fonctionnement asservi par flotteur.
Dégrilleur manuel de secours.

Espacement entre barreaux : 1,5 cm
Largeur : 1,0 m

Moteur électrique
Marque : MERGER. SKE 71 4B N° 453061
Mot. asym. 3 ~ TPM 1380 cos ℓ =0,71
U = 220/380 V ~ 2/1,15 A
F = 50 Hz
P = 0,5 Cv

Réducteur
Marque : MERGER N° 1593369
Type : RAVC 150/ RMFD 72 M63/4
Puissance transmise : 0,5 Cv
Vitesse de rotation : 1450 tours/mn
Vitesse de sortie : 2 tours/min
Rapport de réduction : 1/766

2 DESSABLAGE

Diamètre des particules retenues : 0,2 mm
Diamètre de l'ouvrage : 2,50 m

Vis dessableur à Moteur électrique
SEW USOCOME SAF 67 WAGUENAU
COM 230 89411601 t400/125t/min
WUMID trop
W250 CL isol B.I.P
5t UDE 0,53 V
U = 220 /380 v ~ 2,25 / 1,3 A
P = 0,37 kw
cos ℓ =0,70
NR 262-69 355

Extraction des sables par air lift
Surpresseur dessableur
Marque : HIBON
Type : DU 1612620613 - française
Moteur : MEUB : 132 S2
FL : 5321831/s
Δ : 220 V - 26,8 A ☆ : 380 - 15.3 A
F = 3~50 Hz
P =7,5 kw
n =2890 tours/mn
CL :E : IP55 Δθ75°C

Pompe Egoutage
Marque : Flygt
type : 3065
Nationalité : Suédoise
Moteur : Flygt 3065 - 180 - 64074
Δ : 220 V - 4,2 A ☆ : 380 - 2,4 A
F =3~50 Hz
P =0,95 kw
1300 Cv
Vitesse de rotation =1400 tours/mn

3 DEGRAISSAGE — PRE-AERATION

Volume de l'ouvrage : 100 m3
Temps de séjour au débit maximum de pompage : 12mn
Temps de séjour au débit moyen de la période de pointe : 22mn
Aération par injection d'air sous pression sous forme de moyennes bulles

4 DECANTATION PRIMAIRE

Diamètre de l'ouvrage : 18m
Section utile : 254m2
Volume : 570 m3
Hauteur d'eau moyenne : 2,24 m

Temps de séjour en heure :
au débit moyen : 1,34h
au débit de pointe : 2,08h
au débit maximum de pointe : 1,17 h
Charge superficielle m3/m2/h
Au débit de refoulement de 245 m3/h : 0,96
Au débit de refoulement de 486 m3/h : 1,92

Rendement
Réduction de DBO5 : 35%
Réduction de MES : 60%
Poids des MES retenues en kg/j : 793
Caractéristiques de l'effluent décanté en ppm
DBO5 : 135
MES : 80
Consommation journalière en énergie électrique pour fonctionnement du pont racleur (moteur 0,5 kw) : 19 kwh/j

Moteur électrique
USOCOME - française
SEW SA 67/HAGUENAU
type : R80, 60D/1e4
COM 210 4667/602 kw 0,25
U = 220 Δ / ☆ : 380 A = 1,47 / 0,85 H250
Nr : 263 04165
cos ℓ =0,70
Vitesse : 1400/2,3 tr/mn
CL : ISOL B HUMID trop. IP55UDE 0,530

Réducteur
Marque : SEW : USOCOME S.A 67/ HAGUENAU - française
Type : RF60 Me :1400 i=1956
N° 2304162

B TRAITEMENT SECONDAIRE : EPURATION BIOLOGIQUE DES EAUX

Procédé des boues activées
Alimentation en tête du bassin d'aération
Mélange intégral

1 BASSIN D'AERATION

Caractéristiques d'une cellule

Nombre d'unité identique :2
Volume : 430 m3
Hauteur d'eau : 3,84 m
Section 11 x 11
Volume total mis en oeuvre : 860 m3
Rendement d'épuration : 76%
Volume minimum calculé : 822 m3
Charge admise : 622 kg/j
Charge appliquée effective : 0,99 kg DBO5/m3/j

Charge massique (30% de boues) : 0,346 kg DBO5 MES
Temps de séjour moyen : 3,13 h

Aération

Quantité d'oxygène nécessaire en moyenne : 496 kg O2/j
Oxygénation réalisée à l'aide de deux aérateurs de surface identiques d'une puissance de 20 kw
Capacité d'oxygénation variable de 10 à 30 kg O2/h
Rendement moyen 1,6 kwh consommé / kg O2 transféré
Consommation moyenne journalière 310 kwh/j
Rendement moyen 0,47 kwh/kg DBO5 éliminé
Fonctionnement des aérateurs asservis à la concentration en O2 dans le bassin

TURBINES

Unités : 2
Réducteur
Marque : CUIRACEM
Type : SL 18/9P/35ch
Série : 756272/1 - française
Moteur électrique
moteur asynchrone N :FL 778333
U : JUL 200 Lr 4 : Kw : 2,5 35ch
U = Δ : 220 / ☆ : 380 A = 85,8 / 49,5 Echt :75
cos ℓ =0,85
F= 50Hz
H250 Ptot
tr/mn 1460 ISOL CLASSE E Rotor U : A Masse ..... kg
Norme C51-100

2 DECANTION SECONDAIRE

ouvrage circulaire
Diamètre 21 m
Surface utile 346 m2
Volume 979 m3
Hauteur d'eau 2,83 m

Temps de séjour en heure
au débit moyen (+ recyclage de 250 m3/h) : 2,3
au débit moyen de pointe : 0,79
au débit maximum de pointe : 1,40
au débit maximum de refoulement : 1,45

Consommation journalière pour l'entraînement du pont racleur de boues : 24 kwh/j

Moteur électrique :
type R80.60D/1c4
COM : 2104667/602 kw :0,25
U = Δ : 220 / ☆ : 380 A = 1,47 / 0,85
Nr : 26304167
cos ℓ =0,85
tr/mn : 1400/2,3
CL : ISOL B UDE 530

Réducteur
Type : R80-M
COM : 1404607/601 i = 31-28
Nr = 16033 183 CS80 mkg

POMPE DES EAUX TRAITEES

Marque : Flygt
Type : 3151
Nationalité : Suédoise
Moteur électrique : Flygt 3151-180-57140
e 3151 -4.10
U= 380 V 24 A
12,6 kw
1400 tours/mn

3 RECYCLAGE DES BOUES BIOLOGIQUES

Volume moyen recirculée assuré par air lift : 3300 m3/j
Débit maxi. : 250 m3/h

Pompe de recyclage des boues

Marque : FGIGIER
Type : T4 100 HP6 - française

Moteur électrique
Mat : MEUB 112 MR6 NOUACEM - compax
F : 53119166/s
U = Δ : 220 / ☆ : 380 A = 10,85 / 6,26
F= 3 ~ 50Hz
P = 2,2 kw
n = 915 tours/mn
CL : FIP 55 Δθ 75°C

Pompe
Marque :Flygt - française - SA
Fabrication : 21296
Débit : 50m3/h
HMT : 2m
Vit. Rotor : 1000 tour/mn
N° de dossier : 6T04301

4 JAUGEAGE DE DEBIT

Canal de Venturi avec débit-mètre sans enregistreur

5 RECYCLAGE DES EAUX TRAITEES

Réalisé par une pompe submersible installée dans un regard à la sortie du décanteur secondaire
Débit : 250 m3/h
HMT 2,5 à 3.00 m
Puis. mot. 8cv

C TRAITEMENT DES BOUES

1 BOUES BIOLOGIQUES EXCEDENTAIRES

Production journalière 430 kg/j
Volume correspondant à 0,75% MES 57 m3/j
%Refoulement à l'aide d'une pompe à Vortex
Débit 50 m3/h à 2 m HMT
Moteur 3cv
Consommation journalière 2 kwh

Pompe boue N°1

Marque : EGIGIER
Type : T4 100 HP6 - française -
moteur électrique
C.E.M Electro-mécanique NOVACEM - compax
Mat : MEUA 112 MR6
FL : 533/646/s
U = Δ : 220 / ☆ : 380 A = 10,85 / 6,26
F= 3~50Hz
P = 2,2 kw
n = 915 tours/mn
CL : E/P44 Δθ 75°C

Pompe
Type : T4100 HP6
Fabrication : 21291
Débit : 80 m3/h
HMT : 2m
Vit. Rotor : 1000 tour/mn
N° de dossier : 6T05501

Pompe boue N°2
Marque : EGIGIER
Type : T4 100 HP6 - française -
moteur électrique
C.E.M Electro-mécanique NOVACEM - compax
Mat : MEUA 112 MR6
F : 5331644/s
U = Δ : 220 / ☆ : 380 A = 10,85 / 6,26
F= 3 ~ 50Hz
P = 2,2 kw
n = 915 tours/mn
CL : E/P44 Δθ 75°C
Pompe
Type : T4100 HP6
Fabrication : 21295
Débit : 80 m3/h
HMT : 2m
Vit. Rotor : 1000 tour/mn
N° de dossier : 6T05501

2 TRAITEMENT DES BOUES BRUTES

Quantité journalière des boues brutes 1223 kg de MES
Composition Solide Volatile 853 kg
Matières minérales 370 kg

Stabilisation par voie aérobie

Période de stabilisation : 12 jours
Concentration moyenne de MES dans le bassin de stabilisation 2%
Volume de stabilisation nécessaire (15°C) 732 m3
Volume effectif : 757 m3
Temps de séjour effectif : 12 j
Charge en S.V. : 1,13 kg/m3/j
Poids journalier des boues stabilisées en matières sèches 924 kg/j
Volume correspondant après épaississement (humidité 97%) : 31m3/j

Aération

Réalisée à l'aide d'injection d'air sous pression (grosses bulles)
Quantité d'oxygéne nécessaire 900 kg/j
Définition des surpresseurs d'air
Besoin journalier pour dégraissage préaération 13700 m3
Recyclage des boues biologiques 3300 m3
Aération de bassin de stabilisation : 60300 m3
Soit un total journalier de 77300 m3 <=> 3220 m3/h

3 LITS DE SECHAGE

Surface prévue : 2304 m2
16 lits de 18 x 8 + 6 nouveaux lits de 18 x 8
Charge max. 147 kg MES/m2/an
Temps moyen de séchage : 1 mois
Quantité journalière de boues déshydratée à évacuer (humidité 70%) : 3 m3/j.
Volume annuel des boues déshydratées (70% d'humidité) 1095 m3/an.

D SERVICES GENERAUX

Le bâtiment d'exploitation comprend
- Un bureau laboratoire
- Des sanitaires
- Un local de transformateur
- Une salle pour les surpresseurs :

Surpresseur N°1
Marque :HIBON
Type :N° DU110 18630118 - française
Moteur électrique :
- Moteur asynchrone N :FL 782247
- MEUL 280 S4 kw 75 100 ch
- U = Δ : 220 / ☆ : 380 A = 246 / 142 Echt = 80
- cos ℓ =0,86
- H250 prot tr/mn 1480 ISOL Classe A
- Rotor V A Masse 595 kg
- Norme C51-100

Réducteur
- Pompe HIBON
- Vitesse : 745 tr/mn
- pression 4200 m C.E
- Dépression 0 m m C.E

Surpresseur N°2
Marque :HIBON

Type :N° DU110 17630131 - française
Moteur électrique :
Moteur asynchrone N :FL 782257
MJUL 225 M4 kw 45 60 ch
U = Δ : 220 / ☆ : 380 A = 149 / 86 Echt = 75
tr/mn 1470 ISOL Classe E
Rotor V A Masse *** kg
Norme C51-100
Réducteur
Vitesse : 865 tr/mn
pression 4200 m m C.E

E ENERGIE ELECTRIQUE

Consommation électrique pour services divers 10 kwh/j
Consommation journalière 1630 kwh/j
Consommation annuelle 594950 kwh/an

II STATION D'EPURATION SE-2

A TRAITEMENT DES EAUX

1 DEGRILLAGE

Grille courbe en acier galvanisé à nettoyage automatique par l'amont.
Fonctionnement asservi par flotteur.
Dégrilleur manuel de secours.

Espacement entre barreaux : 1,5 cm
Largeur : 1,0 m

Moteur d'entraînement 0,5 kw
Consommation journalière 3kwh/j

Moteur
- Marque : MERGER
- type : M63/4, TROPIC IP55
- Puissance : 0,5 ch
- Vitesse de rotation = 1400 t/mn
- U = 220/380 V

Réducteur
- Marque : MERGER
- type : RAVC 150/RMFD 72 M63/4 sortie A
- Rapport de réduction total : 1/766

2 DESSABLAGE

Diamètre des particules retenues : 0,2 mm
Diamètre de l'ouvrage : 2,50 m

Moto réducteur d'entraînement des palettes 0,25 kw
Consommation journalière 5 kwh/j

Extraction des sables par air lift
PISTA type 2,25
Moto-réducteur
- Marque : SEW
- Type : RF40 D 71 D4
- Puissance : 0,5CV
- U : 220/380
- F : 50 Hz

Surpresseur
- Marque : HIBON
- Type : DV 1,6
- Vitesse : 2850 tours/mn
- Puissance au refoulement : 0,8

Moteur
- Marque : CEM
- Type : 10 ch
- Vitesse : 3000 tours/mn

3 DEGRAISSAGE — PREAERATION

Volume de l'ouvrage : 100 m3
temps de séjour au débit maximum de pompage : 12mn
temps de séjour au débit moyen de la période de pointe : 22mn
Aération par injection d'air sous pression sous forme de moyennes bulles

Moteur
- Type : E 7727
- Puissance : 20 Ch
- Vitesse : 1465 tours/mn
- U : 220/380

Surpresseur

4 DECANTATION PRIMAIRE

Diamètre de l'ouvrage : 18 m
Section utile : 254m2
Volume : 570 m3
Hauteur d'eau moyenne : 2,24 m

Temps de séjour en heure :
- au débit moyen :2,49h
- au débit de pointe : 1,73h
- au débit maximum de pointe : 1,00 h

Charge superficielle m3/m2/h
- Au débit de refoulement de 360 m3/h : 1,42
- Au débit de refoulement de 504 m3/h : 1,59
- Au débit de refoulement de 504 m3/h : 2,84

Rendement
Réduction de DBO5 : 35%
Réduction de MES : 60%
Poids des MES retenues en kg/j : 1324

Caractéristiques de l'effluent décanté en ppm
DBO5 : 182
MES : 112
Consommation journalière en énergie électrique pour fonctionnement du pont racleur (moteur 0,9 kw) : 19 kwh/j

Entraînement par moto-réducteur SEW
Type : R8060 D71 C4 - Protection IP65
Puissance : 0,25 kw
Vitesse : 1400 tours/mn
Vitesse de sortie : 2,3 tours/mn

B TRAITEMENT SECONDAIRE : EPURATION BIOLOGIQUE DES EAUX

Procédé des boues activées
Alimentation en tête du bassin d'aération
Mélange intégral

1 BASSIN D'AERATION

Turbine

Unité : 3
Marque : SEM OX
Type : SL 18.9 P IV
Moto-réducteur :
Marque : HANSEN
Type : NE36
Moteur : 35 ch
Vitesse : 1500 tours/mn
Vitesse de sortie : 51 tours/mn

Caractéristiques d'une cellule :

Nombre d'unité identique :3
Volume : 430 m3
Hauteur d'eau : 3,84 m
Section 11 x 11
Volume total mis en oeuvre : 1290 m3
Rendement d'épuration nécessaire : 84%
Volume minimum calculé : 1316 m3

Charge admise : 1432 kg/j
Charge appliquée effective : 1,11 kg DBO5/m3/j
Charge massique (30% de boues) : 0,37 kg DBO5 MES
Temps de séjour moyen : 4,09 h

Aération

Quantité d'oxygène nécessaire en moyenne : 1045 kg O2/j
Oxygénation réalisée à l'aide de trois aérateurs de surface identiques d'une puissance de 20 kw
Capacité d'oxygénation variable de 10 à 30 kg O2/h
Rendement moyen 1,6 kwh consommé / kg O2 transféré
Consommation moyenne journalière 563 kwh/j
Rendement moyen 0,55 kwh/kg DBO5 éliminé
Fonctionnement des aérateurs asservis à la concentration en O2 dans le bassin

Vanne automatique DOSAPRO DN150
Compresseur LUCHARD Type AMAM
Pression Max : 8 bar
Puissance moteur : 0,5 Ch
Vitesse : 1450 tours/mn

2 DECANTEUR SECONDAIRE

ouvrage circulaire
Diamètre 21 m
Surface utile 346 m2
Volume 979 m3
Hauteur d'eau 2,83 m

Temps de séjour en heure
- au débit moyen : 4,28
- au débit moyen de pointe : 2,97
- au débit maximum de pointe : 1,71
- au débit maximum de refoulement : 1,36

Charge superficielle en m3/m2/h
- au débit moyen : 0,66
- au débit moyen de pointe : 0,95
- au débit maximum de pointe : 1,65
- au débit maximum de refoulement : 2,08

Consommation journalière pour l'entraînement du pont racleur de boues : 24 kwh/j

Moto-réducteur
Marque : SEW
Type : R8060 D4
Puissance : 0,25 kw
Vitesse : 1400 tours/mn
Vitesse de sortie : 2,3 tours/mn

3 JAUGEAGE DE DEBIT

Canal de Venturi avec débit-mètre sans enregistreur

4 RECYCLAGE DES BOUES BIOLOGIQUES

Volume moyen recirculée assuré par air lift : 4000 m3/j
Débit maxi. : 300 m3/h

C TRAITEMENT DES BOUES

1 BOUES BIOLOGIQUES EXCEDENTAIRES

Production journalière 777 kg/j
Volume correspondant à 0,75% MES 104 m3/j
Refoulement à l'aide d'une pompe à Vortex
Débit 50 m3/h à 2 m HMT
Moteur 3cv
Consommation journalière 4 kwh

2 TRAITEMENT DES BOUES BRUTES

Quantité journalière des boues brutes 2100 kg de MES
Composition Solide Volatile 1465 kg
Matières minérales 635 kg

Stabilisation par voie aérobie

Période de stabilisation : 12 jours
Concentration moyenne de MES dans le bassin de stabilisation 2%
Volume de stabilisation nécessaire (15°C) 1260 m3
Volume effectif : 1235 m3
Temps de séjour effectif : 13,4 j
Charge en S.V. : 1,18 kg/m3/j
Réduction moyenne des S.V = 36%
Poids journalier des boues stabilisées en matières sèches 1573 kg/j
Volume correspondant après épaississement (humidité 97%) : 52m3/j

Aération

Réalisée à l'aide d'injection d'air sous pression (grosses bulles)
Quantité d'oxygéne nécessaire 1538 kg/j
Définition des surpresseurs d'air
Besoin journalier pour dégraissage préaération 13700 m3
Recyclage des boues biologiques 4000 m3
Aération de bassin de stabilisation : 103000 m3
Soit un total journalier de 12700 m3 <=> 5029 m3/h

3 LITS DE SECHAGE

Surface prévue : 3744 m2
26 lits de 18 x 8
Charge max. 155 kg MES/m2/an
Temps moyen de séchage : 1 mois
Quantité journalière de boues déshydratée à évacuer (humidité 70%) : 5,24 m3/j.
Volume annuel des boues déshydratées (70% d'humidité) 1913 m3/an.

Pompe de refoulement des eaux d'égouttage des lits :
Unité :1
Marque : Flygt
Type : Cs 3065 MT - Roue 430
Débit : 20 m3/h
HMT : 5,50 m
Puissance : 2Ch à 1450 tours/mn

Pompe de recirculation
Marque : Flygt (Egger-turo)
Type : T4 100 HP6
Débit : 50 m3/h
HMT : 2 m
Puissance : 3Ch à 270 tours/mn

Pompe décantage des sables
Marque : Flygt
Type : Cs 3065 MT - Roue 430
Débit : 28 m3/h
HMT : 5,50 m
Puissance : 2Ch à 1450 tours/mn

D SERVICES GENERAUX

Le bâtiment d'exploitation comprend
Un bureau laboratoire

Un local de transformateur
Des sanitaires
Une salle pour les surpresseurs

2 surpresseurs
Marque : HIBON
Type : DV 110
Débit : 4000 m3/h
Pression au refoulement : 0,420 bar
Vitesse de rotation : 745 tours/mn

2 moteurs
Marque : CEM
Type : MEUL 280 84
Puissance : 100 ch
Vitesse de rotation : 1500 tours/mn

E ENERGIE ELECTRIQUE

Consommation électrique pour services divers 7 kwh/j
Consommation journalière 2405 kwh/j
Consommation annuelle 877825kwh/an
Consommation annuelle/ eq. hab. 20 kwh

III STATION D'EPURATION SE-3

A TRAITEMENT DES EAUX

1 DEGRILLAGE

Grille courbe à nettoyage automatique par l'amont.
Fonctionnement asservi par flotteur
Dégrilleur manuel de secours.

Espacement entre barreaux : 1,5 cm
Largeur : 1,0 m

Moteur d'entraînement 0,5 kw
Consommation journalière 3kwh/j

Moteur
- Marque : MERGER Moteur Asynchrone triphasé
- TPM 1380
- SKE 71-4B
- Puissance : 0,5 ch
- U = 220/380 V ~ 2/1,15 A
- F=50 Hz
- cos ℓ =0,71

Réducteur
- Marque : MERGER
- type : RAVC 150/RMFD7 - 2 M63/4
- Puissance 0,5 cv
- Vitesse GV : 1400 tours/mn
- Rapport de réduction total : 1/760

2 DESSABLAGE

Diamètre des particules retenues : 0,2 mm
Diamètre de l'ouvrage : 2,50 m
Moto réducteur d'entraînement des palettes 0,25 kw
Consommation journalière 5 kwh/j
Extraction des sables par air lift

Moteur
- Marque : CEM
- Type : MEUB 132 S2
- Puissance : 10 ch
- Vitesse 3000 tours/mn

Manchon d'accouplement type N12
Surpresseur
Marque : ROUBAIX HIBON
type : DV 1,6
Débit : 150m3/h
Pression au refoulement : 0,8 bar
Pression différentielle : 0,8 bar
Vitesse de rotation : 2,850 tours/mn

Dessableur Hélice

Type : PISTA 2/25
Moto-réducteur
Marque : SEW
Type RF40 D71040
Puissance : 0,5 cv
U = 220/ 380 V
F = 50 Hz

3 DEGRAISSAGE — PRE-AERATION

Volume de l'ouvrage : 100 m3
temps de séjour au débit maximum de pompage : 12mn
temps de séjour au débit moyen de la période de pointe : 22mn
Aération par injection d'air sous pression sous forme de moyennes bulles

Dégraisseur - Surpresseur
Marque : RUBAIX HIBON
Type : DV9
Surpresseur
Marque : HIBON
Type : DV9
Débit : 40 m3/h 800 m3/h
pression au refoulement 420 mb 420 mb
pression différentielle 420 mb 420 mb
vitesse de rotation 1180 tour/mn 1800 tour/mn
Moteur
Marque : CEM
Type : MIVL 20014/6
Puissance : 15 ch à 1000 t /mn 24 ch à 1500 t/mn

Courroie
Type : VP2 SPB/B
Long 2500

Réf. 02500SPB.B
Rapport de réduction 1800/1450
Poulie motrice
Φ 224
3 gorges SPB/B
alésage = 55
Poulie Réceptrice
Φ 180
3 gorges SPB/B
Clavetage = 16
alésage = 55
Clavetage = 10

4 DECANTATION PRIMAIRE

Diamètre de l'ouvrage : 18m
Section utile : 254m2
Volume : 570 m3
Hauteur d'eau moyenne : 2,24 m

Temps de séjour en heure :
au débit moyen (+ recyclage de 250 m3/h) : 1,30
au débit de pointe : 1,96
au débit maximum de pointe : 1,11

Charge superficielle m3/m2/h
Au débit de refoulement de 324 : 1,28
Au débit de refoulement de 648 : 2,56

Rendement
Réduction de DBO5 : 35%
Réduction de MES : 60%
Poids des MES retenues en kg/j : 842

Caractéristiques de l'effluent décanté en ppm
DBO5 : 130
MES : 80

Consommation journalière en énergie électrique pour fonctionnement du pont racleur (moteur 0,9 kw) : 19 kwh/j

Pont racleur
marque : SEW
Type : R80 60D / 1C4

Nationalité : Française
moteur
Type : R80 60D / 1C4
N° : 26266187
COM : 10466/60
cos ℓ =0,70
U = 220/380 V ~ 1,47/0,85 A
Vitesse de rotation = 1400/2,3 tours/mn
F = 50 Hz
P = 0,25 kw
IP = 55
VDE = 0530
CI Isol = B.

B TRAITEMENT SECONDAIRE : EPURATION BIOLOGIQUE DES EAUX

Procédé des boues activées ***
Alimentation en tête du bassin d'aération
Mélange intégral

1 CHENAL D'OXYDATION

Caractéristiques d'une cellule

Volume : 430 m3
Hauteur d'eau : 3,84 m
Section 11 x 11
Nombre d'unité identique :2
Volume total mis en oeuvre : 860 m3
Rendement d'épuration nécessaire : 77%
Volume minimum calculé : 870 m3
Charge admise : 918 kg/j
Charge appliquée effective : 1,06 kg DBO5/m3/j
Charge massique (30% de boues) : 0,35 kg DBO5 MES
Temps de séjour moyen : 2,95 h

Aération

Quantité d'oxygène nécessaire en moyenne : 522 kg O2/j
Oxygénation réalisée à l'aide de trois aérateurs de surface identiques d'une puissance de 20 kw
Capacité d'oxygénation variable de 10 à 30 kg O2/h
Rendement moyen 1,6 kwh consommé / kg O2 transféré
Consommation moyenne journalière 326 kwh/j
Rendement moyen 0,47 kwh/kg DBO5 éliminé
Fonctionnement des aérateurs asservis à la concentration en O2 dans le bassin

2 DECANTEUR SECONDAIRE

ouvrage circulaire
Diamètre 21 m
Surface utile 346 m2
Volume 979 m3
Hauteur d'eau 2,83 m

Temps de séjour en heure
- au débit moyen (+ recyclage de 250 m3/h) : 2,24
- au débit moyen de pointe (+ recyclage en 81) : 3,37
- au débit maximum de pointe : 1,90
- au débit maximum de refoulement : 1,50

Charge superficielle en m3/m2/h
- au débit moyen (+ recyclage de 250 m3/h) : 1,26
- au débit moyen de pointe (+ recyclage en 1981) : 0,84
- au débit maximum de pointe : 1,49
- au débit maximum de refoulement : 1,88

Consommation journalière pour l'entraînement du pont racleur de boues : 24 kwh/j

3 RECYCLAGE DES BOUES BIOLOGIQUES

Volume moyen recirculée assuré par air lift : 3500 m3/j
Débit maxi. : 300 m3/h

4 JAUGEAGE DE DEBIT

Canal de Venturi avec débit-mètre sane enregistreur

C TRAITEMENT DES BOUES

1 BOUES BIOLOGIQUES EXCEDENTAIRES

Production journalière 454 kg/j
Volume correspondant à 0,75% MES 60 m3/j
Refoulement à l'aide d'une pompe à Vortex
Débit 50 m3/h à 2 m HMT
Moteur 3cv
Consommation journalière 3 kwh

2 TRAITEMENT DES BOUES BRUTES

Quantité journalière des boues brutes 1297 kg de MES
Composition Solide Volatile 902 kg
Matières minérales 395 kg

Stabilisation par voie aérobie

Période de stabilisation : 12 jours
Concentration moyenne de MES dans le bassin de stabilisation 1%
Volume de stabilisation nécessaire (15°C) 777 m3
Volume effectif : 757 m3
Temps de séjour effectif : 12 j
Charge en S.V. : 1,19 kg/m3/j
Réduction moyenne des S.V = 35%
Poids journalier des boues stabilisées en matières sèches 981 kg/j
Volume correspondant après épaississement (humidité 97%) : 33 m3/j

Aération

Réalisée à l'aide d'injection d'air sous pression (grosses bulles)
Quantité d'oxygéne nécessaire 947 kg/j
Définition des surpresseurs d'air
- Besoin journalier pour dégraissage préaération 13700 m3
- Recyclage des boues biologiques 3500 m3
- Aération de bassin de stabilisation : 63449 m3

Soit un total journalier de 80649 m3 <=> 3360 m3/h

3 LITS DE SECHAGE

Surface prévue : 2304 m2
16 lits de 18 x 8
Charge max. 155 kg MES/m2/an
Temps moyen de séchage : 1 mois
Quantité journalière de boues déshydratée à évacuer (humidité 70%) : 3,27 m3/j.
Volume annuel des boues déshydratées (70% d'humidité) 1194 m3/an.

