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DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

PROJECT ASSISTANCE PAPER

YEMEN: TAIZ WATER AND SEWERAGE CONSTRUCTION  
PROJECT AMENDMENT

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DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

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<b>AGENCY FOR INTERNATIONAL DEVELOPMENT</b> <b>PROJECT DATA SHEET</b>	<b>1. TRANSACTION CODE</b> <input type="checkbox"/> A = Add <input checked="" type="checkbox"/> C = Change <input type="checkbox"/> D = Delete	<b>Amendment Number</b> 1	<b>DOCUMENT CODE</b> 3
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<b>2. COUNTRY/ENTITY</b> YEMEN ARAB REPUBLIC	<b>3. PROJECT NUMBER</b> 279-0039
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<b>4. BUREAU/OFFICE</b> NEAR EAST	<b>5. PROJECT TITLE (maximum 40 characters)</b> TAIZ WATER AND SEWERAGE CONSTRUCTION
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<b>6. PROJECT ASSISTANCE COMPLETION DATE (PACD)</b> MM DD YY 06 30 83	<b>7. ESTIMATED DATE OF OBLIGATION</b> (Under 'B.' below, enter 1, 2, 3, or 4) A. Initial FY 77 B. Quarter 4 C. Final FY 81
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A. FUNDING SOURCE	FIRST FY 77			LIFE OF PROJECT		
	E. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	8,350	1,650	10,000	11,520	3,480	15,000
(Grant)	( 8,350 )	( 1,650 )	( 10,000 )	( 8,350 )	( 1,650 )	( 10,000 )
(Loan)	( )	( )	( )	( 3,170 )	( 1,830 )	( 5,000 )
Other U.S.						
1. Host Country	7,417	19,035	26,452	14,256	21,300	35,556
2. Other Donor(s)	23,336	5,712	29,048	45,580	8,135	53,715
<b>TOTALS</b>	<b>39,103</b>	<b>26,397</b>	<b>65,500</b>	<b>71,356</b>	<b>32,915</b>	<b>104,271</b>

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) H	501	540	540	10,000			5,000	10,000	5,000
(2)									
(3)									
(4)									
<b>TOTALS</b>				10,000			5,000	10,000	5,000

<b>10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)</b>	<b>11. SECONDARY PURPOSE CODES</b>
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<b>12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)</b>									
A. Code									
B. Amount									

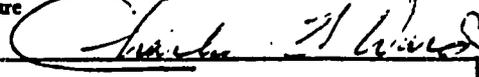
**13. PROJECT PURPOSE (maximum 480 characters)**

To construct a water and sewerage system which supplies adequate services to consumers in Taiz, Yemen Arab Republic and which is financially self-sustaining in the long run.

<b>14. SCHEDULED EVALUATIONS</b> Interim MM YY MM YY Final MM YY 06 83	<b>15. SOURCE/ORIGIN OF GOODS AND SERVICES</b> <input type="checkbox"/> 000 <input checked="" type="checkbox"/> 941 <input checked="" type="checkbox"/> Local <input type="checkbox"/> Other (Specify)
--	---

**16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a \_\_\_\_\_ page PP Amendment.)**

Increase AID grant support of \$10 million for project by \$5 million in form of a development loan to permit completion of AID supported elements of the project.

<b>17. APPROVED BY</b>	Signature:  Title: DIRECTOR, USAID/YEMEN	Date Signed: MM DD YY 03 18 81	<b>18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION</b> MM DD YY 03 27 81
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## INSTRUCTIONS

The approved Project Data Sheet summarizes basic data on the project and must provide reliable data for entry into the Country Program Data Bank (CPDB). As a general rule blocks 1 thru 16 are to be completed by the originating office or bureau. It is the responsibility of the reviewing bureau to assume that whenever the original Project Data Sheet is revised, the Project Data Sheet conforms to the revision.

Block 1 - Enter the appropriate letter code in the box, if a change, indicate the Amendment Number.

Block 2 - Enter the name of the Country, Regional or other Entity.

Block 3 - Enter the Project Number assigned by the field mission or an AID/W bureau.

Block 4 - Enter the sponsoring Bureau/Office Symbol and Code. *(See Handbook 3, Appendix 5A, Table 1, Page 1 for guidance.)*

Block 5 - Enter the Project Title *(stay within brackets; limit to 40 characters).*

Block 6 - Enter the Estimated Project Assistance Completion Date. *(See AIDTO Circular A-24 dated 1/26/78, paragraph C, Page 2.)*

Block 7A. - Enter the FY for the first obligation of AID funds for the project.

Block 7B. - Enter the quarter of FY for the first AID funds obligation.

Block 7C. - Enter the FY for the last AID funds obligations.

Block 8 - Enter the amounts from the 'Summary Cost Estimates' and 'Financial Table' of the Project Data Sheet.

**NOTE: The L/C column must show the estimated U.S. dollars to be used for the financing of local costs by AID on the lines corresponding to AID.**

Block 9 - Enter the amounts and details from the Project Data Sheet section reflecting the estimated rate of use of AID funds.

Block 9A. - Use the Alpha Code. *(See Handbook 3, Appendix 5A, Table 2, Page 2 for guidance.)*

Blocks 9B., C1. & C2. - See Handbook 3, Appendix 5B for guidance. The total of columns 1 and 2 of F must equal the AID appropriated funds total of 8G.

Blocks 10 and 11 - See Handbook 3, Appendix 5B for guidance.

Block 12 - Enter the codes and amounts attributable to each concern for Life of Project. *(See Handbook 3, Appendix 5B, Attachment C for coding.)*

Block 13 - Enter the Project Purpose as it appears in the approved PID Facesheet, or as modified during the project development and reflected in the Project Data Sheet.

Block 14 - Enter the evaluation(s) scheduled in this section.

Block 15 - Enter the information related to the procurement taken from the appropriate section of the Project Data Sheet.

Block 16 - This block is to be used with requests for the amendment of a project.

Block 17 - This block is to be signed and dated by the Authorizing Official of the originating office. The Project Data Sheet will not be reviewed if this Data Sheet is not signed and dated. Do not initial.

Block 18 - This date is to be provided by the office or bureau responsible for the processing of the document covered by this Data Sheet.

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USAID/YEMEN PROJECT COMMITTEE

CHAIRMAN: Zachary M. Hahn, Capital Development Officer

MEMBERS : Basharat Ali, Asst. Capital Development Officer  
Ronald R. Hammersley, Accountant/Financial Analyst  
F. Le Young, General Engineering Advisor

AID/WASHINGTON PROJECT COMMITTEE

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NE/PD/ENGR, Robert Fedel  
GC/NE, Bruce Janigian

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PROJECT PAPER

YEMEN ARAB REPUBLIC

TAIZ WATER AND SEWERAGE CONSTRUCTION PROJECT

SUMMARY AND RECOMMENDATIONS

1. BORROWER: The Government of the Yemen Arab Republic (YARG)
2. IMPLEMENTING AGENCY: The National Water and Sewerage Authority (NWSA), an autonomous agency under the Ministry for Electricity, Water, and Sewerage, is currently implementing the project and will assume responsibility for implementing those activities financed from the proposed loan.
3. AMOUNT: U.S. \$5,000,000 (Five Million Dollars) to be authorized as a development loan in FY 1981. (This amount will be additional to an AID grant for \$10 million authorized on August 26, 1977.)
4. TERMS: The additional project activities are proposed for loan financing from monies appropriated for population and health activities (Section 104 of the FAA, as amended). Standard AID development loan terms will be included in the loan agreement with the Government, i.e., repayment over 40 years with a 10-year grace period with interest at 2 percent (2%) of the disbursed balance during the grace period and at 3 percent (3%) thereafter. Provision will be made for the Government to relend the loan's proceeds to NWSA for agreed project purposes at terms no less favorable than those received by the Government from AID. The loan will primarily finance U.S. dollar costs of equipment and/or engineering construction supervision services. There might be limited local costs financed, either as a component of the engineering services' costs or for operations and maintenance training. Disbursements from the loan will be made through normal AID financing instruments.
5. TOTAL PROJECT COST: Total project costs are estimated at \$104,271,000, including a contingency amount of \$9,334,000. The YARG contribution is anticipated to be not less than \$35 million. Other project donors are the Saudi Fund for Development (now committed to provide \$29.8 million to the project) and the Abu Dhabi Fund for Arab Economic Development (currently committed for \$9.2 million). Negotiations between the YARG and the two non-AID donors for further commitments are currently in progress. The YARG understands that AID's contributions will be limited to \$15 million (\$10 million grant plus \$5 million loan)
6. DESCRIPTION OF PROJECT: The project involves the construction and equipping of facilities to improve and expand the supply of domestic water in Taiz, Yemen and also to expand sewerage services and provide for treatment of sewage in the city. Included for water supply are development of new well fields, a transmission line to the city, treatment facilities, water storage tanks, primary and secondary distribution lines and house connections. For

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sewage, facilities include house connections, gravity sewage collection lines, a low-head sewage outfall passing through a degritting chamber and a blow-off pond and oxidation treatment ponds providing anerobic and aerobic treatment producing an effluent suitable for crop irrigation. The project also provides limited O&M training for the staff who will assume responsibility for the project's facilities upon completion.

7. PURPOSE: To construct a water and sewerage system which supplies adequate services to consumers in Taiz and which is financially self-sustaining in the long run.

8. SUMMARY FINDINGS:

(a) Technical Analysis: The design of all project facilities is considered technically sound. The main contractor and the engineer providing construction supervision are both technically qualified to complete the work according to accepted international standards.

(b) Administrative Feasibility: Administrative capability is considered adequate. The implementing agency, NWSA, has a staff which is generally qualified, but which is spread extremely thin. Administration experience to date has been generally satisfactory.

(c) Financial Analysis: Staff and time constraints precluded preparation of a full financial analysis. Indications are that the Taiz Branch of NWSA will require operating and financial subsidies at least through the initial years of project operations. Financial viability is thus dependent on the YARG's commitment to support the series of water and sewerage projects now under construction in, or planned for, major urban areas, which appears strong.

(d) Economic Analysis: As is generally true with water supply and sewerage projects, no quantification of project economic benefits is possible. Based on worldwide experience to date, however, economic benefits are assumed to be large and the benefit/cost ratio to be strongly positive. It is believed that the project as designed provides the least-cost solution to Taiz's water supply and sewage problem over the near- and medium-term time periods.

(e) Social Analysis: Experience indicates that the project responds to some of the most strongly felt social requirements of Taiz' populace. It is believed that none of the project's aspects will conflict with any of the social norms or cultural patterns of its beneficiaries. Project facilities have been designed to be available to all strata of Taiz' citizenry. In addition, income distribution is much more even in Yemen than in most other developing countries, indicating that project services will be affordable to a large proportion of the populace.

(f) Environmental Considerations: The proposed project is judged to be sound environmentally. The major project purpose is to improve the sanitary environment of Taiz. Negative environmental impacts caused by construction activities are generally of short duration in any one area and the contractor is obliged to take actions to minimize the effects of such impacts.

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9. STATUTORY REQUIREMENTS: All statutory criteria have been met (see Annex N).

10. ISSUES: None

11. MISSION VIEW: The Mission strongly supports the proposed loan, primarily because additional AID financing for the project is required to maintain the United States' reputation in Yemen as a dependable development assistance partner. The Embassy also supports the project strongly, for similar reasons. (The FAA Section 611(e) certification executed by the Mission Director is included as Annex L.)

12. RECOMMENDATION: Approval of the proposed loan by authorization of U.S. \$5,000,000 from FY 1981 appropriations

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I. PROJECT BACKGROUND

A. Introduction

The purpose of this paper is to present justification for an increase in AID financial assistance to the Taiz Water and Sewerage Project of \$5 million in the form of a loan to the Yemen Arab Republic, to be onlent to the implementing agency, the National Water and Sewerage Authority (NWSA). The proposed \$5 million loan increment would be additional to a \$10 million grant authorized by AID on August 26, 1977. The \$10 million grant is being implemented as AID Project Number 279-0039 and it is proposed that the \$5 million loan be authorized as an increase in funding for that project.

The \$10 million AID grant was part of an \$80 million financial package arranged by the Government of the Yemen Arab Republic (YARG) to cover fully the costs of the project as estimated at the time of contract awards in April 1979. The YARG was successful in obtaining two other outside pledges of assistance in addition to the \$10 million AID grant, about \$30 million from the Saudi Fund for Development (SF) and about \$10 million from the Abu Dhabi Fund for Arab Economic Development (ADF). The YARG then pledged itself to finance the remaining estimated \$30 million of the project.

Total project costs have increased steadily through the implementation period. The current estimate for the full project has risen to about \$104 million. Since the authorization of the AID grant, the estimated final costs of the two major AID-financed components, engineering supervisory services and selected U.S. equipment, have increased significantly, from a total of about \$8.8 million to one of about \$13.1 million.

There have been a variety of reasons for the cost increases experienced by the project. These are discussed in some length in Section I.D. 2 below. For the AID-financed components, the major causes of these increases have been: (1) the high inflation rate in the intervening period (which has increased costs for both components); (2) in the case of the engineering services, increased services for design and other work not originally anticipated; and (3) for the U.S. equipment, changes in specifications (sometimes resulting in changes in actual equipment requirements) caused by ongoing redesign of some of the project's facilities, particularly those for the new well fields.

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The basic purpose of the proposed \$5.0 million loan is to allow AID to fulfill its commitment to finance the two major components of the current grant mentioned above. The additional financial commitment is necessary both to maintain AID's reputation in Yemen as a dependable development assistance partner and to fulfill a condition to consideration of additional financing by the two other outside donors, namely, that adequate construction supervision be assured through the end of major project construction.

B. General History of Project

Taiz is the second largest city in the Yemen Arab Republic with a population estimated (at end 1980) at between 100,000 and 120,000. The city lies at an elevation of about 3,500 feet in Yemen's southern hilly highlands and is the capital of Taiz Province. (See figure 1) The surrounding area is a quite densely populated agricultural region and Taiz is, therefore, the commercial and governmental center for a significant proportion of Yemen's populace. Like most of the world's developing countries, Yemen has been experiencing accelerating urbanization during the past decade and more and Taiz, like the other major cities in the country, has experienced rapid development with concomitant rapid population growth, which has been estimated at between 15 and 20 percent in 1980 alone.

In the early 1960's, when Taiz was the national capital, at the YARG's request, AID financed the construction of a water system capable of supplying adequate water to the city's population, then estimated at about 20,000 persons. As a symbol of appreciation for the AID-supplied system, at the time of the death of President Kennedy, the YARG renamed the system the Kennedy Memorial Water System. This system was a boon to Taiz from its inauguration until the early 1970's when demand for water started to exceed supply by significant amounts. Also at that time, the water table in the existing well fields at the city's northern edge began to decline quickly and to show signs of serious contamination as untreated wastes percolated into the aquifer.

As a result of this situation, the YARG requested AID to finance a major renovation and expansion of the existing water system. In response, an AID grant-financed contract with James M. Montgomery Consulting Engineers was signed in April 1974 to study the economic, financial and engineering feasibility of expanding the system. Montgomery's final report in the spring of 1975 determined that sufficient well fields could be developed to increase the water supply for Taiz. Following AID's review of Montgomery's work, an AID loan of \$1.35 million and grant funds of \$100,000 were authorized for an engineering design study (by Hazen and Sawyer Engineers -- H&S -- of New York City) and a socio-economic study (by Deloitte/Haskins and Sells, Washington, D.C.). The preliminary engineering design report was completed in mid-1977. Work on the socio-economic study, including proposed water and sewerage user rates, continued through late 1979. The project as envisioned at this time would cost a total of \$65 million and provide adequate water and sewerage facilities to the city through 1990.



The final version of H&S's project design report was submitted to NWSA in October 1977. Engineering work continued on preparation of construction contract documents, design plans and specifications, supervision of well drilling, remedial work, and soils investigations. In March 1978, the scope of the project was increased to include additional water and sewer service areas, along with provision for independent power generation facilities for the system. Work under Hazen and Sawyer's design contract concluded in April 1978. (Hazen and Sawyer's engineering work subsequent to that date came under the new contract for additional engineering and construction supervision which was financed under the \$10 million AID-grant.) Bidding documents were completed and tendered in mid-1978. Construction tasks and supplies for the project were divided into three main contracts as follows:

a. Contract A for bulk supply of general materials and equipment (largely water and sewer pipes and fittings, cement, reinforcing steel, electric poles, etc.).

b. Contract B for supply of mechanical and electrical equipment (well pumps; water pumps for lift stations; chlorination equipment; virtually all required electrical materials and control equipment, including that for generation; other miscellaneous E&M equipment and installation and construction related to the E&M equipment).

c. Contract C -- "the construction contract" -- for the installation of water and sewer pipe and required ancillary civil works.

Each of the main contracts was further broken down into a number of subsidiary contracts which attempted to group supplies and work items in such a manner as to allow the widest possible bidding competition.

Tenders for Contracts A, B, and C, were received in October 1978. Review by the engineers, H&S, commenced in November and their evaluation report was completed late in December and submitted to NWSA in January 1979. Awards to the various contractors began in mid-April and were completed in June 1979. While there are some six contractors involved in the project, all of the construction contracts and the bulk of the supply contracts were awarded to Hanab-Stevin Pipelines, Middle East (HSPL), a Dutch/English firm with headquarters in the Netherlands. (For a catalog of the involved contracts and contractors, see Annex B.)

The main contractor, HSPL, began mobilization and access road construction in June 1979 and started actual project construction in September. Actual physical work on, and procurement for, the project has proceeded, in general, at a satisfactorily steady pace since then. This is not to say that the work has progressed smoothly without encountering significant problems -- the project has encountered a wide range of problems of varying difficulty during the intervening year and a half, which have included, inter alia, need for significant additional design and redesign of various facilities, confused lines of authority and ineffective communications between the various parties involved, disputes over the exact scope and schedules involved

in various of the contracts and delayed payments to the major contractor, HSPL.

Nonetheless, after taking into account the difficulties of the working environment in Yemen and the constraining effects of certain decisions made during the period prior to contract tendering in an effort to accelerate implementation, the overall assessment of implementation to date is that it has been satisfactory. At the end of January 1981, it was estimated that construction is just under 50 percent complete, with current projections showing completion of work by HSPL in mid-July 1982, or just on the contract schedule of 39 months after contract award. At the time of contract completion in mid-1982, physical work on the project should be over 90 percent completed. (Current plans call for the Taiz Branch of NWSA to complete the remaining work, consisting mostly of house connections to water and sewer lines, with its own workforce, a task which should be fully within its capabilities.) For an overview of construction progress (and of proposed service areas) for both the water distribution and sewerage systems in Taiz, see Figures 2 and 3.

#### C. Project Financing to Present

On the basis of the findings of the AID-financed feasibility studies mentioned earlier and of the indicated willingness of other donors to participate in the project, in 1977 AID prepared a project paper for a \$10 million grant to assist in project financing. This grant was authorized August of that year. As mentioned earlier, the YARG was successful in attracting two other donors to the project, the Saudi Fund which pledged about \$30 million and the Abu Dhabi Fund which pledged about \$10 million. At the time of contract awards in early 1979, total project cost had increased to an estimated \$80 million. With the outside donors having pledged a total of about \$50 million, the YARG committed itself to supplying the additional \$30 million required to complete the project.

During the period before and immediately after bid awards, the various project financiers began the process of making discrete financial commitments. The AID commitments are discussed in some detail below. For their commitments, both the Saudi and Abu Dhabi funds reviewed all of the various subcontracts under the three main contracts and each selected those which it considered most appropriate for its financing, pledging a certain amount for each selected subcontract (per guidelines in each fund's loan agreement with NWSA). The YARG contribution then was comprised of residuals consisting of the amounts of those subcontracts not selected or not fully funded by any of the outside donors, plus certain aspects of the project

outside the construction contracts, often comprised entirely of local costs, such as acquiring land and right-of-way and of compensating farmers in the areas of the new well fields for losses they would sustain as a result of water withdrawn by the project. (A general overview of the original financing commitments can be gleaned from the tables in Annex F.)

The allocation of the AID grant funds has changed significantly through project implementation. At the time of the grant project paper, the \$10 million grant was allocated as follows: \$5.0 million for equipment, \$3.8 million for engineering supervision, \$1.0 million for additional water wells and \$0.2 million for on-the-job training. Throughout project implementation, the estimated cost of supervisory engineering services (including additional design) has increased slowly but steadily because of inflation and unforeseen requirements for services. Shortly after contract awards, the rough earmarking of AID grant funds had become as follows: \$4.6 million for engineering services (the initial H&S contract was for \$4.2 million), \$3.2 million for the supply and installation of selected (by AID) U.S. source and origin equipment, \$0.7 for additional well drilling and and \$0.2 million for O&M training. (The remaining \$1.3 million was being held as a contingency.) As the need for increasing engineering services and the effects of inflation on their costs became more apparent, informal planning indicated that the contingency would have to be shifted to that purpose. By the late 1980, AID had informally increased the earmarking for engineering services to about \$6.0 million, the other earmarkings remaining essentially unchanged. The further increases in the estimates for the AID-financed components until the present estimate of about \$13.7 million are discussed in Sections I.D. 2 and II. C. 2 below.

#### D. Project Problems and Responses

##### 1. Donors Conference

By early to mid-1980 accumulating evidence made inescapable the conclusion that the Taiz project faced significant cost overruns. Among the more important causes for the cost increases, as detailed more fully in Section I.D. 2 below, were extensions of both water and sewerage services within the service area limits; greater-than-anticipated obstacles to construction, particularly under Taiz' streets; unexpectedly large quantities of rock in trenches and at tank sites; and the decision to include installation of the secondary water system in the construction contracts (rather than to follow the original plan of having this work performed by the Taiz Branch).

In view of these cost overruns, by mid-1980 NWSA began to consider the possibility of convening a conference of the three outside donors, the Saudi and Abu Dhabi funds and AID, to examine the situation in detail and, it was hoped, to obtain pledges of additional financial support to enable full financing of the project.

NWSA recognized that it would be necessary to have accurate final project cost estimates to present to the donors if it were to have any real chance of eliciting further support. Accordingly, it instructed the supervisory engineers, H&S, to prepare a revised bill of quantities for the project, incorporating all changes approved or anticipated, and to assign the best possible estimate of prices to all quantities, whenever possible the prices to be those agreed between the main contractor, HSPL, and H&S. By the end of July 1980, H&S indicated that the final version of their report could be completed by the first of September and NWSA made preliminary steps to convene the proposed donors conference during September.

During this period, however, project managers both in NWSA and USAID began to surface a number of concerns about holding the donors conference as early as September. One was that the cost information on the revised bill of quantities was not complete enough -- there were still a relatively large number of cases in which there apparently was no agreement between HSPL and H&S on prices. It was feared that the donors would be reluctant to make further commitments to the project until they were convinced that a final, mutually acceptable financial estimate had been achieved. It was also recognized that a situation in which any further commitments made by the donors at the conference later proved still insufficient to complete the project could lead to grave consequences, including, at the worse, withdrawal of one or more of the donors.

Another major concern was that no coherent and comprehensive review of the causes of the project's cost overruns had been completed. When attention initially began to be focused on the project's problems in early 1980, a series of claims and counterclaims about the causes of the cost overruns, and about the focus of responsibility for them, began circulation. In this atmosphere, it was possible for an outside observer to gain several, largely conflicting, explanations for the causes of, and responsibilities for, the overruns. This was obviously not an atmosphere conducive to conveying to the donors a sense of confidence that the project would be completed in good order if further funding were made available.

Of particular concern to USAID during this period was the increasingly strained relationship between NWSA and the AID-Financed engineering contractor, H&S. It was clear that with whatever degree of justification, NWSA had lost confidence in H&S to a great degree. This obviously was another factor not conducive to an early donors meeting, both because evidence of unharmonious relations between NWSA and H&S would tend to generate doubts among the donors as to the wisdom of continuing with the project and because any expressions by NWSA of lack of confidence in H&S tended to lessen confidence in the "final" cost estimates being prepared by H&S.

