UNCLASSIFIED

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

PROJECT PAPER

45p.

JORDAN: RIFT VALLEY WATER RESOURCES STUDY

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PP

2. DOCUMENT CODE: 3

3. COUNTRY ENTITY: Jordan

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 278 - 0229

6. BUREAU OFFICE: A. SYMBOL: NE; B. CODE: 03

7. PROJECT TITLE (Maximum 40 Characters): Jordan Rift Valley Water Resources Study

8. ESTIMATED FY OF PROJECT COMPLETION: FY 81

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 78; B. QUARTER 4 (Enter 1, 2, 3, or 4); C. FINAL FY 78

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 = 31JD)

A. FUNDING SOURCE	FIRST FY 78 B. FX	C. L/C	D. TOTAL	LIFE OF PROJECT E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL						
GRANT						5,000
LOAN	5,000		5,000			
OTHER U.S. 1.						5,000
OTHER U.S. 2.						
HOST COUNTRY	250	1,500	1,750			1,750
OTHER DONORS						
TOTALS	5,250	1,500	6,750			6,750

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	D. LOAN	E. 1ST FY 78 F. GRANT	G. LOAN	H. 2ND FY 79 I. GRANT	J. LOAN	K. 3RD FY 80 L. GRANT	M. LOAN
(1) SA	291		876		5,000		-		-
(2)									
(3)									
(4)									
TOTALS					5,000				

A. APPROPRIATION	N. 4TH FY ___ O. GRANT	P. LOAN	Q. 5TH FY ___ R. GRANT	S. LOAN	LIFE OF PROJECT T. GRANT	U. LOAN
(1)		-		-		5,000
(2)						
(3)						
(4)						
TOTALS						5,000

12. IN-DEPTH EVALUATION SCHEDULED: MM 01 YY 81

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Christopher H. Russell

TITLE: Director, USAID/Jordan

DATE SIGNED: MM 06 DD 18 YY 78

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-76)

JORDAN RIFT VALLEY
WATER RESOURCES STUDY

TABLE OF CONTENTS

JORDAN RIFT VALLEY WATER RESOURCES STUDY

I. Summary and Recommendations

A. Borrower: The Hashemite Kingdom of Jordan (GOJ). The Project will be implemented by the Jordan Valley Authority (JVA).

B. Loan:

1. Amount: Not to exceed Five Million U.S. Dollars (U.S. $5,000,000) to be financed from Security Supporting Funds.

2. Terms: Repayable in U.S. Dollars in 40 years, including a grace period of 10 years at an annual rate of two percent (2%) during the grace period and three percent (3%) thereafter.

C. Project Cost: Total Project cost is estimated at U.S. $6.75 Million of which $5.25 Million represents foreign exchange costs. This estimate includes contingency and escalation allowances. AID funds will be utilized to meet all eligible foreign exchange costs and to the extent that AID funds are not required to pay foreign exchange, the GOJ will be reimbursed for eligible local costs incurred. The following division between foreign exchange and local currency expenditures is projected: 1/

	U.S. Dollars (000)		
FUNDS	FOREIGN EXCHANGE	LOCAL CURRENCY	TOTAL
A.I.D. Loan	$5.0	- -	$5 0
GOJ	.25	$1.5	1.75
TOTALS	$5.25	$1.5	$6.75

D. Project Description: The project consists of a water resources investigation to determine the quantity, quality and location of water in the Jordan Rift Valley (JRV). This knowledge is the essential factor in the formulation of plans for the future development of the Jordan Rift Valley. For purposes of this project the JRV has been sub-divided into three regions: The Jordan River Valley which is the area located between the Yarmouk River in the North and Dead Sea in the South; the Southern Ghors which encompasses an area extending roughly from the Lisan peninsula on the eastern side of

1/ The exchange rate used throughout this paper is one Jordanian Dinar (JD) equals U.S. $3.20 (312 fils equal one U.S. $: 1000 fils equal 1 JD).

of the Dead Sea to Wadi Khanzira about 20 km south of the Dead Sea; and the Wadi Araba region which extends from the southern Ghors to Aqaba (see Maps 1 & 2, Annex 3). The investigation will consist of (1) Ground Water investigations in the entire Jordan Rift Valley, and (2) Surface Water Studies in the Wadi Araba region. On the basis of the results of these investigations, production wells will be drilled for exploiting ground water and plans for developing surface water will be made.