D SERVICES GENERAUX

Le bâtiment d'exploitation comprend
- Un bureau laboratoire
- Un local de transformateur
- Des sanitaires
- Une salle pour les surpresseurs

E ENERGIE ELECTRIQUE

Consommation électrique pour services divers 6 kwh/j
Consommation journalière 1485 kwh/j
Consommation annuelle 542025kwh/an
Consommation annuelle/ eq. hab. 17 kwh

AEROVIS
Unités : 2
Type : LSN 200 L7 (M) MR37(C)
Moteur
- Moteur Asynchrone Rotor Ct Ct conforme à la norme.
- NFC 51-111
- Type : LSN 200 L7 ; N°73853 ; IP55
- Puissance : 30 kw
- cos ℓ =0,85
- U=220 / 380V ~ 98,7 / 75 A
- Vitesse : 1460 tours/mn
- F=50 Hz
- PH3
- ei= f Ambc=0
- Service. cdlen=3,2
- Id/In = 7,5
- Roulement coté entraînement 6312
- Masse 200 kg

Coupleur Hydraulique
- Marque : MR 37 hydro-flow MGH Machinerg and Gears Hansen S.A EDGEM ENT WERP BELGUIM
- Type : MR37 N° 307878

POMPE SILO
Pompe EGGER à cale sèche
Moteur
- Marque : CEM
- Type : NOVACEM COMPAX Mat. MEVA 112 M4
- U = 220 / 380 V ~ 17,9 / 10,33 A
- F= 3~ 50Hz
- IP = (55) 44
- $\Delta\theta$ = 75 °C
- NFC = 51 - 100
- IEC 34 - 1

Pompe
- Marque : Flygt
- Type : T4 100 HP6

Fabrication : 121397
Débit = 50 m3/h
HMT = 5 m
Vitesse de rotation = 1500/970 t/mn

POMPE DE RECYCLAGE
Pompe EGGER à câle sèche
Unité : 2
Marque : CEM
Type : T5 125 HP6
Moteur
Marque :CEM électro-mécanique Novacem Compax
Mot Meva 132 M6
FL = 5331648/s
U = 220 / 380 V ~ 25 / 14,43 A
F = 3 ~ 50 Hz
P = 5,5 kw
Vitesse = 925 t/mn
Cl = E
IP = 44
$\Delta\Theta$ = 75
NFC 51100
IEC 34.1
Pompe
Marque : Flygt
Type : T5 125 HP6
Fabrication : T21354
Débit : 150 m3/h
HMT : 2,5
Vitesse : 970 tour/mn

POMPE DE RELEVEMENT
POMPE 1
Marque : Flygt
Type : CS 3065 MT Roue 430
Débit : 96 m3/h
H.M.T : 5,5 m
Puissance : 2cv à 1450 tours/mn
2 contacteurs à flotteurs SOBATELEC
POMPE 2
Marque : Flygt
Type : CS 3066 Roue 470
Débit : m3/h
U = 220/380 V ~ 3,2/5,6 A
Vitesse de rotation = 1400 tours/mn

ANNEX D

ONAS Treatment Plant O&M Costs

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
STEP-SE1	An1992	An1993	An1994	An1995
1.0 FRAIS DE PERSONNEL				
1.1 Personnel SE1	*30,680 DT*	*32,784 DT*	*34,095 DT*	*35,459 DT*
1.2 Personnel DME	2,317 DT	2,576 DT	2,679 DT	2,786 DT
1.3 Personnel DEX + DIST	1,565 DT	795 DT	827 DT	860 DT
1.4 Personnel DÉPARTEMENT	2,831 DT	4,182 DT	4,349 DT	4,523 DT
1.5 Personnel SIÈGE	4,311 DT	4,311 DT	4,311 DT	4,311 DT
2.0 TRANSPORT & DÉPLACEMENT				
2.1 DEPARTEMENT	0 DT	0 DT	0 DT	0 DT
2.2 SIÈGE	48 DT	48 DT	48 DT	48 DT
3.0 FRAIS DIVERS DE PRODUCTION				
3.1 Téléphone				
3.1.1 Téléphone SE1	237	250	250	300
3.1.2 Téléphone DIST.	25 DT	12 DT	12 DT	13 DT
3.1.3 Téléphone DEPT.	128 DT	117 DT	120 DT	125 DT
3.1.4 Téléphone SIÈGE	305 DT	305 DT	305 DT	305 DT
3.1.6 Téléphone DEX.	5 DT	6 DT	6 DT	6 DT
3.2 Télégramme				
3.3 Télex				
3.4 Actes de contentieux				
3.4.2 Actes de contentieux DIST	1 DT	3 DT	54 DT	54 DT
3.4.4 Actes de contentieux SIÈGE	20 DT	20 DT	20 DT	20 DT
3.5 Documentation				
3.5.1 Documentation DEPT + DET	7 DT	7 DT	7 DT	7 DT
3.5.2 Documentation SIÈGE	80 DT	80 DT	80 DT	80 DT
3.5.3 Documentation DEX	2 DT	2 DT	2 DT	2 DT
3.5.4 Documentation DIST	9 DT	9 DT	9 DT	9 DT
3.5.5 Documentation DME	1 DT	1 DT	1 DT	1 DT
3.6 Affranchissement				
3.6.1 Affranchissement SIÈGE	10 DT	10 DT	10 DT	10 DT
3.6.2 Affranchissement DEPT	10 DT	10 DT	21 DT	21 DT
3.7 Affichage et annonce				
3.7.1 Affichage et annonce SIÈGE	120 DT	120 DT	120 DT	120 DT
3.7.2 Affichage et annonce DIST	3 DT	5 DT	8 DT	10 DT
3.8 Mission et réception				
3.8.1 Mission et réception SIÈGE	106 DT	106 DT	106 DT	106 DT
3.8.2 Mission et réception DEPT	0 DT	0 DT	0 DT	0 DT
3.9 Fourniture de bureau				
3.9.1 Fourniture de bureau DEPT	115 DT	167 DT	188 DT	209 DT
3.10 Autres frais divers				
3.10.1 SIÈGE	168 DT	168 DT	168 DT	168 DT
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS				
4.1 Loyers				
4.1.1 Loyer de bâtiments DEPT + DET +	213 DT	207 DT	211 DT	211 DT
4.1.2 Loyer SIÈGE	84 DT	84 DT	84 DT	84 DT
4.1.4 Loyer de locaux DIST.	0 DT	0 DT	136 DT	272 DT
4.1.5 Loyer de locaux DME(atelier)	60 DT	60 DT	60 DT	60 DT
4.2 Entretien-réparations				
4.2.1 Ent. + Rép. SE1	1,044 DT	2,016 DT	*1,400 DT*	*2,000 DT*
4.2.2 Matériel roulant SE1	132 DT	28 DT	133 DT	133 DT
4.2.3 Matériel roulant DME	3 DT	2 DT	10 DT	10 DT
4.2.4 Matériel roulant DEPT	10 DT	3 DT	18 DT	18 DT
4.2.5 Matériel roulant DIST	5 DT	3 DT	52 DT	52 DT
4.2.6 Matériel roulant DEX	0 DT	0 DT	2 DT	2 DT
4.2.7 Réparations SIÈGE	261 DT	261 DT	261 DT	261 DT
4.3 Travaux et façons				
4.3.1 Travaux SIÈGE	281 DT	281 DT	281 DT	281 DT
4.3.2 Travaux STEP + pompage				
4.3.3 Travaux DIST	0 DT	136 DT	136 DT	136 DT
4.4 Fourniture d'eau				
SE1	51 DT	54 DT	*75 DT*	*100 DT*
DEPT	5 DT	3 DT	3 DT	4 DT
SIEGE	22 DT	22 DT	22 DT	22 DT
DISTRICT	18 DT	19 DT	19 DT	22 DT
DME(atelier)	8 DT	10 DT	11 DT	13 DT
4.5 Fourniture d'électricité				
SE1	37,700 DT	37,074 DT	42,000 DT	45,000 DT
DEPT Nabeul	15 DT	18 DT	19 DT	22 DT
SIÈGE	301 DT	301 DT	301 DT	301 DT
DME(atelier)	15 DT	19 DT	23 DT	25 DT
4.6 Prestation SONEDE				

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
STEP-SE1	An1992	An1993	An1994	An1995
4.7 Assurances				
4.7.1 Assurances matériel roulant				
SE1	70 DT	76 DT	84 DT	93 DT
DISTRICT	17 DT	19 DT	20 DT	22 DT
DME	8 DT	9 DT	10 DT	11 DT
DEX	1 DT	1 DT	1 DT	2 DT
DEPT	1 DT	1 DT	1 DT	2 DT
SIEGE	1,191 DT	1,191 DT	1,191 DT	1,191 DT
4.8 Honoraires et gardiennage				
4.8.1 Honor. et gardien. Siège	231 DT	231 DT	231 DT	231 DT
4.9 Petits outillages et autres				
DEX	0 DT	0 DT	0 DT	0 DT
SIEGE	401 DT	401 DT	401 DT	401 DT
5.0 BIENS CONSOMMES				
5.1 MATIERES PREMIERES				
5.1.1 Matériaux de construction				
DIST	626 DT	707 DT	816 DT	952 DT
SIEGE	20 DT	20 DT	20 DT	20 DT
5.1.2 Autres matières premières				
5.1.3 Tuyaux consommés				
5.1.5 Pièces en fonte consommées				
5.1.6 Pièces en fonte pour la vente				
5.1.7 Autres				
5.2 MATIERES CONSOMMABLES				
5.2.1 Habillement-Tenue de protection				
SE1				
DIST	299 DT	381 DT	490 DT	544 DT
SIEGE	182 DT	182 DT	182 DT	182 DT
5.2.2 Produits d'entretien				
SE1				
DIST	82 DT	109 DT	136 DT	163 DT
SIEGE	22 DT	22 DT	22 DT	22 DT
5.2.3 Fournitures d'atelier-Laboratoire				
SIEGE	221 DT	221 DT	221 DT	221 DT
DEX	282 DT	418 DT	481 DT	523 DT
SE1				
5.2.4 Fournitures de bureau				
SIEGE	279 DT	279 DT	279 DT	279 DT
5.2.5 Combustible et lubrifiant				
5.2.5.1 SE1	250 DT	361 DT	400 DT	500 DT
5.2.5.2 Matériel roulant				
SE1	572 DT	638 DT	689 DT	767 DT
DIST	122 DT	142 DT	162 DT	182 DT
DME	54 DT	63 DT	73 DT	82 DT
DEX	13 DT	14 DT	16 DT	17 DT
DEPT	21 DT	25 DT	28 DT	31 DT
SIEGE	261 DT	261 DT	261 DT	261 DT
5.2.5.3 Matériels et outillages				
SE1				
5.2.6 Pièces de rechange				
5.2.6.1 Stat. épur. + pomp.				
SE1	4,228 DT	1,698 DT	2,000 DT	2,500 DT
5.2.6.2 Matériel roulant				
SE1	249 DT	793 DT	553 DT	666 DT
DEX	0 DT	10 DT	10 DT	10 DT
DIST	63 DT	156 DT	190 DT	272 DT
SIEGE	601 DT	601 DT	601 DT	601 DT
DME	14 DT	34 DT	57 DT	84 DT
DEPT	11 DT	17 DT	31 DT	47 DT
5.2.6.3 Bâtiments				
5.2.7 Autres matières consommables				
SIEGE	421 DT	421 DT	421 DT	421 DT
5.3 FRAIS SUR ACHAT				
SIEGE	531 DT	531 DT	531 DT	531 DT
6.0 IMPOTS ET TAXES				
6.1 TFP				
SIEGE	86 DT	86 DT	86 DT	86 DT
6.2 Taxes de circulation				
SE1				
DIST	0 DT	0 DT	0 DT	0 DT
DME	0 DT	0 DT	0 DT	0 DT
DMMRT	0 DT	0 DT	0 DT	0 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	126 DT	126 DT	126 DT	126 DT
6.3 TCCL				
6.4 Droit d'enrégistrement				
SIEGE	241 DT	241 DT	241 DT	241 DT
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT				
SIEGE	200 DT	200 DT	200 DT	200 DT
8.0 FRAIS DIVERS D'EXPLOITATION				
SIEGE	50 DT	50 DT	50 DT	50 DT
9.0 CHARGES DE FINANCEMENT				
SIEGE	361 DT	361 DT	361 DT	361 DT
10.0 AMORTISSEMENT				
SIEGE	601 DT	601 DT	601 DT	601 DT
Matériel Roulant	539 DT	539 DT	539 DT	539 DT
TOTAL DES CHARGES	96,883 DT	98,933 DT	105,870 DT	112,617 DT

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
STEP-SE2	An1992	An1993	An1994	An1995
1.0 FRAIS DE PERSONNEL				
1.1 Personnel SE2	34,702 DT	37,875 DT	33,500 DT	44,300 DT
1.2 Personnel DME	2,833 DT	3,150 DT	3,276 DT	3,407 DT
1.3 Personnel DEX + DIST	1,913 DT	972 DT	1,011 DT	1,051 DT
1.4 Personnel DÉPARTEMENT	3,462 DT	5,114 DT	5,319 DT	5,532 DT
1.5 Personnel SIÈGE	5,272 DT	5,272 DT	5,272 DT	5,272 DT
2.0 TRANSPORT & DÉPLACEMENT				
2.1 DEPARTEMENT	0 DT	0 DT	0 DT	0 DT
2.2 SIÈGE	59 DT	59 DT	59 DT	59 DT
3.0 FRAIS DIVERS DE PRODUCTION				
3.1 Téléphone				
3.1.1 Téléphone SE2	192	250	250	300
3.1.2 Téléphone DIST.	30 DT	14 DT	14 DT	16 DT
3.1.3 Téléphone DEPT.	156 DT	143 DT	146 DT	153 DT
3.1.4 Téléphone SIÈGE	373 DT	373 DT	373 DT	373 DT
3.1.5 Téléphone DME	0 DT	0 DT	0 DT	0 DT
3.1.6 Téléphone DEX.	6 DT	7 DT	7 DT	7 DT
3.2 Télégramme				
3.3 Télex				
3.4 Actes de contentieux				
3.4.2 Actes de contentieux DIST	1 DT	3 DT	67 DT	67 DT
3.4.4 Actes de contentieux SIÈGE	25 DT	25 DT	25 DT	25 DT
3.5 Documentation				
3.5.1 Documentation DEPT + DET	8 DT	8 DT	8 DT	9 DT
3.5.2 Documentation SIÈGE	98 DT	98 DT	98 DT	98 DT
3.5.3 Documentation DEX	3 DT	3 DT	3 DT	3 DT
3.5.4 Documentation DIST	11 DT	11 DT	11 DT	11 DT
3.5.5 Documentation DME	1 DT	1 DT	1 DT	1 DT
3.6 Affranchissement				
3.6.1 Affranchissement SIÈGE	12 DT	12 DT	12 DT	12 DT
3.6.2 Affranchissement DEPT	13 DT	13 DT	26 DT	26 DT
3.7 Affichage et annonce				
3.7.1 Affichage et annonce SIÈGE	147 DT	147 DT	147 DT	147 DT
3.7.2 Affichage et annonce DIST	3 DT	7 DT	10 DT	12 DT
3.8 Mission et réception				
3.8.1 Mission et réception SIÈGE	130 DT	130 DT	130 DT	130 DT
3.8.2 Mission et réception DEPT	0 DT	0 DT	0 DT	0 DT
3.9 Fourniture de bureau				
3.9.1 Fourniture de bureau DEPT	141 DT	204 DT	230 DT	256 DT
3.10 Autres frais divers				
3.10.1 SIÈGE	206 DT	206 DT	206 DT	206 DT
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS				
4.1 Loyers				
4.1.1 Loyer de bâtiments DEPT + DE	260 DT	253 DT	258 DT	258 DT
4.1.2 Loyer SIÈGE	103 DT	103 DT	103 DT	103 DT
4.1.4 Loyer de locaux DIST.	0 DT	0 DT	166 DT	333 DT
4.1.6 Location de locaux DME (Ateli	74 DT	74 DT	74 DT	74 DT
4.2 Entretien-réparations				
4.2.1 Ent. + Rép. SE2	843 DT	1,187 DT	1,400 DT	2,000 DT
4.2.2 Matériel roulant SE2	159 DT	32 DT	157 DT	157 DT
4.2.3 Matériel roulant DME	4 DT	2 DT	13 DT	13 DT
4.2.4 Matériel roulant DEPT	12 DT	4 DT	22 DT	22 DT
4.2.5 Matériel roulant DIST	6 DT	3 DT	63 DT	63 DT
4.2.6 Matériel roulant DEX	0 DT	0 DT	3 DT	3 DT
4.2.7 Réparations SIÈGE	319 DT	319 DT	319 DT	319 DT
4.3 Travaux et façons				
4.3.1 Travaux SIÈGE	343 DT	343 DT	343 DT	343 DT
4.3.2 Travaux STEP + pompage				
4.3.3 Travaux DIST	0 DT	166 DT	166 DT	166 DT
4.4 Fourniture d'eau				
SE2	546 DT	724 DT	750 DT	800 DT
DEPT	6 DT	4 DT	4 DT	4 DT
SIEGE	27 DT	27 DT	27 DT	27 DT
DISTRICT	21 DT	23 DT	23 DT	27 DT
DME (Atelier)	10 DT	13 DT	14 DT	15 DT
4.5 Fourniture d'électricité				
SE2	60,000 DT	64,199 DT	68,000 DT	72,000 DT
DEPT Nabeul	19 DT	22 DT	23 DT	27 DT
SIÈGE	368 DT	368 DT	368 DT	368 DT
DME (Atelier)	18 DT	23 DT	28 DT	31 DT
4.6 Prestation SONEDE				

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
STEP-SE2	An1992	An1993	An1994	An1995
4.7 Assurances				
4.7.1 Assurances matériel roulant				
SE1	76 DT	83 DT	92 DT	101 DT
DISTRICT	21 DT	23 DT	25 DT	27 DT
DME	10 DT	11 DT	12 DT	13 DT
DEX	2 DT	2 DT	2 DT	2 DT
DEPT	2 DT	2 DT	2 DT	2 DT
SIEGE	1,456 DT	1,456 DT	1,456 DT	1,456 DT
4.8 Honoraires et gardiennage				
4.8.1 Honor. et gardien. Siège	282 DT	282 DT	282 DT	282 DT
4.9 Petits outillages et autres				
DEX	0 DT	0 DT	0 DT	0 DT
SIEGE	490 DT	490 DT	490 DT	490 DT
5.0 BIENS CONSOMMES				
5.1 MATIERES PREMIERES				
5.1.1 Matériaux de construction				
DIST	765 DT	865 DT	998 DT	1,164 DT
SIEGE	25 DT	25 DT	25 DT	25 DT
5.1.2 Autres matières premières				
5.1.3 Tuyaux consommés				
5.1.4 Tuyaux pour la vente				
5.1.5 Pièces en fonte consommées				
5.1.6 Pièces en fonte pour la vente				
5.1.7 Autres				
5.2 MATIERES CONSOMMABLES				
5.2.1 Habillement-Tenue de protection				
SE2				
DIST	366 DT	466 DT	599 DT	665 DT
SIEGE	223 DT	223 DT	223 DT	223 DT
5.2.2 Produits d'entretien				
SE2				
DIST	100 DT	133 DT	166 DT	200 DT
SIEGE	27 DT	27 DT	27 DT	27 DT
5.2.3 Fournitures d'atelier-Laboratoire				
SIEGE	270 DT	270 DT	270 DT	270 DT
DEX	345 DT	511 DT	588 DT	635 DT
SE2				
5.2.4 Fournitures de bureau				
SIEGE	341 DT	341 DT	341 DT	341 DT
5.2.5 Combustible et lubrifiant				
5.2.5.1 SE2	200 DT	226 DT	300 DT	400 DT
5.2.5.2 Matériel roulant				
SE2	648 DT	722 DT	784 DT	873 DT
DIST	150 DT	174 DT	198 DT	223 DT
DME	66 DT	77 DT	89 DT	100 DT
DEX	15 DT	17 DT	19 DT	20 DT
DEPT	26 DT	30 DT	34 DT	38 DT
SIEGE	319 DT	319 DT	319 DT	319 DT
5.2.5.3 Matériels et outillages				
SE2				
5.2.6 Pièces de rechange				
5.2.6.1 Stat. épur. + pomp.				
SE2	2,853 DT	1,020 DT	2,000 DT	3,000 DT
5.2.6.2 Matériel roulant				
SE2	262 DT	928 DT	650 DT	775 DT
DEX	0 DT	12 DT	13 DT	13 DT
DIST	78 DT	191 DT	233 DT	333 DT
SIEGE	703 DT	736 DT	736 DT	736 DT
DME	17 DT	42 DT	70 DT	102 DT
DEPT	14 DT	21 DT	38 DT	58 DT
5.2.6.3 Bâtiments				
5.2.7 Autres matières consommables				
SIEGE	515 DT	515 DT	515 DT	515 DT
5.3 FRAIS SUR ACHAT				
SIEGE	650 DT	650 DT	650 DT	650 DT
6.0 IMPOTS ET TAXES				
6.1 TFP				
SIEGE	105 DT	105 DT	105 DT	105 DT
6.2 Taxes de circulation				
SE2				
DIST	0 DT	0 DT	0 DT	0 DT
DME	0 DT	0 DT	0 DT	0 DT
DMMR	0 DT	0 DT	0 DT	0 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	154 DT	154 DT	154 DT	154 DT
6.3 TCCL				
6.4 Droit d'enrégistrement				
SIEGE	294 DT	294 DT	294 DT	294 DT
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT				
SIEGE	245 DT	245 DT	245 DT	245 DT
8.0 FRAIS DIVERS D'EXPLOITATION				
SIEGE	61 DT	61 DT	61 DT	61 DT
9.0 CHARGES DE FINANCEMENT				
SIEGE	441 DT	441 DT	441 DT	441 DT
10.0 AMORTISSEMENT				
SIEGE	736 DT	736 DT	736 DT	736 DT
Matériel Roulant	660 DT	660 DT	660 DT	660 DT
TOTAL DES CHARGES	126,983 DT	135,570 DT	137,466 DT	155,399 DT

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
STEP-SE3	An1992	An1993	An1994	An1995
1.0 FRAIS DE PERSONNEL				
1.1 Personnel SE3	52,731 DT	40,319 DT	45,570 DT	50,000 DT
1.2 Personnel DME	1,927 DT	2,142 DT	2,228 DT	2,317 DT
1.3 Personnel DEX+DIST	1,301 DT	661 DT	688 DT	715 DT
1.4 Personnel DÉPARTEMENT	2,355 DT	3,478 DT	3,618 DT	3,762 DT
1.5 Personnel SIÈGE	3,585 DT	3,585 DT	3,585 DT	3,585 DT
2.0 TRANSPORT & DÉPLACEMENT				
2.1 DEPARTEMENT	0 DT	0 DT	0 DT	0 DT
2.2 SIÈGE	40 DT	40 DT	40 DT	40 DT
3.0 FRAIS DIVERS DE PRODUCTION				
3.1 Téléphone				
3.1.1 Téléphone SE3	440	450	450	500
3.1.2 Téléphone DIST.	21 DT	10 DT	10 DT	11 DT
3.1.3 Téléphone DEPT.	106 DT	97 DT	100 DT	104 DT
3.1.4 Téléphone SIÈGE	253 DT	253 DT	253 DT	253 DT
3.1.5 Téléphone DME	0 DT	0 DT	0 DT	0 DT
3.1.6 Téléphone DEX.	4 DT	5 DT	5 DT	5 DT
3.2 Télégramme				
3.3 Télex SE3				
3.4 Actes de contentieux				
3.4.2 Actes de contentieux DIST	1 DT	2 DT	45 DT	45 DT
3.4.4 Actes de contentieux SIÈGE	17 DT	17 DT	17 DT	17 DT
3.5 Documentation				
3.5.1 Documentation DEPT+DET	6 DT	6 DT	6 DT	6 DT
3.5.2 Documentation SIÈGE	67 DT	67 DT	67 DT	67 DT
3.5.3 Documentation DEX	2 DT	2 DT	2 DT	2 DT
3.5.4 Documentation DIST	7 DT	7 DT	7 DT	8 DT
3.5.5 Documentation DME	1 DT	1 DT	1 DT	1 DT
3.6 Affranchissement				
3.6.1 Affranchissement SIÈGE	8 DT	8 DT	8 DT	8 DT
3.6.2 Affranchissement DEPT	9 DT	9 DT	17 DT	17 DT
3.7 Affichage et annonce				
3.7.1 Affichage et annonce SIÈGE	100 DT	100 DT	100 DT	100 DT
3.7.2 Affichage et annonce DIST	2 DT	5 DT	7 DT	8 DT
3.8 Mission et réception				
3.8.1 Mission et réception SIÈGE	88 DT	88 DT	88 DT	88 DT
3.8.2 Mission et réception DEPT	0 DT	0 DT	0 DT	0 DT
3.9 Fourniture de bureau				
3.9.1 Fourniture de bureau DEPT	96 DT	139 DT	156 DT	174 DT
3.10 Autres frais divers				
3.10.1 SIÈGE	140 DT	140 DT	140 DT	140 DT
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS				
4.1 Loyers				
4.1.1 Loyer de bâtiments DEPT+DET	177 DT	172 DT	176 DT	176 DT
4.1.2 Loyer SIÈGE	70 DT	70 DT	70 DT	70 DT
4.1.4 Loyer de locaux DIST.	0 DT	0 DT	113 DT	226 DT
4.1.6 Location de locaux DME (Atelier)	50 DT	50 DT	50 DT	50 DT
4.2 Entretien-réparations				
4.2.1 Ent. + Rép. SE3	61 DT	13,909 DT	2,000 DT	3,000 DT
4.2.2 Matériel roulant SE1	112 DT	26 DT	115 DT	115 DT
4.2.3 Matériel roulant DME	3 DT	2 DT	9 DT	9 DT
4.2.4 Matériel roulant DEPT	8 DT	2 DT	15 DT	15 DT
4.2.5 Matériel roulant DIST	4 DT	2 DT	43 DT	43 DT
4.2.6 Matériel roulant DEX	0 DT	0 DT	2 DT	2 DT
4.2.7 Réparations SIÈGE	217 DT	217 DT	217 DT	217 DT
4.3 Travaux et façons				
4.3.1 Travaux SIÈGE	233 DT	233 DT	233 DT	233 DT
4.3.2 Travaux STEP+pompage				
4.3.3 Travaux DIST	0 DT	113 DT	113 DT	113 DT
4.4 Fourniture d'eau				
SE3	738 DT	773 DT	800 DT	850 DT
DEPT	4 DT	3 DT	3 DT	3 DT
SIEGE	18 DT	18 DT	18 DT	18 DT
DISTRICT	15 DT	16 DT	16 DT	18 DT
DME (Atelier)	7 DT	9 DT	10 DT	11 DT
4.5 Fourniture d'électricité				
SE3	15,350 DT	19,390 DT	23,000 DT	25,000 DT
DEPT Nabeul	13 DT	15 DT	16 DT	18 DT
SIÈGE	250 DT	250 DT	250 DT	250 DT
DME (Atelier)	12 DT	16 DT	19 DT	21 DT
4.6 Prestation SONEDE				

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
STEP-SE3	An1992	An1993	An1994	An1995
4.7 Assurances				
4.7.1 Assurances matériel roulant				
SE1	65 DT	71 DT	79 DT	87 DT
DISTRICT	14 DT	15 DT	17 DT	18 DT
DME	7 DT	8 DT	8 DT	9 DT
DEX	1 DT	1 DT	1 DT	1 DT
DEPT	1 DT	1 DT	1 DT	1 DT
SIEGE	991 DT	991 DT	991 DT	991 DT
4.8 Honoraires et gardiennage				
4.8.1 Honor. et gardien. Siège	192 DT	192 DT	192 DT	192 DT
4.9 Petits outillages et autres				
DEX	0 DT	0 DT	0 DT	0 DT
SIEGE	334 DT	334 DT	334 DT	334 DT
5.0 BIENS CONSOMMES				
5.1 MATIERES PREMIERES				
5.1.1 Matériaux de construction				
DIST	520 DT	588 DT	679 DT	792 DT
SIEGE	17 DT	17 DT	17 DT	17 DT
5.1.2 Autres matières premières				
5.1.3 Tuyaux consommés				
5.1.5 Pièces en fonte consommées				
5.1.6 Pièces en fonte pour la vente				
5.1.7 Autres				
5.2 MATIERES CONSOMMABLES				
5.2.1 Habillement-Tenue de protection				
SE3				
DIST	249 DT	317 DT	407 DT	453 DT
SIEGE	152 DT	152 DT	152 DT	152 DT
5.2.2 Produits d'entretien				
SE3				
DIST	68 DT	91 DT	113 DT	136 DT
SIEGE	18 DT	18 DT	18 DT	18 DT
5.2.3 Fournitures d'atelier-Laboratoire				
SIEGE	183 DT	183 DT	183 DT	183 DT
DEX	235 DT	348 DT	400 DT	435 DT
SE3				
5.2.4 Fournitures de bureau				
SIEGE	232 DT	232 DT	232 DT	232 DT
5.2.5 Combustible et lubrifiant				
5.2.5.1 SE3	360 DT	410 DT	450 DT	500 DT
5.2.5.2 Matériel roulant				
SE3	516 DT	574 DT	618 DT	688 DT
DIST	102 DT	118 DT	135 DT	152 DT
DME	45 DT	53 DT	61 DT	68 DT
DEX	10 DT	11 DT	13 DT	14 DT
DEPT	16 DT	20 DT	23 DT	26 DT
SIEGE	217 DT	217 DT	217 DT	217 DT
5.2.5.3 Matériels et outillages				
SE3				
5.2.6 Pièces de rechange				
5.2.6.1 Stat. épur. + pomp.				
SE3	2,297 DT	13,957 DT	5,000 DT	10,000 DT
5.2.6.2 Matériel roulant				
SE3	239 DT	691 DT	480 DT	583 DT
DEX	0 DT	8 DT	9 DT	9 DT
DIST	53 DT	130 DT	158 DT	226 DT
SIEGE	500 DT	500 DT	500 DT	500 DT
DME	12 DT	29 DT	48 DT	70 DT
DEPT	9 DT	14 DT	26 DT	39 DT
5.2.6.3 Bâtiments				
5.2.7 Autres matières consommables				
SIEGE	350 DT	350 DT	350 DT	350 DT
5.3 FRAIS SUR ACHAT				
SIEGE	442 DT	442 DT	442 DT	442 DT
6.0 IMPOTS ET TAXES				
6.1 TFP				
SIEGE	72 DT	72 DT	72 DT	72 DT
6.2 Taxes de circulation				
SE3				
DIST	0 DT	0 DT	0 DT	0 DT
DME	0 DT	0 DT	0 DT	0 DT
DMMR	0 DT	0 DT	0 DT	0 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	105 DT	105 DT	105 DT	105 DT
6.3 TCCL				
6.4 Droit d'enregistrement				
SIEGE	200 DT	200 DT	200 DT	200 DT
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT				
SIEGE	167 DT	167 DT	167 DT	167 DT
8.0 FRAIS DIVERS D'EXPLOITATION				
SIEGE	42 DT	42 DT	42 DT	42 DT
9.0 CHARGES DE FINANCEMENT				
SIEGE	300 DT	300 DT	300 DT	300 DT
10.0 AMORTISSEMENT				
SIEGE	500 DT	500 DT	500 DT	500 DT
Matériel Roulant	449 DT	449 DT	449 DT	449 DT
TOTAL DES CHARGES	90,932 DT	109,834 DT	98,082 DT	112,198 DT