These circumstances led USAID to the conclusion that it was necessary to build a more solid case for the probable ultimate success of the project prior to convening the donors conference. Accordingly, in August 1980 AID recommended to NWSA that two

outside studies be conducted prior to the donors conference, one of the project's probably costs to completion, and the other of H&S's performance. NWSA accepted the AID proposals and tentatively postponed the donors conference until December, pending completion of the two studies.

Under the arrangements worked out, the "cost team" was composed of two senior engineers from a U.S. firm well-known in the field of sanitary engineering, Stanley Consultants. This team's mandate was to develop an independent estimate of final project costs, suggesting in the process areas where savings could be effected. The other team was composed of three AID officers, two sanitary engineers and a lawyer, and had the assignment of examining H&S's performance to date and making recommendations for the provision of engineering supervision of construction through the end of the project (including an estimate of the costs of such services). The two AID-financed study teams were in Yemen during the month of October 1980, and their findings were available in early December. (See Annex D for Study reference.) As soon as available in December, copies of the cost team's report were made available to NWSA, all of the donors, and H&S. (Copies of the draft AID report on H&S's performance were made available only to NWSA and AID.) During this period, H&S continued to work with HSPL on refining mutually estimates for the final cost of all project elements.

Because of scheduling problems encountered by all participants, the donors conference was delayed and was finally held between January 27 and February 1, 1981. The first two days of the conference, January 27 and 28, comprised its core, with a full explanation of current project status (the basic presentations were made by NWSA and H&S), and discussion of the various problems encountered by the project and of the estimate of costs to complete it.

At the donors conference, HSPL and H&S were able to report substantial progress in their negotiations to tie down final project costs in the wake of the various changes which had been made in project design. In essence, their report was that they were only about \$3 million apart on final basic cost estimates for the three project contracts, with H&S's estimate being \$71,862,004 and HSPL's estimate \$74,883,601. Furthermore, over half of the remaining difference of just over \$3 million was in one contract item (C-7 for water storage tanks). Thus, although final agreement had not been reached between the contractor and the engineer on project cost at the time of the donors conference, the amount of progress to that time toward reaching agreement had been impressive and the small amount of the remaining differences encouraged the participants to believe that final agreement was not far away. (HSPL and H&S were instructed by NWSA at the end of the conference to continue negotiating their differences and to prepare a final report on the situation in early March.)

It should be noted as a point of explanation here that the figures cited above -- the estimates of HSPL and H&S for final project construction cost -- represent only the basic amounts for project construction under the three project contracts. To reach final project cost estimates of about \$100 million these figures must be increased by the amounts for contingencies and for project elements which are outside the basic contracts, many of which are strictly local-cost items. As to the amount for contingencies, although HSPL and H&S are close to agreement on basic construction costs, they are far apart on this question, with H&S estimating about \$5 million for contingencies at the donors conference and HSPL coming in with a figure of \$11.8 million, which it subsequently increased to a tentative figure of \$17.5 million. The reason for HSPL's apparently very high contingency figure is that it is based on a "worst case" analysis. With regard to project elements outside the basic contracts, these total about \$21 million comprised of the following elements: remedial work, \$1.5 million; well drilling, \$0.4 million; supervisory engineering services, \$8.8 million; land and right-of-way, \$0.3 million; compensation to farmers in the well fields' areas, \$10 million and O&M training, \$0.2 million. There are no differences among NWSA, HSPL and H&S on the basic accuracy of the estimates for these items. For further information on project cost estimates at, and following, the donors conference, see Annexes E, F, and G.

In the overall assessment, the donors conference must be judged successful in its effort to provide a full understanding to the donors of the problems which the project has encountered. The discussions were wide ranging and frank, covering virtually all aspects of project implementation. Questions by the donor representatives were well-informed and the general consensus was that all emerged from the meetings with a full understanding of current project status. (See Minutes of Donors Conference in Annexes E.4 and E. 5.)

The donors conference also had the effect of engendering a renewed spirit of cooperation among the major actors in the project's implementation, NWSA, HSPL and H&S. The conference seemed to clear from the air much of the atmosphere of recrimination which had been building during the preceding half year. Each of these participants gained a fuller understanding of the problems being faced by the others and all seemed to come away from the conference with an enhanced respect for the need to cooperate if the project were to be completed and for the possible adverse consequences for all if this were not accomplished.

Based on AID's analysis of the project's overall soundness and the necessity for its completion, and on the perception that assurances of continued engineering supervision were an essential prerequisite for further pledges from the other two outside donors, at the end of the main donors conference, the AID representatives made a tentative commitment to make further \$5 million available to the project in the form of a development loan. On their part, both the Saudi and Abu Dhabi fund representatives explained that final decisions on further support from them would have to be made by their respective head offices. The representatives of both funds indicated, however, a sympathetic understanding of the importance of completion of the project to residents of Taiz and to Yemen's overall development aspirations and plans and left the definite impression that there was a good probability of further pledges from both within a reasonable period after the conference.

## 2. Project Cost Increases

### a. General

Project cost estimates have increased significantly throughout the period of project preparation and implementation. As shown in Table 1 of Annex C these estimates have climbed since the original Montgomery feasibility report in 1975 from about \$23 million to more than \$100 million. A number of factors have caused overall cost increases (it should be noted that some cost decreases have been effected during period also, but these have been far overshadowed in general by the cost increases). The major factors causing cost increases over time, and particularly since the award of contracts in April 1979 (when overall project costs were estimated at \$82 million) are set out below.

-- One significant cause of cost increases has been additions to water and sewer lines authorized by NWSA, as discussed in Section II. B.

-- The rapid growth of the city of Taiz since original design and tendering has caused project costs to increase in several other ways in addition to its effects in increasing the requirements for water and sewerage services. Particularly significant has been the fact that it has required the installation of more public services of all kinds in addition to water and sewerage services. For the project, this has meant more obstacles to be overcome during construction, particularly under the streets. As a major example, Taiz has an extensive system of buried communications and power cables and these

have proven to be expensive obstacles to work around. Uncharted cess pits (which must temporarily remain operative) are among a series of other underground obstacles which have impeded project progress and driven up costs. Increased street paving during implementation has increased costs both by requiring more work to tear up and, of course., by requiring additional repaving once the project lines are in.

-- The topography of Taiz combined with its relatively high rainfall (and the tendency of the rain to fall during fairly intense storms) has played a significant role in increasing project costs. Under these conditions, the topography is subject to constant change through erosion, requiring constant redesign of project facilities, thus increasing design, material and construction costs. Also, the lines in unpaved streets have consistently required added concrete collars to prevent erosion. (Many lines are laid on 25% grades.)

-- Both of the two preceding factors -- rapid population growth and rapidly changing topography -- have mandated a "conservative" design philosophy for project facilities. In order to attempt to minimize the need for redesign, in many instances project water and sewer lines are designed to be laid deeper than is normally required to ensure that subsequent erosion and, for example, grading of streets for paving, do not expose them. This situation has obviously increased costs over those normally encountered in similar projects.

-- Insufficient or inadequate planning has also played a role in increasing project costs. As examples, it is clear in retrospect that insufficient subsurface investigation was undertaken prior to final project design. This led to significant underestimation of the quantities of rock excavation which the project would require. A number of quantities in addition to rock excavation were originally underestimated. These prominently include special bedding materials, cement, and reinforcing steel. In addition to its effects in increasing costs by increasing quantities, underestimation of various aspects of the project by the engineer, particularly of rock excavation, clearly led to "unbalanced bidding" by the contractor, which resulted in "built-in" higher costs from the start of the project construction. Inadequate planning and supervision caused the addition to the project of activities not originally planned, particularly the installation of secondary water lines (which were originally planned for NWSA's own work force and account) and the handling by the Contractor of Contract A materials and made necessary the ordering of more materials than had originally been planned. Inadequate engineering supervision, and errors in design calculations and quantity surveys, have allowed the continuation of a number of uneconomic practices, including contractor billings for rock excavation and for select backfill that appear to be higher than justified under the terms of the contract.

-- The overall high inflation rate prevailing throughout the world has obviously played a major part in increasing project costs. As a result of this phenomenon, all project costs have been subjected to sharply upward pressures. While a provision was made for an increase in billing of 15 percent by the contractor for all work completed and certified after April 15, 1980, and while no exact accounting is available, it is probable that the contractor's actual costs for materials and labor during implementation have exceeded this rate, thus putting pressure on the contractor to recoup his losses in negotiations. There have also been in some instances significant lags in payments due the contractor, which have undoubtedly also placed additional significant financial pressure on the contractor -- particularly in view of the high interest rates prevailing during the period -- and consequently have produced further incentives to attempt to recoup losses.

b. AID-Supported Project Elements

Major cost increases have occurred in both of the significant AID-supported elements of the project, engineering supervisory services and certain U.S. source and origin equipment for Contract B. The estimate for engineering services has increased from about \$4.6 million to about \$8.8 million; that for the AID-financed equipment from \$3.2 million to about \$4.4 million.

The increases in the cost of the AID-financed equipment can be attributed to two primary causes: design changes and inflation, in the rough proportions of 40 percent to 60 percent. By design changes is meant substitutions in the original equipment specifications and quantities as a result of reconsideration of project requirements. The final cost of the AID-financed equipment is part of the ongoing negotiations between the engineer (H&S) and the contractor (HSPL) directed by NWSA at the donors conference with the aim of achieving a final project cost. H&S has committed itself to providing AID with a written explanation of how the cost for each item was arrived at after the negotiations are completed to establish the reasonableness of the established costs. (See Annex G for prices of the AID-financed equipment as agreed between HSPL and H&S.) Similarly, in broad terms the additional costs of the AID-financed engineering services to the project can be broken down into two components, inflation and additional design (and redesign). AID-financed engineering services are being provided under a standard cost-plus-fixed fee contract, under which all cost increases caused by inflation are passed on by the firm to the client (and financing agency).

There have also been a number of significant instances of additional design work which have added to the costs of the contract. First, the project was tendered on a "pre-final design" basis, within a concept that further, supposedly minor, design changes would be required as the project was implemented. The amount of such additional design work has been greater than originally anticipated. There have also been a number of instances in which original designs have proven faulty, thus necessitating redesign that might have been avoided (to be fair to the engineer, some of this redesign was caused by the fact that in an effort to save money he was mandated in many instances

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to use raw design data provided by another firm. Additional design has also been required as a result of the factors of rapid population growth and rapidly changing topography, as discussed in Section I.D.2. (Also, in some instances the two non-AID outside donors have insisted on certain design changes in facilities to make them eligible for their financing.) Finally, H&S has been mandated by NWSA to perform a number of unanticipated tasks outside the realm of design, mostly matters pertaining to preparations for the donors conference, such as revising (and repricing) the bill of quantities -- which has required significant amounts of time -- and establishing the reasonableness of the costs of the AID-financed equipment under Contract B.

## II. PROJECT DESCRIPTION

### A. Project Goal and Purpose (Logical Framework)

The project goal and purpose remain basically unchanged from those in the original Project Paper, as set out in the logical framework (Annex B). The goal as stated there was as follows: "(To) improve personal health and environmental sanitary conditions in Taiz, Yemen, by renovating and expanding the Kennedy Municipal Water and Sewerage System." The purpose was "to construct a financially viable water and sewerage system that supplied adequate service to customers." Similarly, the project outputs and inputs remain basically as stated in the original logical framework. Of course, since the original log frame was completed, the magnitude of both inputs and possible outputs has changed as a result of a number of factors at work during actual project implementation. On the input side, the magnitude of the resources has increased substantially, from an overall estimate for the project of about \$65 million, to one currently in the range of \$100 million. On the output side, while no exact percentages can be estimated at this time, if current population growth trends in Taiz continue, it is doubtful that, as indicated in the original log frame, as a result of the project 90 percent of the population will be connected to the water system and 70 percent to the sewerage system in 1990. Given current growth rates, a more accurate prediction probably would be that completion of the present work will allow such percentages of connections in 1985 or so.

(NWSA recognizes that more rapid than expected growth is quickly threatening to make obsolete the original estimates on which project design was based and they are already tentatively thinking about a follow-on to the present project.) The log frame contained in Annex I of the present paper has been updated to reflect the situation at the time of writing this paper as accurately as possible.

### B. Description of Project Facilities

The basic facilities to be provided under the project have remained essentially unchanged since the original conception. For a description of these facilities, see Section VII of the original Project Paper. Some expansion of the description found there is in order, however, to update the description of the final project as currently envisioned. (For an overview of major project facilities, see Figure 4. Figures 2 and 3 provide an overview of the extent of project water distribution and sewerage facilities in Taiz.)

Emphasis should be placed on the fact that all project facilities have been designed to minimize operation and maintenance costs, particularly the costs of energy to operate the system. Given the very hilly topography of Taiz, it was impossible to avoid lifting water to various storage locations in order to provide full pressure throughout the most of the service area. For reasons of economy, however, the sewerage system has been designed to such a manner that all sewage is moved by

FIGURE 2

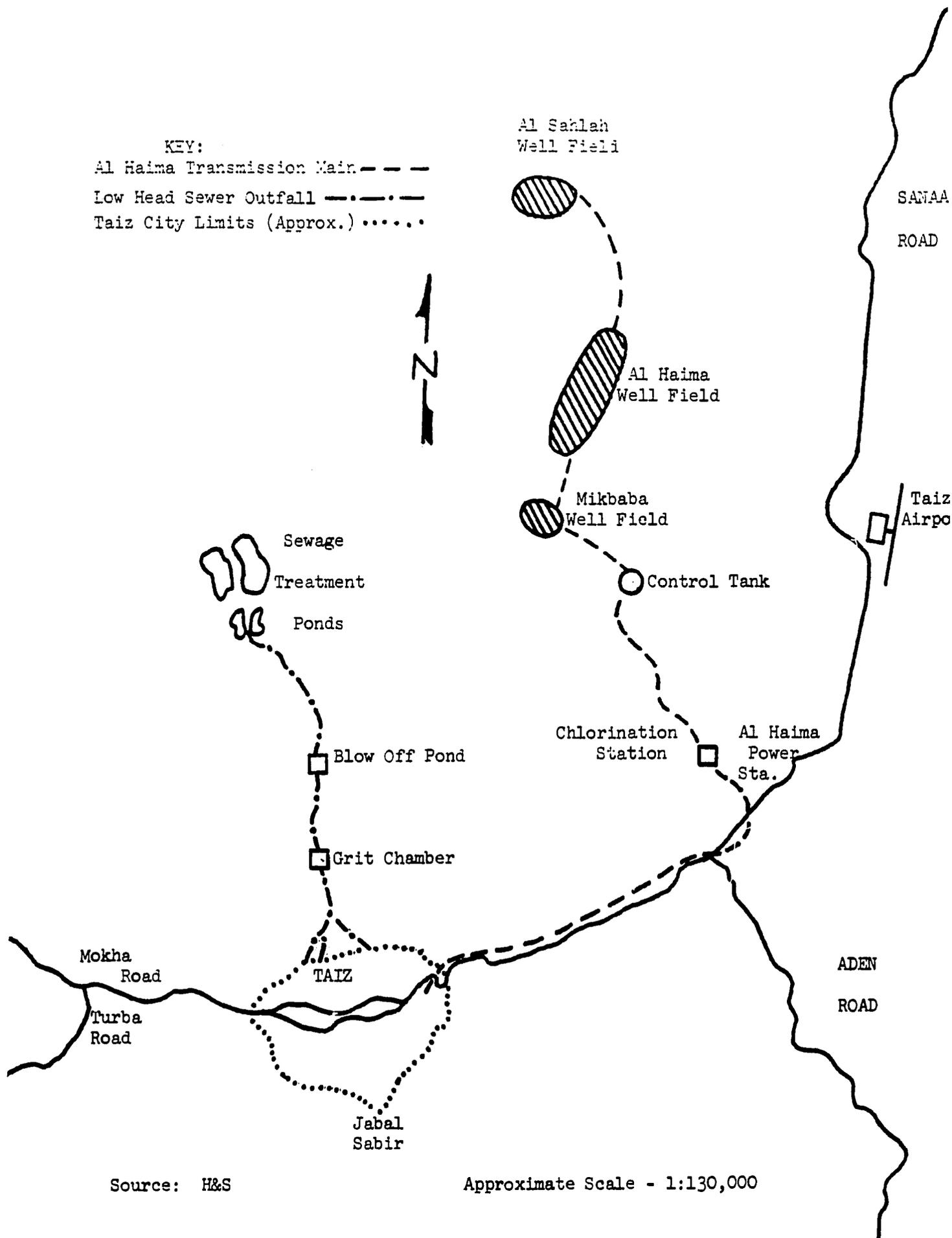
MAP SHOWING EXTENT AND STATUS OF  
WATER DISTRIBUTION CONSTRUCTION  
IN THE CITY OF TAIZ

FIGURE 3

MAP SHOWING EXTENT AND STATUS OF  
SEWERAGE CONSTRUCTION  
IN THE CITY OF TAIZ

(The above two maps are hereby incorporated in this paper by reference.  
Both maps are on file in NE/PD.)

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gravity; there are no provisions for pumping sewage.

From the onset, it was recognized that the hilly nature of the city's topography made it uneconomic to aim for full water and sewerage service, even within the formally defined project service areas. Thus, for both water and sewerage services, there are several populated areas within the project boundaries which are not provided with service. The number of areas without water services is smaller than that without sewerage service, because of the relatively lower cost of small diameter water mains (which on the average are not only smaller than sewer lines but also can be laid at much shallower depths than gravity flow sewers require) and the fact that adequate pressures in feeder mains eliminate the need for pumping facilities -- and thus energy costs -- to get water to certain higher elevations. While many marginal areas at higher elevations have thus been provided with water service under the project design, most marginal areas for sewerage service, lying at lower elevations, have not been provided with service principally because lifting sewage from low-lying areas into the gravity system is more expensive in terms of both construction and operation than those for lifting water. The relatively high costs of laying the generally larger and deeper sewer pipes has also precluded sewerage service to areas with few and widely separated consumers (although some of these areas were also excluded from water service for similar reasons of economy). It was judged that until further development and consequent population density warranted assumption of fairly heavy cost increases, continued limited use of cess pits in areas economically marginal for sewerage services is within the acceptable limits of sanitation. The possibility of contamination from cess pits in sparsely populated areas is generally negligible, even if water service is provided to such areas.

At the time of writing the original Project Paper, there was some question as to whether sewage treatment would be provided by trickling filtration or by oxidation ponds. In keeping with the emphasis on minimizing costs, the final decision was for treatment ponds. A 7.2 kilometre low head sewer outfall transports the sewage through a de-gritting chamber and a blowoff pond to the ponds northwest of the city in a location where soil permeability is low. The ponds, occupying a total area of about 34 hectares, will provide anerobic and aerobic treatment of the sewage, producing an effluent expected to be suitable for crop irrigation.

Although the basic project concept and facilities have remained unchanged, there have been a number of significant changes made in project design during implementation for various reasons. The following three are the most important among these changes.

1. As a result of strong pressures from the general public, reinforced by consequent pressure from Provincial Governor, NWSA has acquiesced in the addition of both water and sewer lines within the project service areas. The areas where additional water and sewer lines have been authorized are generally those which have experienced

significant population growth after original design and tendering, particularly along main roads. (To date, NWSA has successfully resisted public demands for additional water and sewerage services in areas outside the formal project service boundaries.)

2. A decision was made to add more emergency power generation facilities to allow pumping of water during outages of public power. It has now been determined from the announced plans for increasing public power to the Taiz area that adequate public power will not be available to the wellfield area for at least 2 years after project startup. Thus, the "emergency" generation facilities will have to serve as the prime source of power during this period.

3. Gravity pressure water service via a storage tank has been eliminated from one of the proposed service zones (Zone VI) because of the small population to be served. In lieu of the tank service, a hydropneumatic pump system will be installed to provide water to this service zone.

As indicated, a number of other, less important changes have been made in project design. A catalog of those changes with significant cost implications is briefly discussed on pages 3 and 4 of Annex E.4.

#### C. Project Training Plans

Since its inception, the project has had a modest amount of AID money (\$200,000) earmarked for operations and maintenance training for the Taiz Branch personnel who will assume responsibility for project facilities upon their completion. While detailed plans for this training, scheduled to start in May 1982, have not been finalized, it is foreseen that it will involve rather routine O&M training, involving some theoretical work, but mostly "hands-on" work and practice on the actual project facilities. It is anticipated that the required training services could be provided easily by American firms already active in Yemen.

As an adjunct to the formal O&M training planned under the project, during the ongoing negotiations between NWSA and H&S for an amendment to H&S's contract for services through completion of the project, the Mission has been insisting that H&S increase its training activities for Yemen personnel under the contract, and H&S has indicated that it will do so. (While such activities might add marginally to the cost of the H&S contract, savings being effected during the amendment negotiations -- particularly in the area of home office -- U.S. -- salary costs are expected to compensate largely for any such increases.) There is a reasonable chance that at least some of the Yemeni personnel so trained by H&S will be available to NWSA after project completion.

#### D. Project Finances

##### 1. Overall Project Financial Requirements

At the time of preparation of this Project Paper, the engineer,

H&S, and the contractor, HSPL, are still far apart on estimates for total project costs. H&S's latest estimate is \$100.9 million while HSPL's is \$116.7 million. As discussed earlier in Section I.D.1, however, most of this almost \$16 million difference is in contingencies (\$11.5 million). Of the remaining difference of about \$4.5 million, about \$3.5 million consists of continuing differences in the estimate of the costs of the basic construction contracts (H&S: \$71.2 million; HSPL: \$74.6 million) and the remaining \$1.0 million consists of a difference in estimates for house water connections (H&S: \$1.0 million; HSPL: \$1.9 million). (See page 3 of Annex F.)

For the purpose of this paper, the Project Committee chooses to utilize the H&S figures, instead of the HSPL figures, as a basis for projecting final project costs. This is essentially because we feel that HSPL has an obvious interest in pushing its estimates for contingencies to an upper limit. We, therefore, believe that the H&S contingency estimate will ultimately prove more reasonable than that of HSPL. We also use the H&S estimate for the cost of the three basic contracts because there is a provision in the basic contracts which allows the engineer, H&S (on behalf of the client, NWSA) to set the price to the contractor in those cases where agreement cannot be reached (this provision also allows the contractor to take the matter to arbitration after the job is completed if he is still unhappy with the result at that time). Because the H&S contingency allowance was based only on the basic contracts, in the USAID estimate we are increasing contingency somewhat to provide for an across-the-board amount of 10 percent of the project cost. Thus, our final estimate for the project is as follows:

TABLE II-1  
USAID ESTIMATE OF FINAL PROJECT COSTS

<u>ITEM</u>	<u>AMOUNT</u> <u>(\$ MILLIONS)</u>
Three basic contracts (H&S estimate)	\$ 71.202
House water service connections (H&S)	1.000
Other costs (see Section I.D.2 above)	<u>21.136</u>
Subtotal -- basic project cost	\$ 93.338
Contingency (H&S)	6.000
Additional contingency (USAID)	3.334
Interest through 01/81	0.814
Currency fluctuations	<u>0.785</u>
Total estimated project costs	<u>\$104.271</u>

Current project financial commitments (assuming authorization of the AID loan) are as follows:

TABLE II-2  
CURRENT PROJECT FINANCIAL COMMITMENTS

<u>SOURCE</u>	<u>AMOUNT (\$ MILLIONS)</u>
Saudi Fund	\$29.351
Abu Dhabi Fund	9.241
AID	15.000
YARG	35.556
Total	<u>\$39.648</u>

Thus, utilizing our estimates for total project costs, there is currently an uncovered amount of about \$15 million. (To the extent that AID has indicated that we will only provide financing to cover those aspects of the project to which we had earlier committed ourselves, the AID "commitment" of \$15 million in the above table is high because it now appears unlikely that the full additional \$5 million in the proposed loan will be required to complete AID financing - although the Mission believes it is wise to hold the additional amount as contingency.) This accords very closely with the amount estimated by H&S, using a slightly different basis, as follows (see Annex F):

TABLE II-3  
H&S ESTIMATE OF FINAL PROJECT COSTS  
(AMOUNTS IN \$ MILLIONS)

<u>Contributor</u>	<u>Present "Commitment"</u>	<u>Estimate of Final Required Commitment</u>	<u>Uncovered Amount</u>
Saudi Fund	\$20.834	\$ 32.602	\$11.768
Abu Dhabi Fund	9.241	15.394	6.153
AID	12.255	13.778	1.523
YARG	33.557	39.163	5.607
Total	<u>\$75.887</u>	<u>\$100.937</u>	<u>\$25.051</u>

The H&S estimated "final required commitment" above is about \$3 million lower than the USAID estimate of final project costs (see Table II-1) because it does not contain the "additional contingency" which has been included in the USAID figures. The H&S "uncovered amount" is about \$10 million higher than the USAID estimate essentially because H&S shows the Saudi Fund as "committed" to only \$20.8 million worth of project facilities. The actual current situation with regard to the Saudi Fund contribution is that the fund is committed to NWSA for the amount of \$29.8 million (via a signed loan agreement in the amount of Saudi Rials 100,000,000). At the present time, however, only \$20.8 million of the SF \$29.8 million commitment has been designated for financing specific project facilities. In addition to the question of increasing the overall SF commitment, the

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ongoing negotiations between NWSA and the SF include designating specific project activities for the amount of about \$9 million which has not yet been so assigned.