E. Project Justification: The Country Development Strategy Statement (CDSS) for Jordan stresses the need to concentrate on helping meet basic human needs for potable and industrial water supplies and water for irrigation to facilitate food crop production. The anticipated future needs for potable water on the northern plateau, and in the Jordan River Valley, require that new sources of water be found; otherwise, the amount of water available for agriculture will be reduced.

The proposed project is designed to locate potential water supplies as a first step toward providing the water necessary to meet basic human needs. At present, the ground water in the project areas is not fully used, and available quantities not properly verified.

Exploration and development of water resources in the Southern Ghor and Wadi Araba will serve to meet the basic human needs of existing, albeit small, population in the two areas as well as provide a potential for expansion of agriculture for the still semi-nomadic tribes people in the south of Jordan. These objectives are consistent with the stated objectives of the CDSS.

F. Mission Views: The Mission endorses the proposed loan.

G. Statutory Checklist: All statutory criteria have been met. (See Annex 2).

H. Issues: None

I. Recommendation: That a loan be authorized for the purposes described herein in an amount not to exceed US $5 Million, on Terms and Conditions set forth in the loan authorization. (See Annex 1).

Project Committee

NE/PD: R. Fedel ---------- Chairperson
NE/JLS: R. Witherell ---------- Desk
DS/ENGR: S. Remington ---------- ENGR
GC/NE: J. Miller ---------- Counsel

II. Project Background and Description

A. Background:

1. Physical Setting: The Jordan Rift Valley is an extension of the African Rift Structure. It is an area that is highly complex, geologically.

The main Valley floor area is filled with a succession of evaporities, marl, and alluvial sediments of the Plio-Pleistocene and Quaternary ages. Alluvial fans predominate the eastern side of the Valley floor and overlie the evaporite and older alluvial sediments.

The eastern escarpment of the JRV is made of thick indurated sedimentary rocks ranging in age from Precambrian to Eocene consisting of sandstone, limestone, marl, and chert. The rocks are highly folded and faulted within the escarpment.

Topographically, the Rift Valley consists of three sub-basins: the Jordan River, the Dead Sea, and the Red Sea. The topographic slope is generally steep in the escarpment and gentle along the Valley floor. The Dead Sea is the lowest in elevation and is located near the middle of the JRV. Elevations on the Valley floor range from 392m. below Sea Level (MSL) at the Dead Sea to 283 m. above MSL at the Gharandal divide near the middle of Wadi Araba. The JRV is bounded along the east by a mountain range which rises up to more than 1700 m. above MSL east of mid-Wadi Araba.

Arid to semi-arid climate predominates on the Valley floor particularly the southern half of the JRV where the average annual rainfall is about 50 mm. Rainfall increases to about 400 mm annually near Lake Tiberias. Along the eastern highlands of the JRV, annual rainfall varies from 50 mm to slightly more than 600 mm.

2. Studies: Investigation of the water resources of the Jordan and Yarmouk Rivers for irrigation and hydroelectric purposes was considered in the 1920 Convention between Great Britain and France concerning the Mandate for Syria and Lebanon, Palestine and Mesopotamia. In 1930, the British Colonial Office conducted a survey of the potential for irrigation of the Jordan River Valley. This survey was followed by further studies under the 1937 Peel Commission and the 1938 Woodhead Technical Commission in Palestine. An important result of the Peel Commission was the first hydrologic survey of TransJordan. This study, under the direction of M.G. Ionides, was published in 1939. A preliminary surface water study of the Jordan and Yarmouk Valleys was made in 1952 by Baker and Harza Company in collaboration with the Water Devleopment Department of Trans-Jordan Government. Sir M. MacDonald and Partners conducted a preliminary water resources study of Northeast Jordan, including the Jordan Valley, in late 1961 and 1962. Under the same study additional gauging stations were established by the Central Water Authority of the Government of Jordan (GOJ), and geological mapping was performed by Hunting Aerial Surveys of

several thousand square kilometers in the western section of East Jordan except the Wadi Araba area, the escarpments east of Wadi Araba and the Dead Sea. The first ground water study of the Jordan River Valley was done by J. Tleel in 1963. In 1965, a German geologic team conducted an electrical resistivity survey of the southern part of the Jordan River Valley to delineate areas of saline ground water. Hirzalla, in 1969, prepared a comprehensive report which summarized all existing information on ground water in the Jordan River Valley. Regional studies were also made in 1975 (Barber) and in 1977 (Hydro-Technik, National Water Master Plan).