ANNEX E

ONAS Pumping Station O&M Costs

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
St. Pompage R1-1/2/5	An1992	An1993	An1994	An1995
1.0 FRAIS DE PERSONNEL				
1.1 Personnel R1-1/2/5	2,194 DT	2,281 DT	2,373 DT	2,468 DT
1.2 Personnel DME	828 DT	920 DT	957 DT	995 DT
1.3 Personnel DEX+DIST	559 DT	284 DT	295 DT	307 DT
1.4 Personnel DÉPARTEMENT	1,011 DT	1,494 DT	1,554 DT	1,616 DT
1.5 Personnel SIÈGE	1,540 DT	1,540 DT	1,540 DT	1,540 DT
2.0 TRANSPORT & DÉPLACEMENT				
2.1 DEPARTEMENT	0 DT	0 DT	0 DT	0 DT
2.2 SIÈGE	17 DT	17 DT	17 DT	17 DT
3.0 FRAIS DIVERS DE PRODUCTION				
3.1 Téléphone				
3.1.1 Téléphone R1-1/2/5	68	75	83	91
3.1.2 Téléphone DIST.	9 DT	4 DT	4 DT	5 DT
3.1.3 Téléphone DEPT.	46 DT	42 DT	43 DT	45 DT
3.1.4 Téléphone SIÈGE	109 DT	109 DT	109 DT	109 DT
3.1.5 Téléphone DME	0 DT	0 DT	0 DT	0 DT
3.1.6 Téléphone DEX.	2 DT	2 DT	2 DT	2 DT
3.2 Télégramme				
3.3 Télex R1-1/2/5				
3.4 Actes de contentieux				
3.4.2 Actes de contentieux DIST	0 DT	1 DT	19 DT	19 DT
3.4.4 Actes de contentieux SIÈGE	7 DT	7 DT	7 DT	7 DT
3.5 Documentation				
3.5.1 Documentation DEPT+DET	2 DT	2 DT	2 DT	3 DT
3.5.2 Documentation SIÈGE	29 DT	29 DT	29 DT	29 DT
3.5.3 Documentation DEX	1 DT	1 DT	1 DT	1 DT
3.5.4 Documentation DIST	3 DT	3 DT	3 DT	3 DT
3.5.5 Documentation DME	0 DT	0 DT	0 DT	0 DT
3.6 Affranchissement				
3.6.1 Affranchissement SIÈGE	4 DT	4 DT	4 DT	4 DT
3.6.2 Affranchissement DEPT	4 DT	4 DT	7 DT	7 DT
3.7 Affichage et annonce				
3.7.1 Affichage et annonce SIÈGE	43 DT	43 DT	43 DT	43 DT
3.7.2 Affichage et annonce DIST	1 DT	2 DT	3 DT	3 DT
3.8 Mission et réception				
3.8.1 Mission et réception SIÈGE	38 DT	38 DT	38 DT	38 DT
3.8.2 Mission et réception DEPT	0 DT	0 DT	0 DT	0 DT
3.9 Fourniture de bureau				
3.9.1 Fourniture de bureau DEPT	41 DT	60 DT	67 DT	75 DT
3.10 Autres frais divers				
3.10.1 SIÈGE	60 DT	60 DT	60 DT	60 DT
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS				
4.1 Loyers				
4.1.1 Loyer de bâtiments DEPT+DET+	76 DT	74 DT	75 DT	75 DT
4.1.2 Loyer SIÈGE	30 DT	30 DT	30 DT	30 DT
4.1.4 Loyer de locaux DIST.	0 DT	0 DT	49 DT	97 DT
4.1.4 Loyer de locaux DME (Atelier)	22 DT	22 DT	22 DT	22 DT
4.2 Entretien-réparations				
4.2.1 Ent. + Rép. R1-1/2/5	10 DT	2,315 DT	2,547 DT	2,802 DT
4.2.2 Matériel roulant R1-1/2/5	43 DT	6 DT	39 DT	39 DT
4.2.3 Matériel roulant DME	1 DT	1 DT	4 DT	4 DT
4.2.4 Matériel roulant DEPT	3 DT	1 DT	6 DT	6 DT
4.2.5 Matériel roulant DIST	2 DT	1 DT	18 DT	18 DT
4.2.6 Matériel roulant DEX	0 DT	0 DT	1 DT	1 DT
4.2.7 Réparations SIÈGE	93 DT	93 DT	93 DT	93 DT
4.3 Travaux et façons				
4.3.1 Travaux SIÈGE	100 DT	100 DT	100 DT	100 DT
4.3.2 Travaux STEP+pompage				
4.3.3 Travaux DIST	0 DT	49 DT	49 DT	49 DT
4.4 Fourniture d'eau				
R1-1/2/5	37 DT	27 DT	50 DT	57 DT
DEPT	2 DT	1 DT	1 DT	1 DT
SIEGE	8 DT	8 DT	8 DT	8 DT
DISTRICT	6 DT	7 DT	7 DT	8 DT
DME (Atelier)	3 DT	4 DT	4 DT	5 DT
4.5 Fourniture d'électricité				
R1-1/2/5	6,004 DT	6,571 DT	7,228 DT	7,951 DT
DEPT Nabeul	6 DT	6 DT	7 DT	8 DT
SIÈGE	107 DT	107 DT	107 DT	107 DT
DME (Atelier)	5 DT	7 DT	8 DT	9 DT
4.6 Prestation SONEDE				

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
St. Pompage R1-1/2/5	An1992	An1993	An1994	An1995
4.7 Assurances				
4.7.1 Assurances matériel roulant				
R1-1/2/5	10 DT	11 DT	12 DT	13 DT
DISTRICT	6 DT	7 DT	7 DT	8 DT
DME	3 DT	3 DT	4 DT	4 DT
DEX	0 DT	0 DT	1 DT	1 DT
DEPT	0 DT	0 DT	1 DT	1 DT
SIEGE	425 DT	425 DT	425 DT	425 DT
4.8 Honoraires et gardiennage				
4.8.1 Honor. et gardien. Siège	82 DT	82 DT	82 DT	82 DT
4.9 Petits outillages et autres				
DEX	0 DT	0 DT	0 DT	0 DT
SIEGE	143 DT	143 DT	143 DT	143 DT
5.0 BIENS CONSOMMES				
5.1 MATIERES PREMIERES				
5.1.1 Matériaux de construction				
DIST	224 DT	253 DT	292 DT	340 DT
SIEGE	7 DT	7 DT	7 DT	7 DT
5.1.2 Autres matières premières				
5.1.3 Tuyaux consommés				
5.1.4 Tuyaux pour la vente				
5.1.5 Pièces en fonte consommées				
5.1.6 Pièces en fonte pour la vente				
5.1.7 Autres				
5.2 MATIERES CONSOMMABLES				
5.2.1 Habillement-Tenue de protection				
R1-1/2/5				
DIST	107 DT	136 DT	175 DT	194 DT
SIEGE	65 DT	65 DT	65 DT	65 DT
5.2.2 Produits d'entretien				
R1-1/2/5				
DIST	29 DT	39 DT	49 DT	58 DT
SIEGE	8 DT	8 DT	8 DT	8 DT
5.2.3 Fournitures d'atelier-Laboratoire				
SIEGE	79 DT	79 DT	79 DT	79 DT
DEX	101 DT	149 DT	172 DT	187 DT
R1-1/2/5				
5.2.4 Fournitures de bureau				
SIEGE	100 DT	100 DT	100 DT	100 DT
5.2.5 Combustible et lubrifiant				
5.2.5.1 R1-1/2/5	250 DT	300 DT	400 DT	500 DT
5.2.5.2 Matériel roulant				
R1-1/2/5	121 DT	136 DT	152 DT	169 DT
DIST	44 DT	51 DT	58 DT	65 DT
DME	19 DT	23 DT	26 DT	29 DT
DEX	4 DT	5 DT	6 DT	6 DT
DEPT	8 DT	9 DT	10 DT	11 DT
SIEGE	93 DT	93 DT	93 DT	93 DT
5.2.5.3 Matériels et outillages				
R1-1/2/5				
5.2.6 Pièces de rechange				
5.2.6.1 Stat. épur. + pomp.				
R1-1/2/5	1,569 DT	716 DT	2,000 DT	3,500 DT
5.2.6.2 Matériel roulant				
R1-1/2/5	21 DT	217 DT	156 DT	175 DT
DEX	0 DT	3 DT	4 DT	4 DT
DIST	23 DT	56 DT	68 DT	97 DT
SIEGE	215 DT	215 DT	215 DT	215 DT
DME	5 DT	12 DT	21 DT	30 DT
DEPT	4 DT	6 DT	11 DT	17 DT
5.2.6.3 Bâtiments				
5.2.7 Autres matières consommables				
SIEGE	150 DT	150 DT	150 DT	150 DT
5.3 FRAIS SUR ACHAT				
SIEGE	190 DT	190 DT	190 DT	190 DT
6.0 IMPOTS ET TAXES				
6.1 TFP				
SIEGE	31 DT	31 DT	31 DT	31 DT
6.2 Taxes de circulation				
R1-1/2/5				
DIST	0 DT	0 DT	0 DT	0 DT
DME	0 DT	0 DT	0 DT	0 DT
DMMR	0 DT	0 DT	0 DT	0 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	45 DT	45 DT	45 DT	45 DT
6.3 TCCI				
6.4 Droit d'enregistrement				
SIEGE	86 DT	86 DT	86 DT	86 DT
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT				
SIEGE	72 DT	72 DT	72 DT	72 DT
8.0 FRAIS DIVERS D'EXPLOITATION				
SIEGE	18 DT	18 DT	18 DT	18 DT
9.0 CHARGES DE FINANCEMENT				
SIEGE	129 DT	129 DT	129 DT	129 DT
10.0 AMORTISSEMENT				
SIEGE	215 DT	215 DT	215 DT	215 DT
Matériel Roulant	771 DT	771 DT	771 DT	771 DT
TOTAL DES CHARGES	18,647 DT	21,507 DT	24,258 DT	27,309 DT

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
St. Pompage R2-2/3/5	An1992	An1993	An1994	An1995
1.0 FRAIS DE PERSONNEL				
1.1 Personnel R2-2/3/5	3,069 DT	3,192 DT	3,320 DT	3,452 DT
1.2 Personnel DME	353 DT	393 DT	408 DT	425 DT
1.3 Personnel DEX+DIST	239 DT	121 DT	126 DT	131 DT
1.4 Personnel DÉPARTEMENT	432 DT	638 DT	663 DT	690 DT
1.5 Personnel SIÈGE	657 DT	657 DT	657 DT	657 DT
2.0 TRANSPORT & DÉPLACEMENT				
2.1 DEPARTEMENT	0 DT	0 DT	0 DT	0 DT
2.2 SIÈGE	7 DT	7 DT	7 DT	7 DT
3.0 FRAIS DIVERS DE PRODUCTION				
3.1 Téléphone				
3.1.1 Téléphone R2-2/3/5	68	75	83	91
3.1.2 Téléphone DIST.	4 DT	2 DT	2 DT	2 DT
3.1.3 Téléphone DEPT.	19 DT	18 DT	18 DT	19 DT
3.1.4 Téléphone SIÈGE	46 DT	46 DT	46 DT	46 DT
3.1.5 Téléphone DME	0 DT	0 DT	0 DT	0 DT
3.1.6 Téléphone DEX.	1 DT	1 DT	1 DT	1 DT
3.2 Télégramme				
3.3 Télex R2-2/3/5				
3.4 Actes de contentieux				
3.4.2 Actes de contentieux DIST	0 DT	0 DT	8 DT	8 DT
3.4.4 Actes de contentieux SIÈGE	3 DT	3 DT	3 DT	3 DT
3.5 Documentation				
3.5.1 Documentation DEPT+DET	1 DT	1 DT	1 DT	1 DT
3.5.2 Documentation SIÈGE	12 DT	12 DT	12 DT	12 DT
3.5.3 Documentation DEX	0 DT	0 DT	0 DT	0 DT
3.5.4 Documentation DIST	1 DT	1 DT	1 DT	1 DT
3.5.5 Documentation DME	0 DT	0 DT	0 DT	0 DT
3.6 Affranchissement				
3.6.1 Affranchissement SIÈGE	2 DT	2 DT	2 DT	2 DT
3.6.2 Affranchissement DEPT	2 DT	2 DT	3 DT	3 DT
3.7 Affichage et annonce				
3.7.1 Affichage et annonce SIÈGE	18 DT	18 DT	18 DT	18 DT
3.7.2 Affichage et annonce DIST	0 DT	1 DT	1 DT	1 DT
3.8 Mission et réception				
3.8.1 Mission et réception SIÈGE	16 DT	16 DT	16 DT	16 DT
3.8.2 Mission et réception DEPT	0 DT	0 DT	0 DT	0 DT
3.9 Fourniture de bureau				
3.9.1 Fourniture de bureau DEPT	18 DT	25 DT	29 DT	32 DT
3.10 Autres frais divers				
3.10.1 SIÈGE	26 DT	26 DT	26 DT	26 DT
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS				
4.1 Loyers				
4.1.1 Loyer de bâtiments DEPT+DET+	32 DT	32 DT	32 DT	32 DT
4.1.2 Loyer SIÈGE	13 DT	13 DT	13 DT	13 DT
4.1.4 Loyer de locaux DIST.	0 DT	0 DT	21 DT	41 DT
4.1.4 Loyer de locaux DME (Atelier)	9 DT	9 DT	9 DT	9 DT
4.2 Entretien-réparations				
4.2.1 Ent. + Rép. R2-2/3/5	25 DT	19,742 DT	3,000 DT	4,000 DT
4.2.2 Matériel roulant R2-2/3/5	18 DT	2 DT	17 DT	17 DT
4.2.3 Matériel roulant DME	1 DT	0 DT	2 DT	2 DT
4.2.4 Matériel roulant DEPT	1 DT	0 DT	3 DT	3 DT
4.2.5 Matériel roulant DIST	1 DT	0 DT	8 DT	8 DT
4.2.6 Matériel roulant DEX	0 DT	0 DT	0 DT	0 DT
4.2.7 Réparations SIÈGE	40 DT	40 DT	40 DT	40 DT
4.3 Travaux et façons				
4.3.1 Travaux SIÈGE	43 DT	43 DT	43 DT	43 DT
4.3.2 Travaux STEP+pompage				
4.3.3 Travaux DIST	0 DT	21 DT	21 DT	21 DT
4.4 Fourniture d'eau				
R2-2/3/5	61 DT	82 DT	102 DT	115 DT
DEPT	1 DT	0 DT	0 DT	1 DT
SIEGE	3 DT	3 DT	3 DT	3 DT
DISTRICT	3 DT	3 DT	3 DT	3 DT
DME (Atelier)	1 DT	2 DT	2 DT	2 DT
4.5 Fourniture d'électricité				
R2-2/3/5	18,757 DT	14,556 DT	17,750 DT	19,300 DT
DEPT Nabeul	2 DT	3 DT	3 DT	3 DT
SIÈGE	46 DT	46 DT	46 DT	46 DT
DME (Atelier)	2 DT	3 DT	4 DT	4 DT
4.6 Prestation SONEDE				

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
St. Pompage R2-2/3/5	An1992	An1993	An1994	An1995
4.7 Assurances				
4.7.1 Assurances matériel roulant				
R1-1/2/5	4 DT	5 DT	5 DT	5 DT
DISTRICT	3 DT	3 DT	3 DT	3 DT
DME	1 DT	1 DT	2 DT	2 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	182 DT	182 DT	182 DT	182 DT
4.8 Honoraires et gardiennage				
4.8.1 Honor. et gardien. Siège	35 DT	35 DT	35 DT	35 DT
4.9 Petits outillages et autres				
DEX	0 DT	0 DT	0 DT	0 DT
SIEGE	61 DT	61 DT	61 DT	61 DT
5.0 BIENS CONSOMMES				
5.1 MATIERES PREMIERES				
5.1.1 Matériaux de construction				
DIST	95 DT	108 DT	124 DT	145 DT
SIEGE	3 DT	3 DT	3 DT	3 DT
5.1.2 Autres matières premières				
5.1.3 Tuyaux consommés				
5.1.4 Tuyaux pour la vente				
5.1.5 Pièces en fonte consommées				
5.1.6 Pièces en fonte pour la vente				
5.1.7 Autres				
5.2 MATIERES CONSOMMABLES				
5.2.1 Habillement-Tenue de protection				
R2-2/3/5				
DIST	46 DT	58 DT	75 DT	83 DT
SIEGE	28 DT	28 DT	28 DT	28 DT
5.2.2 Produits d'entretien				
R2-2/3/5				
DIST	12 DT	17 DT	21 DT	25 DT
SIEGE	3 DT	3 DT	3 DT	3 DT
5.2.3 Fournitures d'atelier-Laboratoire				
SIEGE	34 DT	34 DT	34 DT	34 DT
DEX	43 DT	64 DT	73 DT	80 DT
R2-2/3/5				
5.2.4 Fournitures de bureau				
SIEGE	42 DT	42 DT	42 DT	42 DT
5.2.5 Combustible et lubrifiant				
5.2.5.1 R2-2/3/5	150 DT	200 DT	250 DT	300 DT
5.2.5.2 Matériel roulant				
R2-2/3/5	51 DT	58 DT	65 DT	72 DT
DIST	19 DT	22 DT	25 DT	28 DT
DME	8 DT	10 DT	11 DT	12 DT
DEX	2 DT	2 DT	2 DT	3 DT
DEPT	3 DT	4 DT	4 DT	5 DT
SIEGE	40 DT	40 DT	40 DT	40 DT
5.2.5.3 Matériels et outillages				
R2-2/3/5				
5.2.6 Pièces de rechange				
5.2.6.1 Stat. épur. + pomp.				
R2-2/3/5	509 DT	19,173 DT	11,000 DT	11,000 DT
5.2.6.2 Matériel roulant				
R2-2/3/5	9 DT	92 DT	66 DT	76 DT
DEX	0 DT	1 DT	2 DT	2 DT
DIST	10 DT	24 DT	29 DT	41 DT
SIEGE	92 DT	92 DT	92 DT	92 DT
DME	2 DT	5 DT	9 DT	13 DT
DEPT	2 DT	3 DT	5 DT	7 DT
5.2.6.3 Bâtiments				
5.2.7 Autres matières consommables				
SIEGE	64 DT	64 DT	64 DT	64 DT
5.3 FRAIS SUR ACHAT				
SIEGE	81 DT	81 DT	81 DT	81 DT
6.0 IMPOTS ET TAXES				
6.1 TFP				
SIEGE	13 DT	13 DT	13 DT	13 DT
6.2 Taxes de circulation				
R2-2/3/5				
DIST	0 DT	0 DT	0 DT	0 DT
DME	0 DT	0 DT	0 DT	0 DT
DMMR	0 DT	0 DT	0 DT	0 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	19 DT	19 DT	19 DT	19 DT
6.3 TCCL				
6.4 Droit d'enrégistrement				
SIEGE	37 DT	37 DT	37 DT	37 DT
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT				
SIEGE	31 DT	31 DT	31 DT	31 DT
8.0 FRAIS DIVERS D'EXPLOITATION				
SIEGE	8 DT	8 DT	8 DT	8 DT
9.0 CHARGES DE FINANCEMENT				
SIEGE	55 DT	55 DT	55 DT	55 DT
10.0 AMORTISSEMENT				
SIEGE	92 DT	92 DT	92 DT	92 DT
Matériel Roulant	329 DT	329 DT	329 DT	329 DT
TOTAL DES CHARGES	26,272 DT	60,955 DT	39,592 DT	42,500 DT

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
St. Pompage R3-5/6	An1992	An1993	An1994	An1995
1.0 FRAIS DE PERSONNEL				
1.1 Personnel R3-5/6	7,474 DT	7,773 DT	8,084 DT	8,407 DT
1.2 Personnel DME	410 DT	456 DT	474 DT	493 DT
1.3 Personnel DEX + DIST	277 DT	141 DT	146 DT	152 DT
1.4 Personnel DÉPARTEMENT	501 DT	741 DT	770 DT	801 DT
1.5 Personnel SIÈGE	763 DT	763 DT	763 DT	763 DT
2.0 TRANSPORT & DÉPLACEMENT				
2.1 DEPARTEMENT	0 DT	0 DT	0 DT	0 DT
2.2 SIÈGE	9 DT	9 DT	9 DT	9 DT
3.0 FRAIS DIVERS DE PRODUCTION				
3.1 Téléphone				
3.1.1 Téléphone R3-5/6	45	50	55	61
3.1.2 Téléphone DIST.	4 DT	2 DT	2 DT	2 DT
3.1.3 Téléphone DEPT.	23 DT	21 DT	21 DT	22 DT
3.1.4 Téléphone SIÈGE	54 DT	54 DT	54 DT	54 DT
3.1.5 Téléphone DME	0 DT	0 DT	0 DT	0 DT
3.1.6 Téléphone DEX.	1 DT	1 DT	1 DT	1 DT
3.2 Télégramme				
3.3 Télex R3-5/6				
3.4 Actes de contentieux				
3.4.2 Actes de contentieux DIST	0 DT	0 DT	10 DT	10 DT
3.4.4 Actes de contentieux SIÈGE	4 DT	4 DT	4 DT	4 DT
3.5 Documentation				
3.5.1 Documentation DEPT + DET	1 DT	1 DT	1 DT	1 DT
3.5.2 Documentation SIÈGE	14 DT	14 DT	14 DT	14 DT
3.5.3 Documentation DEX	0 DT	0 DT	0 DT	0 DT
3.5.4 Documentation DIST	2 DT	2 DT	2 DT	2 DT
3.5.5 Documentation DME	0 DT	0 DT	0 DT	0 DT
3.6 Affranchissement				
3.6.1 Affranchissement SIÈGE	2 DT	2 DT	2 DT	2 DT
3.6.2 Affranchissement DEPT	2 DT	2 DT	4 DT	4 DT
3.7 Affichage et annonce				
3.7.1 Affichage et annonce SIÈGE	21 DT	21 DT	21 DT	21 DT
3.7.2 Affichage et annonce DIST	0 DT	1 DT	1 DT	2 DT
3.8 Mission et réception				
3.8.1 Mission et réception SIÈGE	19 DT	19 DT	19 DT	19 DT
3.8.2 Mission et réception DEPT	0 DT	0 DT	0 DT	0 DT
3.9 Fourniture de bureau				
3.9.1 Fourniture de bureau DEPT	20 DT	30 DT	33 DT	37 DT
3.10 Autres frais divers				
3.10.1 SIÈGE	30 DT	30 DT	30 DT	30 DT
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS				
4.1 Loyers				
4.1.1 Loyer de bâtiments DEPT + DET +	38 DT	37 DT	37 DT	37 DT
4.1.2 Loyer SIÈGE	15 DT	15 DT	15 DT	15 DT
4.1.4 Loyer de locaux DIST.	0 DT	0 DT	24 DT	48 DT
4.1.4 Loyer de locaux DME (Atelier)	11 DT	11 DT	11 DT	11 DT
4.2 Entretien-réparations				
4.2.1 Ent. + Rép. R3-5/6	465 DT	15,764 DT	1,500 DT	2,000 DT
4.2.2 Matériel roulant SE1	21 DT	3 DT	19 DT	19 DT
4.2.3 Matériel roulant DME	1 DT	0 DT	2 DT	2 DT
4.2.4 Matériel roulant DEPT	2 DT	1 DT	3 DT	3 DT
4.2.5 Matériel roulant DIST	1 DT	0 DT	9 DT	9 DT
4.2.6 Matériel roulant DEX	0 DT	0 DT	0 DT	0 DT
4.2.7 Réparations SIÈGE	46 DT	46 DT	46 DT	46 DT
4.3 Travaux et façons				
4.3.1 Travaux SIÈGE	50 DT	50 DT	50 DT	50 DT
4.3.2 Travaux STEP + pompage				
4.3.3 Travaux DIST	0 DT	24 DT	24 DT	24 DT
4.4 Fourniture d'eau				
R3-5/6	87 DT	150 DT	165 DT	181 DT
DEPT	1 DT	1 DT	1 DT	1 DT
SIEGE	4 DT	4 DT	4 DT	4 DT
DISTRICT	3 DT	3 DT	3 DT	4 DT
DME (Atelier)	1 DT	2 DT	2 DT	2 DT
4.5 Fourniture d'électricité				
R3-5/6	10,771 DT	9,649 DT	12,800 DT	14,000 DT
DEPT Nabeul	3 DT	3 DT	3 DT	4 DT
SIÈGE	53 DT	53 DT	53 DT	53 DT
DME (Atelier)	3 DT	3 DT	4 DT	4 DT
4.6 Prestation SONEDE				

CHARGES D'EXPLOITATION	COUT D'EXPLOITATION DE L'ONAS			
St. Pompage R3-5/6	An1992	An1993	An1994	An1995
4.7 Assurances				
4.7.1 Assurances matériel roulant				
R1-1/2/5	5 DT	5 DT	6 DT	6 DT
DISTRICT	3 DT	3 DT	4 DT	4 DT
DME	2 DT	2 DT	2 DT	2 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	211 DT	211 DT	211 DT	211 DT
4.8 Honoraires et gardiennage				
4.8.1 Honor. et gardien. Siège	41 DT	41 DT	41 DT	41 DT
4.9 Petits outillages et autres				
DEX	0 DT	0 DT	0 DT	0 DT
SIEGE	71 DT	71 DT	71 DT	71 DT
5.0 BIENS CONSOMMES				
5.1 MATIERES PREMIERES				
5.1.1 Matériaux de construction				
DIST	111 DT	125 DT	145 DT	169 DT
SIEGE	4 DT	4 DT	4 DT	4 DT
5.1.2 Autres matières premières				
5.1.3 Tuyaux consommés				
5.1.4 Tuyaux pour la vente				
5.1.5 Pièces en fonte consommées				
5.1.6 Pièces en fonte pour la vente				
5.1.7 Autres				
5.2 MATIERES CONSOMMABLES				
5.2.1 Habillement-Tenue de protection				
R3-5/6				
DIST	53 DT	67 DT	87 DT	96 DT
SIEGE	32 DT	32 DT	32 DT	32 DT
5.2.2 Produits d'entretien				
R3-5/6				
DIST	14 DT	19 DT	24 DT	29 DT
SIEGE	4 DT	4 DT	4 DT	4 DT
5.2.3 Fournitures d'atelier-Laboratoire				
SIEGE	39 DT	39 DT	39 DT	39 DT
DEX	50 DT	74 DT	85 DT	93 DT
R3-5/6				
5.2.4 Fournitures de bureau				
SIEGE	49 DT	49 DT	49 DT	49 DT
5.2.5 Combustible et lubrifiant				
5.2.5.1 R3-5/6	150 DT	200 DT	250 DT	300 DT
5.2.5.2 Matériel roulant				
R3-5/6	60 DT	67 DT	75 DT	84 DT
DIST	22 DT	25 DT	29 DT	32 DT
DME	10 DT	11 DT	13 DT	14 DT
DEX	2 DT	2 DT	3 DT	3 DT
DEPT	4 DT	4 DT	5 DT	5 DT
SIEGE	46 DT	46 DT	46 DT	46 DT
5.2.5.3 Matériels et outillages				
R3-5/6				
5.2.6 Pièces de rechange				
5.2.6.1 Stat. épur. + pomp.				
R3-5/6	8,348 DT	14,407 DT	5,000 DT	7,000 DT
5.2.6.2 Matériel roulant				
R3-5/6	11 DT	107 DT	77 DT	87 DT
DEX	0 DT	2 DT	2 DT	2 DT
DIST	11 DT	28 DT	34 DT	48 DT
SIEGE	107 DT	107 DT	107 DT	107 DT
DME	2 DT	6 DT	10 DT	15 DT
DEPT	2 DT	3 DT	6 DT	8 DT
5.2.6.3 Bâtiments				
5.2.7 Autres matières consommables				
SIEGE	75 DT	75 DT	75 DT	75 DT
5.3 FRAIS SUR ACHAT				
SIEGE	94 DT	94 DT	94 DT	94 DT
6.0 IMPOTS ET TAXES				
6.1 TFP				
SIEGE	15 DT	15 DT	15 DT	15 DT
6.2 Taxes de circulation				
R3-5/6				
DIST	0 DT	0 DT	0 DT	0 DT
DME	0 DT	0 DT	0 DT	0 DT
DMMR	0 DT	0 DT	0 DT	0 DT
DEX	0 DT	0 DT	0 DT	0 DT
DEPT	0 DT	0 DT	0 DT	0 DT
SIEGE	22 DT	22 DT	22 DT	22 DT
6.3 TCCL				
6.4 Droit d'enrégistrement				
SIEGE	43 DT	43 DT	43 DT	43 DT
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT				
SIEGE	36 DT	36 DT	36 DT	36 DT
8.0 FRAIS DIVERS D'EXPLOITATION				
SIEGE	9 DT	9 DT	9 DT	9 DT
9.0 CHARGES DE FINANCEMENT				
SIEGE	64 DT	64 DT	64 DT	64 DT
10.0 AMORTISSEMENT				
SIEGE	107 DT	107 DT	107 DT	107 DT
Matériel Roulant	382 DT	382 DT	382 DT	382 DT
TOTAL DES CHARGES	31,561 DT	52,564 DT	32,601 DT	36,876 DT