In previous discussions with the non-AID donors, the YARG has been proposing that its overall commitment to the project be reduced somewhat. USAID has the feeling from our discussions that as the outcome to the current negotiations the Saudi and Abu Dhabi funds will probably decide between themselves to provide financing to cover the current estimated project shortfall of \$15 million, providing that the YARG agrees to hold to its present commitment of about \$35 million. (A recommended condition precedent to the AID loan is evidence of sufficient overall financial resources to complete the project as envisioned -- see Section IV.E.1 below.)

## 2. Proposed AID Contribution

Based on the best available information at the time of writing this paper, the overall AID contribution to the project will be \$13,686,019. This estimate is based on tentative figures for the two major AID-financed components of \$4,353,804 for the U.S. source and origin equipment and \$8,772,215 for the final cost of H&S services. The first figure is the estimated amount for equipment which was agreed between H&S and HSPL, with an additional \$30,000 estimated for marine insurance. The second figure is the current H&S estimate for the final cost of their contract to provide engineering services, as proposed in their draft of Amendment No. 5 to provide services through completion of construction and closeout. (Neither figure at this time has been given final approval by NWSA or AID.) Based on these figures, the estimate for total AID funding is as follows:

TABLE II-4  
ESTIMATED AID PROJECT CONTRIBUTION

<u>Item</u>	<u>Original Estimate/ Commitment</u>	<u>Current Estimate</u>
Engineering Services (H&S)	\$ 4,600,000	\$ 8,772,215
U.S. Equipment	3,212,911*	4,353,804
Well Drilling	700,000	360,000
O&M Training	200,000	200,000
Contingency	1,287,089	1,313,981
Totals	<u>\$10,000,000</u>	<u>\$15,000,000</u>

\*Differs from some previous estimates because this figure included about \$290,000 for installation of equipment, which is no longer under consideration for AID-financing. This installation will now be financed by YARG.

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### III. PROJECT ANALYSIS

#### A. Technical Analysis

1. Water Supply. The plans for supplying water to Taiz under the project, including the selection of the sites for the new wellfields and the design of the system to transmit the water to the city and store it there for distribution, are considered technically good. All well drilling was completed by late 1979. The tests conducted on the wells after drilling yielded very satisfactory results; all evidence indicates that the well fields developed under the project will be sources of high-quality replenishable water for Taiz for many years to come. No exceptional design problems were encountered in the transmission and water storage system and all aspects are considered to be technically sound. The water distribution system being constructed under the project, including the individual house connections, is standard; no technical problems have been encountered to date with this system and none are expected.

2. Sewerage and Sewage Treatment Facilities. The sewerage system being installed in Taiz is also judged to be technically sound. In all cases, simplicity of operation and maintenance was stressed. Thus, all sewage is transported by gravity; no pumping is involved. In addition, the sewerage system existing in the central part of town was incorporated into the new system to the maximum extent possible (the existing central system is judged to be adequate for service at least until 1990).

The sewage treatment system utilizing oxidation ponds some 7 kilometres from Taiz is well suited technically to the project's requirements. Taiz' climate is warm enough to allow the effective operation of oxidation ponds and these will present the fewest problems with regard to both operation and maintenance. The soils at the site of the ponds have a very low permeability, thus ensuring to a high degree against seepage of untreated sewage below the surface. The site is sufficiently removed from significant habitation to ensure against odor pollution during those periods of the year when the treatment process will not be operating at full effectiveness.

3. Capability of Construction Contractor. All evidence to date indicates that the construction contractor, Hanab-Stevin Pipelines (who are also providing the bulk of the supplies to the project), is fully competent technically and adequately staffed to perform the contract. In general, the contractor's work to date has been of a high standard, fully meeting international requirements and the specifications of the contract.

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4. Capability of Supervisory Engineer. A balanced assessment of H&S's performance must take into account a number of inhibiting factors in the environment in Yemen, including a reluctance of the client, NWSA, to provide H&S with full authority to carry out its mandate; the fact that many of the project's design problems had to be undertaken without sufficient information, particularly with regard to soil conditions; the situation that the strategy of proceeding to contract tendering without full final design caused higher-than-normal levels of conflict between the engineer and the contractor; and the fact that, fairly or unfairly, Yemen often is not perceived as a desirable working locale, which caused some recruitment problems for the firm.

As a general rule, H&S has performed better at the task of supervising construction than at its other major task, that of design. At the time of project paper preparation, most of the design work on the project -- including required additional design and redesign -- has been completed; the preponderance of the work remaining involves construction supervision. In addition, based on its own assessment of H&S's performance and the results of the AID team's study of that performance conducted in October 1980 (see Annex D), NWSA is insisting on a number of changes in H&S's personnel at Taiz prior to coming to final agreement on the amendment to H&S's contract required to provide for the firm's services through the end of the project construction. (These personnel changes mostly involve particular people; significant changes in personnel strength are not being contemplated.) USAID has been following negotiations on the proposed final amendment to H&S's contract closely, particularly with regard to personnel matters, and have informed both NWSA and H&S that AID does not intend to approve the upcoming contract amendment unless it is convinced that H&S's personnel on site at Taiz have both the capability and the authority to complete their work on the project in a satisfactory manner. (Contractual arrangements for supervisory engineering services through the end of the project which are acceptable to AID is a recommended condition precedent for the proposed loan -- see Section IV.E.1.)

#### B. Administrative Feasibility

Chief administrative responsibility rests with NWSA, whose staff is on the whole capable (although spread extremely thin). Although relations between NWSA and the contractor (HSPL) and engineer (H&S) have been strained at times in the past, as discussed above (see Section I.D.1), the Mission believes that the recent donors conference has spawned an era of better cooperation among all parties. Assuming successful conclusion of the ongoing negotiations over project costs and further financial commitments by the two non-AID donors (the prospects of both of which are judged to be good), this spirit should be

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maintained and the administrative problems of the project through completion should be reduced correspondingly. At the Mission's initiative, it was agreed at the donors conference that representatives of all donors and NWSA would convene a "mini-donors conference" at approximately 4-month intervals to review project progress and problems through completion; this should serve to maintain the spirit of cooperation which evolved from the donors conference. It is the Mission's overall judgment that administrative capability will be adequate to complete the project as envisioned.

### C. Financial Analysis

Unfortunately, the extremely large cost increases which the project has encountered render previous financial analyses, such as that completed by Deloitte/Haskins and Sells in 1979, or that included in the original Project Paper, not very useful as guides to probable future financial requirements. This is because, as an example, in its "worst case" analysis, D/H&S assumed a 25 percent increase in project costs above the then-estimated \$53 million, raising project costs to \$67 million, while current estimates are in the range of \$100 million, which is a 150 percent increase even over D/H&S's "worst case" assumption. Completion of a new financial analysis, under present conditions of greatly increased costs and as-yet-undetermined new financing arrangements, would require staff resources and time which simply are not available in the Mission.

It can be noted that the need for a comprehensive review of future financial requirements of NWSA as a whole (which would have to be built up from comprehensive studies of the financial requirements of each of the branches) is recognized by NWSA and the major donors as the one aspect of NWSA's management and planning which probably has been most neglected. The Mission understands that the IBRD has been reviewing the requirements in this area for some time with a view toward the possibility of mounting in the near future a comprehensive financial analysis of NWSA, including a major study to provide recommended tariffs through the foreseeable future (probably the next decade). (Such an analysis will be complicated by NWSA's preference for political reasons to levy a uniform tariff rate for water and sewerage services in all of the cities it serves.) One possible vehicle for such a study is a proposed cooperative agreement between NWSA and the Washington Suburban Sanitary Commission (being fostered by the IBRD) which, the Mission understands, would make specific reference to the possibility of providing assistance from the WSSC to NWSA on financial analysis, rate studies, analysis of costs, etc.

At the present time, NWSA has varying tariff schedules. It charges customers in Sanaa 5 Yemeni Rial (YR) (\$1 = YR 4.55) per cubic metre of water for the first 10 cubic metres and YR 10 per cubic metre for all consumption above 10 metres. Elsewhere (i.e., in Taiz and Hodeida) it charges a flat rate of YR 5 per cubic metre. (Since none of the sewerage systems are yet in operation, none of the systems is yet required to cover the costs of sewerage service.)

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For the year ending June 30, 1980, NWSA as a whole made a small operating profit. Among the three operating branches, however, only Hodeidia made a profit -- both Sanaa and Taiz experienced losses. The Taiz loss was comparatively small -- about YR 320,000 on revenues of about YR 7.3 million. The loss for FY 80 for the Taiz Branch would have been a profit except for a recent change in NWSA's regulations requiring a much larger set aside from revenues than had previously been in effect for provision for end of service benefits for employees. It should be also kept in mind that prior to the inauguration of the new project facilities, the Taiz Branch has a cap on the amount of water available for "sale" -- thus, if more water had been potentially available, the Taiz Branch undoubtedly would have been able to make a significantly higher return in recent years because it would have been faced with relatively small increases in direct costs to produce the additional water. On the other hand, it must be noted that the Branch only just broke even in FY 80 despite the fact that between FY 78 and FY 80 the price of municipal water in Taiz increased constantly from YR 2 to YR 5 per cubic metre. In other words, these rather rapid increases were necessary just to break even in a situation of extremely low amortization (depreciation) costs. (See Tables III-1 and III-2, respectively, for the unaudited financial results of NWSA as a whole for 1980 and the Taiz Branch for FYs 79 and 80.)

None of the above has any real bearing on the situation which will obtain in the Taiz Branch and NWSA when the new project facilities in all three branches are put into operation within the next 3 years, thus increasing both operations and maintenance costs and amortization costs significantly. While we admittedly have no rigorous support for our opinion, the Mission suspects that the most likely conclusion of a thorough analysis of the Taiz Branch's financial requirements after completion of project facilities would be that the branch will require significant subsidies for at least the first 10 years after startup, because the rates which would be required to cover all costs (even without consideration of a return on net assets) would be so high that they could not be levied for political reasons (and they would be beyond the means of most citizens as a practical matter).

(This conclusion is probably true for the other branches as well.) The Mission will continue to monitor the situation with regard to financial projections for NWSA (and the Taiz Branch) closely and will keep AID/W informed of any plans for financial analyses, rate studies, etc., and of any results when available.

In view of the Mission's opinion of the likely financial situation facing the Taiz Branch after completion of project facilities, the Project Committee is recommending as a condition precedent to the AID loan a signed releas agreement between the YARG and NWSA which provides the proceeds of the AID loan to NWSA for agreed project purposes on terms no less favorable than those of the AID loan to the YARG -- see Section IV.E.2 below.

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TABLE III-1  
National Water and Sewerage Authority  
Consolidated Statement of Revenue and Expenses  
For the Year Ending June 30, 1980

	Headquarters	Taiz Branch	Hodeida Branch	Sana'a Branch	Branches Total	Totals
<b>REVENUES AND INCOME</b>						
Water Sales	-0-	7,427,610	7,992,369	10,717,474	26,137,453	26,137,453
Other Income	423,960	363,985	423,613	96,000	883,598	1,307,556
<b>TOTALS</b>	<u>423,960</u>	<u>7,791,595</u>	<u>8,415,982</u>	<u>10,813,474</u>	<u>27,021,051</u>	<u>27,445,011</u>
<b>OPERATING AND ADMINISTRATIVE EXPENSE</b>						
Directors Remuneration	56,302					56,302
Salaries and Allowances	4,284,971	4,166,652	2,542,933	3,755,312	10,464,897	14,749,665
Electricity	1,124	-0-	2,881,399	1,701,125	4,582,524	4,583,648
Fuel and Oil	61,108	1,215,227	58,832	231,182	1,505,241	1,566,349
Chemicals	-0-	56,358	20,418	3,700	80,476	80,476
Maintenance and Spare Parts	86,127	318,049	130,236	176,804	625,089	711,216
Stationary, Printing and Other Office Expenses	84,727	43,911	22,748	81,104	147,763	232,490
Employee Expense Allowance	153,347	131,679	36,613	39,010	207,302	360,649
Building Rentals	-0-	-0-	100,800	10,783	111,583	111,583
Provision for Bad Debts	-0-	-0-	-0-	329,301	329,301	329,301
Provision for End of Service Benefits	559,224	1,119,996	396,052	769,459	2,285,507	2,844,731
Other Expenses	338,495	164,633	183,009	225,620	567,282	911,757
Depreciation	237,408	536,777	475,259	3,763,118	4,775,154	5,012,562
<b>TOTALS</b>	<u>5,862,833</u>	<u>7,753,282</u>	<u>6,848,299</u>	<u>11,086,518</u>	<u>25,682,119</u>	<u>31,550,932</u>
Headquarters Expense Allocated to Branches	(1,087,775)	362,229	165,342	560,204	1,087,775	-0-
<b>TOTAL EXPENSES</b>	<u>4,795,058</u>	<u>8,115,511</u>	<u>7,013,641</u>	<u>11,033,722</u>	<u>26,769,894</u>	<u>31,550,932</u>
Headquarters Expense Allocated to Work in Progress	(4,351,098)					(4,351,098)
<b>NET REVENUE OR (LOSS)</b>		<u>(323,916)</u>	<u>1,402,341</u>	<u>(833,248)</u>		<u>245,177</u>

Note: All amounts in Yemeni Rials (\$1 = YR4.55)

Source: NWSA

TABLE III-1

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TABLE III-2

National Water and Sewerage Authority

Comparative Statement of Revenue and Expenses  
Taiz Branch

For Year Ending June 30, 1980

	<u>1978/79</u>	<u>1979/80</u>	<u>Increase or (Decrease)</u>	<u>%</u>
REVENUES AND INCOME				
Water Sales	6,141,546	7,427,610	1,286,064	21
Other Income	522,984	363,985	(158,999)	(30)
TOTAL REVENUES	<u>6,664,530</u>	<u>7,791,595</u>	<u>1,127,065</u>	17
OPERATING AND ADMINISTRATIVE EXPENSES				
Salaries & Allowances	3,421,236	4,166,652	745,416	22
Fuel and Oil	899,649	1,215,227	315,578	35
Chemicals	53,068	56,358	3,290	6
Maintenance and Spares	421,100	318,049	(103,051)	(24)
Stationary, Printing & Other Office Expenses	26,390	43,911	17,521	66
Employee Expense Allowance	83,884	131,679	47,795	57
Provision for End of Service Benefits	318,878	1,119,996	801,118	182
Other Expenses	137,208	164,633	(27,425)	(20)
Depreciation	305,461	536,777	231,316	76
Headquarters Expense Allowance	347,697	362,229	14,532	4
TOTAL EXPENSES	<u>6,014,571</u>	<u>8,115,511</u>	<u>2,100,940</u>	35
NET REVENUE OR (LOSS)	<u>649,959</u>	<u>(323,916)</u>	<u>(973,875)</u>	(150)

Note: All amounts in Yemeni Rials (\$1 = YR4.55)

Source: NWSA

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D. Economic Analysis

It is generally accepted among economists that there is no satisfactory method of providing benefit/cost analyses for water and sewerage projects, simply because there is no way to quantify project benefits. It is possible to provide proxy benefits in the form of revenues to the operating authority and then to use these "benefits" and the project's costs to calculate an "internal rate of return" for the project, as was done in the original project paper (See Section VIII.E of that PP). The Project Committee finds such a calculation to be of limited usefulness, however for two reasons:

a. The crucial determining factor as to whether or not the "IRR" so derived will be positive or negative is the level of revenues, and thus of service charges (or rates) which is assumed. Making realistic a priori assumptions about such rates is a notoriously difficult process. In the real world, actual balancing of costs for water and sewerage systems (or achievement of a given return on assets) is usually more a matter of trial and error than of theory, not the least because each system's situation, or setting, is unique. As indicated in the above financial analysis section, the Project Committee suspects that any assumed rates for services which are within the realms both of political possibility and of practical ability to pay for many of Taiz' residents would yield a negative IRR at this time.

b. Of much more importance to the Project Committee as an objection to using "proxy benefits" to calculate an economic return for a project like this one is the point made in the original Project Paper that it is generally acknowledged that such proxy measures inevitably ignore large, but unquantifiable, benefits which will accrue to the residents involved. On the theoretical level there is perhaps a valid argument that with sufficient education and awareness any population should be willing to pay for the full costs of reaping all benefits provided by water sector projects. But such a high level of awareness will not be achieved early in the Yemen setting (indeed, it is not usually achieved in most developed countries, at least not at the local level), while the benefits, although unquantifiable, are real and substantial. The Mission believes that the real situation is well summed up in the last two sentences of the economic analysis in the original PP, viz., "In the case of Taiz, these unquantifiable benefits are very important and there is no real alternative to providing water and sewerage services. Most cities ("civilizations" might have been a better word) have determined that such systems are essential for a safe, healthy (and productive) environment and that total benefits exceed total costs."

Finally, there is a good argument to be made that the project as designed (and as being implemented in its environment) provides the least-cost solution to providing the desired benefits. As discussed earlier (see Section II.B above), project facilities have been designed to provide the lowest possible operating (particularly with regard to energy) and maintenance costs. There might be a question as to whether the sewerage services are necessary at this time, i.e., whether the city

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could not have continued using cess pits for some time, given the fact that the currently utilized aquifers under parts of the city are to be abandoned once the new well fields are put into operation. Aside from the probable sanitary problems such a course would pose for the city's living environment, we believe that because of the rapid growth of the city, the decision to provide the sewerage services now with a view toward ultimately pressing the current aquifers into reuse once they have had a chance to recharge (and to be "flushed out") is extremely farseeing and wise. In sum, everything considered, we believe that the present project indeed does provide Taiz with the least-cost solution to its water and sanitation problems now and in the immediate future, and further that it provides a solid -- and least-cost -- basis for the solution of the city's longer-term problems as well.

#### E. Social Analysis

All indications are that the social value placed on clean water (and on sanitary disposal of waste water) in Yemen is high, as it is in most other West Asian countries. There are numerous indications to back up the above general assessment. In the Taiz context, the obviously great public appreciation for the benefits received to date from the Kennedy Memorial Water System provides strong support for the proposition that adequate amounts of water are highly prized for the populace. The pressure exerted both by various sectors of the populace and the Governor of Taiz during the implementation of the present project to extend the actual service area for water supply and sewerage represents another strong indication of the high value placed on adequate supplies of water and sanitation. Similarly, the insistence that none of the planned public lavatories be eliminated, voiced by large segments of the populace, gives further evidence of the value placed on sanitary waste disposal. These indicators of high social value for adequate water and sanitary waste disposal in Taiz are mirrored by similar indicators at the national level. Here, the value is reflected in the fact that a significant proportion of the total development resources available to the Government are being budgeted for water supplies in general and for sanitary wastewater disposal in the major cities. While this analysis is admittedly not rigorous, it is believed sufficient to show that the proposed project will provide services responding to social demands representing some of the strongest perceived requirements of the populace.

The project will serve all levels of Taiz' population. Even the poorest strata will have access to project services, through public water distribution points and public lavatories. In general, the income distribution in Yemen is more even than in most countries with similar per capital income levels. Thus, ceteris paribus, a larger proportion of the populace should be able to afford the costs of the system's services than is generally true in countries of similar income level.

1/ ceteris paribus: other things being equal

F. Environmental Assessment

The environmental assessment for the proposed loan remains unchanged from that for the original grant. See Section VIII.F and Annex J of the original Project Paper.

#### IV. PROJECT IMPLEMENTATION AND EVALUATION

##### A. Project Implementation Schedule

Major events required for implementation of the AID-project from time of submitting this Project Paper until project completion are set out in Table IV-1. (While this schedule does not include past implementation actions for the AID grant-financed project, it does include all actions believed to be required from the present to complete all aspects of the AID project, regardless of funding source.) Given the experience in implementation to date, it is believed that the schedule presented is realistic and that there is a high probability of achieving full project implementation within the PACD of June 30, 1983.

##### B. Disbursement Method and Schedule

###### 1. Method

Only three items remain to be financed through the end of the AID Project. These are, in order of magnitude, the supervisory engineering services (about \$4.7 million), the AID-financed equipment (about \$4.4 million), and the local training (\$200,000). The engineering services are currently being financed by two methods, a direct letter of commitment to the engineers for the dollar costs and a direct reimbursement authority to NWSA for the local (Yemen Rial) costs (both have the Mission as the paying agent). These arrangements have worked satisfactorily to date and the Mission believes that they will continue to do so through the end of the project. Possible arrangements for disbursements for the AID-financed equipment have been set forth in great detail recently for NWSA's consideration; they will involve either direct reimbursement to the contractor, HSPL, upon satisfactory delivery of the equipment to Taiz or, alternatively, a direct letter of commitment to the U.S. subcontractor, Twombly, Inc., of New Jersey, containing standard AID-financing arrangements. Again, provided that all details of the shipment and receipt of the equipment are worked out satisfactorily among the involved parties (and this matter appears to be well on its way to resolution), no disbursement problems are anticipated. As to the relatively small amount budgeted for local O&M training, USAID currently is disbursing for several similar programs in Yemen utilizing direct reimbursement authorities with the Mission as paying office and is encountering no significant problems; it is anticipated that the training program disbursement procedures can be arranged fairly quickly once details of the program are agreed.

###### 2. Schedule

To the end of December 1980, of the \$10 million in grant funds already authorized, about \$5.3 million have been committed and about \$4.4 million disbursed. Following is the estimated schedule by fiscal year quarter for disbursement of AID funds (grant and loan) through the end of the project.