As part of an A.I.D. engineering services project with the Water Development Department of the Central Authority and its successor, the Natural Resources Authority, several exploratory wells were drilled in the Jordan River Valley and a few wells were drilled in Wadi Araba. This was done between 1960 and 1967. Information obtained from these wells and from geological mapping and exploratory well drilling in other areas of East Jordan demonstrated that ground water exists in the escarpments adjacent to the Jordan River Valley. The results from the test drilling in the Jordan River Valley showed that in most areas the ground water was saline due to contamination by the Jordan Valley sediments (Lisan Marls). In an attempt to intercept the ground water before it came into contact with the saline sediments, ten test wells were drilled in the southern end of the Jordan River Valley escarpment during 1966, 1967 and in 1970. These wells showed the occurrence of fresh water with yields ranging from 50 to 160 cubic meters per hour. Because of the physical limitations of the drilling rigs available at that time, the maximum depth attained was 300 meters which was not deep enough to encounter the deeper aquifers. About 10 shallow wells have been drilled in Wadi Araba primarily to supply water for a road construction. Little information is known about these wells except that water levels range from 2 to 88 meters and salinity ranges from 600 to 3,000 ppm (parts per million). Salinity levels of 600 ppm and below are generally suitable for most uses; salinity levels above 3,000 ppm are not suitable for most agricultural purposes. Virtually no surface hydrologic data exists for the area south of Ghor 1/ Safi. (Location on Map 2).

Usable surface water resources of the Jordan River Valley consist of the stream flow of the Yarmouk River and 10 side tributaries (wadis); all of the flow is or will be developed for irrigation and/or domestic and industrial uses. The main ground water resources of this area are in the alluvium of the Valley floor and the chert-limestone formations in the eastern escarpment. Although about 950 wells have been drilled in the Jordan Valley (mostly by private individuals for agricultural purposes) less than 200 are still in use due to a depletion of the aquifer and/or salt water intrusion from deep seated saline ground water. Increased water demands, because of population increases and the present and projected large scale transfer of surface water for irrigation over almost all of the Valley floor, require an integrated surface and ground water management program.

1/ "Ghor" is an Arabic word meaning "valley".

For the Southern Ghors and Wadi Araba regions the major surface water flows are from six perennial wadis. Ground water in the area occurs mainly in the alluvial deposits in the Valley floor but the potential for development is not known. Present water use is limited to irrigation using wadi base flow and a few wells near Ghor Safi. Detailed information on the volume of surface water flows and the quantity and quality of ground water is deficient.

B. Project Description: The Project consists of a water resources investigation to determine the quantity, quality and location of water available for possible development for agricultural, industrial and domestic uses in the Jordan Rift Valley. The study 1/ will consist of the following:

1. A review and appraisal of all available reports and documents related to the project including previous geological, geophysical and hydrogeological surveys and records.

2. Geologic mapping (where needed).

3. Establishing stream gauging and meteorological stations in Wadi Araba.

4. Geophysical surveys.

5. Exploratory drilling and test pumping of wells.

6. Determining quantity and quality of water available for development and the most economic means to devleop it.

7. Artificial recharge studies for Wadi Araba and the Southern Ghors.

8. Final report of findings.

C. Rationale for U.S. Assistance: A.I.D. has assisted the GOJ in financing major irrigation schemes in the Jordan River Valley for increasing agricultural production. Water for these projects, which are vital to increased food production, is supplied from surface water sources. It has become increasingly clear that water for domestic and industrial uses will place more and more demands on the limited surface water resources of Jordan.

Ground water is known to exist in the Southern Ghors and Wadi Araba region. However, in this disadvantaged area of Jordan, the quantity of water is unknown and devleopment plans for permanent residents and the nomadic tribes who inhabit the regions cannot be made.

The GOJ has as basic objectives in its development effort the provision of services and facilities to satisfy all of the population of Jordan, and to increase agricultural production. Water is a critical element necessary to realize these objectives.

1/ See Annex 5 for detailed description of proposed consultants services and the project area.

D. Other Donor Coordination: At present there are no other donor projects directly related to the investigation of the availability of water resources in the proposed project areas. However, there have been a number of studies, financed by other donors, as noted above in the background section.