ANNEX F

Private Sector O&M Costs and Project Budget

BUDGET DU PROJET PILOTE STEP (DT)

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
1.0 FRAIS DE PERSONNEL												
1.1 Personnel STEP et SP	130850	124224	126941	144086	STEP	0.75	95206	101870	109001	116631	124795	547504
1.2 Personnel DME	8669	9637	10022	10423	DME							
1.3 Personnel DEX + DIST	5854	2974	3093	3216	DEX+DIST							
1.4 Personnel DÉPARTEMENT	10593	15647	16273	16924	DEPT							
1.5 Personnel SIÈGE	16128	16128	16128	16128	SIEGE							
2.0 TRANSPORT & DÉPLACEMENT												
2.1 DEPARTEMENT	0	0	0	0	DEPT							
2.2 SIÈGE	180	180	180	180	SIEGE		4000	4000	2000	2000	4000	16000
3.0 FRAIS DIVERS DE PRODUCTION												
3.1 Téléphone												
3.1.1 Téléphone STEP	1051	1150	1170	1342	STEP		500	520	541	562	585	2708
3.1.2 Téléphone DIST.	93	44	44	49	DIST.							
3.1.3 Téléphone DEPT.	477	438	448	469	DEPT							
3.1.4 Téléphone SIÈGE	1140	1140	1140	1140	SIEGE							
3.1.6 Téléphone DEX.	19	21	21	22	DEX							
3.2 Télégramme												
3.3 Télex												
3.4 Actes de contentieux												
3.4.2 Actes de contentieux DIST	4	10	204	204	DIST							
3.4.4 Actes de contentieux SIÈGE	75	75	75	75	SIEGE		1000	1040	1082	1125	1170	5416
3.5 Documentation												
3.5.1 Documentation DEPT+DET	26	26	26	26	DEPT							
3.5.2 Documentation SIÈGE	300	300	300	300	SIEGE							
3.5.3 Documentation DEX	9	9	9	9	DEX							
3.5.4 Documentation DIST	33	33	33	35	DIST							
3.5.5 Documentation DME	4	4	4	4	DME							
3.6 Affranchissement												
3.6.1 Affranchissement SIÈGE	38	38	38	38	SIEGE		100	104	108	112	117	542
3.6.2 Affranchissement DEPT	39	39	78	78	DEPT							
3.7 Affichage et annonce												
3.7.1 Affichage et annonce SIÈGE	450	450	450	450	SIEGE	0.60	270	281	292	304	316	1463
3.7.2 Affichage et annonce DIST	10	20	31	36	DIST							
3.8 Mission et réception												
3.8.1 Mission et réception SIÈGE	398	398	398	398	SIEGE		1000	1040	1082	1125	1170	5416
3.8.2 Mission et réception DEPT	0	0	0	0	DEPT							
3.9 Fourniture de bureau												
3.9.1 Fourniture de bureau DEPT	430	626	704	782	DEPT	0.80	563	586	609	633	659	3050
3.10 Autres frais divers												
3.10.1 SIÈGE	630	630	630	630	SIEGE	0.90	567	590	613	638	663	3072
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS												
4.1 Loyers												
4.1.1 Loyer de bâtiments DEPT+DET+DEX	796	774	790	790	DEPT							
4.1.2 Loyer SIÈGE	315	315	315	315	SIEGE							
4.1.3 Loyer Matériel							5000	5250	5513	5788	6078	27628
4.1.4 Loyer de locaux DIST.	0	0	509	1018	DIST							
4.1.5 Loyer de locaux DME(ateler)	225	225	225	225	DME							
4.2 Entretien-réparations												
4.2.1 Ent. + Rép. SE1	2447	54933	11847	15802	STEP	0.90	10662	11195	11755	12343	12960	58916
4.2.2 Matériel roulant STEP	487	97	479	479	STEP		1930	2027	2128	2234	2346	10664
4.2.3 Matériel roulant DME	13	7	39	39	DME							
4.2.4 Matériel roulant DEPT	37	11	66	66	DEPT							
4.2.5 Matériel roulant DIST	17	10	193	193	DIST							
4.2.6 Matériel roulant DEX	1	0	8	8	DEX							
4.2.7 Réparations SIÈGE	975	975	975	975	SIEGE							
4.3 Travaux et façons												
4.3.1 Travaux SIÈGE	1050	1050	1050	1050	SIEGE							
4.3.2 Travaux STEP+pompage							1000	1050	1103	1158	1216	5526
4.3.3 Travaux DIST	0	509	509	509	DIST							
4.4 Fourniture d'eau												
STEP	1520	1810	1942	2103	STEP	0.90	1747	1835	1927	2023	2124	9655

BUDGET DU PROJET PILOTE STEP (DT)

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
DEPT	18	12	12	13	DEPT							
SIEGE	83	83	83	83	SIEGE							
DISTRICT	66	71	71	81	DIST							
DME(atelier)	32	39	43	47	DME							
4.5 Fourniture d'électricité												
STEP	148582	151440	170778	183251	STEP	0.60	102467	107590	112970	118618	124549	566193
DEPT Nabeul	58	69	70	82	DEPT							
SIÈGE	1125	1125	1125	1125	SIEGE							
DME(atelier)	55	70	86	94	DME							
4.6 Prestation SONEDE												
4.7 Assurances												
4.7.1 Assurances matériel roulant												
STEP							2200	2310	2426	2547	2674	12156
DISTRICT	65	69	76	82	DIST							
DME	32	34	38	41	DME							
DMMRT	0	0	0	0	DMMR							
DEX	5	5	5	6	DEX							
DEPT	5	5	5	6	DEPT							
SIEGE	4456	4456	4456	4456	SIEGE							
4.8 Honoraires et gardiennage												
4.8.1 Honor. et gardien. Siège	863	863	863	863	SIEGE							
4.9 Petits outillages et autres												
DEX	0	0	0	0	DEX							
SIEGE	1500	1500	1500	1500	SIEGE							
5.0 BIENS CONSOMMES												
5.1 MATIERES PREMIERES												
5.1.1 Matériaux de construction												
DIST	2341	2646	3054	3562	DIST	0.50	1527	1603	1683	1767	1856	8436
SIEGE	75	75	75	75	SIEGE							
5.1.2 Autres matières premières												
5.1.3 Tuyaux consommés												
5.1.5 Pièces en fonte consommées												
5.1.6 Pièces en fonte pour la vente												
5.1.7 Autres												
5.2 MATIERES CONSOMMABLES												
5.2.1 Habillement-Tenue de protection												
STEP	0	0	0	0	STEP		2700	2835	2977	3126	3282	14919
DIST	1120	1425	1832	2036	DIST							
SIEGE	683	683	683	683	SIEGE							
5.2.2 Produits d'entretien												
STEP	0	0	0	0	STEP		400	420	441	463	486	2210
DIST	305	407	509	611	DIST							
SIEGE	83	83	83	83	SIEGE							
5.2.3 Fournitures d'atelier-Laboratoire												
SIEGE	825	825	825	825	SIEGE							
DEX	1056	1564	1799	1955	DEX							
STEP	0	0	0	0	STEP		2000	2100	2205	2315	2431	11051
5.2.4 Fournitures de bureau												
SIEGE	1043	1043	1043	1043	SIEGE							
5.2.5 Combustible et lubrifiant												
5.2.5.1 STEP	1360	1697	2050	2500	STEP	1.00	2050	2153	2260	2373	2492	11328
5.2.5.2 Matériel roulant												
STEP	1967	2195	2383	2653	STEP		8712	9148	9605	10085	10589	48139
DIST	458	531	606	682	DIST							
DME	203	236	274	305	DME							
DMMR	0	0	0	0	DMMR							
DEX	47	52	59	63	DEX							
DEPT	80	92	104	115	DEPT							
SIEGE	975	975	975	975	SIEGE							
5.2.5.3 Matériels et outillages												
STEP	0	0	0	0	STEP							
5.2.6 Pièces de rechange												

EUDGET DU PROJET PILOTE STEP (DT)

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
5.2.6.1 Stat. épur. + pomp.												
STEP	19804	50969	27000	37000	STEP	0.50	13500	14175	14884	15628	16409	74596
5.2.6.2 Matériel roulant												
STEP	791	2830	1983	2360	STEP		1930	2027	2128	2234	2346	10664
DEX	0	36	39	39	DEX							
DIST	238	584	712	1018	DIST							
SIEGE	2250	2250	2250	2250	SIEGE							
DME	52	129	215	313	DME							
DEPT	42	63	117	176	DEPT							
5.2.6.3 Bâtiments												
5.2.7 Autres matières consommables												
SIEGE	1575	1575	1575	1575	SIEGE							
5.3 FRAIS SUR ACHAT												
SIEGE	1988	1988	1988	1988	SIEGE							
6.0 IMPOTS ET TAXES												
6.1 TFP												
SIEGE	323	323	323	323	SIEGE							
6.2 Taxes de circulation												
STEP	0	0	0	0	STEP		2200	2288	2380	2475	2574	11916
DIST	0	0	0	0	DIST							
DME	0	0	0	0	DME							
DMMRT	0	0	0	0	DMMR							
DEX	0	0	0	0	DEX							
DEPT	0	0	0	0	DEPT							
SIEGE	473	473	473	473	SIEGE							
6.3 TCCL												
6.4 Droit d'enrégistrement												
SIEGE	900	900	900	900	SIEGE							
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT												
SIEGE	750	750	750	750	SIEGE							
8.0 FRAIS DIVERS D'EXPLOITATION												
SIEGE	188	188	188	188	SIEGE							
9.0 CHARGES DE FINANCEMENT												
SIEGE	1350	1350	1350	1350	SIEGE							
10.0 AMORTISSEMENT												
SIEGE	2250	2250	2250	2250	SIEGE							
Matériel Roulant	3129	3129	3129	3129	STEP		12192	12192	12192	12192	12192	60960
TOTAL DES CHARGES	391279	479362	438469	486899			275423	290227	303902	320500	340078	1530131
IMPREVU						0.10	27542	29023	30390	32050	34008	153013
FRAIS D'ADMINISTRATION SIEGE PRIVE						0.03	8263	8707	9117	9615	10202	45904
FRAIS D'ADMINISTRATION LOCAUX						0.12	13771	14511	15195	16025	17004	76507
TOTAL AVANT BENEFICE												
MARGE BENEFICIAIRE AVANT IMPOT						0.20	325000	342468	358604	378190	401293	1805554
IMPOT SUR MARGE BENEFICIAIRE						0.20	65000	68494	71721	75638	80259	361111
TOTAL DU CONTRAT PRIVE							389999	410961	430325	453828	481551	2166665
COUT DE L'UCP							29201	30369	31584	32847	34161	158162
PIECES DE RECHANGE (ONAS)							13500	14040	14602	15186	15793	73121
TOTAL DU COUT D'EXPLOITATION PREVU							432700	455370	476511	501861	531505	2397948
COUT DE L'ONAS							438469	486899	516113	547080	579905	2568466
ECONOMIE REALISEE PAR L'ONAS							5769	31529	39602	45219	48400	170518
% ECONOMIE							1.32%	6.48%	7.67%	8.27%	8.35%	6.64%

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #1 : Clef economies personnel = .80

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
1.0 FRAIS DE PERSONNEL												
1.1 Personnel STEP et SP	130850	124224	126941	144086	STEP	0.80	101553	108662	116268	124407	133115	584004
1.2 Personnel DME	8669	9637	10022	10423	DME							
1.3 Personnel DEX + DIST	5854	2974	3093	3216	DEX + DIST							
1.4 Personnel DÉPARTEMENT	10593	15647	16273	16924	DEPT							
1.5 Personnel SIÈGE	16128	16128	16128	16128	SIEGE							
2.0 TRANSPORT & DÉPLACEMENT												
2.1 DEPARTEMENT	0	0	0	0	DEPT							
2.2 SIÈGE	180	180	180	180	SIEGE		4000	4000	2000	2000	4000	16000
3.0 FRAIS DIVERS DE PRODUCTION												
3.1 Téléphone												
3.1.1 Téléphone STEP	1051	1150	1170	1342	STEP		500	520	541	562	585	2708
3.1.2 Téléphone DIST.	93	44	44	49	DIST.							
3.1.3 Téléphone DEPT.	477	438	448	469	DEPT							
3.1.4 Téléphone SIÈGE	1140	1140	1140	1140	SIEGE							
3.1.6 Téléphone DEX.	19	21	21	22	DEX							
3.2 Télégramme												
3.3 Télex												
3.4 Actes de contentieux												
3.4.2 Actes de contentieux DIST	4	10	204	204	DIST							
3.4.4 Actes de contentieux SIÈGE	75	75	75	75	SIEGE		1000	1040	1082	1125	1170	5416
3.5 Documentation												
3.5.1 Documentation DEPT + DET	26	26	26	26	DEPT							
3.5.2 Documentation SIÈGE	300	300	300	300	SIEGE							
3.5.3 Documentation DEX	9	9	9	9	DEX							
3.5.4 Documentation DIST	33	33	33	35	DIST							
3.5.5 Documentation DME	4	4	4	4	DME							
3.6 Affranchissement												
3.6.1 Affranchissement SIÈGE	38	38	38	38	SIEGE		100	104	108	112	117	542
3.6.2 Affranchissement DEPT	39	39	78	78	DEPT							
3.7 Affichage et annonce												
3.7.1 Affichage et annonce SIÈGE	450	450	450	450	SIEGE	0.60	270	281	292	304	316	1463
3.7.2 Affichage et annonce DIST	10	20	31	36	DIST							
3.8 Mission et réception												
3.8.1 Mission et réception SIÈGE	398	398	398	398	SIEGE		1000	1040	1082	1125	1170	5416
3.8.2 Mission et réception DEPT	0	0	0	0	DEPT							
3.9 Fourniture de bureau												
3.9.1 Fourniture de bureau DEPT	430	626	704	782	DEPT	0.80	563	586	609	633	659	3050
3.10 Autres frais divers												
3.10.1 SIÈGE	630	630	630	630	SIEGE	0.90	567	590	613	638	663	3072
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS												
4.1 Loyers												
4.1.1 Loyer de bâtiments DEPT + DET + DEX	796	774	790	790	DEPT							
4.1.2 Loyer SIÈGE	315	315	315	315	SIEGE							
4.1.3 Loyer Matériel							5000	5250	5513	5788	6078	27628
4.1.4 Loyer de locaux DIST.	0	0	509	1018	DIST							
4.1.5 Loyer de locaux DME(ateler)	225	225	225	225	DME							
4.2 Entretien-réparations												
4.2.1 Ent. + Rép. SE1	2447	54933	11847	15802	STEP	0.90	10662	11195	11755	12343	12960	58916
4.2.2 Matériel roulant STEP	487	97	479	479	STEP		1930	2027	2128	2234	2346	10664
4.2.3 Matériel roulant DME	13	7	39	39	DME							
4.2.4 Matériel roulant DEPT	37	11	66	66	DEPT							
4.2.5 Matériel roulant DIST	17	10	193	193	DIST							
4.2.6 Matériel roulant DEX	1	0	8	8	DEX							
4.2.7 Reparations SIÈGE	975	975	975	975	SIEGE							
4.3 Travaux et façons												
4.3.1 Travaux SIÈGE	1050	1050	1050	1050	SIEGE							
4.3.2 Travaux STEP + pompage							1000	1050	1103	1158	1216	5526
4.3.3 Travaux DIST	0	509	509	509	DIST							
4.4 Fourniture d'eau												
STEP	1520	1810	1942	2103	STEP	0.90	1747	1835	1927	2023	2124	9655

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #1 : Clef economies personnel = .80

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
DEPT	18	12	12	13	DEPT							
SIEGE	83	83	83	83	SIEGE							
DISTRICT	66	71	71	81	DIST							
DME(atelier)	32	39	43	47	DME							
4.5 Fourniture d'électricité												
STEP	148582	151440	170778	183251	STEP	0.60	102467	107590	112970	118618	124549	566193
DEPT Nabeul	58	66	70	82	DEPT							
SIÈGE	1125	1125	1125	1125	SIEGE							
DME(atelier)	55	70	86	94	DME							
4.6 Prestation SONEDE												
4.7 Assurances												
4.7.1 Assurances matériel roulant												
STEP							2200	2310	2426	2547	2674	12156
DISTRICT	65	69	76	82	DIST							
DME	32	34	38	41	DME							
DMMRT	0	0	0	0	DMMR							
DEX	5	5	5	6	DEX							
DEPT	5	5	5	6	DEPT							
SIEGE	4456	4456	4456	4456	SIEGE							
4.8 Honoraires et gardiennage												
4.8.1 Honor. et gardien. Siège	863	863	863	863	SIEGE							
4.9 Petits outillages et autres												
DEX	0	0	0	0	DEX							
SIEGE	1500	1500	1500	1500	SIEGE							
5.0 BIENS CONSOMMES												
5.1 MATIERES PREMIERES												
5.1.1 Matériaux de construction												
DIST	2341	2646	3054	3562	DIST	0.50	1527	1603	1683	1767	1856	8436
SIEGE	75	75	75	75	SIEGE							
5.1.2 Autres matières premières												
5.1.3 Tuyaux consommés												
5.1.5 Pièces en fonte consommées												
5.1.6 Pièces en fonte pour la vente												
5.1.7 Autres												
5.2 MATIERES CONSOMMABLES												
5.2.1 Habillement-Tenue de protection												
STEP	0	0	0	0	STEP		2700	2835	2977	3126	3282	14919
DIST	1120	1425	1832	2036	DIST							
SIEGE	683	683	683	683	SIEGE							
5.2.2 Produits d'entretien												
STEP	0	0	0	0	STEP		400	420	441	463	486	2210
DIST	305	407	509	611	DIST							
SIEGE	83	83	83	83	SIEGE							
5.2.3 Fournitures d'atelier-Laboratoire												
SIEGE	825	825	825	825	SIEGE							
DEX	1056	1564	1799	1955	DEX							
STEP	0	0	0	0	STEP		2000	2100	2205	2315	2431	11051
5.2.4 Fournitures de bureau												
SIEGE	1043	1043	1043	1043	SIEGE							
5.2.5 Combustible et lubrifiant												
5.2.5.1 STEP	1360	1697	2050	2500	STEP	1.00	2050	2153	2260	2373	2492	11328
5.2.5.2 Matériel roulant												
STEP	1967	2195	2383	2653	STEP		8712	9148	9605	10085	10589	48139
DIST	458	531	606	682	DIST							
DME	203	236	274	305	DME							
DMMR	0	0	0	0	DMMR							
DEX	47	52	59	63	DEX							
DEPT	80	92	104	115	DEPT							
SIEGE	975	975	975	975	SIEGE							
5.2.5.3 Matériels et outillages												
STEP	0	0	0	0	STEP							
5.2.6 Pièces de rechange												

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #1 : Clef economies personnel = .80

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
5.2.6.1 Stat. épur. + pomp.												
STEP	19804	50969	27000	37000	STEP	0.50	13500	14175	14884	15628	16409	74596
5.2.6.2 Matériel roulant												
STEP	791	2830	1983	2360	STEP		1930	2027	2128	2234	2346	10664
DEX	0	36	39	39	DEX							
DIST	238	584	712	1018	DIST							
SIEGE	2250	2250	2250	2250	SIEGE							
DME	52	129	215	313	DME							
DEPT	42	63	117	176	DEPT							
5.2.6.3 Bâtiments												
5.2.7 Autres matières consommables												
SIEGE	1575	1575	1575	1575	SIEGE							
5.3 FRAIS SUR ACHAT												
SIEGE	1988	1988	1988	1988	SIEGE							
6.0 IMPOTS ET TAXES												
6.1 TFP												
SIEGE	323	323	323	323	SIEGE							
6.2 Taxes de circulation												
STEP	0	0	0	0	STEP		2200	2288	2380	2475	2574	11916
DIST	0	0	0	0	DIST							
DME	0	0	0	0	DME							
DMMRT	0	0	0	0	DMMR							
DEX	0	0	0	0	DEX							
DEPT	0	0	0	0	DEPT							
SIEGE	473	473	473	473	SIEGE							
6.3 TCCL												
6.4 Droit d'enrégistrement												
SIEGE	900	900	900	900	SIEGE							
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT												
SIEGE	750	750	750	750	SIEGE							
8.0 FRAIS DIVERS D'EXPLOITATION												
SIEGE	188	188	188	188	SIEGE							
9.0 CHARGES DE FINANCEMENT												
SIEGE	1350	1350	1350	1350	SIEGE							
10.0 AMORTISSEMENT												
SIEGE	2250	2250	2250	2250	SIEGE							
Matériel Roulant	3129	3129	3129	3129	STEP		12192	12192	12192	12192	12192	60960
TOTAL DES CHARGES	391279	479362	438469	486899			281770	297018	311168	328276	348398	1566631
IMPREVU						0.10	28177	29702	31117	32828	34840	156663
FRAIS D'ADMINISTRATION SIEGE PRIVE						0.03	8453	8911	9335	9848	10452	46999
FRAIS D'ADMINISTRATION LOCAUX						0.12	14089	14851	15558	16414	17420	78332
TOTAL AVANT BENEFICE												
MARGE BENEFICIAIRE AVANT IMPOT						0.20	332489	350482	367179	387365	411110	1848624
IMPOT SUR MARGE BENEFICIAIRE						0.20	66498	70096	73436	77473	82222	369725
TOTAL DU CONTRAT PRIVE							398987	420578	440614	464838	493332	2218349
COUT DE L'UCP							29201	30369	31584	32847	34161	158162
PIECES DE RECHANGE (ONAS)							13500	14040	14602	15186	15793	73121
TOTAL DU COUT D'EXPLOITATION PREVU							441688	464987	486800	512871	543286	2449632
COUT DE L'ONAS							438469	486899	516113	547080	579905	2568466
ECONOMIE REALISEE PAR L'ONAS							-3219	21912	29313	34209	36619	118834
% ECONOMIE							-0.73%	4.50%	5.68%	6.25%	6.31%	4.63%

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #2 : Clef economies personnel = .85

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
1.0 FRAIS DE PERSONNEL												
1.1 Personnel STEP et SP	130850	124224	126941	144086	STEP	0.85	107900	115453	123535	132182	141435	620505
1.2 Personnel DME	8669	9637	10022	10423	DME							
1.3 Personnel DEX + DIST	5854	2974	3093	3216	DEX+DIST							
1.4 Personnel DÉPARTEMENT	10593	15647	16273	16924	DEPT							
1.5 Personnel SIÈGE	16128	16128	16128	16128	SIEGE							
2.0 TRANSPORT & DÉPLACEMENT												
2.1 DEPARTEMENT	0	0	0	0	DEPT							
2.2 SIÈGE	180	180	180	180	SIEGE		4000	4000	2000	2000	4000	16000
3.0 FRAIS DIVERS DE PRODUCTION												
3.1 Téléphone												
3.1.1 Téléphone STEP	1051	1150	1170	1342	STEP		500	520	541	562	585	2708
3.1.2 Téléphone DIST.	93	44	44	49	DIST.							
3.1.3 Téléphone DEPT.	477	438	448	469	DEPT							
3.1.4 Téléphone SIÈGE	1140	1140	1140	1140	SIEGE							
3.1.6 Téléphone DEX.	19	21	21	22	DEX							
3.2 Télégramme												
3.3 Télex												
3.4 Actes de contentieux												
3.4.2 Actes de contentieux DIST	4	10	204	204	DIST							
3.4.4 Actes de contentieux SIÈGE	75	75	75	75	SIEGE		1000	1040	1082	1125	1170	5416
3.5 Documentation												
3.5.1 Documentation DEPT+DET	26	26	26	26	DEPT							
3.5.2 Documentation SIÈGE	300	300	300	300	SIEGE							
3.5.3 Documentation DEX	9	9	9	9	DEX							
3.5.4 Documentation DIST	33	33	33	35	DIST							
3.5.5 Documentation DME	4	4	4	4	DME							
3.6 Affranchissement												
3.6.1 Affranchissement SIÈGE	38	38	38	38	SIEGE		100	104	108	112	117	542
3.6.2 Affranchissement DEPT	39	39	78	78	DEPT							
3.7 Affichage et annonce												
3.7.1 Affichage et annonce SIÈGE	450	450	450	450	SIEGE	0.60	270	281	292	304	316	1463
3.7.2 Affichage et annonce DIST	10	20	31	36	DIST							
3.8 Mission et réception												
3.8.1 Mission et réception SIÈGE	398	398	398	398	SIEGE		1000	1040	1082	1125	1170	5416
3.8.2 Mission et réception DEPT	0	0	0	0	DEPT							
3.9 Fourniture de bureau												
3.9.1 Fourniture de bureau DEPT	430	626	704	782	DEPT	0.80	563	586	609	633	659	3050
3.10 Autres frais divers												
3.10.1 SIÈGE	630	630	630	630	SIEGE	0.90	567	590	613	638	663	3072
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS												
4.1 Loyers												
4.1.1 Loyer de bâtiments DEPT+DET+DEX	796	774	790	790	DEPT							
4.1.2 Loyer SIÈGE	315	315	315	315	SIEGE							
4.1.3 Loyer Matériel												
4.1.4 Loyer de locaux DIST.	0	0	509	1018	DIST		5000	5250	5513	5788	6078	27628
4.1.5 Loyer de locaux DME(ateler)	225	225	225	225	DME							
4.2 Entretien-réparations												
4.2.1 Ent. + Rép. SE1	2447	54933	11847	15802	STEP	0.90	10662	11195	11755	12343	12960	58916
4.2.2 Matériel roulant STEP	487	97	479	479	STEP		1930	2027	2128	2234	2346	10664
4.2.3 Matériel roulant DME	13	7	39	39	DME							
4.2.4 Matériel roulant DEPT	37	11	66	66	DEPT							
4.2.5 Matériel roulant DIST	17	10	193	193	DIST							
4.2.6 Matériel roulant DEX	1	0	8	8	DEX							
4.2.7 Réparations SIÈGE	975	975	975	975	SIEGE							
4.3 Travaux et façons												
4.3.1 Travaux SIÈGE	1050	1050	1050	1050	SIEGE							
4.3.2 Travaux STEP+pompage												
4.3.3 Travaux DIST	0	509	509	509	DIST		1000	1050	1103	1158	1216	5526
4.4 Fourniture d'eau												
STEP	1520	1810	1942	2103	STEP	0.90	1747	1835	1927	2023	2124	9655

BUDGET DU PROJET PILOTE STEP (OT)

Analyse de sensibilité #2 : Clef economies personnel = .85

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
DEPT	18	12	12	13	DEPT							
SIEGE	83	83	83	83	SIEGE							
DISTRICT	66	71	71	81	DIST							
DME(atelier)	32	39	43	47	DME							
4.5 Fourniture d'électricité												
STEP	148582	151440	170778	183251	STEP	0.60	102467	107590	112970	118618	124549	566193
DEPT Nabeul	58	66	70	82	DEPT							
SIÈGE	1125	1125	1125	1125	SIEGE							
DME(atelier)	55	70	86	94	DME							
4.6 Prestation SONEDE												
4.7 Assurances												
4.7.1 Assurances matériel roulant												
STEP							2200	2310	2426	2547	2674	12156
DISTRICT	65	69	76	82	DIST							
DME	32	34	38	41	DME							
DMMRT	0	0	0	0	DMMR							
DEX	5	5	5	6	DEX							
DEPT	5	5	5	6	DEPT							
SIEGE	4456	4456	4456	4456	SIEGE							
4.8 Honoraires et gardiennage												
4.8.1 Honor. et gardien. Siège	863	863	863	863	SIEGE							
4.9 Petits outillages et autres												
DEX	0	0	0	[illegible]	DEX							
SIEGE	1500	1500	1500	1500	SIEGE							
5.0 BIENS CONSOMMES												
5.1 MATIERES PREMIERES												
5.1.1 Matériaux de construction												
DIST	2341	2646	3054	3562	DIST	0.50	1527	1603	1683	1767	1856	8436
SIEGE	75	75	75	75	SIEGE							
5.1.2 Autres matières premières												
5.1.3 Tuyaux consommés												
5.1.5 Pièces en fonte consommées												
5.1.6 Pièces en fonte pour la vente												
5.1.7 Autres												
5.2 MATIERES CONSOMMABLES												
5.2.1 Habillement-Tenue de protection												
STEP	0	0	0	0	STEP		2700	2835	2977	3126	3282	14919
DIST	1120	1425	1832	2036	DIST							
SIEGE	683	683	683	683	SIEGE							
5.2.2 Produits d'entretien												
STEP	0	0	0	0	STEP		400	420	441	463	486	2210
DIST	305	407	509	611	DIST							
SIEGE	83	83	83	83	SIEGE							
5.2.3 Fournitures d'atelier-Laboratoire												
SIEGE	825	825	825	825	SIEGE							
DEX	1056	1564	1799	1955	DEX							
STEP	0	0	0	0	STEP							
5.2.4 Fournitures de bureau							2000	2100	2205	2315	2431	11051
SIEGE	1043	1043	1043	1043	SIEGE							
5.2.5 Combustible et lubrifiant												
5.2.5.1 STEP	1360	1697	2050	2500	STEP	1.00	2050	2153	2260	2373	2492	11328
5.2.5.2 Matériel roulant												
STEP	1967	2195	2383	2653	STEP		8712	9148	9605	10085	10589	48139
DIST	458	531	606	682	DIST							
DME	203	236	274	305	DME							
DMMR	0	0	0	0	DMMR							
DEX	47	52	59	63	DEX							
DEPT	80	92	104	115	DEPT							
SIEGE	975	975	975	975	SIEGE							
5.2.5.3 Matériels et outillages												
STEP	0	0	0	0	STEP							
5.2.6 Pièces de rechange												

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #2 : Clef economies personnel = .85