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TABLE IV-1  
PROJECT IMPLEMENTATION SCHEDULE

<u>ACTION</u>	<u>DATE</u>	<u>RESPONSIBILITY*</u>
1. Project Paper Submitted	3/20/81	USAID
2. Agreement Reached on Final Project Cost Estimates and Information Transmitted to Donors	3/31/81	NWSA, HSPL, H&S
3. Amendment to H&S Contract Signed to Provide Supervisory Engineering Services through Project Completion	3/31/81	NWSA, H&S
4. Loan Authorized	4/15/81	AID/W
5. Loan Agreement Signed	4/30/81	USAID, CPO
6. Shipment of AID-Financed Equipment Completed	4/30/81	HSPL
7. Implementation Letter No. 1 Issued	5/07/81	AID/W, USAID
8. Assurances of Further Financial Support Received from Non-AID Donors (or Sufficient Further YARG Support Confirmed)	5/15/81	NWSA, CPO
9. Loan Conditions Precedent Met	6/01/81	NWSA, CPO
10. AID L/Comms (or Other Financing Document for AID-Financed Equipment) Issued for Engineering Services and Equipment	6/15/81	NWSA, USAID, AID/W
11. Certification of Receipt of AID-Financed Equipment Completed and Payment Authorized	6/30/81	H&S, NWSA, AID/W
12. On-the-Job Training Program for NWSA Taiz Branch Personnel Begins	5/01/82	NWSA
13. Project Construction Completed	7/18/82	HSPL H&S, NWSA
14. On-the-Job Training Completed	8/31/82	NWSA
15. Departure of Last of Engineer's Pers.	12/20/82	H&S
16. Evaluation Conducted and Reported	6/30/83	USAID, NWSA
17. PACD of Project	6/30/83	NWSA, USAID

\* CPO -- Central Planning Organization, Yemen Arab Republic  
H&S -- Hazen and Sawyer  
HSPL -- Hanab-Stevin Pipelines  
NWSA -- National Water and Sewerage Authority

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TABLE IV-2

ESTIMATED AID DISBURSEMENT SCHEDULE  
(\$ Millions)

ITEM BY U.S. FISCAL YEAR <sup>1/</sup>	FISCAL YEAR QUARTERS				TOTALS
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	
(Through 1st Quarter FY 81) -----					4.410
1981					
FS	*	0.660	0.660	0.660	1.980
EQ	-0-	-0-	1.400	2.500	3.900
TR	-0-	-0-	-0-	-0-	-0-
Totals	<u>*</u>	<u>0.660</u>	<u>2.060</u>	<u>3.160</u>	<u>5.880</u>
1982					
ES	0.660	0.600	0.600	0.460	2.320
EQ	0.500	-0-	-0-	-0-	0.500
TR	-0-	-0-	0.025	0.100	0.125
Totals	<u>1.160</u>	<u>0.600</u>	<u>0.625</u>	<u>0.560</u>	<u>2.945</u>
1983					
ES	0.224	0.150	-0-	-0-	0.374
EQ	-0-	-0-	-0-	-0-	-0-
TR	0.075	-0-	-0-	-0-	0.075
Totals	<u>0.299</u>	<u>0.150</u>	<u>-0-</u>	<u>-0-</u>	<u>0.449</u>
GRAND TOTAL					<u>13.684</u>

\*Included in amount through 1st quarter FY 81

<sup>1/</sup> ES = Engineering Supervision of Construction  
EQ = AID-financed Equipment  
TR = O&M Training

C. Project Implementation

Project implementation is, of course, in full swing. Primary responsibility for implementation rests with NWSA, which the Project Committee judges to have adequate capabilities to complete. As discussed previously, the project has faced significant implementation problems in the past but the Project Committee believes that if NWSA can successfully complete negotiations on (a) final project costs, (b) further donor commitments, and (c) provision of engineering supervisory services required through completion of construction, implementation of the remainder of the project will be fully within manageable proportions for NWSA.

At the time of writing this Project Paper, negotiations on "a" above are sufficiently well along for NWSA to feel that it can submit the results to the two non-AID donors. Satisfactory completion of the negotiations for further donor commitments ("b" above) is contingent on the results of "a." NWSA also has entered into final negotiations on an amendment to HRS's contract per "c" above. As indicated earlier, the Project Committee judges the chances for satisfactory conclusion of the required negotiations to be very good.

#### D. Project Monitoring and Evaluation

##### 1. AID Monitoring

AID monitoring and implementation responsibilities will be carried out by the USAID/Yemen Capital Development Office. The chief monitoring activity of Mission staff will be frequent field trips to the project site to ensure that Mission is fully informed at all times of project progress in general and construction progress in particular and of the nature of any current problems. Mission monitoring will place emphasis on following the performance of the AID-financed supervisory engineers. The need to have sufficient expertise to perform the monitoring function on this project was a primary reason for the Mission's insistence that its engineering position be filled with a qualified sanitary engineer. In response to this request a highly qualified and experienced sanitary engineer joined the Mission in November 1980, thus ensuring that the Mission has the full ability and capacity to monitor the project effectively.

##### 2. Project Evaluation

Because of the project's basically capital intensive nature and the fact that it recently has received intense scrutiny in preparation for the donors conference, the Project Committee now believes that no interim project evaluation is required. A final evaluation of the project is planned for mid-1983, by which time all project facilities should have been in full operation for at least 9 months, if not a full year. This evaluation will include the following in its scope:

- a. Confirmation of completion of all physical facilities in accordance with plans and specifications.
- b. Assessment of how well project facilities are being operated and the maintenance function is being performed.
- c. Examination of the adequacy of the staffing pattern for the Taiz Branch and of whether the numbers of onboard personnel are adequate to operate and maintain the system satisfactorily.
- d. Investigation of the financial position of the Taiz Branch to determine whether sufficient financial resources are being made available to operate the project satisfactorily.

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e. Assessment of how well the ongoing connections to water and sewerage services are proceeding.

f. Survey of public and local governmental attitudes toward the new facilities, including an assessment of whether the rates being charged, including those for connections, are considered affordable by most of Taiz' citizens. (This will include an examination of any measures being taken to make connection charges affordable to lower income residents and of any provisions in the rates for cross subsidization.)

At this time, it is believed that the above evaluation should be coordinated with AID/W and should include the participation of three to five non-Mission personnel with various fields of expertise, with at least two to three personnel from outside the Agency.

#### E. Proposed Loan Terms and Negotiating Status

##### 1. Conditions Precedent

The following four conditions precedent to loan disbursements are proposed:

a. Standard requirements for the receipt of a statement from the YARG of the name(s) of the person(s) representing the Government and a specimen signature of all persons so designated and the receipt of a satisfactory legal opinion from the YARG authority to attest to the loan agreement's validity.

b. Contractual arrangements satisfactory to AID between NWSA and an engineering firm acceptable to AID to provide for supervisory engineering services through the end of project construction (i.e., July 1982) and sufficient onsite engineering personnel to complete all supervisory activities through the close-out phase lasting approximately 6 months after the completion of construction.

c. Evidence acceptable to AID that sufficient financial resources will be made available by other donors and/or the YARG to complete the project as envisioned.

d. A signed reloan agreement satisfactory to AID between the appropriate entity of the Y.A.R. Government and NWSA which passes on the proceeds of the AID loan to NWSA for agreed project purposes at terms no less favorable than the terms of the AID loan to the YARG.

##### 2. Special Covenants

No special covenants are being recommended.

##### 3. Previous Experience with Similar Conditions

YARG compliance with the conditions precedent in the original grant agreement has been adequate with the exception of conditions

precedent 4.2(d) and 4.2(g) having to do with proposed rates for services and a financial plan for NWSA, respectively. This situation is discussed in some detail in the Financial Analysis, Section III.C above. As indicated there, the overall question of NWSA's financial position and its ability to finance its operations, including the question of the level of service charges to be applied and the financing of any shortfalls, has so far not been addressed sufficiently. After assessing the current situation thoroughly, particularly in the light of the history of AID's efforts to date to attempt to strengthen NWSA's administrative capabilities and to focus more attention on NWSA's financial situation, the Project Committee concludes that at this time AID cannot further involve itself in this area in a fruitful manner. Accordingly, we recommend that AID rely on the attention being given this problem by other major donors to NWSA, particularly the IBRD, for its resolution. It can be noted that it is the Mission's opinion that the degree of YARG commitment to date to its program to provide water and sanitary services to its major urban areas is so strong that the chances are good that NWSA's operating requirements will be met (in the form of subsidies, if necessary) through the foreseeable future.

#### 4. Procurement

Except for certain limited Yemeni Rial costs for local support for the supervisory engineers and for training, the source and origin of all eligible goods and services shall be Code 941 (effectively the U.S.). Aside from the relatively small training component, all procedures for procurement are fully delineated at this time and no problems with procurement are foreseen.

#### 5. Negotiating Status

The involved entities of the YARG have been fully briefed on the proposed terms of the AID loan and have indicated understanding of, and concurrence with, them. Thus, the Mission anticipates no particular problems with loan agreement negotiation or signature.

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## BRIEF OVERVIEW OF THE WATER SECTOR IN YEMEN

### 1. GENERAL

Although the Yemen Arab Republic faces acute problems of water supply (and sanitation), like many other developing countries facing the same problems, it has no overall water sector plan and no centralized authority to set policy for or to administer its efforts in the sector. The YARG did take a first step toward the ultimate development of a national water authority with the establishment of the Department of Hydrology (DOH) in 1979. As its name implies, the DOH was established to develop within the YARG an organization capable of collecting, analyzing, storing, and disseminating data on the full gamut of Yemen's water resources. AID is supporting the development of the DOH with a \$3.1 million grant (Project No. 279-0043) which is providing services of a U.S. consulting firm to advise on organization and forward planning (and assist with training); local, U.S. and third-country training; limited support for local costs; some project commodities and some short-term technical assistance (planned from the USGS). (The Dutch Government has recently concluded an agreement with the YARG to provide additional assistance for development of the DOH.) The DOH is now under the Yemen Oil and Mineral Corporation, which has only a peripheral interest in its functions and the data it will produce. It is hoped that the DOH ultimately will serve to provide technical backstopping and advice on policy to whatever entities are developed for the YARG to establish and administer a national water policy.

As indicated, however, to date no further progress beyond the establishment of the DOH in the direction of developing national water policy apparatus has been apparent, and the situation now is one of almost entirely uncoordinated actions among the several parties involved in developing and exploiting the nation's water resources, including the Ministry of Agriculture, the Tihama Development Authority, NWSA, the Rural Water Division - see below, the Cooperatives for Local Development, and large numbers of private entities and individuals who have become involved in the recent past in the development of irrigated agriculture in Yemen.

The YARG has established a basic division of labor at the national level, however, in the area of municipal water supply. The National Water and Sewerage Authority (NWSA) was created in 1973 and assigned responsibility for water and sewerage services in the major urban centers (cities with populations of about 20,000 or more). At about the same time, the YARG created the Rural Water Division (RWD) of the Ministry of Civil Works with the major responsibility for water supply in places not under NWSA's purview. In addition to the efforts of the RWD, an unknown number of small water supply projects have been carried out by Cooperatives for Local Development on their own utilizing

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a combination of centrally supplied grants and locally raised monies. (Yemen is uncharacteristic of many developing countries in that remittances from workers abroad tend to be spread rather broadly around the country and, thus, many rural areas have access to significantly more resources than is usual in lower income countries.) The Tihama Development Authority has also been active to a limited degree in providing municipal water supplies to towns and villages in the Tihama, Yemen's lowland coastal belt.

## 2. RURAL WATER SUPPLY ACTIVITIES AND DONORS

The Rural Water Division (RWD) of the Ministry of Public Works was established in 1972 to provide safe and adequate water supplies to towns (urban areas below the approximate threshold of 20,000 people -- those above the threshold are the responsibility of NWSA) and rural villages and other areas.

Since its inception, the RWD has administered projects which have provided a large number of small water supply systems throughout Yemen. Because RWD's staff is relatively small, most of its projects have been accomplished through "turn key" assistance from donors. A large number of donors has been involved in these efforts over the years, including AID, the UNDP (in association with WHO), Holland, the Saudi Fund, the Abu Dhabi Fund, UNICEF, Japan, and Iraq. USAID assistance began with a \$5.6 million project (No. 279-0022) which began in 1973 and provided assistance with the establishment of 50 small water systems. This project was judged successful and a follow-on project, No. 279-0044, for \$7.0 million was signed with the YARG in 1980. Project 044 will provide assistance for up to 140 small water projects over its 5-year lifespan. Both AID projects have utilized assistance from the Peace Corps to provide trained manpower -- the second project will be implemented through a U.S. PVO, the TransCentury Foundation.

While the overall RWD effort has been fairly successful in providing water supplies to Yemen's rural areas, the organization has had and continues to have significant problems in administration and management. The RWD staff is small and spread thin and it has trouble providing adequate management for all of its activities. A continuing problem has been maintenance, after project completion, particularly for diesel engines and pumps.

## 3. NWSA

Created in 1973 as an autonomous agency, with its chairman reporting directly to the Council of Ministers, NWSA was incorporated into the

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newly created Ministry of Electricity, Water, and Sewerage in late 1980. Since its inception, NWSA has been active in implementing a large number of projects to provide water and sewerage services to Yemen's major cities, beginning with the Sanaa Water I Project initiated in 1974. By late 1980, firm plans had been laid for projects estimated to cost over \$500 million, to provide water and sewerage services to all of Yemen's major urban areas, and NWSA estimates that by the end of 1982 over \$400 million will have been expended for these projects, with the YARG having financed about 25 percent and outside donors the rest. NWSA has been generally successful to date in attracting outside donor financing for its projects. Table provides an overview of NWSA's projects to date and current planning for the future. (In addition to these projects for providing water and sewerage services to the country's major urban areas, there was tentative consideration for a while of NWSA's involvement in projects to provide such services to "secondary cities." To date, however, no concrete plans have been made for such an extension of NWSA's activities.)

Although fairly successful to date in its program and planning to construct water and sewerage systems in Yemen's major urban areas, NWSA also has been faced with difficult administrative and management problems as more and more of its facilities have come on line. To assist NWSA in improving its capabilities in these areas, in 1977 AID extended a grant to NWSA of \$5 million (Project No. 279-0028) to finance technical and managerial advisory services to NWSA and an extensive training program for NWSA's personnel. In 1979, NWSA contracted with a U.S. firm, Technical Management Services, Inc., (a subsidiary of Daniel, Mann, Johnson, and Mendenhall) of Los Angeles to supply the proposed advisory services and TMSI personnel have been on the job at NWSA since early 1980. In general, this part of the AID project is being successfully implemented. The training component of the project has been less successful to date, however, as of the end of 1980, only three trainees had been enrolled in courses at various levels. Like virtually all other public agencies in Yemen (and, of course, most of the developing world), NWSA has encountered extreme difficulty in attracting and retaining qualified personnel. Because of its tightly constrained personnel situation, NWSA has been reluctant to release personnel for training under the AID project. (The AID project will be evaluated during the third quarter of FY 81 and a major part of this evaluation will be a survey of, and recommendations on, NWSA's overall personnel situation.) In addition to AID's project to improve NWSA's administrative and managerial capability, IBRD also has programmed limited amounts of its project funds for training and other activities to strengthen NWSA management capabilities.

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NWSA WATER AND SEWERAGE PROJECTS  
(As of end 1980)

<u>City</u>	<u>Project</u>	<u>Purpose</u>	<u>Estimated Implemen- tation Period</u>	<u>Estimated Cost (\$ Millions)</u>	<u>Outside Donors</u>
Sanaa	Sanaa Water I	Provide water services to city center	1974-79 (actual)	27.0 (actual)	IBRD, Arab Fund
Sanaa	Sanaa Water II	Expand water service to outer areas of city	1978-81	51.2	IBRD, Arab Fund
Sanaa	Sanaa Sewerage I	Provide sewerage services (and treatment) for city center	1981-83	70.3	Saudi Fund, IBRD
Sanaa	Sanaa Sewerage II	Extend sewerage services to outer areas of city	Not yet determined	129.7	Not yet determined
Hodeida	Water and Sewerage	Provide water supply, sewerage and sewage treatment facilities to city	1979-82	74.7	IBRD, Arab Fund
Taiz	Water and Sewerage	Provide water supply, sewerage and sewage treatment facilities to city	1979-82	78.4	Saudi Fund, Abu Dhabi Fund, A.I.D.
Ibb and Dhamar	Water and Sewerage	Provide water supply, sewerage and sewage treatment facilities to city	1981-84	95.2	IBRD, Arab Fund, KiW (German) -- Ibb, Holland-Dhamar
				TOTAL	<u>526.6</u>
Zabid	Water and Sewerage	Provide water supply, sewerage and sewage treatment facilities to city	No definite plans or studies yet developed		
Taiz	Water and Sewerage II	Expand water and sewerage services to serve rapidly expanding population	No definite plans or studies yet developed		

Source: NWSA

TAIZ WATER AND SEWERAGE PROJECT  
CATALOG OF CONSTRUCTION AND PROCUREMENT CONTRACTS

## A. CONSTRUCTION CONTRACTS

Contractor: Hanab-Stevin Pipelines (Middle East) for all contracts

<u>Contract Number</u>	<u>Description</u>
(Contract B)	
B-0	Mobilization
B-21	Construction of Electric Generator Buildings
B-24	Pump Stations
B-25	Chlorination Stations
B-26	Electric Transmission Lines
B-27	Electric Installation
B-28	Mechanical Installation
(Contract C)	
C-0	Mobilization
C-1	Installation of Pipe, Fittings, and Valves for Transmission Main and Well Field Header Lines
C-2	Installation of Pipe, Fittings, and Valves for Potable Water Distribution System
C-3	Installation of Pipe, for Gravity Sewers, 250 mm through 800 mm Diameter, and Construction of Manholes
C-4	Installation of Pipe for Gravity Sewers, 150 mm through 200 mm Diameter, and Construction of Manholes
C-5	Installation of Sewer House Connections
C-6	Installation of Low-Head Sewage Line
C-7	Erecting Water Storage Tanks

**B-2**

(Contract C)

C-3	Deleted
C-9	Construction of Public Toilets
C-10	Construction of Well Pump Houses
C-11	Deleted
C-12	Construction of Sewage Treatment and Disposal Facilities
C-13	Subsurface Exploration and Testing

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## B. PROCUREMENT CONTRACTS

## B.1 Contract A

<u>Contract Number</u>	<u>Description</u>	<u>Contractor</u>
A-1	Pipe and Fittings for Transmission Main	Hanab-Stevin
A-1A	Pipe and Fittings for Well Field Header System	Hanab-Stevin
A-2	Pipe and Fittings for Potable Water Distribution System Valves for Water Supply System	Hanab-Stevin
A-3	Valves for Water Supply System	Saarberg-Interplan
A-4	Pipe for Gravity Sewers, 250 mm through 800 mm Diameters	Al-Mutahar
A-5	Pipe for Gravity Sewers, 100 mm through 200 mm Diameters	Hanab-Stevin
A-6	Miscellaneous Castings	Al-Metahar
A-7	Portland Cement	Sam Whan Corp.
A-8	Reinforcing Steel	Sam Whan Corp.
A-9	Deleted	Deleted
A-10	Electric Poles	Al-Mutahar Co.
A-11	Pipe for Low Pressure Sewer Line	Al-Mutahar Co.
A-12	Motor Vehicles	Mitsui & Co.
A-13	Miscellaneous Earthmoving Equipment	Not let
A-14	House Water Meters	Tihama Co.
A-15	Air Compressor and Portable Arc Welder	Al-Mutahar

KINGDOM OF SAUDI ARABIA  
MINISTRY OF WATER AND ELECTRICITY

## B. PROCUREMENT CONTRACTS (Continued)

## B.2 Contract B

Contractor: Hanab-Stevin for all contracts, with Twombly, Inc., of New Jersey as subcontractor for AID-Financed Equipment

<u>Contract Number</u>	<u>Description</u>
B-1	Distribution System Water Pumps
B-2	Chlorination and Associated Equipment
B-3	Water Meters
B-4	Hoisting Equipment
B-5	Misc. Tools and Equipment
B-6	Sluice Gates
B-7	Sewage Pond Liner
B-8	Electrical Equipment for Power Lines Including Substation Transformers
B-9	Hydraulic Sewer Cleaner
B-10	Submersible Pumping Equipment
B-11	Well Pumping Equipment
B-12	Power Generator Equipment
B-13	Switchgear and Motor Control Center for Al-Haima Power Plant
B-14	Transformers
B-15	Substation Structure, Oil Circuit Breakers and Air Break Disconnect Switches
B-16	Ventilation Equipment
B-17	Plug Valves
B-18	Pressure Reducing and Pack Pressure Valves
B-19	Communication System
B-20	Valves
B-21	Altitude Valves
B-23	Pressure Gauges

"COST TEAM" REPORT

This annex incorporates the following work by reference:

"Sanitary Consulting Services, Taiz Water Supply and Sewerage Project,"  
Stanley Consultants, Washington, D.C.; November 14, 1980.

(Work performed under an AID Indefinite Quantity Contract, AID/otc-c-1628,  
Work Order No. 7.)

(On file in NE/PD.)

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"AID TEAM" REPORT

This annex incorporates the following work by reference:

"AID Study Team Report for AID Project No. 279-0039 (ProAg 77-7), Taiz Water and Sewerage Construction Project," prepared by Theodore B. Carter, NE/GC; Frederick J. Guymont, USAID/Cairo and James G. Casanos, USAID/Amman.

(On file in NE/PD.)

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ANNEX D

AGENDA OF INITIAL MEETING  
OF  
DONORS CONFERENCE  
TO REVIEW THE  
TAIZ WATER AND SEWERAGE PROJECT

January 27, 1981

1630 Hours

1. Introductions of Representatives/Participants
2. Opening Statement by NWSA (Director General)
3. Briefing on Project Scope and Program (NWSA)
4. Presentation on Status of Project Technical Issues

Underestimation of Construction Quantities

Schedule B - Buildings

Schedule C - Water Mains

Sewers

Water Tanks

Well Houses

- . Secondary Water System Installation (C-2)
- . Expanded Distribution/Collection Systems
- . Handling/Storage of Contract A Materials
- . Electric Transmission Poles (A-10)
- . Additional Pipe/Fittings
- . Additional Materials (Contract A)
- . Redesign Features

Water Storage Reservoirs

Service to Zone VI

Sewage Treatment Facilities

CONFIDENTIAL PROJECT FILE  
ANNEX E.1

Recommended Redesign Items

Select Backfill and Bedding

Built-up Roofing

Blow-off Station

Electric Transmission Main (Sana'a Road to Al-Haima)

5. Discussion/Questions from Financing Agencies
6. Construction Supervision
  - . Staffing of Engineer
  - . Extension of Services
7. Summary of Project Costs
  - . Reductions
  - . Increases
8. Concluding Statements

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PARTICIPANTS  
IN THE  
DONORS CONFERENCE  
TO REVIEW THE  
TAIZ WATER AND SEWERAGE PROJECT  
January 27 through February 1, 1981

## SAUDI FUND FOR DEVELOPMENT

Dr. Ahmed Abanomi  
Mr. Omer Awad Allam

## ABU DHABI FUND FOR ARAB ECONOMIC DEVELOPMENT

Mr. Mohamed Abdul Latif Ahmed  
Dr. Rasoul Ahmed Istrabadi

## UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Mr. Robert Beckman, USAID Deputy Director  
Mr. Lee Young, USAID Project Officer  
Dr. Basharat Ali, USAID Loan Officer

## HAZEN AND SAWYER ENGINEERS

Mr. Richard Hazen, Chairman  
Mr. Frank Coughlin, Vice President and Project Director  
Mr. Robert Buchanan, Field Project Manager  
Mr. John Coleman, Cost Engineer  
Mr. Richard Fahey, Design Engineer

## HANAB-STEVEN PIPELINES (MIDDLE EAST)

Mr. Horace Sutton, Project Manager  
Mr. Theo Haagsma, Deputy Project Manager

## STANLEY CONSULTANTS

Mr. Richard Lord, Vice President

## GOVERNMENT OF YEMEN ARAB REPUBLIC\*

Mr. Akil Al-Iryani  
Mr. Abdul Fattah Al-Sheikh

## NATIONAL WATER AND SEWERAGE AUTHORITY

Mr. Mohamed Ali Al-Fusail, Director General  
Mr. Mohamed Abu Taleb, Deputy Director General  
Mr. Abdul Rahman Saeed Nadji, Technical Manager  
Mr. Muhsin Al-Haraibi, Project Engineer  
Mr. Tom Bailey, Advisor (TMSI)  
Mr. Bill Mabry, Advisor (TMSI)

\* Not able to attend.

EXHIBIT E.2

All of the above participants attended the meetings on January 27 and 28, 1981. The Saudi Fund representatives returned to Saudi Arabia on January 29. The USAID and Abu Dhabi Fund representatives left for Taiz, with the NWSA representatives, on January 30 to visit the project site, and they returned to Sanaa on February 1 for a final meeting with NWSA on the same evening. All of the above did not participate in every activity during the conference period. The representatives of Hazen and Sawyer, Hanab-Stevin, and Stanley Consultants were called in for presentation and for questions and answers from time to time.

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MATERIAL PREPARED

BY

HAZEN AND SAWYER

FOR

PRESENTATION TO  
DONORS CONFERENCE

TO

REVIEW THE TAIZ WATER AND SEWERAGE PROJECT

AT

SANNA JANUARY 27, 1981

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The Taiz Water Supply and Sewerage Project is designed to meet the needs of a municipal population estimated to increase from about 120,000 today to more than 130,000 in 1990. The rapid growth of Taiz in recent years is shown by the number of building permits issued each year in Exhibit 1. 200 in 1970, 500 in 1975, and almost 1600 in 1980. If we assume 10 persons per building the annual growth in population in recent years has reached 15,000.