E. Project Costs:

Cost Estimate
(US $ x 1000)

Item		Local	Foreign	Total
1.	Drilling	470	2,730	3,200
2.	Well developing & testing	16	300	316
3.	Meteorological Stations	9	16	25
4.	Stream Gauging Stations	47	63	110
5.	Artificial Recharge Studies	190	30	220
6.	Equipment not included in 2, 4, and 5	16	203	219
7.	Field Camps and Offices	125	65	190
8.	Administration & Engineering	203	678	881
9.	Subtotal	1,076	4,085	5,161
10.	Contingencies & Escalation	434	1,163	1,597
	TOTALS	1,510	5,248	6,758

The details supporting the above cost estimate are provided in Annex 4. Costs were estimated jointly by JVA, NRA, USAID and AID/W engineering. They are, therefore, considered reasonable and consistent with the data available.

A physical contingency factor of 15 percent was selected as being appropriate for the estimation purposes. The escalation rates are the rates projected by the World Bank for the Arab Pogash Project as follows for: local currency 13.5% in 1978, 13% in 1979 and 11% in 1980 and for foreign exchange costs the rates 7.5% for 1978 and 1979 and 7% for 1980. Disbursements for each year were estimated and appropriate factor applied. Item 10 also is the total of those calculated cost increases. Based on our analysis of the cost estimates, and taking into consideration the adequacy of the planning data and experience of the Jordanian authorities i similar activities, we conclude the cost estimates to be reasonably firm.

F. Financial Plan: A.I.D. loan funds will be applied first to meet the foreign exchange requirements of the project. GOJ funding may be required for foreign exchange procurements. AID funds in excess of the amounts required for foreign exchange, will be used to reimburse the Government of Jordan for local currency costs when it is determined that all dollars costs for the investigation have been covered. The financial plan is set forth below. The amounts shown include the amounts allocated for contingency and escalation.

Disbursement Schedule

U.S. Dollars
(000)

	CY 1979	CY 1980	TOTAL
A.I.D.			
Foreign Exchange	2,424	2,506	5,000
Local Currency	0	0	0
TOTALS	2,424	2,506	5,000
G.O.J.			
Foreign Exchange	0	248	248
Local Currency	643	867	1,510
GRAND TOTALS	3,067	3,691	6,758

G. Repayment Prospects: A debt-service analysis was made recently (January-February 1978) by USAID and the GOJ for the purpose of projecting the impact of the proposed Maqarin Dam (Jordan Valley Irrigation Stage II) and Potash Projects. It was concluded that Jordan's debt service in relation to expected foreign exchange earnings is manageable. The analysis shows debt service as a percentage of exports and non-factor services peaking at 13.8 percent in 1979 and declining gradually thereafter. This proposed loan, considering the concessionary terms recommended and the amount of the loan, will have minimal impact on the debt-service ratio.

H. Role of Women: This project does not lend itself for a specific consideration of the role of women in Jordanian society.

I. Social Soundness Analysis: No social soundness analysis is required for this project.

J. Environmental Considerations: An Initial Environmental Examination (IEE) has been prepared and a determination reached that the proposed project will not have a significant effect on the environment and that no further environmental analysis is necessary. (See Annex 6).

III. Implementation

A. Administrative Arrangements

The borrower will be the Hashemite Kingdom of Jordan; the implementing agency will be the Jordan Valley Authority (JVA). An organizational chart of the Authority is contained in Annex 7. The project will be under the direction of the Water Resources Sector, Ground Water and Hydrology Division. The chief of the division is well qualified and experienced in conducting hydrological studies.

(1) JVA Responsibilities. The JVA has been the implementing agent for seven AID loan-funded projects, and should experience little difficulty in implementing this project. The JVA will be responsible for (a) preparation of the request for proposals for consultants, (b) selection of a consultant and execution of a contract for performing the study, (c) providing $1.5 million equivalent in local currency and $248,000 foreign exchange estimated to be required beyond the AID Loan to meet the estimated project financing, (d) providing all necessary financing beyond the financial plan that may be required for completing the study, (e) providing all available requisite background information and data to the consultant, (f) supervision of the consultant's activities, and (g) preparation of contracts, selection of contractors and monitoring the execution of the drilling and geophysical activities.

(2) AID Responsibility. AID's responsibility will include:

(a) During Implementation

(i) Review and approval of the scopes of work, the requests for proposals, and the contract documents for the study;

(ii) Follow-up on and appraisal of documents submitted in fulfillment of Conditions Precedent;

(iii) Approval of the selected contractors for the water resource study, and their contracts and/or agreements.