	COUT ONAS					Clef des	COUT SECTEUR PRIVE					
CHARGES D'EXPLOITATION	1992	1993	1994	1995	Zone	économies	An 1	An 2	An 3	An 4	An 5	TOTAL
5.2.6.1 Stat. épur. + pomp.												
STEP	19804	50969	27000	37000	STEP	0.50	13500	14175	14884	15628	16409	74596
5.2.6.2 Matériel roulant												
STEP	791	2830	1983	2360	STEP		1930	2027	2128	2234	2346	10664
DEX	0	36	39	39	DEX							
DIST	238	584	712	1018	DIST							
SIEGE	2250	2250	2250	2250	SIEGE							
DME	52	129	215	313	DME							
DEPT	42	63	117	176	DEPT							
5.2.6.3 Bâtiments												
5.2.7 Autres matières consommables												
SIEGE	1575	1575	1575	1575	SIEGE							
5.3 FRAIS SUR ACHAT												
SIEGE	1988	1988	1988	1988	SIEGE							
6.0 IMPOTS ET TAXES												
6.1 TFP												
SIEGE	323	323	323	323	SIEGE							
6.2 Taxes de circulation												
STEP	0	0	0	0	STEP		2200	2288	2380	2475	2574	11916
DIST	0	0	0	0	DIST							
DME	0	0	0	0	DME							
DMMRT	0	0	0	0	DMMR							
DEX	0	0	0	0	DEX							
DEPT	0	0	0	0	DEPT							
SIEGE	473	473	473	473	SIEGE							
6.3 TCCL												
6.4 Droit d'enrégistrement												
SIEGE	900	900	900	900	SIEGE							
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT												
SIEGE	750	750	750	750	SIEGE							
8.0 FRAIS DIVERS D'EXPLOITATION												
SIEGE	188	188	188	188	SIEGE							
9.0 CHARGES DE FINANCEMENT												
SIEGE	1350	1350	1350	1350	SIEGE							
10.0 AMORTISSEMENT												
SIEGE	2250	2250	2250	2250	SIEGE							
Matériel Roulant	3129	3129	3129	3129	STEP		12192	12192	12192	12192	12192	60960
TOTAL DES CHARGES	391279	479362	438469	486899			288117	303810	318435	336051	356718	1603131
IMPREVU						0.10	28812	30381	31844	33605	35672	160313
FRAIS D'ADMINISTRATION SIEGE PRIVE						0.03	8644	9114	9553	10082	10702	48094
FRAIS D'ADMINISTRATION LOCAUX						0.12	14406	15190	15922	16803	17836	80157
TOTAL AVANT BENEFICE												
MARGE BENEFICIAIRE AVANT IMPOT						0.20	339979	358495	375753	396540	420927	1891695
IMPOT SUR MARGE BENEFICIAIRE						0.20	67996	71699	75151	79308	84185	378339
TOTAL DU CONTRAT PRIVE							407974	430195	450904	475848	505112	2270034
COUT DE L'UCP							29201	30369	31584	32[illegible]7	34161	158162
PIECES DE RECHANGE (ONAS)							13500	14040	14602	15186	15793	73121
TOTAL DU COUT D'EXPLOITATION PREVU							450675	474604	497090	523881	555066	2501317
COUT DE L'ONAS							438469	486899	516113	547080	579905	2568466
ECONOMIE REALISEE PAR L'ONAS							-12206	12296	19023	23199	24838	67149
% ECONOMIE							-2.78%	2.53%	3.69%	4.24%	4.28%	2.61%

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #3 : 5% augmentation couts materiel roulant

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
1.0 FRAIS DE PERSONNEL												
1.1 Personnel STEP et SP	130850	124224	126941	144086	STEP	0.75	95206	101870	109001	116631	124795	547504
1.2 Personnel DME	8669	9637	10022	10423	DME							
1.3 Personnel DEX + DIST	5854	2974	3093	3216	DEX + DIST							
1.4 Personnel DÉPARTEMENT	10593	15647	16273	16924	DEPT							
1.5 Personnel SIÈGE	16128	16128	16128	16128	SIEGE							
2.0 TRANSPORT & DÉPLACEMENT												
2.1 DÉPARTEMENT	0	0	0	0	DEPT							
2.2 SIÈGE	180	180	180	180	SIEGE		4000	4000	2000	2000	4000	16000
3.0 FRAIS DIVERS DE PRODUCTION												
3.1 Téléphone												
3.1.1 Téléphone STEP	1051	1150	1170	1342	STEP		500	520	541	562	585	2708
3.1.2 Téléphone DIST.	93	44	44	49	DIST.							
3.1.3 Téléphone DEPT.	477	438	448	469	DEPT							
3.1.4 Téléphone SIÈGE	1140	1140	1140	1140	SIEGE							
3.1.6 Téléphone DEX.	19	21	21	22	DEX							
3.2 Télégramme												
3.3 Télex												
3.4 Actes de contentieux												
3.4.2 Actes de contentieux DIST	4	10	204	204	DIST							
3.4.4 Actes de contentieux SIÈGE	75	75	75	75	SIEGE		1000	1040	1082	1125	1170	5416
3.5 Documentation												
3.5.1 Documentation DEPT + DET	26	26	26	26	DEPT							
3.5.2 Documentation SIÈGE	300	300	300	300	SIEGE							
3.5.3 Documentation DEX	9	9	9	9	DEX							
3.5.4 Documentation DIST	33	33	33	35	DIST							
3.5.5 Documentation DME	4	4	4	4	DME							
3.6 Affranchissement												
3.6.1 Affranchissement SIÈGE	38	38	38	38	SIEGE		100	104	108	112	117	542
3.6.2 Affranchissement DEPT	39	39	78	78	DEPT							
3.7 Affichage et annonce												
3.7.1 Affichage et annonce SIÈGE	450	450	450	450	SIEGE	0.60	270	281	292	304	316	1463
3.7.2 Affichage et annonce DIST	10	20	31	36	DIST							
3.8 Mission et réception												
3.8.1 Mission et réception SIÈGE	398	398	398	398	SIEGE		1000	1040	1082	1125	1170	5416
3.8.2 Mission et réception DEPT	0	0	0	0	DEPT							
3.9 Fourniture de bureau												
3.9.1 Fourniture de bureau DEPT	430	626	704	782	DEPT	0.80	563	586	609	633	659	3050
3.10 Autres frais divers												
3.10.1 SIÈGE	630	630	630	630	SIEGE	0.90	567	590	613	638	663	3072
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS												
4.1 Loyers												
4.1.1 Loyer de bâtiments DEPT + DET + DEX	796	774	790	790	DEPT							
4.1.2 Loyer SIÈGE	315	315	315	315	SIEGE							
4.1.3 Loyer Matériel							5000	5250	5513	5788	6078	27628
4.1.4 Loyer de locaux DIST.	0	0	509	1018	DIST							
4.1.5 Loyer de locaux DME(atelier)	225	225	225	225	DME							
4.2 Entretien-réparations												
4.2.1 Ent. + Rép. SE1	2447	54933	11847	15802	STEP	0.90	10662	11195	11755	12343	12960	58916
4.2.2 Matériel roulant STEP	487	97	479	479	STEP		1930	2027	2128	2234	2346	10664
4.2.3 Matériel roulant DME	13	7	39	39	DME							
4.2.4 Matériel roulant DEPT	37	11	66	66	DEPT							
4.2.5 Matériel roulant DIST	17	10	193	193	DIST							
4.2.6 Matériel roulant DEX	1	0	8	8	DEX							
4.2.7 Réparations SIÈGE	975	975	975	975	SIEGE							
4.3 Travaux et façons												
4.3.1 Travaux SIÈGE	1050	1050	1050	1050	SIEGE							
4.3.2 Travaux STEP + pompage							1000	1050	1103	1158	1216	5526
4.3.3 Travaux DIST	0	509	509	509	DIST							
4.4 Fourniture d'eau												
STEP	1520	1810	1942	2103	STEP	0.90	1747	1835	1927	2023	2124	9655

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #3 : 5% augmentation couts materiel roulant

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
DEPT	10	12	12	13	DEPT							
SIEGE	83	83	83	83	SIEGE							
DISTRICT	66	71	71	81	DIST							
DME(atelier)	32	39	43	47	DME							
4.5 Fourniture d'électricité												
STEP	148582	151440	170778	183251	STEP	0.60	102467	107590	112970	118618	124549	566193
DEPT Nabeul	58	66	70	82	DEPT							
SIÈGE	1125	1125	1125	1125	SIEGE							
DME(atelier)	50	70	86	94	DME							
4.6 Prestation SONEDE												
4.7 Assurances												
4.7.1 Assurances matériel roulant												
STEP							2200	2310	2426	2547	2674	12156
DISTRICT	65	69	76	82	DIST							
DME	32	34	38	41	DME							
DMMRT	0	0	0	0	DMMR							
DEX	5	5	5	6	DEX							
DEPT	5	5	5	6	DEPT							
SIEGE	4456	4456	4456	4456	SIEGE							
4.8 Honoraires et gardiennage												
4.8.1 Honor. et gardien. Siège	863	863	863	863	SIEGE							
4.9 Petits outillages et autres												
DEX	0	0	0	0	DEX							
SIEGE	1500	1500	1500	1500	SIEGE							
5.0 BIENS CONSOMMES												
5.1 MATIERES PREMIERE.												
5.1.1 Matériaux de construction												
DIST	2341	2646	3054	3562	DIST	0.50	1527	1603	1683	1767	1856	8436
SIEGE	75	75	75	75	SIEGE							
5.1.2 Autres matières premières												
5.1.3 Tuyaux consommés												
5.1.5 Pièces en fonte consommées												
5.1.6 Pièces en fonte pour la vente												
5.1.7 Autres												
5.2 MATIERES CONSOMMABLES												
5.2.1 Habillement-Tenue de protection												
STEP	0	0	0	0	STEP		2700	2835	2977	3126	3282	14919
DIST	1120	1425	1832	2036	DIST							
SIEGE	683	683	683	683	SIEGE							
5.2.2 Produits d'entretien												
STEP	0	0	0	0	STEP		400	420	441	463	486	2210
DIST	305	407	509	611	DIST							
SIEGE	83	83	83	83	SIEGE							
5.2.3 Fournitures d'atelier-Laboratoire												
SIEGE	825	825	825	825	SIEGE							
DEX	1056	1564	1799	1955	DEX							
STEP	0	0	0	0	STEP		2000	2100	2205	2315	2431	11051
5.2.4 Fournitures de bureau												
SIEGE	1043	1043	1043	1043	SIEGE							
5.2.5 Combustible et lubrifiant												
5.2.5.1 STEP	1360	1697	2050	2500	STEP	1.00	2050	2153	2260	2373	2492	11328
5.2.5.2 Matériel roulant												
STEP	1967	2195	2383	2653	STEP		8712	9148	9605	10085	10589	48139
DIST	458	531	606	682	DIST							
DME	203	236	274	305	DME							
DMMR	0	0	0	0	DMMR							
DEX	47	52	59	63	DEX							
DEPT	80	92	104	115	DEPT							
SIEGE	975	975	975	975	SIEGE							
5.2.5.3 Matériels et outillages												
STEP	0	0	0	0	STEP							
5.2.6 Pièces de rechange												

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #3 : 5% augmentation couts materiel roulant

	COUT ONAS					Clef des	COUT SECTEUR PRIVE					
CHARGES D'EXPLOITATION	1992	1993	1994	1995	Zone	économies	An 1	An 2	An 3	An 4	An 5	TOTAL
5.2.6.1 Stat. épur. + pomp.												
STEP	19804	50969	27000	37000	STEP	0.50	13500	14175	14884	15628	16409	74596
5.2.6.2 Matériel roulant												
STEP	791	2830	1983	2360	STEP		1930	2027	2128	2234	2346	10664
DEX	0	36	39	39	DEX							
DIST	238	584	712	1018	DIST							
SIEGE	2250	2250	2250	2250	SIEGE							
DME	52	129	215	313	DME							
DEPT	42	63	117	176	DEPT							
5.2.6.3 Bâtiments												
5.2.7 Autres matières consommables												
SIEGE	1575	1575	1575	1575	SIEGE							
5.3 FRAIS SUR ACHAT												
SIEGE	1988	1988	1988	1988	SIEGE							
6.0 IMPOTS ET TAXES												
6.1 TFP												
SIEGE	323	323	323	323	SIEGE							
6.2 Taxes de circulation												
STEP	0	0	0	0	STEP		2200	2288	2380	2475	2574	11916
DIST	0	0	0	0	DIST							
DME	0	0	0	0	DME							
DMMRT	0	0	0	0	DMMR							
DEX	0	0	0	0	DEX							
DEPT	0	0	0	0	DEPT							
SIEGE	473	473	473	473	SIEGE							
6.3 TCCL												
6.4 Droit d'enrégistrement												
SIEGE	900	900	900	900	SIEGE							
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT												
SIEGE	750	750	750	750	SIEGE							
8.0 FRAIS DIVERS D'EXPLOITATION												
SIEGE	188	88	188	188	SIEGE							
9.0 CHARGES DE FINANCEMENT												
SIEGE	1350	1350	1350	1350	SIEGE							
10.0 AMORTISSEMENT												
SIEGE	2250	2250	2250	2250	SIEGE							
Matériel Roulant	3129	3129	3129	3129	STEP		12802	12802	12802	12802	12802	64008
TOTAL DES CHARGES	391279	479362	438469	486899			276033	290837	304511	321110	340688	1533179
IMPREVU						0.10	27603	29084	30451	32111	34069	153318
FRAIS D'ADMINISTRATION SIEGE PRIVE						0.03	8281	8725	9135	9633	10221	45995
FRAIS D'ADMINISTRATION LOCAUX						0.12	13802	14542	15226	16055	17034	76659
TOTAL AVANT BENEFICE												
MARGE BENEFICIAIRE AVANT IMPOT						0.20	325719	343187	359323	378909	402012	1809151
IMPOT SUR MARGE BENEFICIAIRE						0.20	65144	68637	71865	75782	80402	361830
TOTAL DU CONTRAT PRIVE							390863	411825	431188	454691	482414	2170981
COUT DE L'UCP							29201	30369	31584	32847	34161	158162
PIECES DE RECHANGE (ONAS)							13500	14040	14602	15186	15793	73121
TOTAL DU COUT D'EXPLOITATION PREVU							433564	456234	477374	502724	532368	2402264
COUT DE L'ONAS							438469	486899	516113	547080	579905	2568466
ECONOMIE REALISEE PAR L'ONAS							4905	30666	38739	44356	47536	166202
% ECONOMIE							1.12%	6.30%	7.51%	8.11%	8.20%	6.47%

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #4 : 10% augmentation couts materiel roulant

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
1.0 FRAIS DE PERSONNEL												
1.1 Personnel STEP et SP	130850	124224	126941	144086	STEP	0.75	95206	101870	109001	116631	124795	547504
1.2 Personnel DME	8669	9637	10022	10423	DME							
1.3 Personnel DEX + DIST	5854	2974	3093	3216	DEX + DIST							
1.4 Personnel DÉPARTEMENT	10593	15647	16273	16924	DEPT							
1.5 Personnel SIÈGE	16128	16128	16128	16128	SIEGE							
2.0 TRANSPORT & DÉPLACEMENT												
2.1 DÉPARTEMENT	0	0	0	0	DEPT							
2.2 SIÈGE	180	180	180	180	SIEGE		4000	4000	2000	2000	4000	16000
3.0 FRAIS DIVERS DE PRODUCTION												
3.1 Téléphone												
3.1.1 Téléphone STEP	1051	1150	1170	1342	STEP		500	520	541	562	585	2708
3.1.2 Téléphone DIST.	93	44	44	49	DIST.							
3.1.3 Téléphone DEPT.	477	438	448	469	DEPT							
3.1.4 Téléphone SIÈGE	1140	1140	1140	1140	SIEGE							
3.1.6 Téléphone DEX.	19	21	21	22	DEX							
3.2 Télégramme												
3.3 Télex												
3.4 Actes de contentieux												
3.4.2 Actes de contentieux DIST	4	10	204	204	DIST							
3.4.4 Actes de contentieux SIÈGE	75	75	75	75	SIEGE		1000	1040	1082	1125	1170	5416
3.5 Documentation												
3.5.1 Documentation DEPT + DET	26	26	26	26	DEPT							
3.5.2 Documentation SIÈGE	300	300	300	300	SIEGE							
3.5.3 Documentation DEX	9	9	9	9	DEX							
3.5.4 Documentation DIST	33	33	33	35	DIST							
3.5.5 Documentation DME	4	4	4	4	DME							
3.6 Affranchissement												
3.6.1 Affranchissement SIÈGE	38	38	38	38	SIEGE		100	104	108	112	117	542
3.6.2 Affranchissement DEPT	39	39	78	78	DEPT							
3.7 Affichage et annonce												
3.7.1 Affichage et annonce SIÈGE	450	450	450	450	SIEGE	0.60	270	281	292	304	316	1463
3.7.2 Affichage et annonce DIST	10	20	31	36	DIST							
3.8 Mission et réception												
3.8.1 Mission et réception SIÈGE	398	398	398	398	SIEGE		1000	1040	1082	1125	1170	5416
3.8.2 Mission et réception DEPT	0	0	0	0	DEPT							
3.9 Fourniture de bureau												
3.9.1 Fourniture de bureau DEPT	430	626	704	782	DEPT	0.80	563	586	609	633	659	3050
3.10 Autres frais divers												
3.10.1 SIÈGE	630	630	630	630	SIEGE	0.90	567	590	613	638	663	3072
4.0 TRAVAUX-FOURN.-SERVICES EXTERIEURS												
4.1 Loyers												
4.1.1 Loyer de bâtiments DEPT + DET + DEX	796	774	790	790	DEPT							
4.1.2 Loyer SIÈGE	315	315	315	315	SIEGE							
4.1.3 Loyer Matériel							5000	5250	5513	5788	6078	27628
4.1.4 Loyer de locaux DIST.	0	0	509	1018	DIST							
4.1.5 Loyer de locaux DME(ateler)	225	225	225	225	DME							
4.2 Entretien-réparations												
4.2.1 Ent. + Rép. SE1	2447	54933	11847	15802	STEP	0.90	10662	11195	11755	12343	12960	58916
4.2.2 Matériel roulant STEP	487	97	479	479	STEP		1930	2027	2128	2234	2346	10664
4.2.3 Matériel roulant DME	13	7	39	39	DME							
4.2.4 Matériel roulant DEPT	37	11	66	66	DEPT							
4.2.5 Matériel roulant DIST	17	10	193	193	DIST							
4.2.6 Matériel roulant DEX	1	0	8	8	DEX							
4.2.7 Réparations SIÈGE	975	975	975	975	SIEGE							
4.3 Travaux et façons												
4.3.1 Travaux SIÈGE	1050	1050	1050	1050	SIEGE							
4.3.2 Travaux STEP + pompage							1000	1050	1103	1158	1216	5526
4.3.3 Travaux DIST	0	509	509	509	DIST							
4.4 Fourniture d'eau												
STEP	1520	1810	1942	2103	STEP	0.90	1747	1835	1927	2023	2124	9655

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #4 : 10% augmentation couts materiel roulant

	COUT ONAS					Clef des	COUT SECTEUR PRIVE					
CHARGES D'EXPLOITATION	1992	1993	1994	1995	Zone	économies	An 1	An 2	An 3	An 4	An 5	TOTAL
DEPT	18	12	12	13	DEPT							
SIEGE	83	83	83	83	SIEGE							
DISTRICT	66	71	71	81	DIST							
DME(atelier)	32	39	43	47	DME							
4.5 Fourniture d'électricité												
STEP	148582	151440	170778	183251	STEP	0.60	102467	107590	112970	118618	124549	566193
DEPT Nabeul	58	66	70	82	DEPT							
SIÈGE	1125	1125	1125	1125	SIEGE							
DME(atelier)	55	70	86	94	DME							
4.6 Prestation SONEDE												
4.7 Assurances												
4.7.1 Assurances matériel roulant												
STEP							2200	2310	2426	2547	2674	12156
DISTRICT	65	69	76	82	DIST							
DME	32	34	38	41	DME							
DMMRT	0	0	0	0	DMMR							
DEX	5	5	5	6	DEX							
DEPT	5	5	5	6	DEPT							
SIEGE	4456	4456	4456	4456	SIEGE							
4.8 Honoraires et gardiennage												
4.8.1 Honor. et gardien. Siège	863	863	863	863	SIEGE							
4.9 Petits outillages et autres												
DEX	0	0	0	0	DEX							
SIEGE	1500	1500	1500	1500	SIEGE							
5.0 BIENS CONSOMMES												
5.1 MATIERES PREMIERES												
5.1.1 Matériaux de construction												
DIST	2341	2646	3054	3562	DIST	0.50	1527	1603	1683	1767	1856	8436
SIEGE	75	75	75	75	SIEGE							
5.1.2 Autres matières premières												
5.1.3 Tuyaux consommés												
5.1.5 Pièces en fonte consommées												
5.1.6 Pièces en fonte pour la vente												
5.1.7 Autres												
5.2 MATIERES CONSOMMABLES												
5.2.1 Habillement-Tenue de protection												
STEP	0	0	0	0	STEP		2700	2835	2977	3126	3282	14919
DIST	1120	1425	1832	2036	DIST							
SIEGE	683	683	683	683	SIEGE							
5.2.2 Produits d'entretien												
STEP	0	0	0	0	STEP		400	420	441	463	486	2210
DIST	305	407	509	611	DIST							
SIEGE	83	83	83	83	SIEGE							
5.2.3 Fournitures d'atelier-Laboratoire												
SIEGE	825	825	825	825	SIEGE							
DEX	1056	1564	1799	1955	DEX							
STEP	0	0	0	0	STEP		2000	2100	2205	2315	2431	11051
5.2.4 Fournitures de bureau												
SIEGE	1043	1043	1043	1043	SIEGE							
5.2.5 Combustible et lubrifiant												
5.2.5.1 STEP	1360	1697	2050	2500	STEP	1.00	2050	2153	2260	2373	2492	11328
5.2.5.2 Matériel roulant												
STEP	1967	2195	2383	2653	STEP		8712	9148	9605	10085	10589	48139
DIST	458	531	606	682	DIST							
DME	203	236	274	305	DME							
DMMR	0	0	0	0	DMMR							
DEX	47	52	59	63	DEX							
DEPT	80	92	104	115	DEPT							
SIEGE	975	975	975	975	SIEGE							
5.2.5.3 Matériels et outillages												
STEP	0	0	0	0	STEP							
5.2.6 Pièces de rechange												

BUDGET DU PROJET PILOTE STEP (DT)

Analyse de sensibilite #4 : 10% augmentation couts materiel roulant

CHARGES D'EXPLOITATION	COUT ONAS 1992	1993	1994	1995	Zone	Clef des économies	COUT SECTEUR PRIVE An 1	An 2	An 3	An 4	An 5	TOTAL
5.2.6.1 Stat. épur. + pomp.												
STEP	19804	50969	27000	37000	STEP	0.50	13500	14175	14884	15628	16409	74596
5.2.6.2 Matériel roulant												
STEP	791	2830	1983	2360	STEP		1930	2027	2128	2234	2346	10664
DEX	0	36	39	39	DEX							
DIST	238	504	712	1018	DIST							
SIEGE	2250	2250	2250	2250	SIEGE							
DME	52	129	215	313	DME							
DEPT	42	63	117	176	DEPT							
5.2.6.3 Bâtiments												
5.2.7 Autres matières consommables												
SIEGE	1575	1575	1575	1575	SIEGE							
5.3 FRAIS SUR ACHAT												
SIEGE	1988	1988	1988	1988	SIEGE							
6.0 IMPOTS ET TAXES												
6.1 TFP												
SIEGE	323	323	323	323	SIEGE							
6.2 Taxes de circulation												
STEP	0	0	0	0	STEP		2200	2288	2380	2475	2574	11916
DIST	0	0	0	0	DIST							
DME	0	0	0	0	DME							
DMMRT	0	0	0	0	DMMR							
DEX	0	0	0	0	DEX							
DEPT	0	0	0	0	DEPT							
SIEGE	473	473	473	473	SIEGE							
6.3 TCCL												
6.4 Droit d'enrégistrement												
SIEGE	900	900	900	900	SIEGE							
7.0 FRAIS FINANCIERS DE FONCTIONNEMENT												
SIEGE	750	750	750	750	SIEGE							
8.0 FRAIS DIVERS D'EXPLOITATION												
SIEGE	188	188	188	188	SIEGE							
9.0 CHARGES DE FINANCEMENT												
SIEGE	1350	1350	1350	1350	SIEGE							
10.0 AMORTISSEMENT												
SIEGE	2250	2250	2250	2250	SIEGE							
Matériel Roulant	3129	3129	3129	3129	STEP		13411	13411	13411	13411	13411	67056
TOTAL DES CHARGES	391279	479362	438469	486899			276643	291446	305121	321719	341298	1536227
IMPREVU						0.10	27664	29145	30512	32172	34130	153623
FRAIS D'ADMINISTRATION SIEGE PRIVE						0.03	8299	8743	9154	9652	10239	46087
FRAIS D'ADMINISTRATION LOCAUX						0.12	13832	14572	15256	16086	17065	76811
TOTAL AVANT BENEFICE												
MARGE BENEFICIAIRE AVANT IMPOT						0.20	326438	343907	360043	379629	402731	1812747
IMPOT SUR MARGE BENEFICIAIRE						0.20	65288	68781	72009	75926	80546	362549
TOTAL DU CONTRAT PRIVE							391726	412688	432051	455555	483277	2175297
COUT DE L'UCP							29201	30369	31584	32847	34161	158162
PIECES DE RECHANGE (ONAS)							13500	14040	14602	15186	15793	73121
TOTAL DU COUT D'EXPLOITATION PREVU							434427	457097	478237	503588	533231	2406580
COUT DE L'ONAS							438469	486899	516113	547080	579905	2568466
ECONOMIE REALISEE PAR L'ONAS							4042	29802	37876	43492	46673	161886
% ECONOMIE							0.92%	6.12%	7.34%	7.95%	8.05%	6.30%

ANNEX G

Treatment Plant Saturation Tables (1992-1993)

STATION SE1
Année 1992

mois	Volume d'eau m³/mois	Débit jour. moy. m³/j	Débit jour. max m³/j	DBO5 à l'entrée Kg/j	DBO5 à la sortie mg/l	DBO5 à la sortie KG/j	DCO à l'entrée mg/l	DCO à l'entrée kg/j	DCO à la sortie mg/l	Qmax/Qdim	DBO5moy/ DBO5dim	DCOmoy/ DCOdim	DBO5/30 DBO > DBOdim	DBO5/30 Q > Qdim	DCO/90 DCO > DCOdim	DCO/90 Q > Qdim
Jan	50746	1637	2269	297.7	16.0	26.2	375.0	613.9	100.5							
Fév	21250	733	2572	316.3	15.0	11.0	416.0	304.8	89							
Mars	62129	2004	2593	331.3	6.0	12.0	427.0	855.8	68							
Avr	82918	2764	4589	770.7	17.3	47.8	635.0	1755.1	92.6	109.05%				57.67%		102.89%
Mai	91409	2949	4396	846	10.0	29.5	638.5	1882.7	78	104.47%				33.33%		86.67%
Juin	95399	3180	3450	1113	21.5	68.4	821.0	2610.8	134							
Juil	104284	3364	3844	916.6	21.5	72.3	638.0	2146.2	116							
Août	121448	3918	4446	1479	18.3	71.7	973.0	3811.9	113	105.66%	111.96%	144.28%	61.00%	61.00%		125.56%
Sept	101657	3389	3763	1663.5	19.5	66.1	1062.0	3598.7	79		125.93%	136.21%	65.00%			
Oct	97337	3140	4692	1298.4	21.0	65.9	1015.5	3188.6	103.5	111.50%		120.69%		70.00%		115.00%
Nov	64746	2158	3746	597.7	22.0	47.5	606.5	1308.9	117							
Déc.	60266	1944	5046	492.8	22.5	43.7	556.5	1081.9	117	119.91%				75.00%		130.00%

STATION SE2
Année 1992

mois	Volume d'eau m³/mois	Débit jour. moy m³/j	Débit jour. max. m³/j	DBO5 à l'entrée Kg/j	DBO5 à la sortie mg/l	DBO5 à la sortie KG/j	DCO à l'entrée mg/l	DCO à l'entrée kg/j	DCO à la sortie mg/l	Qmax/Qdim	DBO5moy/ DBO5dim	DCOmoy/ DCOdim	DBO5/30 DBO > DBOdim	DBO5/30 Q > Qdim	DCO/90 DCO > DCOdim	DCO/90 Q > Qdim
Jan	89513	2888	5494	1354.2	8.5	24.5	999.0	2884.6	42.5	106.76%				28.33%		47.22%
Fév.	91259	3147	5428	1670.9	14.0	44.1	891.0	2803.9	64	105.48%				46.67%		71.11%
Mars	97910	3158	3742	656.9	6.0	19.0	660.0	2084.5	48							
Avr	107122	3571	5581	2081.7	14.0	50.0	1321.0	4716.9	69.9	108.45%		106.91%		46.67%		77.67%
Mai	120246	3879	6739	1949.1	15.0	58.2	1179.0	4573.2	24	130.96%		103.65%		50.00%		26.67%
Juin	124626	4154	5610	1765.5	16.0	66.5	1149.0	4773.2	77	109.02%		108.19%		53.33%		85.56%
Juil.	152362	4915	6105	1678.4	16.5	81.1	917.0	4507.0	91.5	118.64%		102.15%		55.00%		101.67%
Août	194408	6271	6971	2916.1	16.5	103.5	1221.0	7657.2	84	135.46%	132.19%	173.55%	55.00%	55.00%		93.33%
Sept	161144	5371	6847	2073.3	15.0	80.6	950.0	5102.9	69	133.05%		115.66%		50.00%		76.67%
Oct	146055	4711	7503	2235.5	14.0	66.0	1102.0	5192.0	74	145.80%	101.34%	117.68%	46.67%	46.67%		82.22%
Nov	140750	4692	9592	2132.3	12.5	58.6	1043.0	4893.4	77.5	186.40%		110.91%		41.67%		86.11%
Déc	145381	4690	10757	2236.9	12.5	58.6	1190.0	5580.8	78	209.04%	101.40%	125.49%	41.67%	41.67%		86.67%