This growth has raised the cost of the project in several ways: by the need for more water and sewerage facilities within the service areas; by the construction of cess pits in the streets to serve individual buildings; by the construction of storm and sanitary sewers by the municipality; installation of under ground telephone and electrical cables; and by extensive street paving. Not to be forgotten is the greatly increased traffic on city streets which seriously impedes construction.

The principal new water supply and sewerage facilities to be built and their location are shown on Exhibit 2. Water supply improvements, augmenting the Kennedy Water System completed in 1965, include a major ground water development of 21 wells around Al Haima, a 25 km. long transmission main to the city, reinforcement of the principal mains in the distribution systems, pumping stations, water storage reservoirs, house services and other appurtenances.

Sewerage improvements include the installation of lateral sewers, trunk sewers, house connections and an 8 km. outfall to the sewage treatment ponds. These ponds will provide anaerobic and aerobic treatment and are expected to yield and effluent suitable for irrigation of crops.

The construction contract with Hanab-Stevin Pipelines Ltd. (HSPL) was signed on April 16, 1979. It required that construction be completed in 39 months (or July 16, 1982). In May 1979, HSPL proposed to complete the work in 29 months. NWSA approved this schedule in 1980 but prescribed that "NWSA shall not be responsible for any delays caused by: land acquisition; delivery of materials and equipment; change orders; and re-design, due to the shortening of the program." Excluding the period of mobilization and access road construction, construction started in September 1979. On this basis 47 percent of the construction time (as defined by the contract) has elapsed. Considering the HSPL schedule, 67 percent of the time has elapsed. Certified thru December 1980 are about \$32,000,000 in interim payments to HSPL and other Contract A suppliers. This is 45 percent of Hazen and Sawyer's current estimates of construction and supply contracts.

The extent of the water service area was defined in the Hazen and Sawyer (H&S) September 1977 design report and approved by NWSA. The limits are shown in Exhibit 3. Not all areas within these limits were to be served by this project and some extensions have been authorized by NWSA. Those areas authorized since the design report are shown by red stripes. Construction work in green colored areas has been finished, and the contractor is currently working in the pink shaded areas.

ANNEX E.3  
ANNEX E.3

As shown in Exhibit 4, limits of sewer services are much smaller than water service limits principally in order to avoid pumping sewage from outlying areas. Omission of sewer service from such areas is a matter of economics. Providing sewers in areas with few widely separated houses, or pumping sewage from low lying areas into the gravity system is expensive, not only in cost of construction but also in operation and maintenance. Until development and population warrant these costs, continued use of cess pits is preferable. A water system may be provided in areas without sewers because the relatively low cost of small diameter water mains and adequate pressures in feeder mains overcome the differences in elevation.

Of the necessary sewerage work the contractor has completed the areas colored green, and is presently working in the pink shaded areas. The red striped areas are ones authorized by NWSA subsequent to the Hazen and Sawyer Design Report. The large yellow area in the center of the city already has lateral and trunk sewers that can be connected to the new outfall sewer with gravity flow. Construction of new sewers within this yellow area is expected to be negligible.

The estimated cost of the Taiz Water Supply and Sewerage project has increased drastically from the \$15,200,000 in the Montgomery feasibility report of 1975, to the present estimate of approximately \$100,000,000. Table 5, (Exhibit 5) adapted from the "Sanitary Consulting Services, Taiz Water and Sewerage Project: by Stanley Consultants, provides a history of estimates between 1975 and 1980. The figures shown are taken directly from the Stanley report except for a few items (\*), where known costs were added to make the Stanley totals consistent with other forecasts.

Project Cost Estimates detailed in Exhibit 5 range as follows:

September 1977	H&S Design Report	\$73,359,000
August 1977	USAID (Draft)	65,411,547
October 1978	H&S Construction Cost	92,995,730
April 1979	Contract Award	82,390,000
September 1980	H&S Revised Bill of Quantities	97,404,359
October 1980	Stanley's Interpretation of Hanab-Stevin Estimates	104,321,000
January 1981	HSPL Estimate Adjusted for Stanley Consultants Current Project Recommended Changes	104,467,557

Many reasons for the rising cost estimates may be cited:

1. Extension of water and sewer service to a greater population and to additional neighborhoods within the service area limits.
2. Unknown obstacles to the construction of sewers and water lines such as cess pits built below the streets.

E-8

3. Unexpected quantities of rock in trenches to be excavated and removed, and the subsequent need for extensive special bedding under water mains and sewers.
4. The decision to have Hana-Stevens Pipelines Limited (HSPL) install the secondary water system rather than have the Taiz branch of NWSA install the small piping and services with its own forces over the next few years.
5. Under estimation of quantities of rock excavation, special bedding materials, cement, and reinforcement steel.

Both H&S and HSPL have recalculated project costs for this meeting incorporating in the estimates many, but not all of the recommendations in the Stanley report. The costs are compared in Exhibit 6, and show H&S estimates of 99.8 million dollars, and HSPL estimates of 109.5 million dollars. The contractor's estimate for the supply and construction contracts includes 11.8 million dollars for potential claims with a construction period ending December 1982. This total is composed of 2.3 million for day works, 3.4 million for deeper trenches, 1.8 million for uneconomical working, 4 million for overhead losses and \$320,000 for miscellaneous claims. Priced claims to date total 1.3 million dollars of which about \$200,000 have been allowed.

The impact of these increases with respect to each of the four funding agencies is summarized below:

#### USAID Contribution

USAID has contributed \$10 million to the project, including \$2,922,733 towards the purchase of equipment and material. USAID is also financing engineering, well drilling, and training, estimated to cost \$10.2 million thru December 1982.

For the Contract B items financed by USAID, H&S has estimated a cost of \$4,069,584 and a shortfall of \$1,146,851. The major causes of this shortfall are \$520,000 for changes in the well field. Tender documents were prepared prior to test pumping the wells and major changes in design were necessary. HSPL has estimated the total cost at \$4,563,399 and the shortfall at \$1,640,666. Under both estimates the most significant differences, all of which must be negotiated, are electrical including pole line hardware (B-\*), generator (B-12) and switchgear (B-13).

#### Abu Dhabi Fund Contribution

Abu Dhabi has committed \$9,241,627 to the project. \$9,693,567 has been spent through 1980. The commitment is spread over 7 contracts related to water supply. For these items H&S estimates a total cost of \$13,436,116 and HSPL \$14,513,726. The shortfall under the H&S estimate will be \$4,194,489, and under the HSPL estimate \$5,272,099. The explanation for the H&S shortfall may be stated as follows:

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1. The award for primary water mains (C-2) in April 1979 was \$2,023,000 and the Abu Dhabi commitment was \$1,186,230, leaving a shortfall initially of \$837,000.
2. Approximately 8500 meters of water mains were added to C-2 to serve the Revolutionary Hospital area, the Sanaa Rd. extension, extension of the Wadi Seena service area, the Mokha Rd. extension, and to serve Zone VI tank. The cost for water mains is estimated at \$686,000.
3. Additional quantities of rock, especial bedding, concrete encasement at wadis and road paving amounting to \$1,400,000.
4. Escalation for work performed after April 16, 1980 amounting to \$607,000.
5. After award a decision was made to buy 10 percent more pipe and fittings than was shown in the tender B/Q. This cost \$356,000. When it became evident 2700 meters of 600 mm pipe would be surplus, it was decided to incorporate 2500 meters of it in the primary system in place of 500 and 400 mm pipe. This raised installation costs in C-2 by about \$100,000.

#### Saudi Fund Contribution

The Saudi Fund has committed \$20,833,798, of which \$9,438,250 has been spent for the 19 contracts covered, H&S has estimated a cost of \$29,754,095 and HSPL \$41,089,017. The shortfall under the H&S estimate will be \$8,920,297 and under the HSPL estimate \$20,255,219. The H&S shortfall is accounted for as follows:

1. A decision to have HSPL install the secondary water system (100 and 20 mm pipe) rather than the Taiz branch of NWSA. The tender documents did not include trenching quantities or paving for this system. The increased cost is \$2,984,000.
2. Escalation, as provided in the contract of \$2,855,000.
3. Uneven ground and the existing wide spread installation of water, sewer, electrical and telephone facilities required deeper trenches for water and sewer lines, more rock excavation, and special bedding material to protect pipes. These costs are estimated at \$2,765,000.
4. Additional 14,000 cubic meters of rock to be removed at the water storage tank sites. Originally Zone 2 tanks were west of the present site. Before the site was acquired, it was built on and the Zone 2 tanks were moved to their present location. In any event there would have been a cost overrun because the allowance for rock was too small. The cost for this rock excavation is \$1,120,000.
5. An under estimation of cement and reinforcing steel amounting to \$1,242,000.

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Yemen Government Contribution

The Yemen Government has committed \$21,752,604 towards completion of the construction phases of the project, of which \$11,788,181 has been spent through 1980. For these items H&S has estimated a total cost of \$24,602,209, and HSFL \$30,481,686. The H&S estimated shortfall of \$2,849,605 is accounted for as follows:

1. Escalation of \$1,914,000.
2. The Yemen Government portion of Contracts C-4 and C-5 (discussed under Saudi Fund Contribution) of \$1,488,000.

There are also cost reductions in certain contracts such as C-12 where a redesign saved \$1,475,000 (before escalation).

In addition, the Yemen Government has made commitments for land compensation, right-of-ways and remedial work which are not considered in this discussion.

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CURRENT PROJECT COST ESTIMATES

<u>Cost Item</u>	<u>Hazen and Sawyer Estimate</u>	<u>Hanab Stevin Estimate</u>
Water & Sewerage Construction Contracts	\$71,862,004 <sup>+331,973</sup>	\$ 86,703,601 <sup>2/</sup>
Currency Fluctuations	785,000	785,000
Contingency	<u>5,030,000 <sup>1/</sup></u>	<u>-0-</u>
Subtotal Contractor Associated Costs	\$77,677,004	\$ 87,488,601
Remedial Work	1,500,000	1,500,000
Well Drilling	360,000	360,000
Engineering	9,662,956	9,662,956
Training	200,000	200,000
Land and R.O.W.	304,000	304,000
Al Haima Compensation	<u>10,000,000</u>	<u>10,000,000</u>
Total Project Cost	\$99,789,960 <u>100,035,933</u>	\$109,515,557 <u>                    </u>

1/ A contingency allowance of 7% of Contracts A, B, and G.

2/ Includes \$331,973 for handling Contract A materials from nominated suppliers. This fee not shown in Donor Contribution Tables.

GAID CONTRIBUTION

C O N T R A C T	Funds Committed	Spent Thru 1980	Project Estimate		Shortfall	
			Hazen and Sawyer	Hanab-Stevin	Hazen and Sawyer	Hanab-Stevin
B-1 Distribution System Pumps	\$ 113,119	\$ -0-	\$ 149,084	\$ 153,000	\$ 35,965	\$ 39,881
B-2 Chlorination Equipment	69,852	-0-	26,510	35,000	(13,312)	(31,852)
B-3 Water Meters	21,467	-0-	26,229	28,000	4,762	6,533
B-4 Hoisting Equipment	107,973	-0-	124,180	132,000	16,207	24,027
B-5 Miscellaneous Tools & Equip.	30,934	4,000	36,055	38,000	5,121	7,666
B-6 Sluice Gates	19,771	-0-	19,400	32,000	(371)	12,229
B-7 Sewage Pond Liner	13,927	16,000	16,016	17,000	2,089	3,073
B-8 Pole Line Hardware	970,540	1,050,000	1,272,255	1,448,000	301,715	477,460
B-9 Hydraulic Sewer Cleaner	24,898	-0-	28,633	31,000	3,735	6,102
B-10 Submersible Pumping Equipment	11,438	-0-	13,154	14,000	1,716	2,562
B-11 Well Pumps	153,888	-0-	707,529	690,000	553,641	536,112
B-12 Generators	730,956	-0-	839,449	978,000	108,493	247,044
B-13 Switchgear and Motor Controls	65,338	-0-	35,423	96,000	(29,215)	30,662
B-14 Transformers	136,102	-0-	153,152	166,399	17,050	30,297
B-15 Electrical Substation Equipment	24,797	-0-	28,517	31,000	3,720	6,203
B-16 Ventilation Equipment	30,452	8,000	36,897	39,000	6,445	8,548
B-17 Plug Valves	70,101	-0-	80,616	86,000	10,515	15,899
B-18 Pressure Reducing Valves	47,116	51,000	71,377	73,000	24,261	25,884
B-19 Communication System	129,229	12,000	148,613	169,000	19,384	39,771
B-20 Valves	129,832	2,000	210,548	203,000	80,716	73,168
B-22 Altitude Valves	18,037	19,000	41,338	29,000	23,301	10,963
B-23 Pressure Gauges	2,966	-0-	4,609	9,000	1,643	6,034
<b>T O T A L</b>	<b>\$2,922,733</b>	<b>\$1,162,000</b>	<b>\$4,069,584</b>	<b>\$4,515,399</b>	<b>\$1,146,851</b>	<b>\$1,592,666</b>

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AMU DHARI FUND CONTRIBUTION

C O N T R A C T	Funds Committed	Spent Thru 1980	Project Estimate		Shortfall	
			Hazen and Sawyer	Hanal-Stevin	Hazen and Sawyer	Hanal-Stevin
A-1 Transmission Main Piping	\$3,222,274	\$3,387,269	\$ 3,556,633	\$ 3,565,943	\$ 334,359	\$ 343,669
A-1A Well Field Piping	537,750	708,298	743,713	748,114	205,963	210,364
A-2 Water Dist. System Piping	1,187,441	1,567,000	1,866,979	1,953,052	679,538	765,611
A-3 Valves	143,104	208,000	312,349	312,349	169,245	169,245
C-0 Mobilization	821,858	822,000	821,842	839,588	(16)	17,730
C-1 Well Field & Trans. Main	2,142,970	2,003,000	2,294,955	3,058,680	151,985	915,710
C-2 Water Distribution System	1,186,230	998,000	3,839,645	4,036,000	2,653,415	2,849,770
<b>T O T A L</b>	<b>\$9,241,627</b>	<b>\$9,693,567</b>	<b>\$13,436,116</b>	<b>\$14,513,726</b>	<b>\$4,194,489</b>	<b>\$5,272,099</b>

SAUDI FUND CONTRIBUTION

C O N T R A C T	Funds Committed	Spent Thru 1980	Project Estimate		Shortfall	
			Hazen and Sawyer	Hanabi-Stevins	Hazen and Sawyer	Hanabi-Stevins
A-2 Water Dist. System Piping	\$ 694,274	\$ 579,000	\$ 605,009	\$ 633,948	\$ (80,265)	\$ (51,325)
A-4 AC Sewer	440,209	387,000	446,730	446,730	6,521	5,521
A-5 PVC Sewer	317,688	510,250	529,751	686,401	212,003	366,713
A-6 Castings	158,213	142,000	158,213	158,213	-0-	-0-
A-7 Cement	676,022	455,000	1,559,284	1,559,284	883,262	883,262
A-8 Reinforcing Steel	292,013	306,000	651,272	651,272	359,259	359,252
A-11 Low Head Sewage Line Pipe	1,699,420	1,000,000	1,802,730	1,802,730	103,310	103,310
A-12 Motor Vehicles	207,376	192,000	207,376	207,376	-0-	-0-
A-14 Water Meters	201,747	192,000	201,747	201,747	-0-	-0-
A-15 Equipment	26,837	20,000	26,837	26,837	-0-	-0-
C-2 Water Dist. System	1,324,191	950,000	4,787,500	5,522,000	3,463,309	4,197,809
C-3 Large Gravity Sewers	1,658,227	716,000	1,070,630	1,563,900	(588,297)	(95,027)
C-4 Small Gravity Sewers	1,285,785	1,167,000	3,770,287	5,861,699	2,492,502	4,575,214
C-5 Sewer House Connections	1,151,238	313,000	2,154,826	3,524,951	1,913,508	2,373,713
C-6 Low Head Sewage Line	394,102	13,000	617,371	616,799	223,269	222,597
C-7 Storage Tanks	4,492,052	1,099,000	6,453,142	8,757,000	1,961,080	4,264,948
C-9 Public Toilets	1,858,512	44,000	1,440,027	1,830,840	(415,485)	(27,672)
C-12 Sewage Treatment	3,705,112	1,066,000	2,971,300	3,786,320	(71,812)	41,208
C-13 Subsurface Exploration	250,000	280,000	281,063	350,720	30,283	108,640
<b>T O T A L</b>	<b>\$20,833,798</b>	<b>\$9,430,250</b>	<b>\$29,754,095</b>	<b>\$38,196,767</b>	<b>\$8,920,297</b>	<b>\$17,362,909</b>

MINOR WORKS  
 ANNEX E.3  
 1980

YEARLY GOVERNMENT CONTRIBUTION

CONTRACT	Funds Committed	Spent Thru 1980	Project Estimate		Shortfall		
			Hazen and Sawyer	Hannab-Stevin	Hazen and Sawyer	Hannab-Stevin	
A-1	Transmission Main	\$ 145,535	\$ 152,987	\$ 160,636	\$ 161,057	\$ 15,101	\$ 15,522
A-1A	Well Field Piping	51,672	68,060	71,463	71,886	19,791	20,214
A-4	Asbestos Cement Sewer Piping	237,036	208,385	240,528	240,528	3,492	3,492
A-5	PVC Sewer Piping	171,062	274,749	285,249	369,599	114,187	198,537
A-6	Castings	85,192	77,000	85,192	85,192	0	0
A-10	Electrical Poles	184,628	0	388,700	388,700	204,072	204,072
A-11	Low Head Sewage Line Piping	424,855	375,000	450,682	450,682	25,827	25,827
B-0	Mobilization	2,015,988	2,016,000	2,015,988	2,015,988	0	0
B-14	Transformers	1,287,089	0	1,448,328	1,573,601	161,239	286,512
B-21	Generator Buildings	381,700	320,000	669,506	627,000	287,806	245,300
B-24	Pump Stations	1,312,660	478,000	1,675,274	1,754,000	362,644	445,340
B-25	Chlorination Station	157,146	192,000	311,806	331,000	154,660	173,854
B-26	Electrical Pole Line	2,578,457	0	2,291,740	2,928,000	(286,717)	349,543
B-27	Electrical Installation	1,085,143	0	1,202,495	1,612,000	117,352	524,657
B-28	Mechanical Installation	1,259,804	0	1,361,993	1,968,000	102,189	798,196
C-0	Mobilization	5,553,604	5,553,000	5,553,495	5,673,412	(109)	119,808
C-1	Well Field & Trans. Main	273,466	256,000	292,861	390,320	19,395	116,854
C-3	Large Sewers	893,269	385,000	576,494	842,100	(316,775)	(51,169)
C-4	Collector Sewers	692,346	628,000	2,034,463	3,156,301	1,342,117	2,463,955
C-5	Sewer House Connections	619,897	159,000	1,165,674	1,898,049	545,777	1,278,152
C-6	Low Head Sewage Line	98,256	3,000	154,343	154,201	56,087	55,945
C-9	Public Toilets	586,899	14,000	454,746	578,160	(132,153)	(8,739)
C-10	Well Pump Houses	407,892	193,000	683,491	528,000	275,599	120,108
C-12	Sewage Treatment	1,170,035	336,000	938,305	1,195,680	(231,730)	25,645
C-13	Subsurface Exploration	78,973	89,000	88,757	113,280	9,784	34,307
<b>T O T A L</b>		<b>\$21,752,604</b>	<b>\$11,788,181</b>	<b>\$24,602,209</b>	<b>\$29,110,736</b>	<b>\$2,849,605</b>	<b>\$7,358,132</b>

USAID MINUTES  
OF  
DONORS CONFERENCE  
TO REVIEW THE  
TAIZ WATER AND SEWERAGE PROJECT  
January 27 through February 1, 1981

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The following paragraphs record the proceedings of the conference in chronological order.

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MEETING OF JANUARY 27

1. Mr. Al-Fusail opened the Conference by welcoming the participants and emphasizing the importance of the project to the citizens of Taiz.
2. Mr. Al-Huraibi presented an overview of the project; including its history, purpose and current status.
3. Mr. Coughlin briefed the donors of cost overruns, and differences in Hazen and Sawyer and Hanab-Stevin estimates of costs to finish the project. Hazen and Sawyer's current estimate of project cost is \$77.6 million, which is approximately \$13.0 million more than the April 1979 contract award. Hanab-Stevin's current estimate, however, is nearly \$10.0 million more than Hazen and Sawyer's estimate. Thus Hazen and Sawyer estimates a shortfall of \$1.14 million in the USAID contribution toward equipment procurement, \$8.92 million to Saudi Fund contribution, \$4.19 million in Abu Dhabi fund contribution, and \$2.84 million in Yemen Government contribution. However, Hanab-Stevin estimates these shortfalls to be \$1.59, \$5.27, \$17.36, and \$7.35 million, respectively, for each of the funding agencies.
4. Mr. Coughlin attributed the cost overruns principally to underestimation of quantities by Hazen and Sawyer (particularly in the area of rock excavation), population growth, and some additions to project work within the "project boundary." He further stated that 47 percent of the job has been completed by the contractor. The contractor's original completion period was 39 months with expected completion date of July 16, 1982. The contractor later submitted a 29-month construction program to which NWSA responded by outlining conditions under which this accelerated program of construction would be acceptable.
5. Mr. Al-Fusail elaborated that NWSA decided to add water lines within the project area as a result of pressure from the public and the Governor of Taiz. NWSA, however, successfully resisted public demand for adding water lines in areas outside of project boundaries. Within the project boundaries, NWSA officials agreed to add water lines in areas where citizens have moved in; particularly in areas along the main roads.
6. In response to a question from the Adu Dhabi Fund (ADF), Mr. Coughlin agreed that the problem of underestimation of quantities was partially associated with Hazen and Sawyer's reliance on the usage of someone else's data (Montgomery Report of September 1975) in the design of the project. The consultant, however, conducted further studies during the design.
7. In response to another ADF question, Mr. Coughlin stated that NWSA should negotiate reasonable unit prices with the contractor whenever the quantities exceed 115 percent. In case the contractor refuses to negotiate, the owner (through its consultant) can issue a unilateral change order at a set price. The contractor either accepts the unit price quoted or takes the disputed item to arbitration.

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8. The participants discussed air testing and water testing as pipeline testing procedures. They felt that both were acceptable procedures. In the city, they expressed interest in air testing prior to backfilling and water testing later. In the case of the main line, they preferred that the contractor conduct the water test first prior to backfilling.
9. The USAID representative, Mr. Beckman, raised the issue of continuing absence of HSPL expatriate supervisory staff from construction sites. The consultant responded that this has happened several times. The consultant has brought this situation to the contractor's and NWSA's attention. HSPL, however, has continued to deny that this situation ever occurred and continued to do so even after the consultant took the resident engineer of NWSA to various sites to witness the absence of HSPL supervisory staff (for further discussion on the subject, see para 15 below).
10. Mr. Al-Huraibi, after the departure of the consultant from the meeting, discussed the adequacy of staffing of the consultant construction supervision team in the field. In early stages, the team was weak both in numbers and quality. The situation has since improved slightly. The consultant's field staff lacks authority and consequently refers even very basic questions to its home office in New York. Mr. Young, of USAID, emphasized the need for the addition of professional engineering capability to the field staff. Mr. AL-Fusail suggested that the consultant should ask the contractor to submit a monthly construction program and approve what he can effectively supervise. There was general consensus among the participants for the need to make these improvements.
11. The meeting was adjourned and the participants agreed to meet on the following day, January 28, 1981, with contractors' representatives in attendance.

MEETING OF JANUARY 28

1. Mr. Al-Huraibi opened the meeting by asking Mr. Sutton to justify the contractor's project cost estimates. Mr. Sutton responded that out of the \$10.0 million difference in the two estimates, only \$3.1 million is in the construction cost and the balance is reflected in higher and lower rates of contingency used by the contractor and the consultant. Of the \$3.1 million difference in construction cost, \$1.6 million is in contract Item C-7 (more rock excavation, crane usage and less reduction in concrete quantities than estimated by the consultant), and the balance is spreadover 49 items. The consultant and the contractor basically agreed with each other on factors contributing to two significantly different project cost estimates. The contractor attributed the \$6.8 million contingency difference to (a) the extra anticipated cost of rock excavation (\$2.5 million), (b) the claims for overhead losses because of delay in moving the work as fast as the contractor expected (\$2.0 million), and (c) anticipated extra day work (\$2.3 million). It appears

that the estimate for overhead loss is based on HSPL assumption that it is working on agreed 29-month schedule which NWSA contends it has not accepted.

2. At the request of NWSA, Mr. Coughlin made brief comments on various items listed under item No. 4 of the 27 January agenda as follows (as recorded by TMSI - see Annex ).
  - a. Secondary water system: The original tender documents did not include trenching, backfilling, select backfill material, and pavement restoration. These items caused the major cost increases.
  - b. Expanded distribution system: The requests from local officials and higher government authorities put NWSA in a position of having to extend services.
  - c. Handling of Contract A materials: The contractor was not originally expected to handle Contract A materials not purchased by him. Now, he will not handle the materials without payment.
  - d. Additional pipe/fittings: The increases are due to the changed conditions in the city with more building and more construction interference.
  - e. Electric transmission poles (A-10): The successful bidder (Al-Mutahar) has never been able to provide the required 14 metre concrete poles. Therefore, much effort and time was lost to find a solution. The solution at this time seems to be fabricated steel poles.
  - f. Additional Contract A materials: Primary cause for the increase was a purchase order for 10 percent more materials requested by NWSA. Also, some fittings were not included in the original tenders.
  - g. Water storage reservoirs: Zones II and III tanks were affected by a house on the site (Zone II) and by large quantities of rock (Zone III) that was shifted because of the house. At Zone III there are three alternatives to the large cost of rock excavation: (1) pay contractor's price, (2) negotiate and set a fair price with contractor, and (3) re-tender the rock excavation.
  - h. Service to Zone VI: Mr. Coughlin explained why the hydropneumatic system was used to replace the original tank concept.
  - i. Sewage treatment facilities: Extensive soils testing showed that a redesign of the ponds was in order. The redesign will effect a cost savings from the original tenders.
  - j. Select backfill and begging: The consultant is evaluating all areas where savings can be realized by changing contract specifications while insuring complete protection for the pipelines.

CONFIDENTIAL

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- k. Built-up roofing: The contractor is evaluating the changes and preparing cost estimates for the new approach as recommended in the Stanley report.
  - l. Blow off station: No changes from the original design.
  - m. Electric transmission main (Sanaa road to Al-Haima): Construction of this line will be postponed until YGEC is capable of providing service.
  - n. Mr. Coughlin summarized briefly the consultant's position on the status of the other redesign features included in Stantly Consultants' report as recommendations on cost savings.
3. The discussion then reverted back to the issue of cost overruns. The ADF representative asked Mr. Coughlin to explain the cost overruns of \$17.00 million over tender amount. Mr. Coughlin responded that \$6.0 million overrun is in price escalation provided for in the contract, \$4.00 million is due to NWSA's decision to have the contractor install the secondary water system (instead of NWSA Taiz branch as originally planned), a little over \$1.0 million is the result of change orders and the balance (\$6 million) is in the underestimation of quantities (particularly rock excavation) by the consultant. On rock excavation, Mr. Coughlin recommended that NWSA will realize substantial saving if additional rock excavation is rebid. The contractor's unit price is \$214 while the consultant considers a unit price of approximately \$80 as very reasonable. On underestimation of quantities: Mr. Coughlin stated that NWSA had accepted the Montgomery report which served as the basis of the consultant's estimates, and that NWSA was unwilling to fund another feasibility study. Consequently, the consultant did not have the proper quantities at the time of tendering. Mr. Coughlin then agreed with NWSA that had it known the quantities, NWSA would have been able to negotiate the unit price substantially downward.
4. The participants then focused on the staffing of Hazen and Sawyer. The ADF representative asked Mr. Coughlin to describe the staffing of the consultant as it relates to the construction sites and number of work crews involved. Mr. Coughlin responded that there are 13 expatriates on the Hazen and Sawyer team (four of them are professional engineers) and that he plans to add three more (waiting NWSA approval) in addition to nine Yemenis involved in supervising construction. The contractor has 51 expatriates on its staff and approximately 21 crews are involved in construction. Fourteen of the 21 crews are pipeline gangs and the civil work is being done by the Indian work force. The ADF representative felt that the consultant's staff was widely distributed to which Mr. Coughlin countered that it is not necessary to have an inspector on every construction site. Mr. Coughlin then commented on the contractor's supervisory staff by stating that HSPL has six expatriates and at time 2 to 3) supervising the work on pipelines. This has been evidenced by NWSA representative but the contractor insists that the consultant is wrong. When asked about the possibility of directing the contractor to reduce the number of crews working on the pipeline, Mr. Coughlin stated the answer is for NWSA to put pressure on HSPL

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to increase supervision and deny payment to the contractor on work at a site from which HSPL supervision is absent. The ADF representative recommended that the consultant should deny payment for work done without supervision by the contractor to which other donors, NWSA, and the consultant agreed.

5. On HSPL's proposed change in the construction period from 39 (period in tender documents) to 29 months, Mr. Coughlin stated that NWSA wrote a letter to the contractor outlining conditions to which he has not responded and, therefore, the consultant presumes the acceptance of NWSA's conditions by HSPL.
6. On testing of the pipelines, Mr. Coughlin reiterated that HSPL plans air testing first and water testing later. A NWSA representative asked the consultant to water test the pipelines before backfilling. Should excavation be needed again (if the lines are tested and leaks are found after backfilling), NWSA will be severely criticized by the public, the NWSA representative added. Mr. Coughlin pointed out the advantage of running a water test after the settlement of the backfill in mostly rocky Taiz.
7. Upon departure of the consultant from the conference room, the donors listened to Mr. Lord (Stanley Consultants) who covered the elements of the Stanley report pertaining to Hazen and Sawyer. He recommended a correct mix of people on the staff of Hazen and Sawyer, delegation of authority from the home office to the field, increase in the field staff, and a set of appropriate procedures to improve the performance of NWSA's consultant.
8. The donors then focused on the question of retention of the consultant and the extension of his contract which runs out the end of February 1981. After a brief discussion, the donors and NWSA officials concluded that Hazen and Sawyer should be retained and their contract be extended. The participants strongly felt that the consultant should restructure its field staff, appoint a knowledgeable (particularly of the design) and aggressive negotiator as its manager, and delegate more authority to personnel in the field.
9. NWSA then asked the funding agencies to give an indication of the additional financial support they could provide. The ADF representative stated that their delegation will make their recommendations to the Fund, and that the decision will be made by the ADF head office. The Saudi Fund representative asked NWSA to negotiate with the contractor, define the final cost, and notify the Fund. The Fund would then consult with NWSA and make a decision. The USAID representative, on behalf of the U.S. Government, expressed tentative willingness to contribute up to \$5.0 million for the extension of consultant's services and for the cost of commodities, details of which will be worked out with NWSA. He further stated that this project is important for the people of Yemen, and expressed his hope that, after their review, the Abu Dhabi and the Saudi Fund would support the project. He also stated that he was very pleased with the donors' decision to continue with Hazen and Sawyer and expressed his confidence that Hazen and Sawyer will do a good job to protect its reputation. He asked NWSA to bargain hard with the consultant and negotiate a good contract.

10. Mr. Al-Fusail, Director General of NWSA, made the concluding remarks of the January 29 meeting. He stated that potable water was number one priority of his country, and as everyone knows, Yemen is a very poor country. A lot of money has already been spent on the project. He urged the delegates to help NWSA and the people of Yemen by recommending to their governments to finance the overruns. Without additional support, the project will not progress, he concluded.

SITE VISIT - JANUARY 29 THROUGH 31

The ADF and USAID representatives made site visit to Taiz following full sessions of conference of January 27 - 28. The SF representative, who left on January, empowered the ADF to investigate for them and report back its findings to the SF.

MEETING OF FEBRUARY 1

1. The USAID and ADF representatives stated that HSPL seems well organized. The contractor had complained that NWSA has not paid \$8.0 million due to him and does not know what is holding up the payment. NWSA is generally tardy in making payments. The consultant's field staff lacks authority and there is no one on the project site to represent NWSA. The contractor further stated to the visitors that he was 2 months behind schedule because of delays in drawing changes, increase in quantities, and time-consuming process of seeking approval on variation orders. The contractor claimed NWSA's consultant does not have the authority to approve a variation order.
2. The NWSA representatives responded that the consultant's authority to approve variation orders was withdrawn because (a) change orders required additional money, (b) various change orders were approved by the consultant without the knowledge of NWSA, and (c) at times the consultant recommended the approval of variation orders without having the contractor's price. The consultant, however, has the authority to approve change orders which involve no extra cost.
3. The ADF representative identified lack of communication among the owner, the consultant, and the contractor, and the lack of delegation of authority by the principals, including NWSA, to their respective staff, as major problems confronting the project. He also emphasized the necessity of building the consultant's confidence. He cautioned NWSA not to publicly criticize its consultant. The contractor is trying to create a wedge between the owner and the consultant. The evaluation of Hazen and Sawyer's work by Stanley Consultants was a serious mistake insofar as it hurts the confidence of Hazen and Sawyer, the ADF representative observed. One NWSA representative agreed with the ADF representative on the need for NWSA's representative to be on the project site and that lack of communication exists among three parties while another one disagreed that NWSA had not delegated enough authority to its staff.

4. Mr. Al-Fusail stated that NWSA will negotiate with the consultant in good faith, give more authority, cooperate with the consultant, refrain from any public criticism and work toward building the confidence of the consultant. In reply to the ADF representative's comments concerning the hiring of Stanley, USAID representative Beckman noted that whereas Stanley's involvement might have hurt the consultant's confidence, the action was necessary to give NWSA and USAID the necessary basis for judgments concerning the progress of work and analysis of the problems, and appropriate future course of action as background to the Donors Conference.
  
5. The ADF representative then shared with the participants Hazen and Sawyer's expressed willingness to make personnel changes as desired. He further urged NWSA to negotiate a contract extension with a ceiling and at a reduced rate of fixed fees to which all participants agreed. With this, the Donors Conference concluded its final meeting.

ANNEX E.4  
AWARD NUMBER 15747

TMSI\* MINUTES

OF

DONORS CONFERENCE

TO REVIEW THE

TAIZ WATER AND SEWERAGE PROJECT

January 27 through February 1, 1981

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\* Technical Management Services, Inc., AID-financed advisor to NWSA on technical and administrative development.

1. D.G. opened meeting with brief statement of importance of project to citizens of Taiz.
2. Mr. Muhsin Al-Huraibi presented project overview and brief statement of meeting purpose, status, and objectives.
3. Mr. Frank Coughlin, H&S, Project Director presented discussion on project (copy attached).
4. Questions:
  - a. Was HSPL 29-month program of construction approved?  
Answer: It was approved with conditions but was not to change the basic tender document proposed program.
  - b. When was data collection period begun?  
Answer: It started in 1975 with Montgomery Report and further studies were done by H&S in 1976 and 1977.
  - c. According to the contract conditions can the owner impose on the Contractor the Engineer's estimated prices?  
Answer: The changes to the contract documents beyond the 115 percent must be negotiated to arrive at a fair and equitable price. If the Contractor is not willing to negotiate a reasonable price for such work then the owner (Engineer) can issue a unilateral change order with a set price and the Contractor must perform the work. The Contractor can then go to arbitration if he does not agree with the price.
  - d. Why were more lines added to the project service area beyond those shown in the tender documents? Why were these not included in the tenders?  
Answer: The pressure for additional lines came from the local citizens and the Governor, and higher Governmental authorities. Demands were also made for service outside the project boundaries. This was resisted successfully by NWSA. It was stated that the Engineer would present his explanation on the second question during the meeting on Wednesday, 28 January.
  - e. The issue of pipeline testing procedures was raised and different opinions were expressed. The use of air testing and water testing are both common procedures accepted on such construction projects. This will be further discussed with the Engineer.
  - f. The question of the deficiencies in expatriate supervision by the Contractor was discussed. The Engineer has directed corrections to the Contractor and has requested owner assistance in resolving the problem.

5. Meeting's adjourned session was set for Wed. 28 Jan 81 at 3 PM with funding agencies, NWSA, H&S, HSPL. Donors will be observers at this meeting.

At the end of the meeting H&S will be asked to report on the redesign features listed in the agenda.

Trip to Taiz will be Friday and Saturday.

6. The proposed program (attached) recommended by NWSA for the visiting delegations was presented and discussed. Changes were to be made due to travel schedules.

Reconvened Session of Meeting 28 Jan. 81  
at 1500 at Sana'a YAR

Attendees: same representatives present as in meeting on 27 January with the addition of representatives of Hanab-Stevin: Mr. W. Sutton and Mr. Theo Haagsma.

1. Mr. Al-Fusail, Director General and Mr. Muhsin Al-Huraibi, Taiz Resident Engineer welcomed everyone and thanked the representatives for attending. The meeting agenda was set as follows:
  - a. Presentation by Hanab-Stevin, Mr. Sutton
  - b. Discussion with Hazen and Sawyer, Engineer
  - c. Discussion with financing agencies
2. Mr. Sutton explained how Hanab-Stevin developed their estimates of project costs. The total cost includes the potential for all types of claims that the Contractor might submit. The estimated cost for the construction contracts (approximately \$73.2 million) is considered a very realistic figure. The estimate for claims (contingencies) is less firm and includes more flexibility relative to projection.
  - a. Question was asked regarding the meaning of the cost difference of \$3.1 million between H&S and HSPL.  
Answer: \$1.6 million is in C-7 and the other \$1.5 million is spread over 49 items.
  - b. Question was asked why the \$1.6 million difference exists in tank construction.  
Answer: 1. Rock excavation, 2. crane rental, and 3. less reduction in concrete quantities than estimated by Engineer.

*[Faint, illegible stamp or signature]*

c. Hazen and Sawyer's response to the difference of \$3.1 million was:

1. Handling in Contract A materials	\$ +300,000
2. Cost of rock excavation	-1,500,000
3. Remainder of Contract C	- 200,000
4. USAID Financed B	+ 200,000
5. Remainder of B	+1,000,000
6. PVC fittings	+ 300,000

3. Discussion with Hazen and Sawyer, Mr. Frank Coughlin, referred back to the agenda of 27 January 81. Mr. Coughlin further explained specific items questioned:

- a. Secondary water system - the original tender documents did not include trenching, backfilling, select backfill material and pavement restoration. These items caused the principal cost increase.
- b. Expanded distribution system - The requests from local officials and higher executives in government put NWSA in a position where services were to be provided.
- c. Handling of Contract A materials - The Contractor was not originally expected to handle Contract A materials not purchased by him. He would not handle the materials without payment.
- d. Electric transmission poles (A-10) - The successful bidder (Al-Mutahar) has never been able to provide the required 14 meter concrete poles. Therefore, much effort and time was lost to find a solution. The solution at this time seems to be fabricated steel poles.
- e. Additional pipe/fittings - The increases are due principally to the changed conditions in the city with more building and more construction interference.
- f. Additional Contract A materials - Primary cause for increase was purchase order for 10 percent more materials requested by NWSA. Also, some fittings were not included in the original tenders.
- g. Water storage reservoirs - Zone II and III tanks were affected by a house on the site (Zone II) and by large quantities of rock (Zone III) that was shifted due to the house. At Zone III there are three alternatives to the large cost of rock excavation: (1) pay contractors price, (2) negotiate and set a fair price with contractor, and (3) retender the rock excavation.
- h. Service to Zone VI - Mr. Coughlin explained why the hydropneumatic system was used to replace the original tank concept.

- i. Sewage treatment facilities - Extensive soils testing showed that a redesign of the ponds was in order. The redesign will allow a savings in cost from the original tenders.
  - j. Select backfill and bedding - The engineer is evaluating all areas where savings can be realized by changing contract specifications while ensuring complete protection for the pipelines.
  - k. Built-up roofing - The contractor is evaluating the changes and preparing cost estimates for the new approach as recommended in the Stanley report.
  - l. Blow-off station - No changes from the original design.
  - m. Electric transmission main (Sana'a Road to Al-Haima) - this line will be postponed until YGEC is capable of providing service.
  - n. Mr. Coughlin summarized briefly the engineers position and the status of the other redesign features included in Stanley Consultants report as recommendations on cost savings.
4. The following questions were asked by the Funding agency representatives:
- a. Mr. Coughlin was asked to explain the \$17 million difference in the tender price and the present cost estimates.  
Answer: About \$6 million of the price is due to escalation; \$4 million of the price is due to the decision to have the contractor complete the secondary water system (C-2); \$1 million results from change orders and the remainder is due to the increased quantities resulting from low estimates in the tender documents.  
Note: The Funding Agencies were each handed a copy of the engineers September 1980 revised Bill of Quantities. These quantities are presently being used in making project cost projections as presented in this meeting.
  - b. Question was asked as to the engineer's present staffing.  
Answer: Presently there are 13 expatriate employees in Taiz and 3 more have been requested for NWSA approval. There are 4 registered professional engineers on the staff including Mr. Coleman.
  - c. Question on the ratio of staffing by the engineer and the contractor?  
Answer: The contractor has about 50 expatriate staff in Taiz and has 12 to 14 pipeline gangs and about 8 to 10 other gangs working on the project.
  - d. What is the status of the contractors construction program relative to the contract program of 36 months?  
Answer: The contractor submitted a proposal for a 26-month schedule of construction. NWSA responded to that proposal with a letter setting out certain conditions for early completion. The contractor has not responded to NWSA's letter, so presumably he has accepted the conditions.

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e. The engineer was asked to comment on the contractor's supervision.  
Answer: HSPL has 6 people to potentially supervise the work. The contractor has not responded to the engineer's directives to correct the situation. Consultant will inform contractor that work performed without supervision will not be paid because it will not be inspected for approval.

5. Construction Supervision by Hazen and Sawyer.

- a. Mr. Al-Huraibi explained the present contract situation with respect to the engineer's services.
- b. Mr. Richard Lord from Stanley Consultants presented a summary of Stanley's report elements related to the type and number of staff members on H&S's field staff. Also, he briefly stated the issues presented in the report on the function and techniques that should be used by the engineer.
- c. The Financing agencies representatives and NWSA concluded that a contract for the duration of the project should signed with Hazen and Sawyer. However, certain specific condition and improvements on staffing level and type must considered; these conditions will be finalized on basis of Dr. Rasoul (ADFAED) findings after his visit to Taiz.

6. Concluding statements.

- a. The representatives from the Abu Dhabi Fund expressed their interest to support NWSA and stated that any recommendations would have to be considered by their management before decisions could be made relative to additional funding.
- b. The Saudi Fund representative expressed his position that NWSA should continue to negotiate with the contractor to define the final costs and then notify the Saudi Fund on the results. At that time the Fund would be in contact with NWSA.
- c. The USAID representative expressed in behalf of the United States Government their willingness to contribute up to \$5 million more for additional engineering services, as well as increase the AID contribution toward the construction shortfall.
- d. Mr. Al-Fusail closed the meeting by stating the importance of this project to Yemen and to the citizens of Taiz. He asked for early consideration by the funding agencies to assist in eliminating the shortfall for all construction contracts including the Yemen Government portion.

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# HAZEN AND SAWYER

ANNEX F

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March 8, 1981

Mr. M. A. Al-Fusail  
Director General  
National Water and Sewerage Authority  
Sanaa, Yemen Arab Republic

## Taiz Water and Sewerage Construction

Dear Mr. Al-Fusail:

When representatives of the Donor Agencies met in Sanaa, beginning January 27, 1981, Hazen and Sawyer and Hanab-Stevin Pipelines (M.F.) Ltd. presented cost information that indicated comparable estimates of contractor related costs and differed in allowances for contingencies/contractor claims. For example in January 1981 the estimates were:

	<u>H&amp;S</u>	<u>HSPL</u>
Contractor related costs on Contracts A, B & C including disputed items whose prices were still subject to negotiation.	\$71,862,004	\$ 74,883,601
Contingency allowance by H&S and potential claims by HSPL.	5,030,000	11,820,000
Other costs*	<u>22,811,956</u>	<u>22,811,956</u>
Total Project Costs	<u>\$99,703,960</u>	<u>\$109,515,557</u>

In the above table, the term disputed items is used to indicate situations where H&S and HSPL disagree on the value of a deduction or an addition to the contract but expect to negotiate the differences. The term potential claim is used to indicate a request for payment by HSPL that H&S thinks has no validity.

\* Currency Fluctuation, Remedial Work, Well Drilling, Engineering, Training, Land and Right-Of-Way, and Al Haima Compensation.

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Subsequent to the Donor's meeting, NWSA instructed Hazen and Sawyer to review Contracts A, B & C in detail with HSPL and to do the following:

1. Bring up-to-date the quantities in the Bill of Quantities last revised in September 1988 and obtain agreement with HSPL on these quantities.
2. Negotiate with HSPL on disputed prices and identify where negotiations might still be successful (Disputed Items) and where HSPL might file a claim (Potential Claims).
3. Develop a new project cost estimate as a result of 1. and 2.

Representatives of H&S and HSPL have met frequently since and their efforts have resulted in the following:

1. A revised Bill of Quantities which is presented as a bound 184 page book with a Royal Volker Stevin cover sheet. H&S and HSPL agree on the quantities in all three contracts.
2. Agreement on the prices in Contract A - International Bulk Supply.
3. Agreement on 23 of the 28 contracts in Contract B - Mechanical/Electrical Installation and Related Civil Works. Agreement was reached on all USAID financed contracts.
4. Agreement on a substantial number of unit prices necessary for evaluation of contracts in Contract C - Pipeline and General Construction. (See Appendix A)
5. Preparation of a cost estimate by H&S with notations by HSPL where HSPL disagrees with prices or believes there is a potential claim. This estimate is the product of a rigorous analysis of all contract conditions.
6. Identification of seven disputed items in Contract B that can be negotiated further. (See Appendix B). The total value of the differences between the H&S and HSPL estimates is \$1,220,741.

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7. Identification of seven disputed items in Contract C that can be negotiated further. (See Appendix C). The total value of the differences between the H&S and HSPL estimates is \$2,125,202.
8. Presentation by HSPL of five potential claims (totaling \$14,216,265). In addition H&S has reclassified five disputed items as claims (value \$3,282,230). (See Appendix D).

Using the revised Bill of Quantities (March 1981 issue) the project estimates compare as follows:

	<u>H&amp;S</u>	<u>HSPL</u>
Contractor related costs on Contracts A, B & C including items whose prices are still subject to negotiation.	\$72,202,342*	\$ 76,455,285*
Contingency allowance by H&S and potential claims by HSPL.	6,000,000	17,498,495
Other project costs**	<u>22,735,360</u>	<u>22,735,360</u>
Total Project Cost	<u>\$100,937,702</u> -----	<u>\$116,689,140</u> -----

Details on the Project Cost estimates are presented in Table 1. The allowance for contingencies in the H&S estimate has been increased from \$5,030,000 in the January 1981 Donors' Report to \$6,000,000. This allowance is judged to be adequate to cover negotiated settlements of presently disputed items and unforeseen construction problems that may arise in the future. The contingency is not intended to cover the claims listed in Appendix D because we feel that they are without merit. Some interest charges may be incurred in the future and, potentially, there may be legitimate dayworks items. These charges can be covered by the contingency allowance.

\* Includes funds for House Service Connections. H&S estimates the cost for 3,000 connections at \$1,000,000 if the Taiz Branch of NWSA installs them and HSPL estimates \$1,907,000 if HSPL does the installation.

\*\*Currency Fluctuation, Interest through January 1981, Remedial Work, Well Drilling, Engineering, Training, Land and Right-of-Way, and Al Haima Compensation.

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The costs for the individual supply and construction contracts were distributed among the Donors using the same criteria as in the January 1981 Donors' meeting (Appendix E-1). In addition, costs such as Currency Fluctuation, Interest due thru January 1981, HSPL Claims and Contingency Allowance by H&S were distributed among the donors using the criteria of Appendix E-2. Costs for Remedial Work, Land and Right-of-Way and Al Haima Compensation were charged to the Yemen Government. Well Drilling, Engineering and Training were charged to USAID.