STATION SE3
Année 1992

mois	Volume d'eau m³/mois	Débit jour. moy. m³/j	Débit jour. max. m³/j	DBO5 à l'entrée Kg/j	DBO5 à la sortie mg/l	DBO5 à la sortie KG/j	DCO à l'entrée mg/l	DCO à l'entrée kg/j	DCO à la sortie mg/l	Qmax/Qdim	DBO5moy/ DBO5dim	DCOmoy/ DCOdim	DBD5/30 DBO > DBOdim	DBO5/30 Q > Qdim	DCD/90 DCO > DCOdim	DCO 90 Q > Qdim
Jan	47024	1517	3754	347	10.0	15.2	421.0	638.6	56	107.26%				33 33%		62 22%
Fév	48010	1656	2857	331	16.0	26.5	721.0	1193.6	75							
Mars	55884	1803	2392	230	4.0	7.2	321.0	578.7	44							
Avr	65645	2188	3596	792	17.0	37.2	818.0	1790.0	102	102.74%	113 14%	127 86%	56 67%	56 67%		113 33%
Mai	73398	2368	4529	664	5.0	11.8	677 0	1602 9	64	129.40%		114 49%		16 67%		71 11%
Juin	123521	4117	5929	1119	12.0	49 4	603 0	2482.8	72	169.40%	159.86%	177 34%	40 00%	40 00%		80 00%
Juil	123363	3979	5057	931	11.0	43 8	541.0	2152.9	77	144.49%	133.00%	153 78%	36 67%	36 67%		85 56%
Août	141128	4553	5307	1411	14.0	63 7	633.0	2881.7	78	151.63%	201.57%	205 84%	46 67%	46 67%		86 67%
Sept	100684	3356	5159	1110	12.0	40.3	728.0	2443.3	69	147.40%	158.57%	174 52%	40 00%	40 00%		76 67%
Oct	59860	1931	2799	523	17.0	32.8	624.0	1204.9	98							
Nov	47496	1583	2118	360	16.0	25.3	551.0	872.3	84							
Déc	47936	1546	3576	369	13.0	20.1	534 0	825.7	75	102 17%				43 33%		83 33%

STATION SE1
Année 1993

mois	Volume d'eau m³/mois	Débit jour. moy m³/j	Débit jour. max m³/j	DBO5 à l'entrée Kg/j	DBO5 à la sortie mg/l	DBO5 à la sortie KG/j	DCO à l'entrée mg/l	DCO à l'entrée kg/j	DCO à la sortie mg/l	Qmax/Qdim	DBO5moy/ DBO5dim	DCOmoy/ DCOdim	DBO5/30 DBO > DBOdim	DBO5/30 Q > Qdim	DCO 90 DCO > DCOdim	DCO/90 Q > Qdim
Jan	60433	1949	4617	528.5	24.8	48.3	668.7	1303.6	111	109.72%				82.67%		123.33%
Fév	54837	1958	3643	770	26.0	50.9	862.3	1688.8	91.6							
Mars	67732	2185	3312	769.8	19.6	42.8	734.0	1603.7	101							
Avr	73975	2466	3110	651.8	31.5	77.7	706.3	1741.6	179.2							
Mai	80622	2601	3395	738.9	58.0	150.8	832.0	2163.8	191.7							
Juin	91763	3059	3435	985.9	37.0	113.2	1001.8	3064.3	132.5							
Juil	116597	3761	4209	1107.8	19.3	72.6	841.2	3163.9	146.2	109.53%		115.98%				
Août	139508	4500	5098	1350	47.6	214.2	711.0	3199.7	130.2	121.15%	102.20%	119.75%		64.33%		162.44%
Sept	121682	4056	4819	923.1	38.3	155.3	701.5	2845.3	197.5	114.52%		121.11%	158.67%	158.67%		144.67%
Oct	100718	3249	4326	682.1	19.8	64.3	708.0	2300.3	123.1	102.80%		107.70%		127.67%		219.44%
Nov	72311	2410	3633	622	13.5	32.5	657.8	1585.5	94.4					66.00%		136.78%
Déc	52125	1681	2446	337.5	11.4	19.2	618.6	1040.1	86.4							

STATION SE2
Année 1993

mois	Volume d'eau m³/mois	Débit jour. moy. m³/j	Débit jour. max. m³/j	DBO5 à l'entrée Kg/j	DBO5 à la sortie		DCO à l'entrée		DCO à la sortie mg/l	Qmax/Qdim	DBO5moy/ DBO5dim	DCOmoy/ DCOdim	DBO5/30 DBO > DBOdim	DBO5.30 Q > Qdim	DCO/90 DCO > DCOdim	DCO 90 Q > Qdim
					mg/l	KG/j	mg/l	kg/j								
Jan	142640	4601	8535	2098	10.0	46 0	1072 0	4932.6	49	165.86%		111 80%		33 33%		54 44%
Fév	94278	3367	6936	1852	23.0	77 4	1349.0	4542 2	117	134 78%		102 95%		76 67%		130 00%
Mars	93782	3025	4317	1691	22.0	66 6	1313.0	3972 1	134							
Avr	93140	3105	3563	1714	14.0	43 5	1256.0	3899 5	82							
Mai	101525	3275	4287	1431	9.0	29.5	1161 0	3802 3	75							
Juin	99613	3320	3643	1640	8 0	26 6	1160 0	3851 7	61							
Juil	124249	4008	4760	1555	12 0	48 1	816 0	3270 6	71							
Août	144535	4662	5562	1527	18 0	83 9	893 0	4163 5	91	108 08%				60 00%		[illegible]
Sept	116409	3880	4385	1727	11 0	42 7	1052 0	4082 1	83							
Oct	113730	3669	4316	961	11.0	40 4	824 0	3023 0	73							
Nov	95236	3175	4822	1092	7 0	22 2	930 0	2952 3	61							
Déc	89821	2897	4640	1257	12 0	34.8	1000.0	2897 5	85							

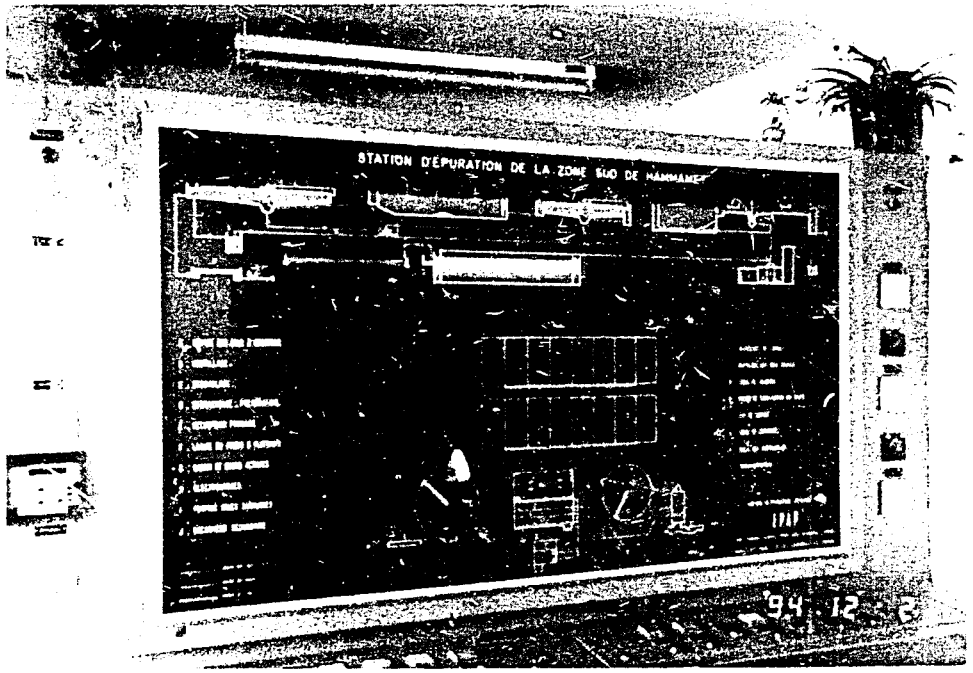
STATION SE3
Année 1993

mois	Volume d'eau m³/mois	Débit jour. moy. m³/j	Débit jour. max m³/j	DBO5 à l'entrée Kg/j	DBO5 à la sortie mg/l	DBO5 à la sortie KG/j	DCO à l'entrée mg/l	DCO à l'entrée kg/j	DCO à la sortie mg/l	Qmax/Qdim	DBO5moy/ DBO5dim	DCOmoy/ DCOdim	DBO5 30 DBO > DBO5dim	DBO5 30 Q > Qdim	DCO 90 DCO > DCOdim	DCO 90 Q > Qdim
Jan	51732	1669	3168	582	10.0	16.7	864.0	1441.8	56			102.99%				
Fév	36754	1313	2177	290	9.0	11.8	489.0	641.9	48							
Mars	41839	1350	2177	318	14.0	18.9	685.0	924.5	78							
Avr	49709	1657	2002	476	10.0	16.6	707.0	1171.5	72							
Mai	56079	1809	2274	450	15.0	27.1	617.0	1116.2	90							
Juin	73677	2456	2702	626	10.0	24.6	645.0	1584.1	79							
Juil	87437	2821	4471	654	13.0	36.7	589.0	1661.3	94	127.74%		113.15%				
Août	105339	3398	3965	561	20.0	68.0	541.0	1838.3	121	113.29%		118.66%		43.33%		104.44%
Sept.	89463	2982	4140	697	22.0	65.6	605.0	1804.2	134	118.29%		131.31%		66.67%		134.44%
Oct.	81721	2636	3531	598	22.0	58.0	543.0	1431.4	113	100.89%		128.87%		73.33%		148.93%
Nov	66101	2203	3946	414	9.0	19.8	585.0	1289.0	69	112.74%		102.25%		73.33%		125.56%
Déc.	53317	1720	2232	357	3.0	5.2	746.0	1283.0	65					30.00%		76.67%

ANNEX H

Photographs

SE-1


STATION D'EPURATION DE LA ZONE SUD DE HAMMAMET
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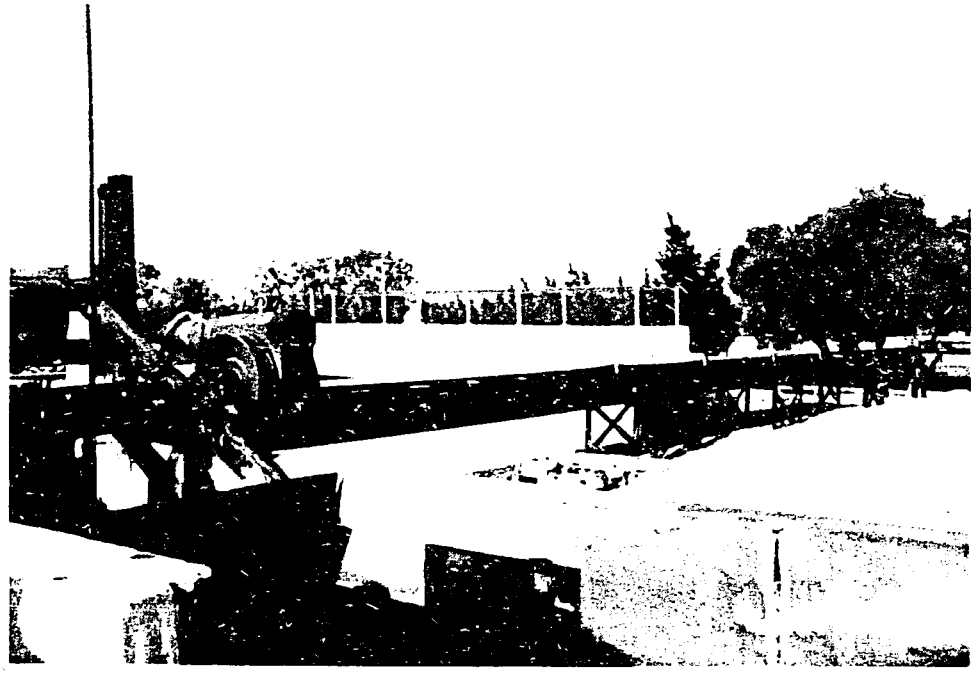
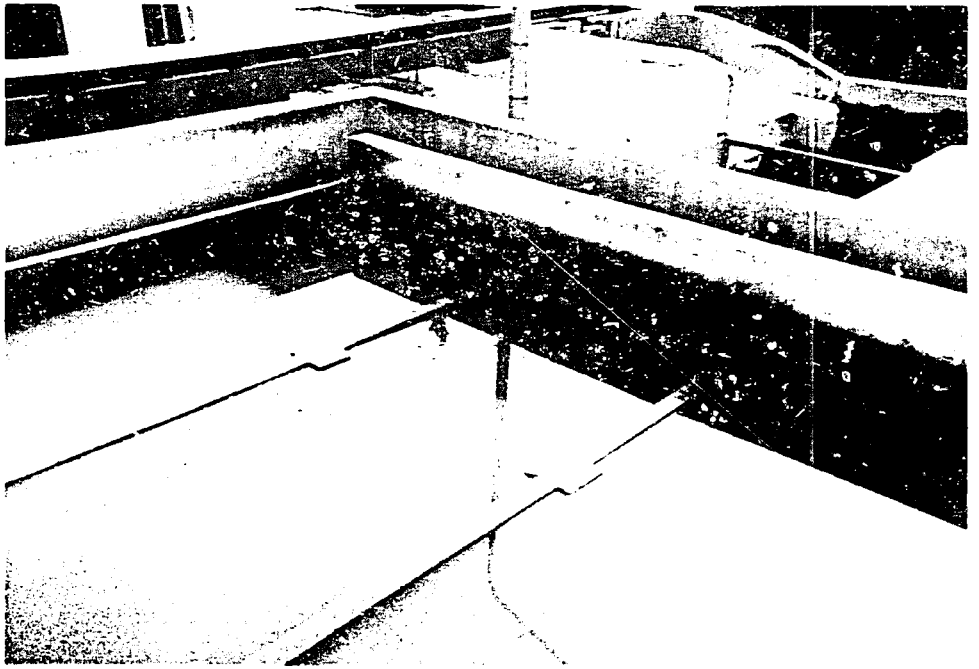
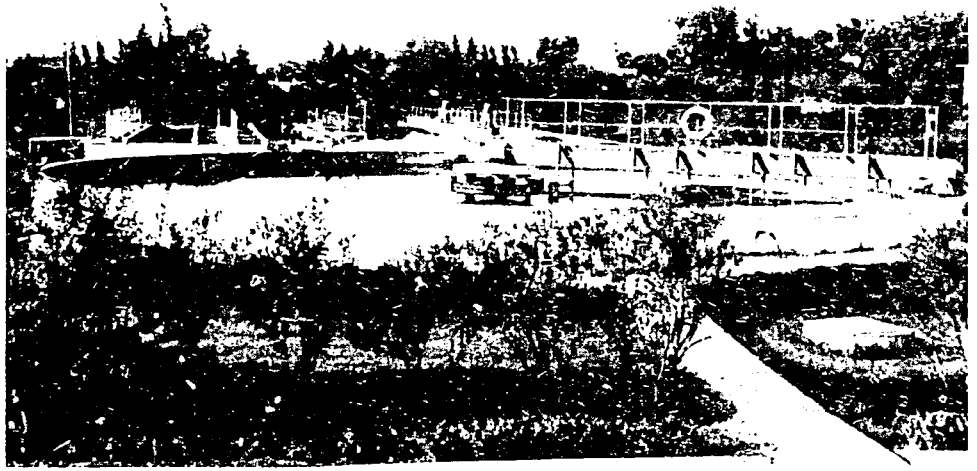
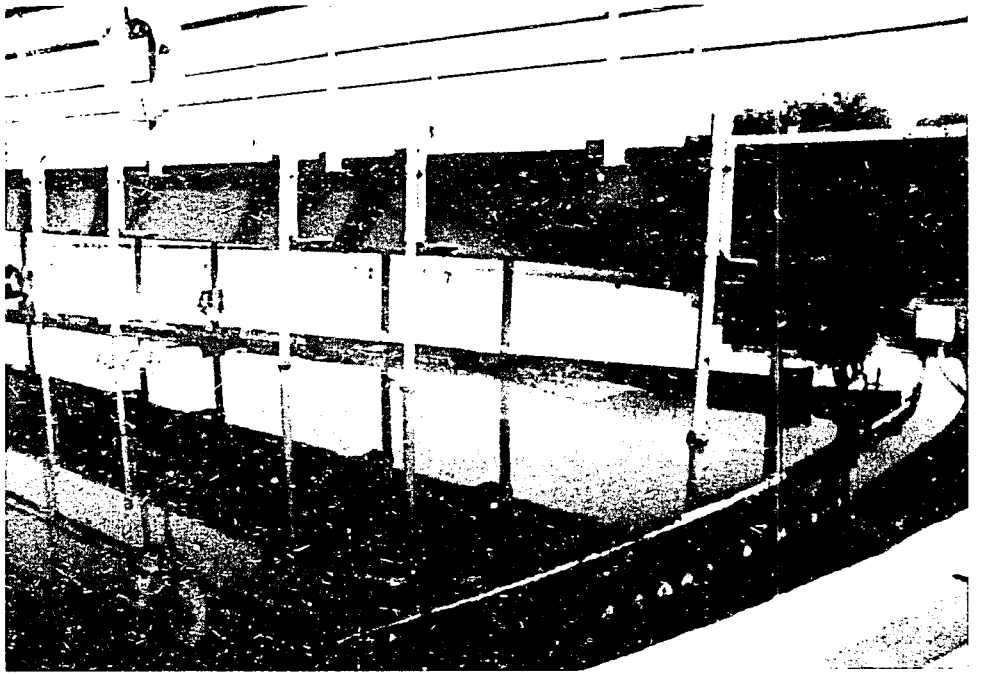
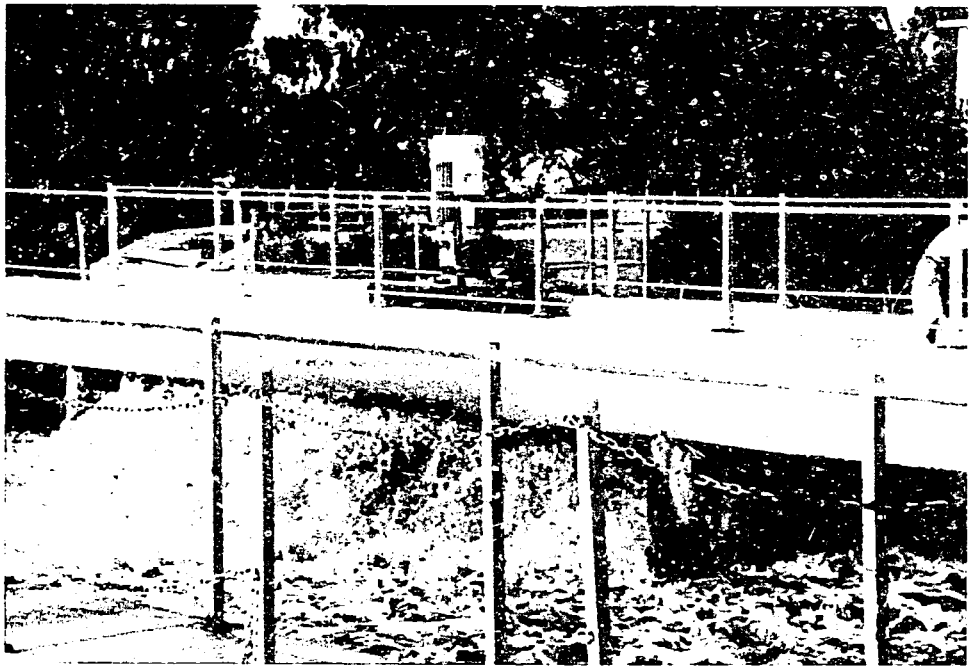
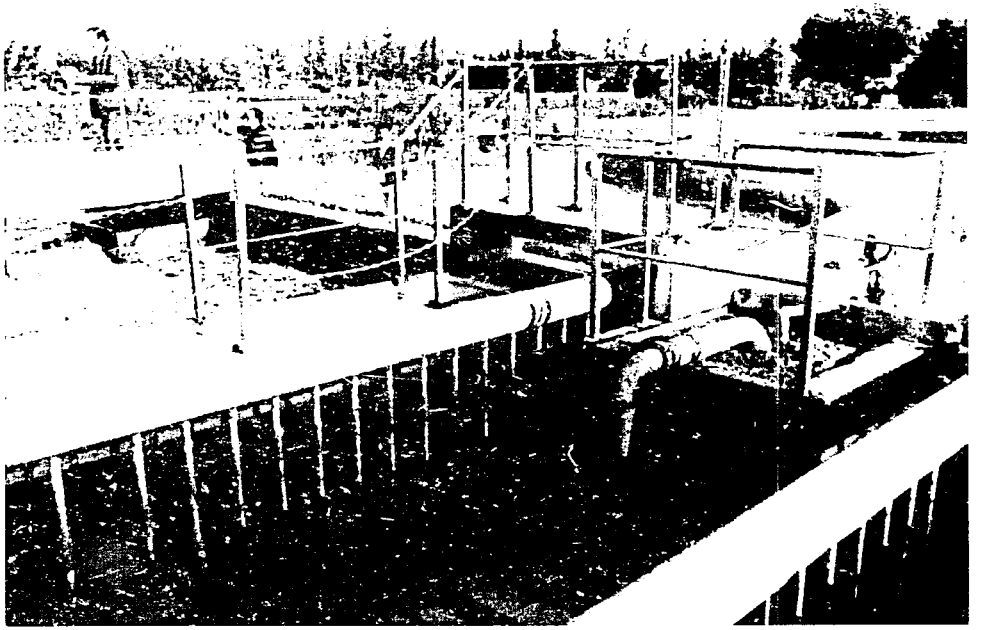