Details of the cost allocations between the donors are presented in Tables 2 thru 5 and are summarized below:

	<u>Government of Yemen</u>	<u>U.S.A.I.D.</u>	<u>Saudi Fund</u>	<u>Abu Dhabi Fund</u>
<u>Funds Committed</u>	\$33,556,604	\$12,254,948	\$20,833,798	\$ 9,241,627
<u>March 1981 Estimates</u>				
by H&S	39,163,330	13,777,705	32,602,014	15,394,661
by HSPL	43,409,007	13,904,002	40,864,532	18,511,607
<u>Shortfall</u>				
by H&S	5,606,726	1,522,757	11,768,216	6,153,034
by HSPL	9,852,403	1,649,054	20,030,734	9,269,980

We trust that this analysis satisfies the requirements of NWSA and the Donors. If more is needed, we stand ready to supply additional information.

Yours truly,

F. P. Coughlan, Jr.  
Project Director

cc: NWSA (5)  
Saudi Fund  
Abu Dhabi Fund  
USAID

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8 March 1981

TARIF 1  
PROJECT COST ESTIMATES

	JANUARY 1981 (1)		MARCH 1981	
	H&S	HSPL	H&S	HSPL
Contract A	\$14,352,073	(Not Avail.)(2)	\$ 15,025,126	\$ 15,025,126
Contract B	15,046,714	(Not Avail.)	15,416,184	16,636,925
Contract C	<u>42,463,217</u>	<u>(Not Avail.)</u>	<u>40,761,032</u>	<u>42,886,234</u>
Sum A + B + C	\$71,862,004	\$ 74,883,601	\$ 71,202,342	\$ 74,548,285
Currency Fluctuation	785,000	785,000	785,000	785,000
Interest thru Jan. 1981	-	- (3)	814,145 (4)	814,145 (4)
Claims	-	11,820,000	-	17,498,495 (5)
Contingency allowance	5,030,000	-	6,000,000	-
House Water Connections	<u>- (6)</u>	<u>- (6)</u>	<u>1,000,000 (7)</u>	<u>1,907,000 (8)</u>
Sub-Totals	\$77,677,004	\$ 87,488,601	\$ 79,801,487	\$ 95,552,925
Remedial Work	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000
Well Drilling	360,000	360,000	360,000	360,000
Engineering	9,662,956	9,662,956	8,772,215	8,772,215
Training	200,000	200,000	200,000	200,000
Land and ROW	304,000	304,000	304,000	304,000
Al-Haina Compensation	<u>10,000,000</u>	<u>10,000,000</u>	<u>10,000,000</u>	<u>10,000,000</u>
Sub-Totals	<u>\$22,026,956</u>	<u>\$ 22,026,956</u>	<u>\$ 21,136,215</u>	<u>\$ 21,136,215</u>
Total Project Costs	<u>\$99,703,960</u>	<u>\$109,515,557</u>	<u>\$100,937,702</u>	<u>\$116,689,140</u>

ANNEX F

ANNEX F

See next page for notes

Notes for Table 1

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- (1) Figures presented at the Donors' meeting.
- (2) HSPL furnished only a total cost of Contract A, B and C excluding claims plus a separate estimate of total claims for all contracts.
- (3) HSPL reports that through an oversight, the interest due of \$650,000 was not included in the amounts reported to the Donors.
- (4) Reported by HSPL thru January 31, 1981.
- (5) From Appendix D.
- (6) Excavation, pipe installation and backfill for 30,000 meters of 20 mm service pipe included in estimates for Contract C.
- (7) Estimate based on House Water Service Connections being installed by Taiz Branch of NWSA. (3000 services at \$300/service plus \$100,000 for equipment and training).
- (8) Estimate based on quotation of 4 March 1981 from HSPL assuming following:
  - a. 300 services installed with pipeline work @ \$514 each.
  - b. 2700 services installed after pipeline work @ \$604 each.
  - c. Average length of service = 10 m with 9 m paid for at \$32.20 per m for excavation, installation and backfill. 1 m included in connection price.
  - d. Approximately 10 percent of excavation will be in rock and will be paid for at \$113 per cubic meter.

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ANNEX F

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**TABLE 2**  
**YEMEN GOVERNMENT CONTRIBUTION**

CONTRACTS	FUNDS		PROJECT ESTIMATE		SHORTFALL	
	COMMITTED	H&S	HSPL	H&S	HSPL	
A-1 Transmission Main	\$ 145,535	\$ 160,899	\$ 160,899	\$ 15,364	\$ 15,364	
A-1A Well Field Piping	51,672	79,022	79,022	27,350	27,350	
A-4 Asbestos Cement Sewer Piping	237,036	239,025	239,025	1,989	1,989	
A-5 PVC Sewer Piping	171,062	301,711	301,711	130,649	130,649	
A-6 Castings	85,192	85,091	85,091	(101)	(101)	
A-10 Electrical Poles	184,628	388,700	388,700	204,072	204,072	
A-11 Low Head Sewage Line Piping	424,855	450,455	450,455	25,600	25,600	
B-0 Mobilisation	2,015,988	2,015,988	2,015,988	-	-	
B-14 Transformers	1,287,089	1,480,153	1,480,153	193,064	193,064	
B-21 Generator Buildings	381,700	581,280	652,906	199,580	271,206	
B-24 Pump Stations	1,312,660	1,733,420	1,783,815	420,760	471,155	
B-25 Chlorination Station	157,146	272,798	272,798	115,652	115,652	
B-26 Electrical Pole Line	2,578,457	2,291,740	2,734,727	(286,717)	156,270	
B-27 Electrical Installation	1,085,143	1,249,868	1,510,217	164,725	425,074	
B-28 Mechanical Installation	1,259,804	1,437,132	1,832,516	177,328	572,712	
C-0 Mobilisation	5,553,604	5,630,583	5,630,583	76,979	76,979	
C-1 Well Field Trans. Main	273,466	303,355	308,965	29,889	35,499	
C-3 Large Sewers	893,269	649,707	662,779	(243,562)	(230,490)	
C-4 Collector Sewers	692,346	1,955,377	1,963,890	1,263,031	1,271,544	
C-5 Sewer House Connections	619,897	1,016,762	1,016,762	396,865	396,865	
C-6 Low Head Sewage Line	98,256	160,520	160,520	62,264	62,264	
C-9 Public Toilets	586,899	508,619	508,619	(78,280)	(78,280)	
C-10 Well Pump Houses	407,892	500,630	500,630	92,738	92,738	
C-12 Sewage Treatment	1,170,035	810,990	880,713	(359,045)	(289,322)	
C-13 Subsurface Exploration	78,973	88,673	88,673	9,700	9,700	
Contract A Handling	-	423,736	423,736	423,736	423,736	
Sub-Totals	\$21,752,604	\$24,816,234	\$26,133,893	\$3,063,630	\$ 4,381,289	
Currency Fluctuation	-	311,882	311,882	311,882	311,882	
Interest	-	283,755	283,755	283,755	283,755	
Claims	-	-	4,875,477	-	4,875,477	
Contingencies	-	1,947,459	-	1,947,459	-	
Remedial Work	1,500,000	1,500,000	1,500,000	-	-	
Land and ROW	304,000	304,000	304,000	-	-	
Al-Haina Compensation	10,000,000	10,000,000	10,000,000	-	-	
Totals	\$33,556,604	\$39,163,330	\$43,409,007	\$5,606,726	\$ 9,852,403	

ORIGINAL

TABLE 2

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8 March 1981

**TABLE 3**  
**USAID CONTRIBUTION**

CONTRACTS	FUNDS		PROJECT ESTIMATE		SHORTFALL	
	COMMITTED		H&S	HSFL	H&S	HSFL
B-1 Distribution System Pumps	\$ 113,119	\$ 149,084	\$ 149,084	\$ 149,084	\$ 35,965	\$ 35,965
B-2 Chlorination Equipment	69,852	54,090	54,090	54,090	(15,762)	(15,762)
B-3 Water Meters	21,467	26,229	26,229	26,229	4,762	4,762
B-4 Hoisting Equipment	107,973	124,169	124,169	124,169	16,196	16,196
B-5 Miscellaneous Tools & Equipment	30,934	36,055	36,055	36,055	5,121	5,121
B-6 Sluice Gates	19,771	25,908	25,908	25,908	6,137	6,137
B-7 Sewage Pond Liner	13,927	16,016	16,016	16,016	2,089	2,089
B-8 Pole Line Hardware	970,540	1,323,755	1,323,755	1,323,755	353,215	353,215
B-9 Hydraulic Sewer Cleaner	24,898	28,632	28,632	28,632	3,734	3,734
B-10 Submersible Pumping Equip.	11,438	13,154	13,154	13,154	1,716	1,716
B-11 Well Pumps	153,888	707,529	707,529	707,529	553,641	553,641
B-12 Generators	730,956	926,655	926,655	926,655	195,699	195,699
B-13 Switchgear & Motor Cont.	65,338	96,224	96,224	96,224	30,886	30,886
B-14 Transformers	136,102	156,517	156,517	156,517	20,415	20,415
B-15 Electrical Substation Equip.	24,797	28,517	28,517	28,517	3,720	3,720
B-16 Ventilation Equipment	30,452	36,897	36,897	36,897	6,445	6,445
B-17 Plug Valves	70,101	80,616	80,616	80,616	10,515	10,515
B-18 Pressure Reducing Valves	47,116	71,377	71,377	71,377	24,261	24,261
B-19 Communication System	129,229	160,113	160,113	160,113	30,884	30,884
B-20 Valves	129,832	214,216	214,216	214,216	84,384	84,384
B-22 Altitude Valves	18,037	40,396	40,396	40,396	22,359	22,359
B-23 Pressure Gauges	2,966	7,654	7,654	7,654	4,688	4,688
Marine Insurance	-	30,000	30,000	30,000	30,000	30,000
Sub-Totals	\$ 2,922,733	\$ 4,353,803	\$ 4,353,803	\$ 4,353,803	\$1,431,070	\$1,431,070
Currency Fluctuation	-	41,905	41,905	41,905	41,905	41,905
Interest	-	49,782	49,782	49,782	49,782	49,782
Claims	-	-	126,297	126,297	-	126,297
Well Drilling	360,000	360,000	360,000	360,000	-	-
Engineering	8,772,215	8,772,215	8,772,215	8,772,215	-	-
Training	200,000	200,000	200,000	200,000	-	-
Totals	\$12,254,948	\$13,777,705	\$13,904,002	\$13,904,002	\$1,522,757	\$1,649,054

NOTE: See Appendix E for method of cost allocations.

ANNEX F

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TABLE 3

8 March 1981

TABLE 4  
SAUDI FUND CONTRIBUTION

<u>CONTRACTS</u>	<u>FUNDS</u> <u>COMMITTED</u>	<u>PROJECT ESTIMATE</u>		<u>SHORTFALL</u>	
		<u>H&amp;S</u>	<u>HSPL</u>	<u>H&amp;S</u>	<u>HSPL</u>
A-2 Water Distribution System Piping	\$ 694,274	\$ 765,886	\$ 765,886	\$ 71,612	\$ 71,612
A-4 AC Sewer	440,209	443,903	443,903	3,694	3,694
A-5 PVC Sewer	317,688	560,324	560,324	242,636	242,636
A-6 Castings	158,213	158,026	158,026	(187)	(187)
A-7 Cement	676,022	1,559,284	1,559,284	883,262	883,262
A-8 Reinforcing Steel	292,013	651,272	651,272	359,259	359,259
A-11 Low Head Sewage Line Pipe	1,699,420	1,801,782	1,801,782	102,362	102,362
A-12 Motor Vehicles	207,376	215,046	215,046	7,670	7,670
A-14 Water Meters	201,747	132,347	132,347	(69,400)	(69,400)
A-15 Equipment	26,837	22,530	22,530	(4,307)	(4,307)
C-2 Water Distribution System	1,324,191	3,614,447	3,614,447	2,290,256	2,290,256
C-3 Large Gravity Sewers	1,658,927	1,206,598	1,230,876	(452,329)	(428,051)
C-4 Small Gravity Sewers	1,285,785	3,631,413	3,647,223	2,345,628	2,361,438
C-5 Sewer House Connections	1,151,238	1,888,274	1,888,274	737,036	737,036
C-6 Low Head Sewage Line	394,102	643,842	643,842	249,740	249,740
C-7 Storage Tanks	4,492,052	6,139,363*	7,862,804*	1,647,311*	3,370,752*
C-9 Public Toilets	1,858,512	1,610,627	1,610,627	(247,885)	(247,885)
C-12 Sewage Treatment	3,705,112	2,568,137	2,788,926	(1,136,975)	(916,186)
C-13 Subsurface Exploration	250,080	280,796	280,796	30,716	30,716
Sub-Totals	\$20,833,798	\$27,833,837	\$29,878,215	\$ 7,060,099	\$ 9,044,417
Currency Fluctuations	-	298,709	298,709	298,709	298,709
Interest	-	318,946	318,946	318,946	318,946
Claims	-	-	8,461,662	-	8,461,662
Contingencies	-	3,090,462	-	3,090,462	-
House Water Service Connections	-	1,000,000	1,907,000	1,000,000	1,907,000
Totals	\$20,833,798	\$32,602,014	\$40,864,532	\$11,768,216	\$20,030,734

NOTE: See Appendix E for method of cost allocations.

\* Including Hydropneumatic Systems and Al Haima Fuel Tank.

PROCESSED  
AVIATION

TABLE 4

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ANNEX F

8 March 1981

TABLE 5  
ABU DHABI FUND CONTRIBUTION

<u>CONTRACTS</u>	<u>FUNDS COMMITTED</u>	<u>PROJECT ESTIMATE</u>		<u>SHORTFALL</u>	
		<u>H&amp;S</u>	<u>HSPL</u>	<u>H&amp;S</u>	<u>HSPL</u>
A-1 Transmission Main Piping	\$3,222,274	\$ 3,562,451	\$ 3,562,451	\$ 340,177	\$ 340,177
A-1A Well Field Piping	537,750	822,380	822,380	284,630	284,630
A-2 Water Distribution System Piping	1,187,441	1,925,416	1,925,416	737,975	737,975
A-3 Valves	143,104	275,850	275,850	132,746	132,746
C-0 Mobilization	821,858	833,250	833,250	11,392	11,392
C-1 Well Field & Trans. Main	2,142,970	2,377,187	2,421,153	234,217	278,183
C-2 Water Distribution System	1,186,230	4,341,882	4,341,882	3,155,652	3,155,652
Sub-Totals	\$9,241,627	\$14,138,416	\$14,182,382	\$4,896,789	\$4,940,755
Currency Fluctuations	-	132,504	132,504	132,504	132,504
Interest	-	161,662	161,662	161,662	161,662
Claims	-	-	4,035,059	-	4,035,059
Contingencies	-	962,079	-	962,079	-
Totals	\$9,241,627	\$15,394,661	\$18,511,607	\$6,153,034	\$9,269,980

NOTE: See Appendix E for method of cost allocation.

RECEIVED  
 ANNEX F

TABLE 5

ANNEX F  
 F-10

APPENDICES

- A. Agreed Unit Prices in Contract C.
- B. Disputed Items in Contract B.  
Mechanical/Electrical Installation and Related Civil Works.
- C. Disputed Items in Contract C. Pipeline and General Construction.
- D. Tabulation of Potential Claims by HSPL.
- E-1. Allocation of Contracts A, B & C Between Donors.
- E-2. Allocation of Other Costs Between Donors.

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UNCLASSIFIED COPY

APPENDIX A  
AGREED UNIT PRICES IN CONTRACT C

<u>CONTRACTS</u>	<u>ITEM</u>	<u>DESCRIPTION</u>	<u>AGREED UNIT PRICE</u>	<u>COMMENTS AND REFERENCES TO ITEMS IN OTHER CONTRACT</u>
C-2 Primary Water Distri- bution System	1h	Backfill from borrow	\$ 30.23/cm	C-3, 1h
	2i	Install 600 mm pipe	11.22/m	C-1, 2a + 2b
	21	Install valve boxes	45.00 ea	Future V.O.
	15b	Pavement restoration prior to 26 September 1980	21.04/m <sup>2</sup>	Future V.O.
	15c	Pavement restoration after 26 September 1980	26.52/m <sup>2</sup>	NWSA Approval
C-2 Secondary Water Distri- bution System		Applicable unit prices from Primary Water Distribution System Tender	As shown	C-2
C-3 Large Gravity Sewers	3m	Manholes 2m x 2m	13,713.12 ea	Future V.O.
	3n	Manholes 1.2m x 1.2m	7,101.44 ea	Future V.O.
	3p	Drop manhole 1.2m diameter	1,440.00 ea	Future V.O.
	15b	See C-2 above		
	15c	See C-2 above		
C-4 Small Gravity Sewers	3g	PVC Sewer Fittings	1.62/kg	C-2, 2f
	3h	Manhole 1.2m diameter	1,043.18 ea	C-3, 3h
	3j	Blockwork manholes	979.51 ea	Future V.O.
	3k	Inspection chamber	224.00 ea	Future V.O.
	15b	See C-2 above		
	15c	See C-2 above		
	16	Install sewer thru existing cess pit	1,137.00 ea	Future V.O.
C-5 Sewer House Connec- tions	3cd	Inspection chamber	224.00 ea	Future V.O.
	5	Reinforcing Steel	0.99/kg	C-2, 5
	15b	See C-2 above		
	15c	See C-2 above		
	3Bc	Connection to existing service	252.22 ea	C-4, 3f
	3Bd	Install end caps	3.50 ea	Future V.O.
C-6 Low Head Sewage Line	2Ac	Install Air Relief Manhole	34,295.05	C-1, 7b

NOTE: Above unit prices agreed to by H&S and HSPL but except for Item 15c not approved yet by NWSA.

APPENDIX B  
DISPUTED ITEMS IN CONTRACT B  
Mechanical/Electrical Installation  
and  
Related Civil Works

<u>CONTRACT S</u>	<u>DISPUTED ITEM</u>	<u>AMOUNT DISPUTED</u>
B-21	Generator Buildings	Credit due for change in roofing material \$ 69,501
B-24	Pump Station	Credit due for change in roofing material 38,346
B-21	Generator Buildings	Measurement of fill at Wadi Seena 2,125
B-24	Pump Stations	Extra concrete 12,049
B-26	Electrical Pole Line	Credit due for installation of less poles. 442,987
B-27	Electrical Installation	Value of additions and deletions 260,349
B-28	Mechanical Installation	Value of additions and deletions 395,384
	TOTAL	<u>\$1,220,741</u> -----

APPENDIX B

ANNEX F

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ANNEX F

8 March 1961

APPENDIX C  
DISPUTED ITEMS IN CONTRACT C  
PIPELINE AND GENERAL CONSTRUCTION

<u>CONTRACTS</u>	<u>DISPUTED ITEM</u>	<u>AMOUNT DISPUTED</u>
C-1	Well field and transmission main	Cost of additional Sanaa Highway road crossings. \$ 49,576
C-3	Large Sewers	Additional cost of installation of 800 mm sewer over 750 mm sewer in tender. 6,415
C-3	Large Sewers	Difference in evaluation of cost of installing tees on A/C pipe. 30,935
C-4	Collector Sewers	Difference in evaluation of cost of installing temporary wood MH covers to overcome delay in shipment of permanent covers. 24,323
C-7	Storage Tanks	Difference in evaluation of rock excavation costs for Zones II and III tanks. 1,673,719
C-7	Storage Tanks	Difference in evaluation of credit due to reduced amount of concrete required for Zones II and III tanks. 49,722
C-12	Sewage Treatment Ponds	Difference in evaluation of additions and deletions at the Sewage Ponds structures. 290,512
	TOTAL	<u>\$2,125,202</u> =====

APPENDIX C

ANNEX 2

F-14

8 March 1981

APPENDIX D  
TABULATION OF POTENTIAL CLAIMS BY HSPL

<u>DESCRIPTION</u>	<u>VALUATION BY HSPL</u>	
	<u>March 1981</u>	<u>January 1981</u>
1. <u>INCREASED TRENCH DEPTHS</u> HSPL projects that pipe construction at increased depths has and will cause delays in the schedule. Therefore, HSPL contends that it is entitled to more compensation than the excavation unit price.	\$ 4,856,254	\$ 5,200,000
2. <u>LOSS OF OVERHEAD</u> HSPL projects that a claim will be submitted because the progress of the work has been impeded.	4,000,000	4,000,000
3. <u>REDEFINITION OF SELECT BACKFILL</u> HSPL contends that backfill material from any source, including excavated materials, should be paid for as select backfill if placed around pipes.	2,847,093	-
4. <u>INTEREST CHARGES</u> This is a projection by HSPL of additional interest due if the present situation of late payments persists. This is in addition to the \$814,145 shown in Table 1.	2,185,855	- (2)
5. <u>DAY WORKS AND ADDITIONAL WORKS</u> HSPL projection to completion of project. The validity of certain day work items is being reviewed.	1,698,263(1)	2,300,000
6. <u>DISPOSAL OF SURPLUS SOIL</u> HSPL contends that NWSA agreed to payment for disposal of surplus excavated materials in Contracts C-1 thru C-6. NWSA denies agreement.	685,858(1)	-
7. <u>SEWAGE POND EMBANKMENTS</u> HSPL contends that the greater embankment volumes in the redesign are not compensated for by the unit prices paid for embankment and borrow quantities.	575,000(1)	-

ANNEX F

APPENDIX D  
Page 1 of 2

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ANNEX F

8 March 1981

<u>DESCRIPTION</u>	<u>VALUATION BY HSPL</u>	
	<u>March 1981</u>	<u>January 1981</u>
8. <u>PIPE DEFLECTIONS</u> HSPL was directed at various locations along Contract C-1 transmission main to deflect pipe joints rather than use fittings. HSPL contends that this was a more costly procedure.	327,063	-
9. <u>WAREHOUSING CONTRACT B MATERIALS</u> This is a proposal, not a claim. HSPL proposes to unload, store, assist in inspection and provide other warehousing functions for Contract B equipment and materials.	302,547(1)	-
10. <u>UTILITY RELOCATION</u> HSPL proposes to claim sewer relocation costs incurred during construction of the transmission main.	20,562(1)	-
11. <u>MISCELLANEOUS CLAIMS</u>	-	320,000
<b>TOTAL POTENTIAL CLAIMS</b>	<b>\$17,498,495</b> -----	<b>\$11,820,000</b> -----

(1) Designated by HSPL as a "DISPUTE" and by Hazen and Sawyer as a "CLAIM". All other items were designated as "CLAIMS" by HSPL.

(2) HSPL reports that thru an oversight, the interest due of \$650,000 was not included in the amounts reported to the Donors.

APPENDIX E-1

ALLOCATION OF CONTRACTS A, B & C BETWEEN DONORS

<u>CONTRACTS</u>	<u>PERCENTAGE ALLOCATION</u>				<u>TOTAL</u>
	<u>Y.A.R.G.</u>	<u>ABU DHABI</u>	<u>SAUDI FUND</u>	<u>U.S.A.I.D.</u>	
A-1	4.3%	95.7%	-	-	100.0%
A-1A	8.8	91.2	-	-	100.0
A-2 (Primary System)	-	100.0	-	-	100.0
A-2 (Secondary System)	-	-	100.0%	-	100.0
A-3	-	100.0	-	-	100.0
A-4, 5, 6	35.0	-	65.0	-	100.0
A-7, 8, 12, 14, 15	-	-	100.0	-	100.0
A-10	100.0	-	-	-	100.0
A-11	20.0	-	80.0	-	100.0
B-0, 21, 24, 25, 26, 27, 28	100.0	-	-	-	100.0
B-1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 22, 23	-	-	-	100.0	100.0
B-14	90.4	-	-	9.6	100.0
C-0	87.1	12.9	-	-	100.0
C-1	11.3	88.7	-	-	100.0
C-2 (Primary System)	-	100.0	-	-	100.0
C-2 (Secondary System)	-	-	100.0	-	100.0
C-3, 4, 5	35.0	-	65.0	-	100.0
C-6	20.0	-	80.0	-	100.0
C-7	-	-	100.0	-	100.0
C-9, 12, 13	24.0	-	76.0	-	100.0
C-10	100.0	-	-	-	100.0
Al-Haima Fuel Tank	-	-	100.0	-	100.0
Hydropneumatic System	-	-	100.0	-	100.0
Contract A Handling	100.0	-	-	-	100.0
House Water Services	-	-	100.0	-	100.0

APPENDIX E-1

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ANNEX F

8 March 1981

APPENDIX E-2

ALLOCATION OF OTHER COSTS BETWEEN DONORS

<u>ITEM</u>	<u>PERCENTAGE ALLOCATION</u>				<u>TOTAL</u>	<u>REMARKS</u>
	<u>Y.A.R.G.</u>	<u>ABU DHABI</u>	<u>SAUDI FUND</u>	<u>U.S.A.I.D.</u>		
Currency Fluctuation	39.7%	16.9%	38.1%	5.3%	100.0%	Allocated by original commitment to Contracts A, B & C.
Interest thru 1/31/81	34.8	19.9	39.2	6.1	100.0	Allocated in proportion to H&S March '81 estimates of Contracts A, B & C.
Claims:						
a) Contract Claims	24.8	26.5	48.7	-	100.0	a) Allocated to related contract.
b) Interest thru remainder of Project.	34.7	19.9	39.7	5.8	100.0	b) Allocated in proportion to HSPL's estimates of Contracts A, B & C.
c) Overhead losses.	32.9	15.0	52.1	-	100.0	c) Allocated in proportion to HSPL's estimate of construction costs excluding mobilization and supply contracts.
d) Weighted average of a, b and c.	27.8	23.1	48.4	0.7	100.0	
Contingencies	32.5	16.0	51.5	-	100.0	Allocated in proportion to H&S's estimate of construction costs excluding mobilization and supply contracts.

8 March 1981

<u>ITEM</u>	<u>PERCENTAGE ALLOCATION</u>				<u>TOTAL</u>	<u>REMARKS</u>
	<u>Y.A.R.G.</u>	<u>ABU DHABI</u>	<u>SAUDI FUND</u>	<u>U.S.A.I.D.</u>		
Remedial Work	100.0%	-	-	-	100.0%	Improvements to exist- ing water system.
Well Drilling	-	-	-	100.0	100.0	-
Engineering	-	-	-	100.0	100.0	-
Training	-	-	-	100.0	100.0	-
Land and ROW	100.0	-	-	-	100.0	-
Al-Haima Compensation	100.0	-	-	-	100.0	-

APPENDIX B-2  
Page 2 of 2

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ANNEX F

ANNEX F

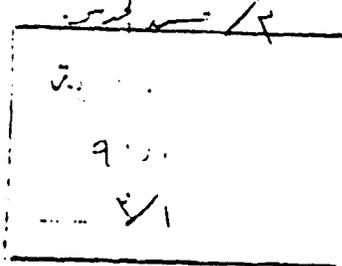
# HAZEN AND SAWYER

ENGINEERS

380 LEXINGTON AVENUE, NEW YORK, N. Y. 10017, USA  
Telex 234882 HZNS UR, Telephone 212 - 9860033

G-1

RICHARD HAZEN  
C. RICHARD WALTER  
FRANCIS P. COUGHLAN JR  
WALTER B. S. MOTT  
ROBERT H. STEWART  
DAVID WALRATH  
SHELDON YUAN



TAIZ FIELD OFFICE  
P. O. Box 4293  
KENNEDY WATER YARD  
TAIZ YEMEN ARAB REPUBLIC  
TEL: 2445  
TLY: 887 HAZSAW TE

26th February, 1981

OUR REF: H+S-552.

Mr. Mohamed Ali Al-Fusail  
Director General  
National Water & Sewerage Authority  
P.O. Box 104  
Sana'a  
Y.A.R.

UNCLASSIFIED COPY AVAILABLE

Dear Mr. Fusail:

USAID Financed Equipment Contract 'B' Variation Orders  
Taiz Water and Sewage Project

We write to advise that ourselves and Hanab-Stevin Pipelines (M.E.) Ltd. have reached agreement on all variation orders related to Contract 'B' equipment except V.O. B-50 which modifies spare parts for the well pumps. Spare parts are being furnished in accordance with previous revisions to well pumps and equipment because cancellation charges are too high to provide beneficial savings. The outstanding variation order (V.O. B-50) will be reviewed against parts furnished at a later date as time is not now available to permit a proper evaluation. We do not expect this to be a factor in our present evaluation of USAID funded items.

Also, we wish to point out that equipment required for the Hydropneumatic Water Supply System for Zone VI is not included in the schedule of items proposed to be financed by USAID and is, therefore, excluded from consideration. Our present estimate for this system will be shown as an allowance in the 'B' Contracts but we have no back-up data to substantiate our allowance. Furthermore, we have not had the benefit of NWSA review of our design drawings for this modification.

The attached tabulation provides an overall status review of USAID funding. We are also attaching one copy of agreed variation orders for your review and/or comment. We do not have time available to properly document those orders. It is a substantial task, and must be deferred until our current project reassessment is completed. We welcome any comments on these orders.

.../...

This transmittal is in response to your Telex 24 Feb. 1981, and to requests made in USAID letter 15 Feb. 1981. The data contained herein will be included in our project reassessment.

Also, for your information and further action, we include in our attachments a revised description of U.S. Aid funded items. This information is to be included in your letters to U.S. Aid.

At this time, we also wish to bring to your attention that NWSA is required to provide insurance on stored equipment during the period when it is stored. As equipment will probably be delivered near the end of March, the insurance should be obtained. Also, the storage site in the Kennedy Yard must be emptied of its present contents prior to equipment delivery.

Very truly yours,  
HAZEN AND SAWYER

*John I. Coleman*  
John. I. Coleman

JIC/yh

cc : NWSA (3)  
USAID (1)  
TMSI (1)  
H&S/NY (1)  
H&S/T (1)

ENCLOSURE  
AVAILABLE COPY

USAID CONTRIBUTION TO CONTRACT 'B' - BULK SUPPLY EQUIPMENT

FEB. 1981

CONTRACTS		FUNDS COMMITTED	H&S/HISPL AGREED VARIATIONS	REVISED CONTRACT VALUE	15% ESCALATION AFTER 16/APRIL/80	REVISED TOTAL CONTRACT VALUE
B- 1.	Distribution System Pumps	\$ 113,119	\$ 16,519	\$ 129,638	\$ 19,446	\$ 149,084
B- 2.	Chlorination Equipment	69,852	(22,817)	47,035	7,055	54,090
B- 3.	Water Meters	21,467	1,341	22,808	3,421	26,229
B- 4.	Hoisting Equipment	107,973	-	107,973	16,196	124,169
B- 5.	Miscellaneous Tools & Equipment	30,934	418	31,352	4,703	36,055
B- 6.	Sluice Gates	19,771	2,758	22,529	3,380	25,909
B- 7.	Sewage Pond Liner	13,927	-	13,927	2,089	16,016
B- 8.	Pole Line Hardware	970,540	180,551	1,151,091	172,664	1,323,755
B- 9.	Hydraulic Sewer Cleaner	24,898	-	24,898	3,734	28,632
B-10.	Sub. Pumping Equipment	11,438	-	11,438	1,716	13,154
B-11.	Well Pumps	(1) 153,888	(2) 461,355	615,243	92,286	707,529
B-12.	Generators	730,956	74,831	805,787	120,868	926,655
B-13.	Switchgear & M.C.C.	65,338	18,335	83,673	12,551	96,224
B-14.	Transformers	136,102	-	136,102	20,415	156,517
B-15.	Elec. Sub-Station Equipment	24,797	-	24,797	3,720	28,517
B-16.	Ventilation Equipment	30,452	1,632	32,084	4,813	36,897
B-17.	Plug Valves	70,101	-	70,101	10,515	80,616
B-18.	Pressure Reducing Valves	47,116	14,951	62,067	9,310	71,377
B-19.	Communication System	129,229	(3) 10,000	139,229	20,884	160,113
B-20.	Valves	129,832	56,443	186,275	27,941	214,216
B-22.	Altitude Valves	18,037	17,090	35,127	5,269	40,396
B-23.	Pressure Gauges	2,966	3,690	6,656	998	7,654
		<u>\$2,922,733</u>	<u>\$837,097</u>	<u>\$3,759,830</u>	<u>\$563,974</u>	<u>\$4,323,804</u>

FUNDS COMMITTED -- \$2,922,733

FUNDING REQUIRED (4) -- \$1,401,071

(1) Ten Pumping Units + Accessories

(2) Twenty-one Pumping Units + Accessories

(3) Allowance agreed H&S, HISPL

(4) Does not include Marine Insurance or Material Handling.

Date Prepared 25/Feb/1981

ANNEX G  
 Page 3 of 4

ANNEX G  
 Page 3 of 4

ANNEX G

ANNEX G

G - 4

Note: A copy of the variation orders originally attached to Hazen and Sawyer's letter to the National Water and Sewerage Authority, dated 26 February 1981, is on file in CE/PD.

REVISED BILL OF QUANTITIES

This annex incorporates the following work by reference:  
"Revised Bill of Quantities for Contracts A, B and C,"  
amended March 1, 1981.

(On file in NE/PD.)

**PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK**

Life of Project:  
From FY 77 to FY 83  
Total U.S. Funding \$12,000,000  
Date Prepared: 15 MARCH 1981

Project Title & Number: TAIZ WATER AND SEWERAGE CONSTRUCTION (279-0039)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><b>Program or Sector Goal:</b> The broader objective to which this project contributes is to improve personal health and environmental sanitary conditions in Taiz, Yemen by renovating and expanding the Kennedy Memorial Water System and the sewerage system and by providing sewerage treatment facilities.</p>	<p><b>Measures of Goal Achievement:</b> Increase in the availability of clean, treated water for municipal use; collection and treatment of sewage and decrease in the incidence of water-related diseases.</p>	<p>Records of Taiz Branch, NWSA (as verified during evaluation) as to operation; YARG medical records as to disease incidence.</p>	<p><b>Assumptions for achieving goal targets:</b> That project plans are sound and that populace utilizes satisfactory personal and household hygiene practices.</p>
<p><b>Project Purpose:</b> To construct a water and sewerage system which supplies adequate services to consumers and which is financially self-sustaining in the long run.</p>	<p><b>Conditions that will indicate purpose has been achieved: End of project status.</b> Completed and operational water and sewerage system with water system producing approximately 11.5 million cubic metres of water annually and sewerage system collecting and treating most wastes produced. Ultimately, rates for services will cover all costs of the systems, including depreciation and debt service.</p>	<p>NWSA operational and financial records. Ninety percent of Taiz' population connected to water system and 70 percent to sewerage by 1985.</p>	<p><b>Assumptions for achieving purpose:</b> That Taiz Branch of NWSA will be able to operate facilities satisfactorily.</p>
<p><b>Outputs:</b> (1) Water production, transmission, treatment and distribution facilities; sewerage system and sewerage treatment facilities.  (2) Trained staff for operating and maintaining facilities.</p>	<p><b>Magnitude of Outputs:</b> (1) 21 production well, 36.1 kms. of water transmission main, water treatment plant, 129.9 kms. of water distribution lines, 5 water storage tanks and ancillary facilities. 82.4 kms. of sewerage collection lines, 7.2 kms. sewerage outfall, sewerage treatment ponds &amp; ancillary facilities completed by 12/82. (2) Minimum of 10 staff members receive training by 11/82.</p>	<p>Project implementation monitoring and final tests for acceptance of project facilities.</p>	<p><b>Assumptions for achieving outputs:</b> The project is constructed according to plans.</p>
<p><b>Inputs:</b> (1) AID, other donors (Saudi and Abu Dhabi funds) and YARG financial resources.  (2) Contracted construction and procurement services.  (3) Qualified personnel to be trained to manage and operate facilities.</p>	<p><b>Implementation Target (Type and Quantity)</b> (1) YARG contribution of at least \$35 million equivalent.  (2) Contributions from Saudi and Abu Dhabi funds totaling at least \$40 million equivalent.  (3) \$15 million AID contribution (\$10 million grant, \$5 million loan) Total: Approximately \$105 million</p>	<p>Records of financial commitments by donors and YARG, and contracts for project construction.</p>	<p><b>Assumptions for providing inputs:</b> That NWSA and YARG are committed to implementing the project, that other donors provide significant financial contributions and that YARG provides any financial resources required above contributions received.</p>

AID/W APPROVAL CABLE

Preparation of this Project Paper was approved by AID/W per State C17663,  
dated 23 January 1981 (LCU).

(On file in NE/PD.)

ANNEX K

بشوراء المندوبين

Yemen Arab Republic  
PRIME MINISTER'S OFFICE  
CENTRAL PLANNING ORGANISATION

P. O. Box : 175 - SANA'A  
Teleg. : GENPLAN  
Phone : 2992-3

الجمهورية العربية اليمنية K-1  
رئاسة مجلس الوزراء  
الجهاز المركزي للتخطيط  
صندوق بريد : ١٧٥ - صنعاء  
تلفون : جنبلان  
تقريباً : ٢٩٩٢.٣

Dept : Tech. CO-operation Dep.  
Our Ref : 977  
Date : 9/3/1981

إدارة :  
رقم الملف :  
تاريخ :

Subject : الموضوع

Mr. Charles D. Ward, Director  
United States AID Mission  
to Yemen Arab Republic  
P.O. Box 1088  
SANA'A

	A	I	N	INFO
IN/UD				✓
AGH				
CU	✓			
CONT				✓
EXU				
HR				
PROG				✓
RD				
CHRON				✓
RF				✓

Dear Mr. Ward,

Reference is made to USAID's letter of January 26, 1981, concerning further financing for the Taiz Water and Sewerage Project which informed our Government of the possibility that A.I.D. could make available an additional \$5 million in the form of a development loan to assist us in completing the Taiz project.

We hereby request a loan for \$5 million for the purposes, and on the terms, set out in your letter mentioned above.

Sincerely yours,

Foad K. Mohamed,  
Minister of Development  
and Chairman C.P.O.



c.c Ministry of Electricity.

DATE RECEIVED

11 MAR 1981

USAID/C&R



AGENCY for INTERNATIONAL DEVELOPMENT  
UNITED STATES AID MISSION TO YEMEN ARAB REPUBLIC

L-1

الوكالة الأمريكية للتنمية الدولية - المبعوثان إلى الجمهورية العربية اليمنية

USA Address  
SANA'A (L.D.)  
Department Of State  
Washington, D.C. 20520

International address:  
USAID  
P. O. Box 1088  
Sanaa, Y. A. R.

مكتب المبعوثان  
صنعاء - اليمن

CERTIFICATION PURSUANT TO SECTION 611(e)  
OF THE FOREIGN ASSISTANCE ACT OF 1961  
AS AMENDED

I, Charles D. Ward, the principal officer of the Agency for International Development in the Yemen Arab Republic, having taken into account, among other things, the maintenance and utilization of projects in the Y.A.R., previously financed or assisted by the United States, do hereby certify that in my judgment the Yemen Arab Republic has both the financial capability and the human resources capability to maintain and to utilize effectively the facilities to be assisted under both the grant component and the proposed loan component of the Taiz Water and Sewerage Project (Project No. 279-0039).

Charles D. Ward  
Director  
USAID/Yemen

March 18, 1981

Date

5C (2) - PROJECT CHECKLIST

N-1

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual funding sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE?  
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FY 80 App. Act Unnumbered; FAA Sec. 634A; Sec. 653(b);

(a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure)?

Congress has been notified via an Advice of Program Change which was sent to them on February 13, 1981; no obligation will be made until congressional waiting period has expired.

2. FAA Sec. 611(a) (1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

(a) Yes

(b) Yes

3. FAA Sec. 611(a) (2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

No further legislative action is required.

4. FAA Sec. 611(b); FY 79 App. Act Sec. 101; FY 80 App. Act Sec. (501.) If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

Yes

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5. FAA Sec. 611(c). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?
- Yes. Certification included among annexes of Project Paper.
6. FAA Sec. 209: Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.
- Project is being financed by multilateral donors. Assistance will not encourage regional development programs.
7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
- Some effects, but largely indirect. The project was bid on competitive basis, thus encouraging private initiative and discouraging monopolistic practices. The project will have some beneficial effect on technical efficiency of industry, agriculture and commerce.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
- Project will encourage private U.S. trade insofar as AID-financed equipment and engineering services are and will be of U.S. source and origin. Shipping will be on U.S. flag vessels for AID-financed equipment.
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.
- The project agreement will stipulate the YARG contribution of local currencies to meet at least 25% of the cost of the project. The U.S. owns no foreign currencies which can be utilized for this project.

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10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? The Yemen Arab Republic is not an excess currency country.

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes

12. FY 79 App. Act, Sec. 608; FY 80 App. Act Sec. (521.) If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity? Not applicable

**B. FUNDING CRITERIA FOR PROJECT**

**1. Development Assistance Project Criteria**

a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts

(a) Poor citizens of Taiz will directly benefit from the provision of safe water and sewerage services by the project, but the project will not have any of the effects described here for improving the lot of the poor; (b) The project will have no effects in helping to develop cooperatives. (c) Project is being implemented and managed by YARG -- to this extent, AID funding is in support of self-help efforts. (d) Women will benefit equally with men from project, but project will not directly promote women's welfare. (e) The two non-AID outside donors of project are regional development funds.

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of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106, 107.

Is assistance being made available: (include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) [103] for agriculture, rural development or nutrition; if so (a) extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, full account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people; and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food

No

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reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, (a.) extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paracetical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

Health. Project is least cost alternative for providing adequate quantities of safe drinking water and sewerage collection and treatment services for people of Taiz. Insofar as they usually are among the most seriously affected victims of unsanitary water supplies, young children should be major beneficiaries of project. Project is not otherwise involved in low-cost health delivery.

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; and (b.) extent to which assistance provides advanced education and training of people in developing countries in such disciplines as are required for planning and implementation of public and private development activities.

No

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is: (1) (a) concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and (b) facilitative of geological and geophysical survey work to locate potential oil, natural gas, and coal reserves and to encourage exploration for potential oil, natural gas, and coal reserves.

No. All sections of this paragraph 4 (i) through (vi), are not applicable to the project.

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- (ii) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;
- (iii) research into, and evaluation of, economic development processes and techniques;
- (iv) reconstruction after natural or manmade disaster;
- (v) for special development problems, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;
- (vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

c. [107] is appropriate effort placed on use of appropriate technology? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor.) Not applicable.

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least developed" country)? Yes.

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? Yes, for project as whole. Yemen is "relatively least developed" country.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's Project has no, or very marginal, impact in areas discussed, except to extent that adequate water and sanitary services are strongly needed of populace which will be met by project in Taiz.

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intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

The project gives excellent promise of contributing to increased productivity through increased health.

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.

Yemen presently has capacity to meet loan terms. Whether it will in future will depend upon whether remittances from Yemeni workers abroad continue at substantial level. Chances that this condition will be fulfilled are judged good.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

Sec. 620(d) not applicable -- assistance is not for productive enterprise.

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102?

Yes, through perceptions that YARG cares for needs of people and is concerned about their health.  
Yes.

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?

No.

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

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These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed? Yes
2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him? Yes
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will commodities be insured in the United States against marine risk with a company or companies authorized to do marine insurance business in the U.S. Not applicable
4. FAA Sec. 604(c). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? Not applicable
5. FAA Sec. 603 Compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers; dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. Will be complied with.
6. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? The use of U.S. Government excess property is not appropriate for this project.
7. FAA Sec. 621. If technical assistance is financed, to the fullest extent practicable will such assistance, goods and professional and other services from private enterprise, be furnished on a Yes

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contract basis? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

The facilities of other Federal agencies will not be utilized.

8. International Air Transport. Fair Competitive Practices Act, 1974.

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes.

9. FY 79 App. Act, Sec. 105; FY 80 App. Act Sec. [505.] Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?

Yes.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

Yes.

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Yes

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million?

Not applicable

C. Other Restriction

1. FAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? | Yes

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? Not applicable
3. FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? Yes.
4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, sale, longterm lease, exchange or guaranty of motor vehicles manufactured outside the U.S.? Yes.
5. Will arrangements preclude use of financing:
- a. FAA Sec. 104(f). To pay for performance of abortions as a method of family planning or to, motivate or coerce persons to practice abortions; to pay for performance of involuntary sterilization as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization? Yes.
- b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property? Yes.
- c. FAA Sec. 650. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? Yes.
- d. FAA Sec. 662. For CIA activities? Yes.
- e. FY 79 App. Act, Sec. 104; FY 80 App. Act Sec. [504.] To pay pensions, etc., for military personnel? Yes.
- f. FY 79 App. Act, Sec. 106; FY 80 App. Act. Sec. [506.] To pay U.N. assessments? Yes.

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g. FY 79 App. Act, Sec. 107; FY 80 App. Act, Sec. [507.] To carry out provisions of FAA section 209(d)? (Transfer of FAA funds to multilateral organizations for lending.) Yes.

h. FY 79 App. Act, Sec. 112; FY 80 App. Act Sec. [511.] To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields? Yes.

i. FY 79 App. Act, Sec. 601; FY 80 App. Act Sec. [515.] To be used for publicity or propaganda purposes within U.S. not authorized by Congress? Yes.

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5C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights?
  - Yes
  - Not applicable
  
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the United States unlawfully?
  - No
  
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?
  - Yes
  
4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?
  - Yemen is not known to be in violation of the requirements of this section.
  
5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?
  - Yemen is not known to be in violation of the requirements of this section.

EXHIBIT 12  
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A.

6. FAA Sec. 620(a), 620(f); FY 79 App. Act, Sec. 108, 114 and 606. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Uganda, Mozambique, or Angola?

7. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?

8. FAA Sec. 620 (j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?

9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?

10. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters:

a. has any deduction required by the Fishermen's Protective Act been made?

b. has complete denial of assistance been considered by AID Administrator?

11. FAA Sec. 620; FY 79 App. Act, Sec. 603.  
(a) Is the government of the recipient country in default for more than 6 months on interest or principal of any AID loan to the country?  
(b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds?

12. FAA Sec. 620(s). If contemplated assistance is Development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the

6. No.

7. (a) No.  
(b) No.

3. Some damage was caused to U.S. property when diplomatic relations were severed in 1967 and the general U.S. feeling is that Yemen failed to take adequate measures at that time to attempt to prevent this damage. Although specific action was not taken by either side with respect to this damage to U.S. property, the matter has been discussed at length by U.S. and YARG officials. At present all evidence indicates that the YARG would do everything in its power to prevent such mob action if it appeared imminent again.

9. An investment guaranty agreement has been concluded with the YARG COVERING the risks mentioned.

10. Not applicable

11. (a) No.  
(b) No.

12. Yes, taken into account by Administrator pursuant to 1980 Report to Congress.

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amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, as reported in annual report on implementation of Sec. 620(s)." This report is prepared at time of approval by the Administrator of the Operational Year Budget and can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

Yemen severed diplomatic relations with the U.S. in 1967. Relations have been resumed and new bilateral assistance agreements have been negotiated since resumption.

14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

To AID's knowledge, Yemen's U.N. obligations are fully met.

15. FAA Sec. 620A, FY 79 App. Act, Sec. 607. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?

No.

16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?

AID has no knowledge of any such objection.

17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the nonproliferation treaty?

No.

B. FUNDING CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy?

While no specific criteria have been developed to assess commitment and progress of Yemen in areas mentioned, the YARG is judged by USAID to be making adequate progress in all enumerated areas, given the extreme obstacles to development posed by Yemen's social, political and economic milieu.

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8.1.

b. FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban poor?

Project's chief aim is disease control. Project should promote environment in which decisions for small families are supported through lower infant mortality

2. Economic Support Fund Country Criteria

a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights?

Not applicable

b. FAA Sec. 533(b). Will assistance under the Southern Africa program be provided to Mozambique, Angola, Tanzania, or Zambia? If so, has President determined (and reported to the Congress) that such assistance will further U.S. foreign policy interests?

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

d. FY 79 App. Act. Sec. 113. Will assistance be provided for the purpose of aiding directly the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?

e. FAA Sec. 620B. Will security supporting assistance be furnished to Argentina after September 30, 1978?

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