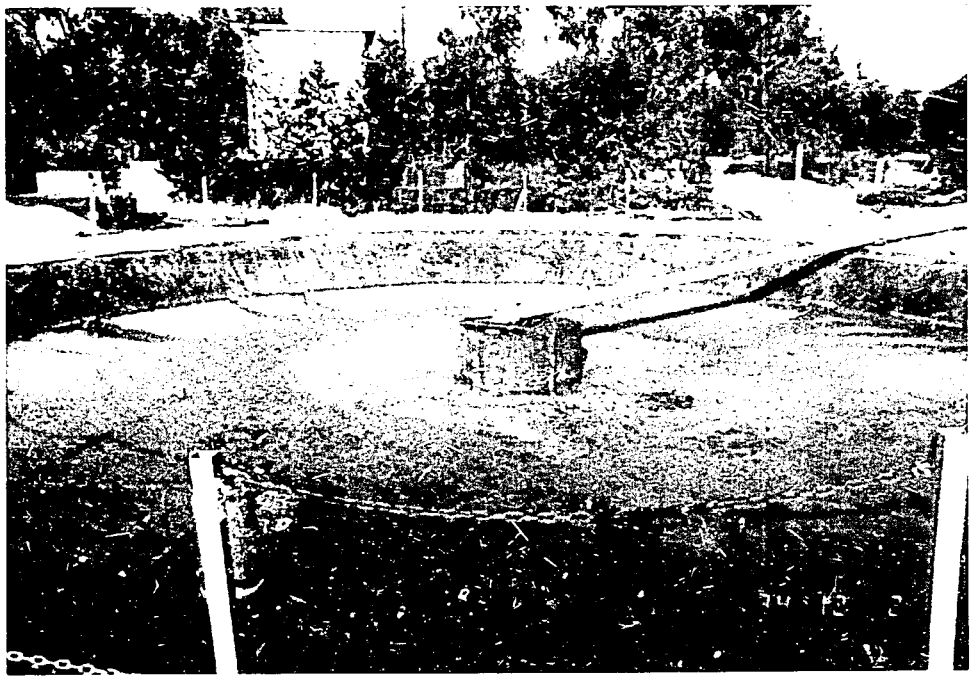


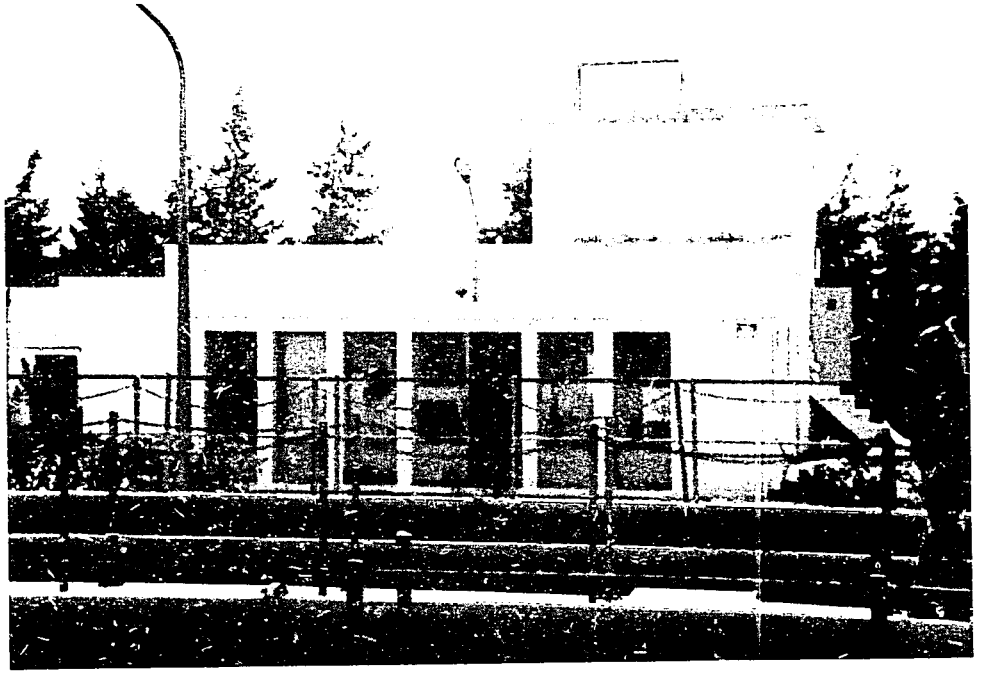


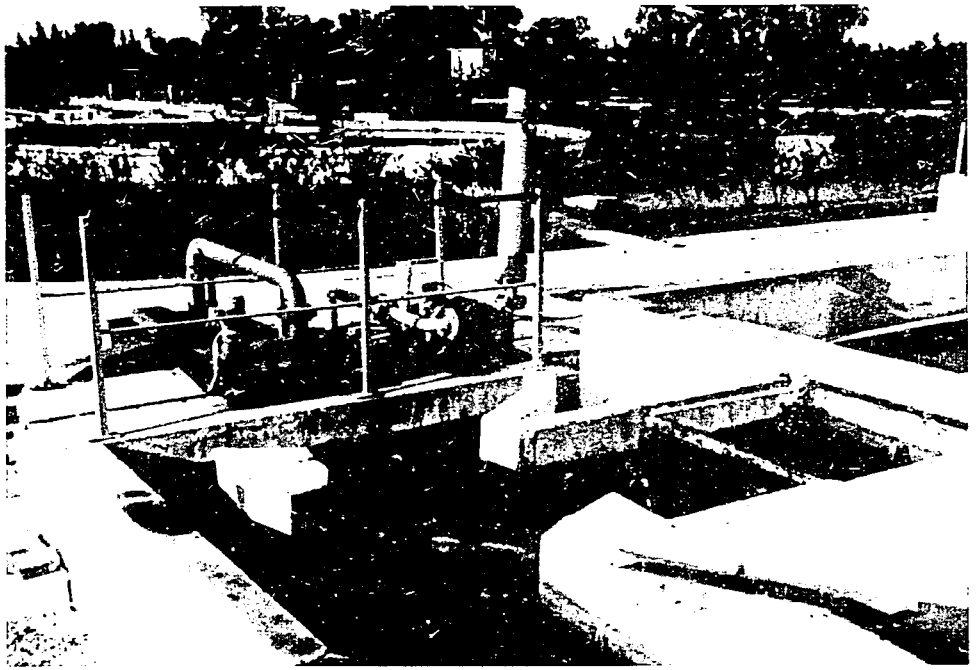


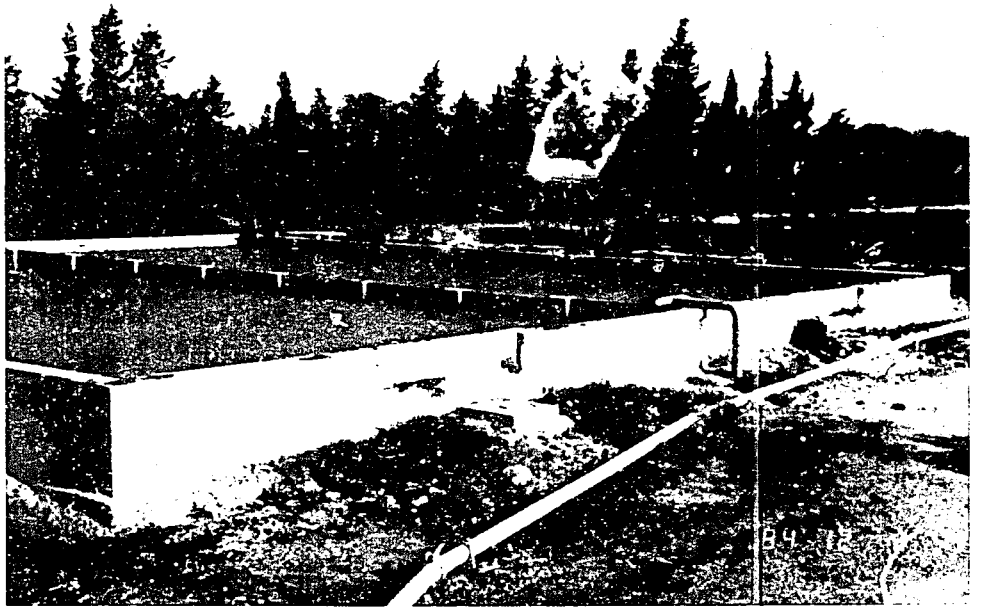






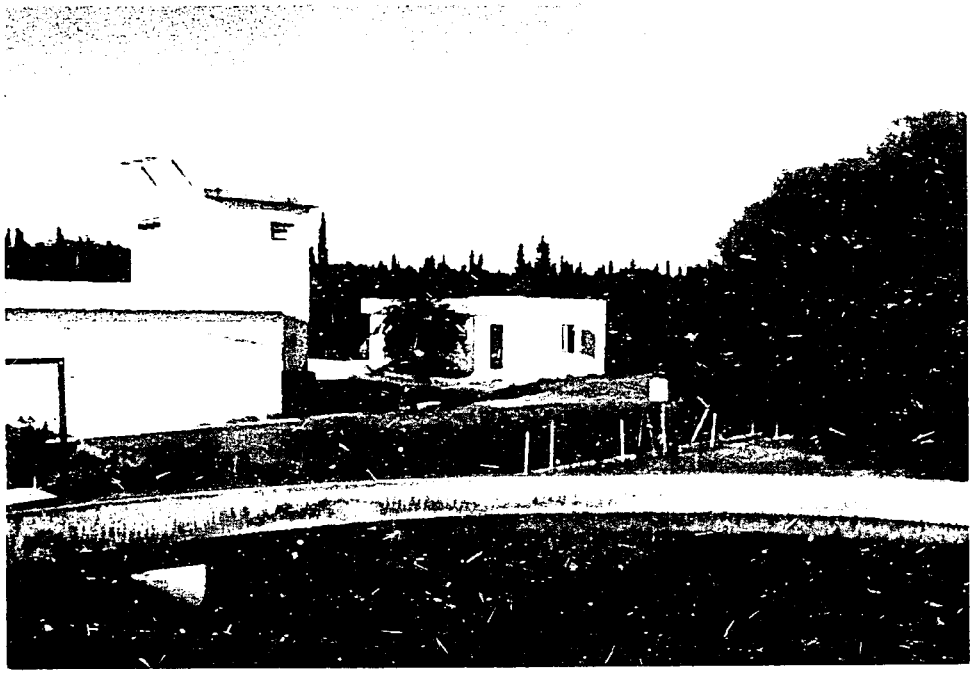


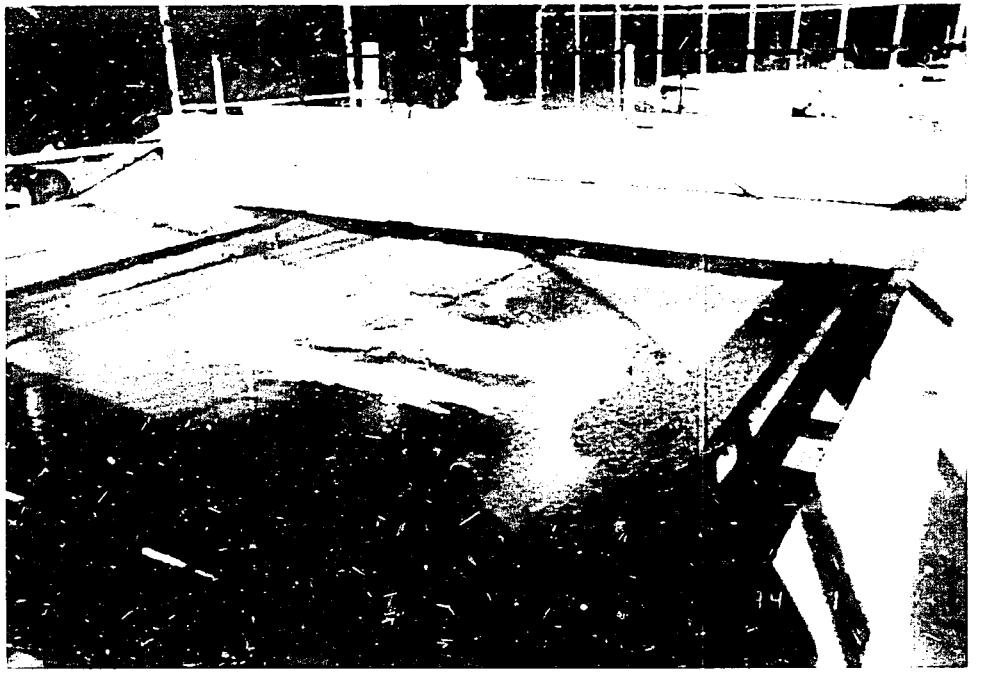


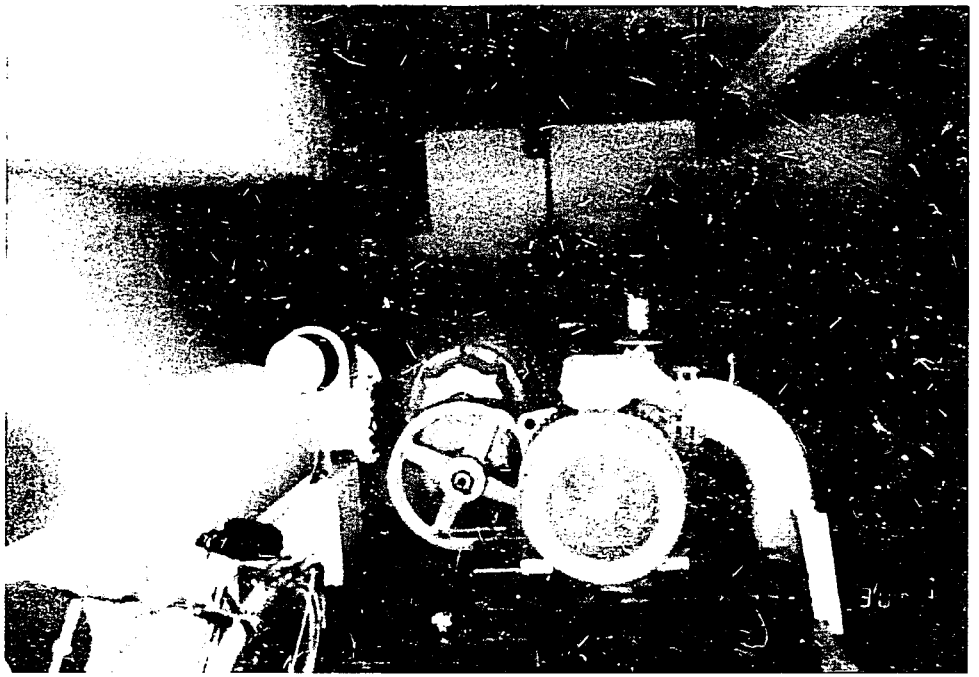


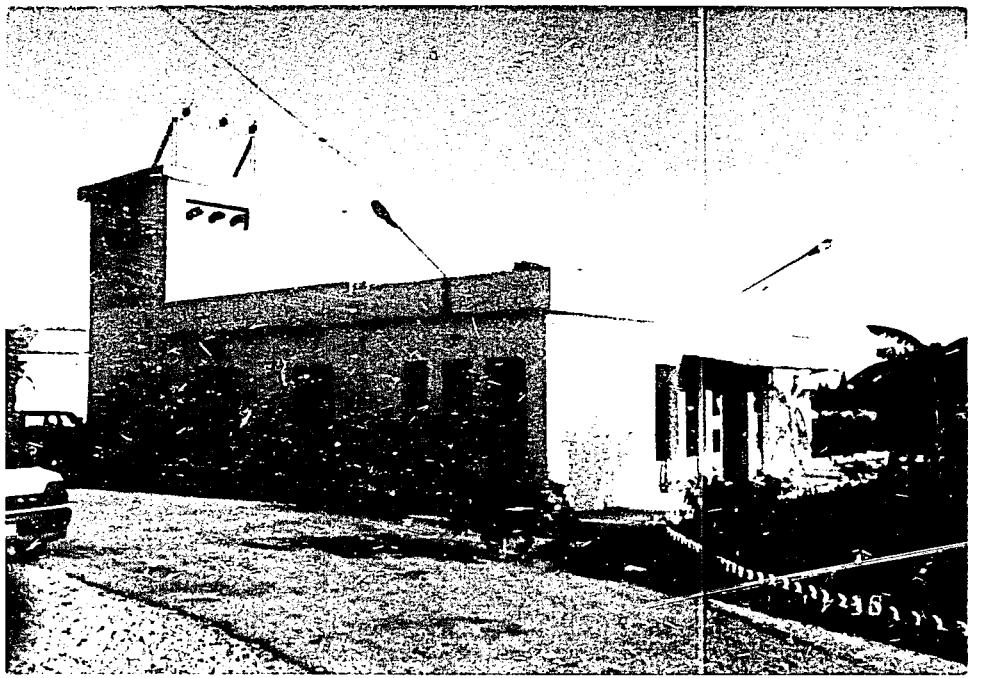
SE-2

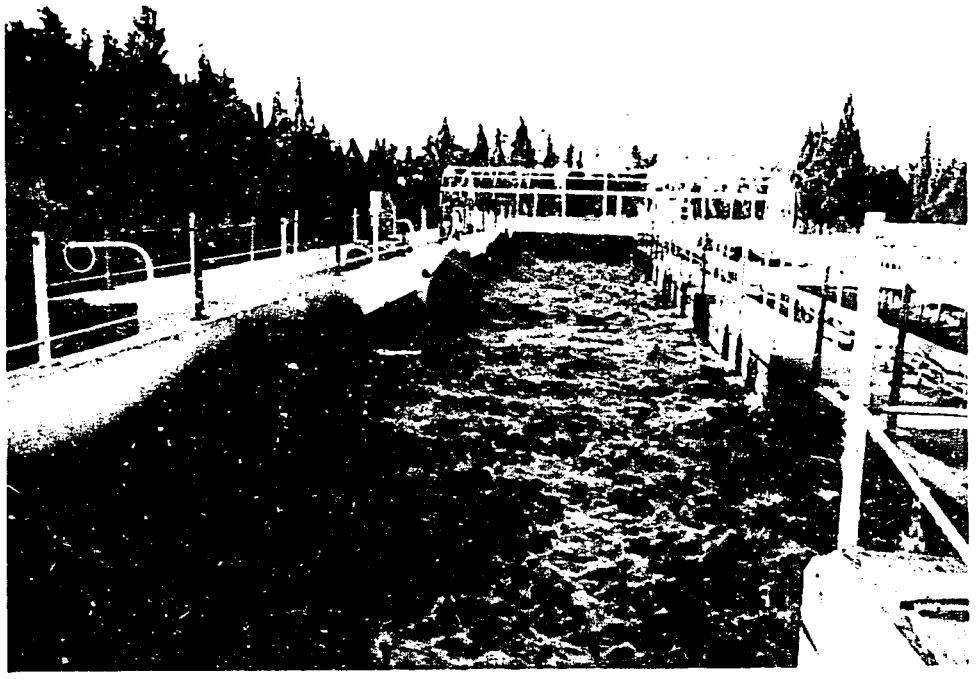
104

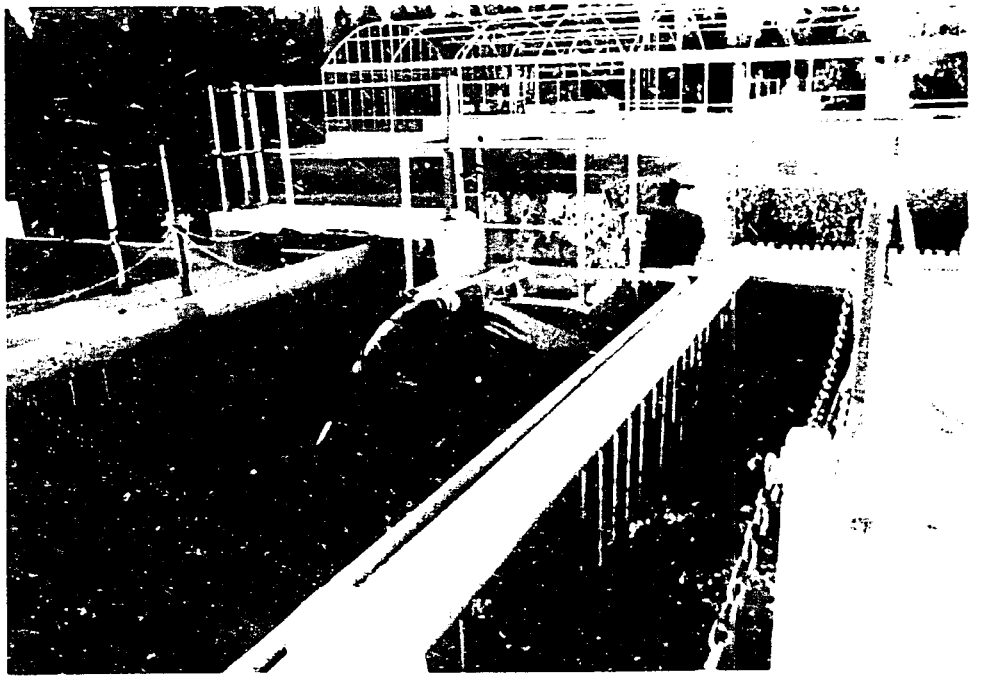


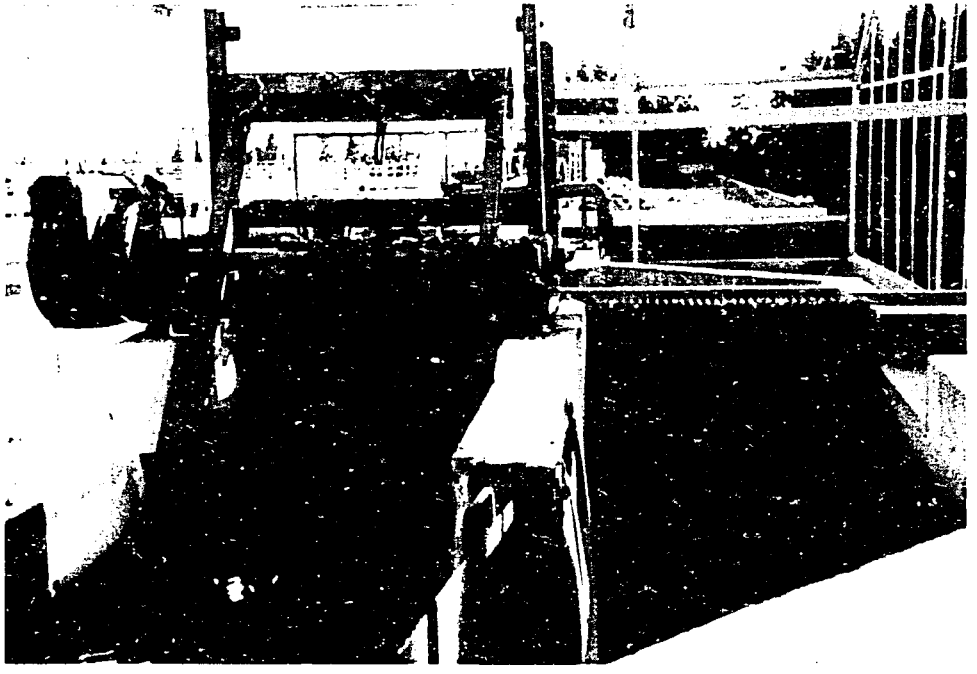


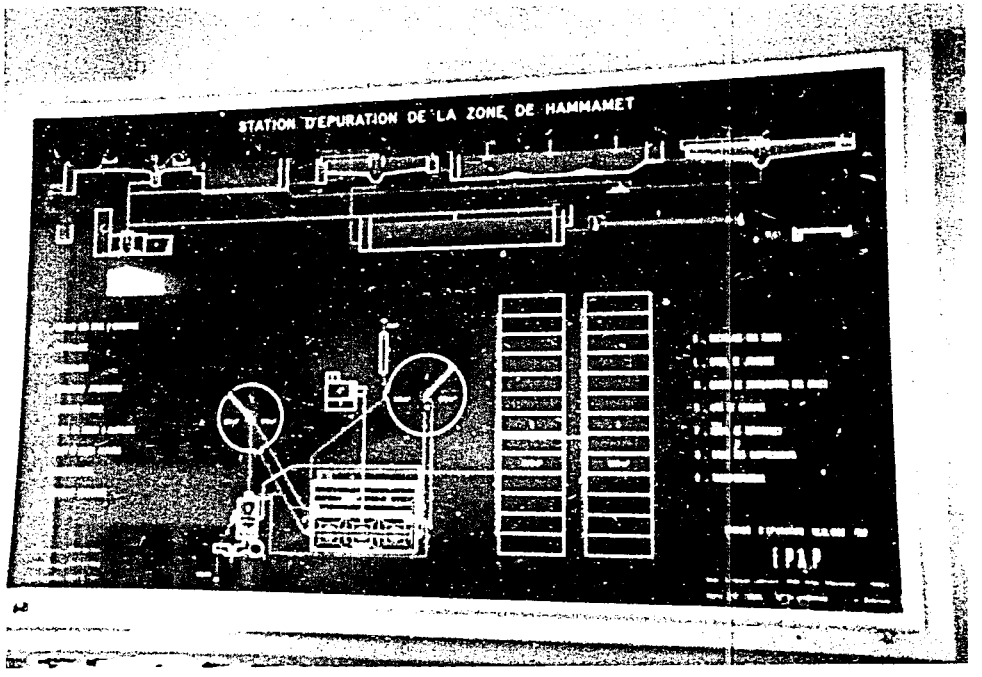











STATION D'EPURATION DE LA ZONE DE HAMMAMET
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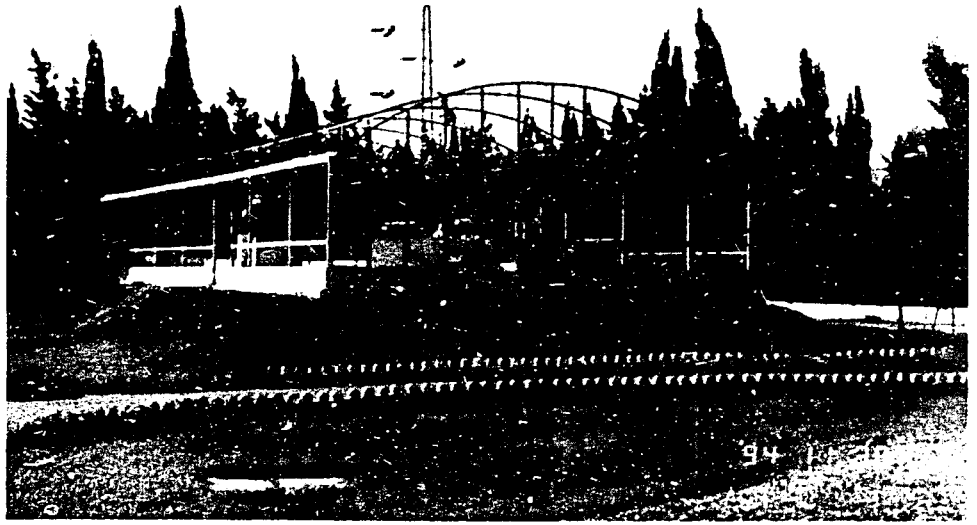
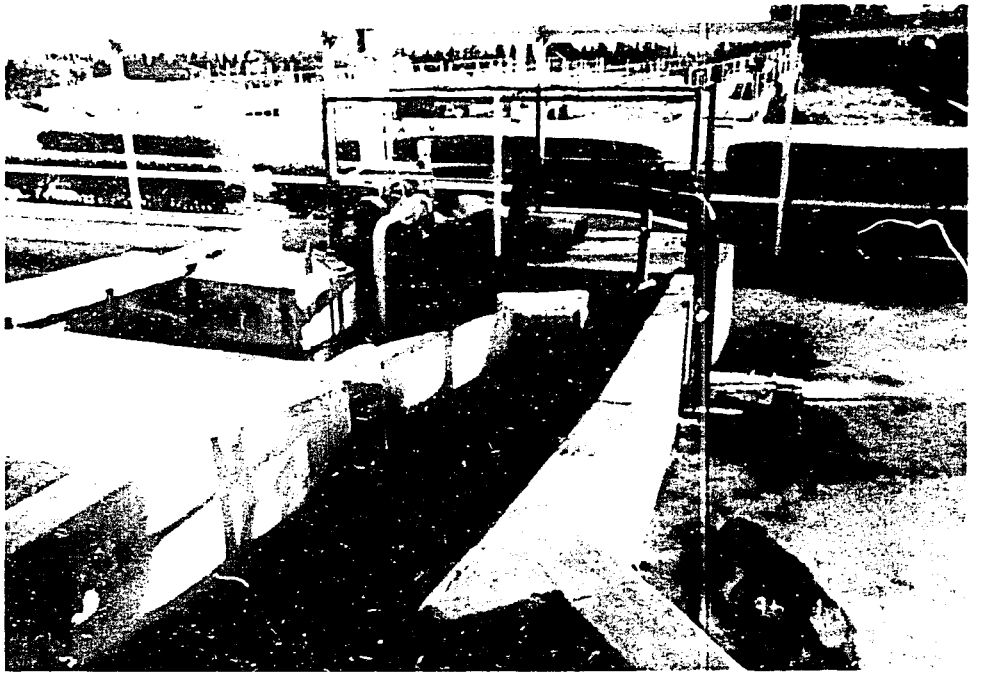
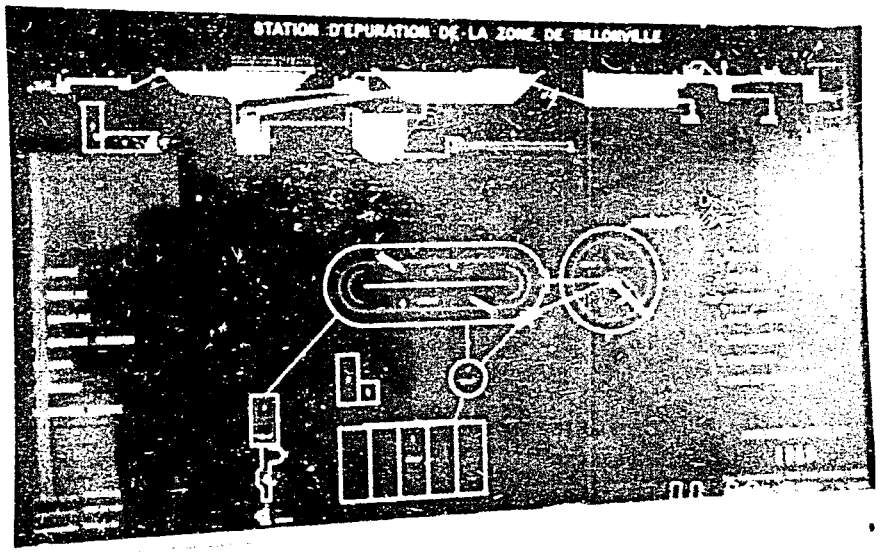
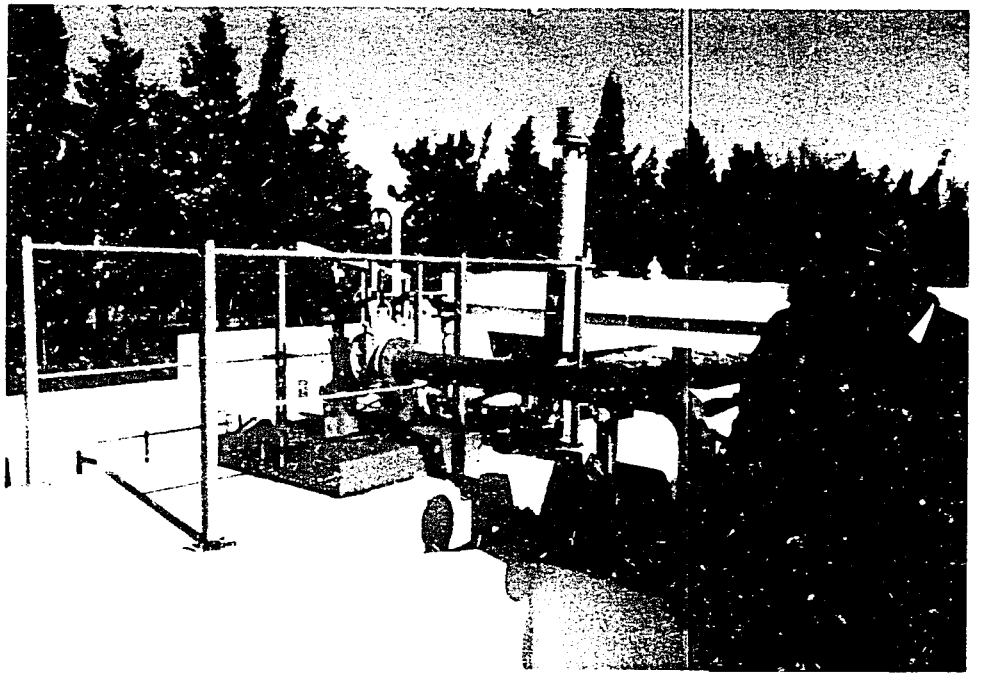
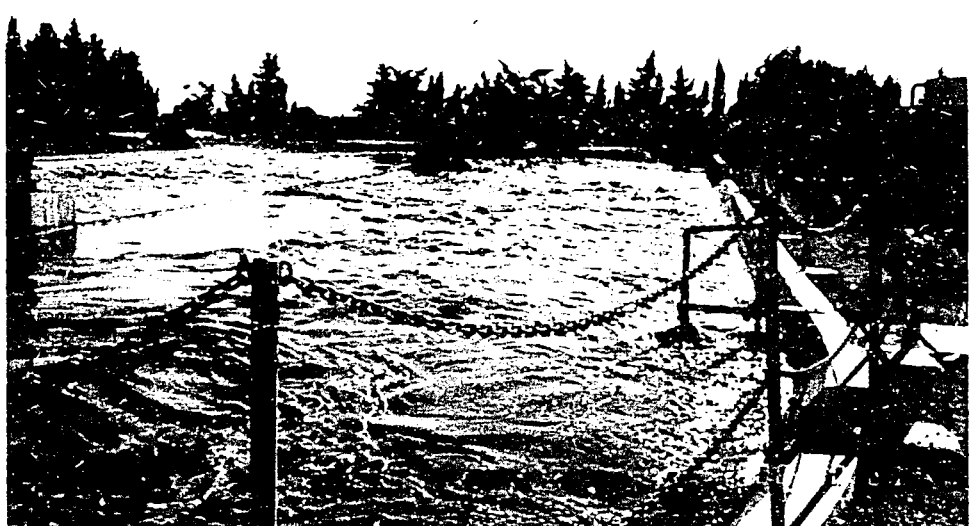


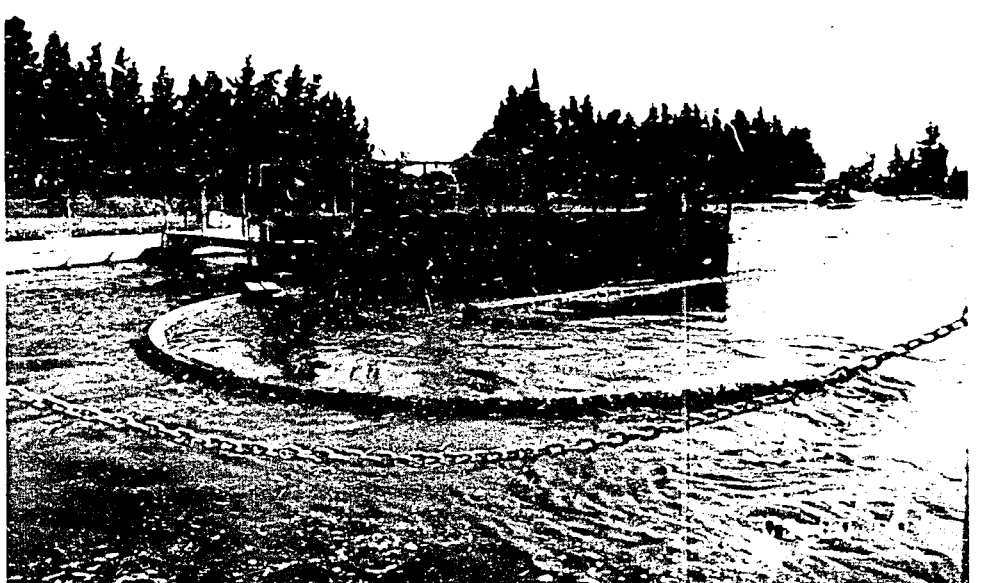


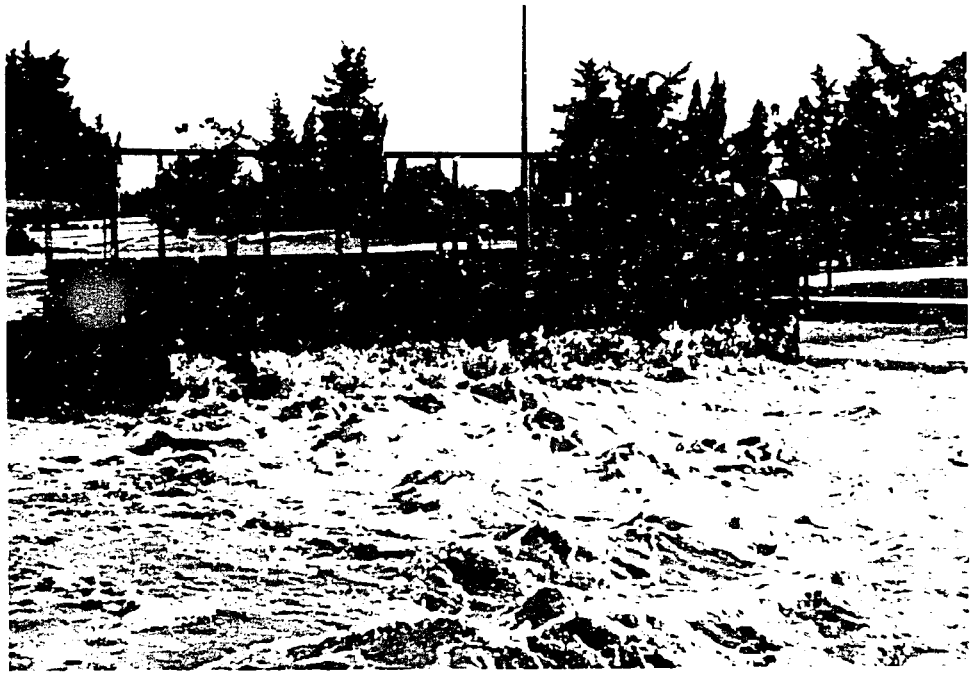
SE-3

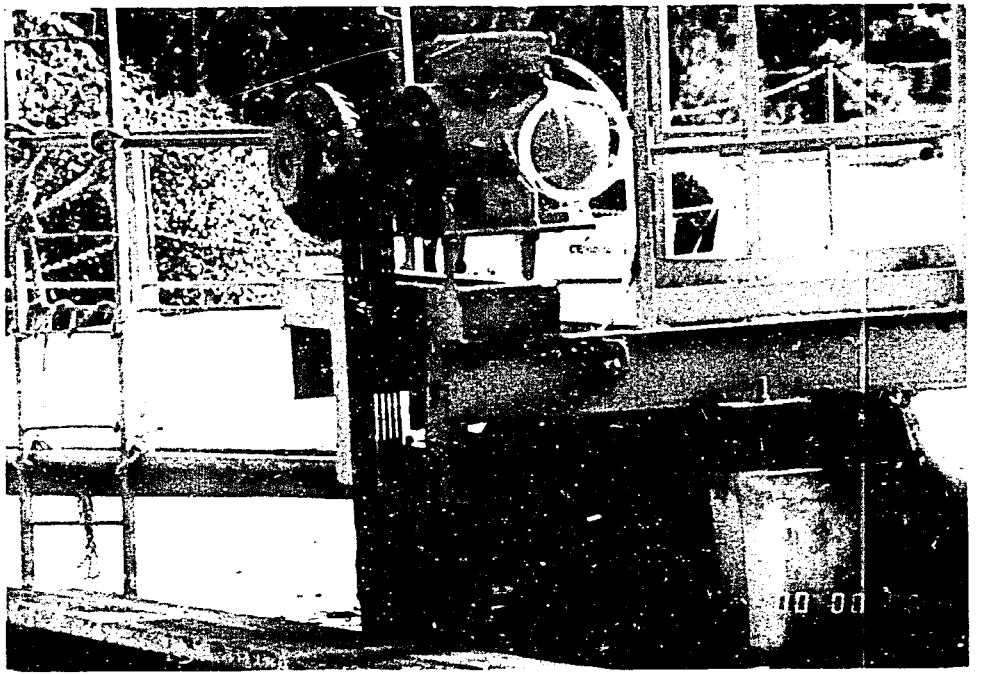

STATION D'EPURATION DE LA ZONE DE BELLOIRVILLE

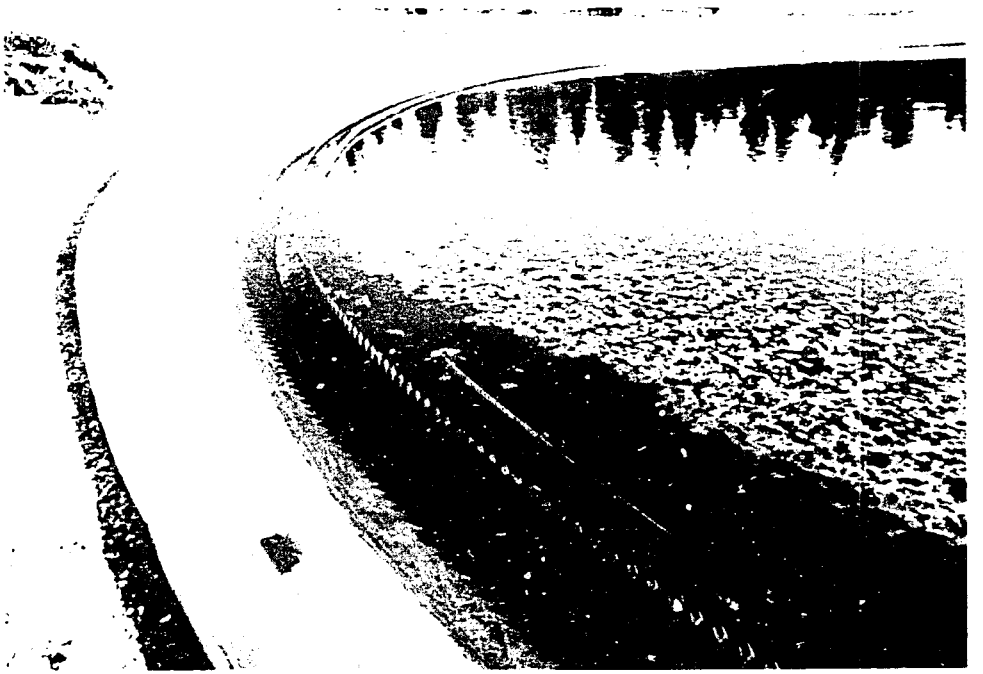


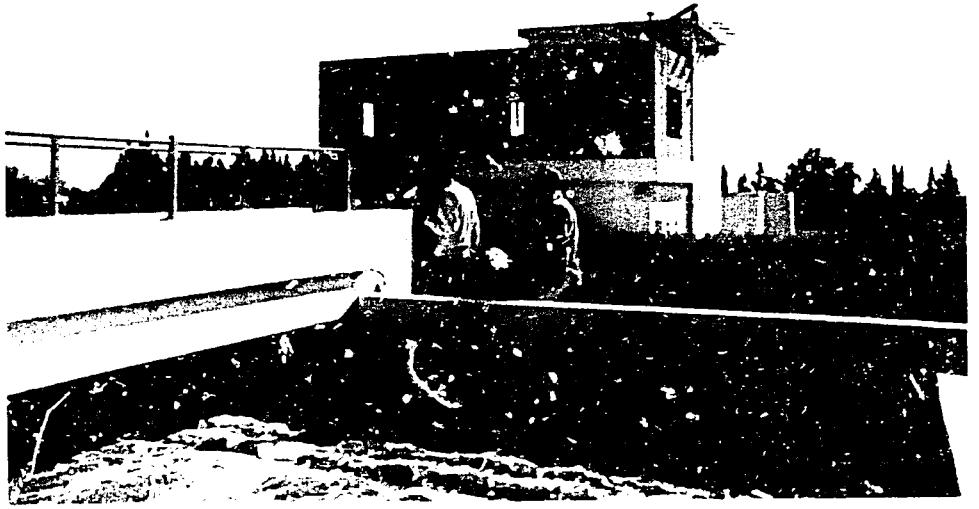


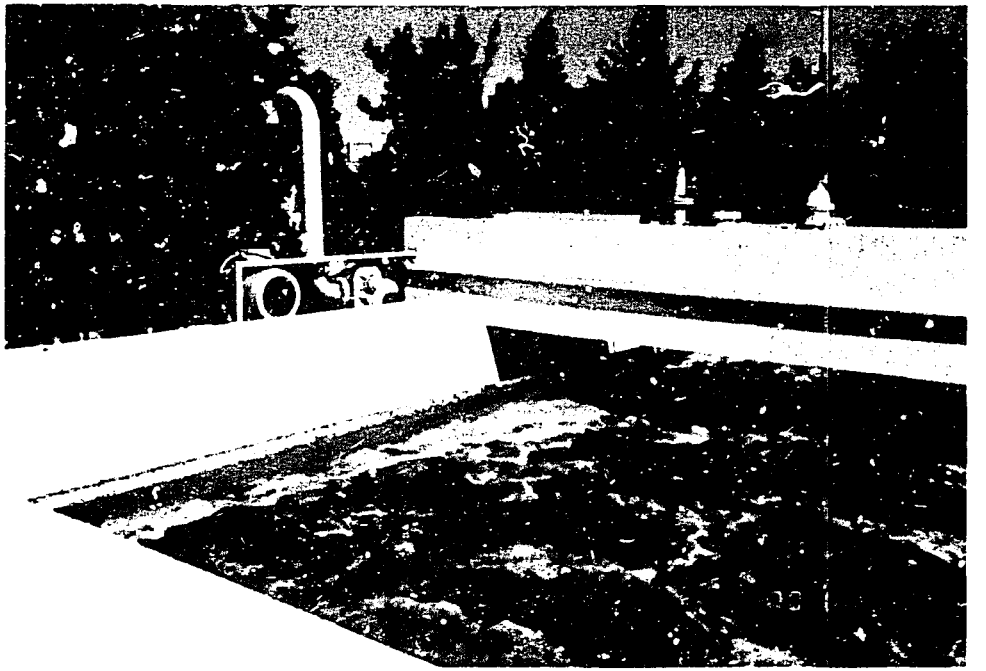


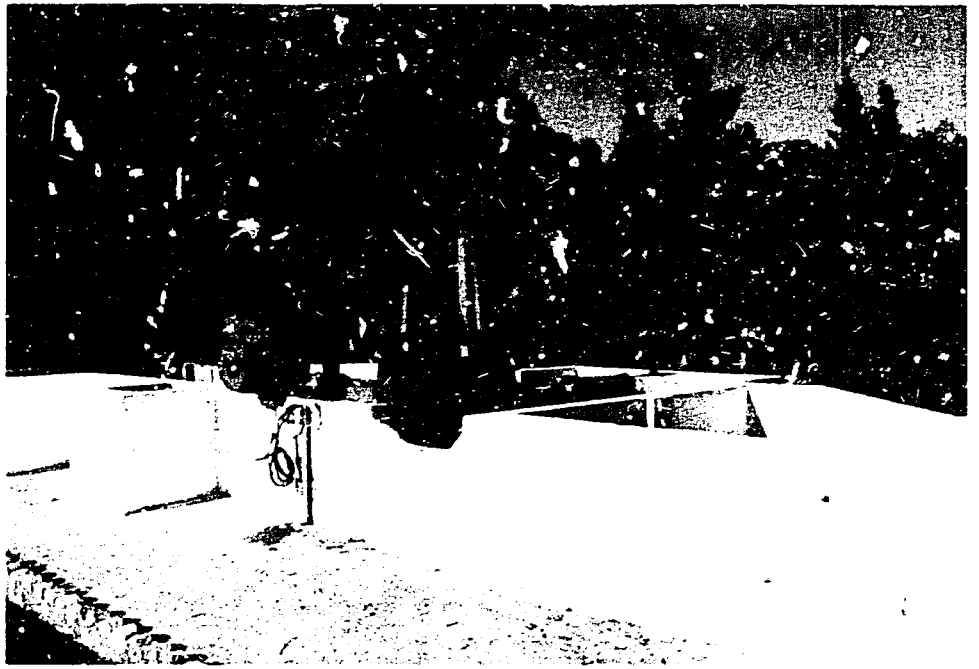




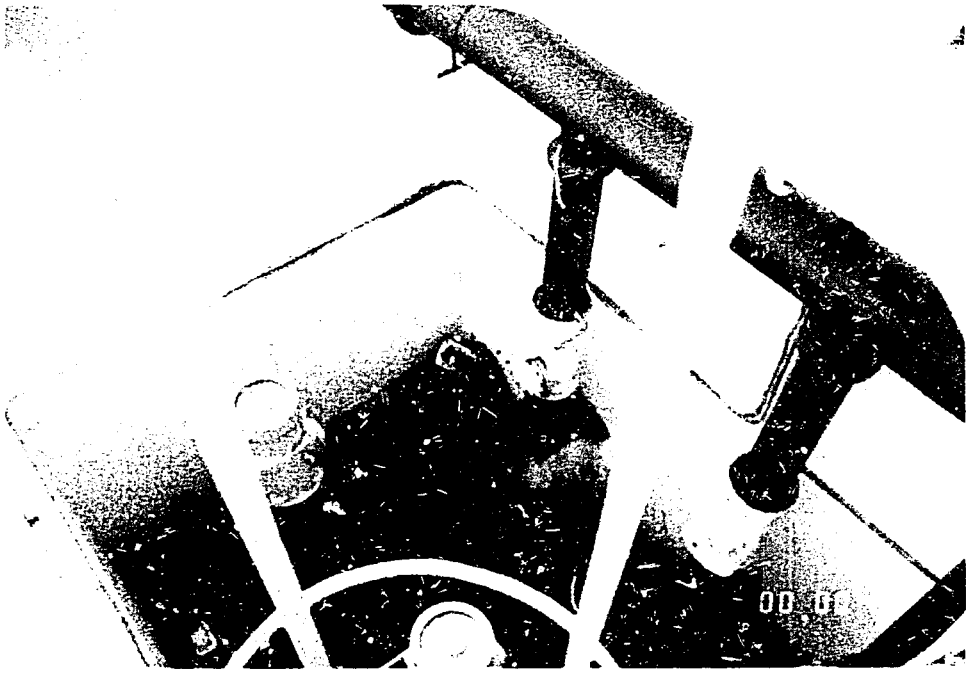


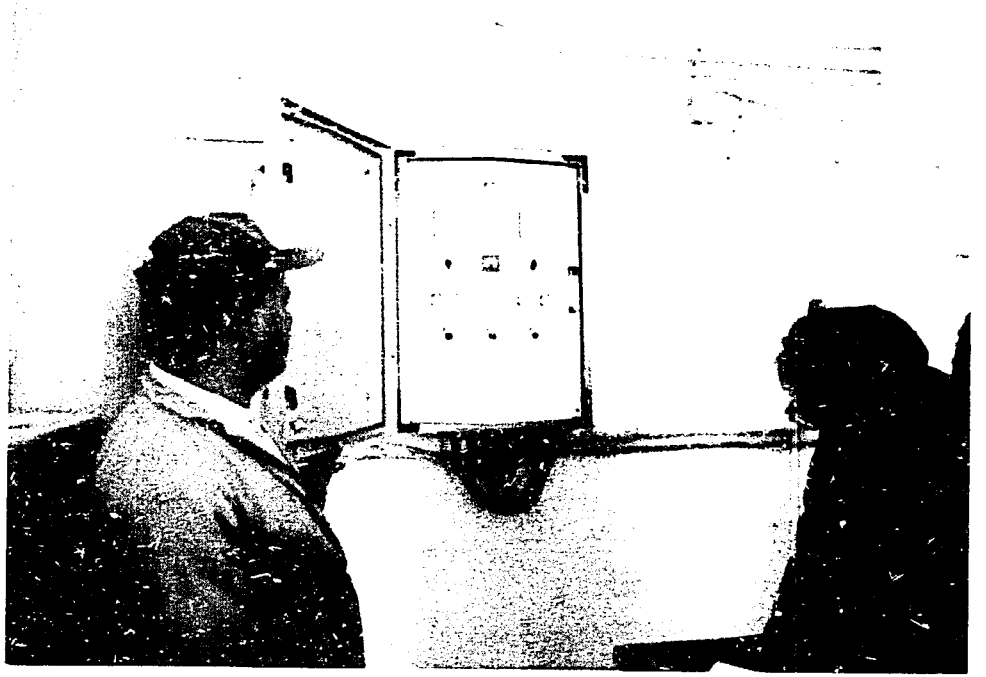


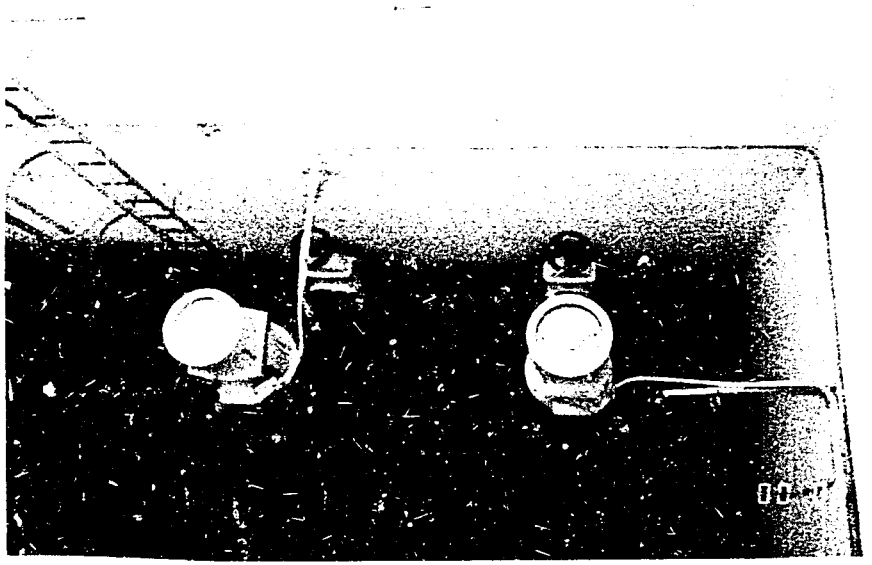


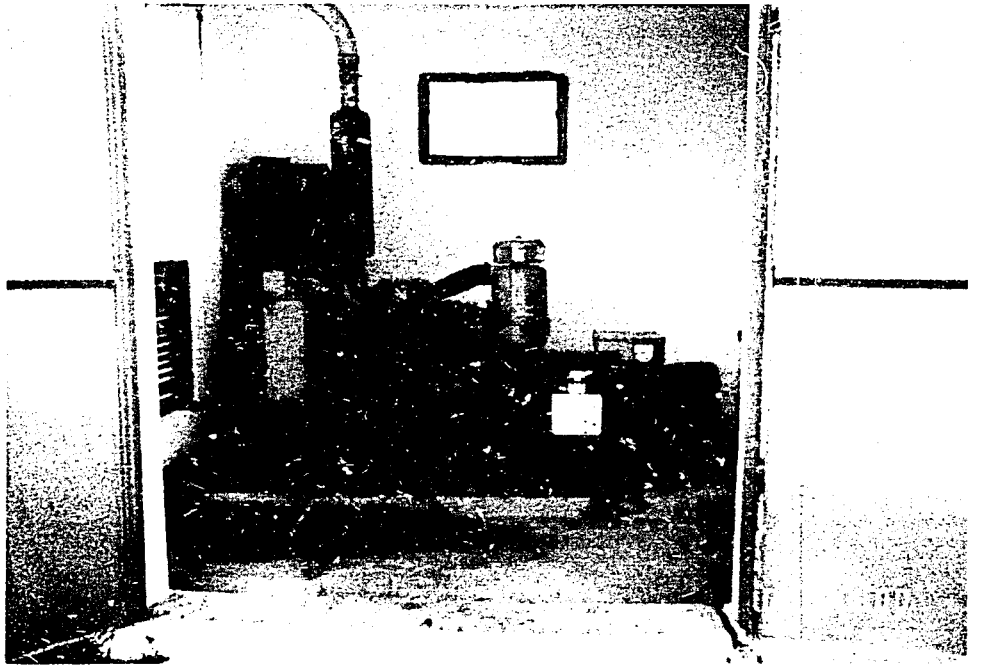


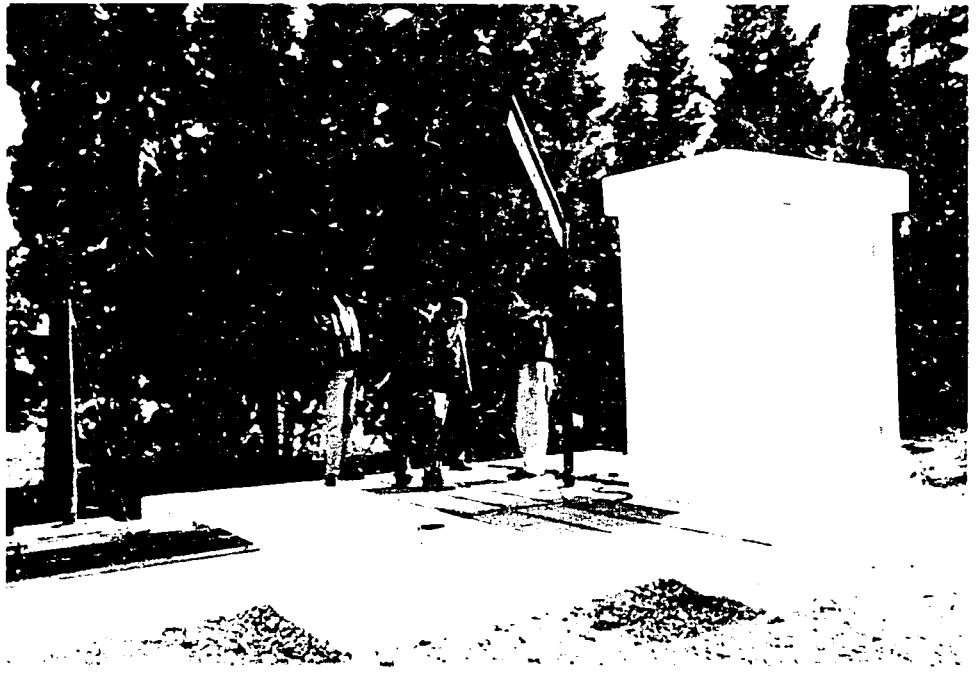
Pumping Stations

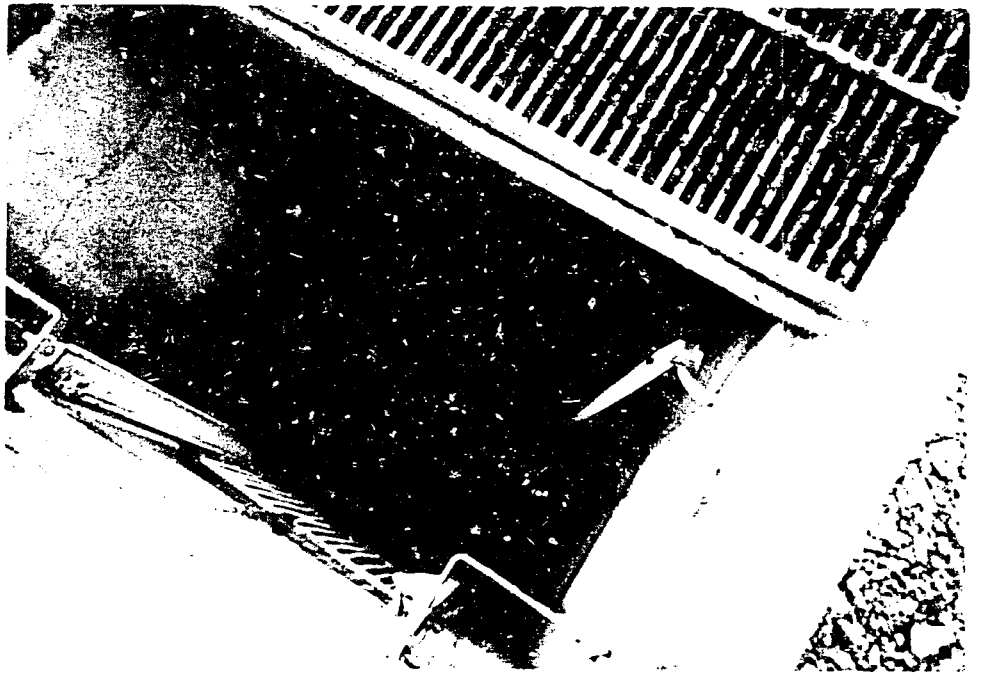












ANNEX I

References

Documents de référence

Claudon, J.G. *Traité d'hydraulique*. Technique et documentation Lavoisier. 1985.

Descriptif et caractéristiques des STEPs SE-1, SE-2 et SE-3. Données de conception. ONAS, Département Nord-Est.

Enquête pour l'élaboration du budget d'exploitation 1993 et 1994 du Département Nord-Est. ONAS, Direction de l'Exploitation.

Rapport annuel d'activités, section C (Epuration) du District de Nabeul. 1992.

Rapport annuel d'activités, sections C (Epuration) et D (Pompage) du District de Nabeul. 1993.

Rapport annuel des réseaux et des ouvrages annexes 1993. ONAS — Ministère de l'Environnement.

Rapport annuel des stations d'épuration 1993. ONAS — Ministère de l'Environnement.

Rapports d'exploitation des STEPs SE-1, SE-2 et SE-3 pour l'année 1992. ONAS, Département Nord-Est, District de Nabeul.

Rapports d'exploitation des STEPs SE-1, SE-2 et SE-3 pour l'année 1993. ONAS, Département Nord-Est, District de Nabeul.

Rapport des dépenses effectuées par les STEPs du District de Nabeul pour l'année 1993.

Rapport sur l'évolution des caractéristiques et paramètres des STEPs du District de Nabeul de l'année 1983 à 1993. ONAS, Département Nord-Est.

ANNEX J

Terms of Reference

Termes de référence

ARTICLE I. Objectif et contexte

Le gouvernement tunisien et l'USAID ont conclu, en août 1993, les accords officiels du programme de Participation du secteur privé dans les services environnementaux urbains (PPES). Outre le soutien budgétaire, sous forme de garantie de prêt aux activités tunisiennes dans ce domaine, le programme prend en charge (sous forme de don) une assistance technique qui vise à augmenter la participation du secteur privé dans la fourniture et le financement des services liés à l'assainissement, les ordures ménagères, et l'aménagement foncier. Dans le cadre de cette assistance technique, le présent contrat a pour objet d'assurer les services d'experts pour l'aide à la réalisation de deux projets pilotes, l'un dans la sous-traitance de l'exploitation d'un réseau d'égout et l'autre dans la sous-traitance de l'exploitation d'une station d'épuration.

ARTICLE II. Consistance des tâches

Le contractant préparera deux études de factibilité, l'une pour le projet pilote dans la sous-traitance de l'exploitation du réseau d'égout, l'autre pour la sous-traitance de l'exploitation de la station d'épuration. Ces études auront pour objet la justification des opérations tant du point de vue du secteur public que de celui du secteur privé.

Pour les deux études, cette justification englobera :

1. Le diagnostic de la situation actuelle

Le contractant effectuera un diagnostic du service d'exploitation du réseau ou bien d'exploitation de la station d'épuration, ce diagnostic couvrant tous les aspects techniques, financiers, et organisationnels.

a. Aspects techniques

- Un diagnostic détaillé de l'état actuel du réseau ou de la station d'épuration et de tout autre ouvrage d'assainissement concerné par la sous-traitance.
- Evaluation des performances techniques de l'activité de l'exploitation durant les trois dernières années; pour le réseau, la fréquence de curage, le nombre de casses de conduite, nombre de bouchages, etc; pour la station d'épuration, les rendements, la fréquence de remplacement des petites pièces de rechange, la fréquence de renouvellement des équipements, etc.
- Principales contraintes de l'activité de l'exploitation.

b. Aspects financiers

- Evaluation détaillée des coûts actuels de services d'exploitation, y compris les coûts des tâches effectuées aux niveaux du siège, du département et du district, au profit de la zone pilote.
- Préparation du budget.

c. Aspects organisationnels

- Identification de la totalité des tâches d'exploitation, y compris les tâches actuellement effectuées aux niveaux du siège, du département et du district, au profit de la zone pilote.

2. Faisabilité de la sous-traitance

Suite à l'établissement, dans le cadre du diagnostic, de la situation de référence, les conditions de fonctionnement du service d'exploitation, le niveau de ce service, les coûts et les contraintes, le contractant proposera une répartition de tâches entre l'ONAS et le promoteur privé et de vérifiera que cette répartition répond aux critères des deux parties. Dans cette répartition, il sera tenu compte de la spécificité de chaque site du projet pilote.

Les experts devront se baser sur les informations contenues dans l'étude des marchés potentiels pour le secteur privé dans le domaine de l'assainissement (PACT réf : 1.A.I) . Les informations les plus pertinentes de ce document portent, d'une part, sur la répartition des tâches entre l'organisme public et le promoteur privé dans le cadre de la sous-traitance (marché de service), et d'autre part sur les critères de viabilité de ces marchés pour les parties concernées. Les projets pilotes sont viables s'ils répondent aux critères suivants:

a. Secteur public

- Diminution des coûts de services d'exploitation. Compte tenu des coûts administratifs liés au changement de procédure, cette diminution risque de se réaliser au fur et à mesure du contrat de sous-traitance. Elle devrait en tout cas coïncider avant la fin du contrat.
- Amélioration de la qualité de service. Le transfert du service d'exploitation du public au privé devra aboutir à une amélioration de la qualité de service. Il est à noter pourtant, que tout changement de niveau de service doit être pris en compte dans la comparaison des coûts actuels aux coûts futurs.

b. Secteur privé

- Rentabilité. Les conditions spécifiques de la sous-traitance doivent permettre aux sociétés privées de réaliser des bénéfices raisonnables.

La diminution des coûts et la rentabilité liée aux opérations en question seront démontrés à l'aide des comptes d'exploitation prévisionnels similaires à ceux qui auront déjà été développés dans le cadre de l'étude des marchés potentiels mentionnée ci-dessus et adaptés pour les cas particuliers des projets pilotes en question.

Le contractant analysera aussi des options pour faire participer, du côté du privé, le personnel de l'ONAS qui est actuellement chargé de l'exploitation du réseau et ou de la station d'épuration du projet pilote. Le contractant proposera pour cela les modalités susceptibles d'intéresser toutes les parties concernées.