(iv) Review and approval of requests for disbursements;

(v) Follow-up on project progress and reporting;

(vi) During the performance of the study, holding periodic meetings with the Jordan Valley Authority to jointly review, evaluate and recommend solutions to problems encountered by the consultants; and

(vii) Review and approval of the consultant's draft and final report on findings of the exploration.

(b) Evaluation

The purpose of the project is to carry out surveys and analyses necessary to determine the quantity, quality and location of water in the Jordan Rift Valley. The findings and analyses of the investigations will be the basis for future projects in exploitation of water resources. Therefore, there is no planned project evaluation other than the AID monitoring and report reviews noted following and foregoing paragraphs.

(c) Monitoring Capability

The USAID will have sufficient engineering and loan officer capability for routine monitoring of the project; however, due to the specialized nature of the investigation, it is now anticipated that an AID hydrologist will be required to participate in the preparation of the technical specifications for the drilling contract and to make approximately three additional field visits during the life of the project.

(3) Selection of Contractors

(a) Engineering: United States firms have been prequalified and the selection of the firm to perform the necessary services will be accomplished in accordance with the procedures set forth in Handbook 11, Country Contracting, Chapter 1, "Procurement of Professional and Technical Services".

(b) Geophysical Investigation: The JVA will contract the Geophysical Investigation to a qualified firm.

(c) Drilling Contractor: Eligible source firms will be asked to submit competitive bids for the performance of the drilling work in accordance with the procedures spelled out in Handbook 11, Country Contracting, Chapter 2, "Procurement of Construction Services".

B. Implementing Schedule

1. Loan

Project Appraisal and Project Paper Completed	Aug. 1, 1978
Authorization of Loan	Aug. 28, 1978
Negotiation and Execution of Loan Agreement	Sept. 30, 1978
Conditions Precedent Met	Nov. 1, 1978
Initial Disbursement	Mar. 1, 1979
Final Disbursement	Sept. 30, 1981

2. A & E Firm

Advertisement for Prequalification of A & E Firms	Jan. 1978
Receive Prequalification Data	Feb. 28, 1978
Evaluate and Complete Short List by JVA	Apr. 1, 1978
AID approval of Short List	May 17, 1978
Issue RFP to Short Listed Firms	Sept. 1978
Receive Responses to RFP	Nov. 1978
Evaluate Proposals and Select Firm for Negotiation	Jan. 1979
AID Approval of JVA Selection	Feb. 1979
Negotiate and Execute Contract	Mar. 1979
Contract Termination	Mar. 1981

3. Drilling Contract

Begin Preparation of IFB	Oct. 1978
A.I.D. Approval of IFB	Jan. 1979
Issuance of IFB	Feb. 1979

Receipt of Bids	Mar. 1979
Evaluation of Bids and Selection of Contractor	Apr. 1979
Mobilization and Begin Drilling Program	May 1979
Completion Drilling Program	Dec. 31, 1980

C. Reporting Requirements

The selected consultant will be required to submit the following reports:

(1) An "Inception" report which will set forth the work program, scope and schedule of investigations.

(2) A brief monthly progress report.

(3) A technical progress report every three months to summarize all the activities performed and their findings. These reports should also include the activities planned for the following three month period;

(4) An interim technical report should be submitted within 12 months after the execution of the contract which will include the results of investigations completed; and

(5) A final technical report, in draft form, should be submitted two months before the end of the project period. The report should include the findings of the overall study, the data collected, results of data analysis and interpretation and recommendations on location, quantity and quality of surface and ground water available for development, supported by graphs, maps, tables and annexes as necessary.

D. Disbursements: Loan funds will be used to finance consultant services, the drilling contract and required equipment of Code 941 and Jordan source and origin. The terminal date for disbursements will be set at 3 years from the signing of the loan agreement. Loan funds for foreign exchange costs will be disbursed either under the direct letter of commitment or by the letter of commitment/letter of credit procedure. Jordanian dinar expenditures will be made in accordance with the terms and conditions of the contracts and/or agreements as approved by A.I.D. Reimbursements for eligible local currency costs if any, will either be in U.S. dollars to a named GOJ bank account in the U.S. or by payment of dinars directly to the GOJ in Jordan.

E. Conditions Precedent and Covenants: The standard conditions precedent of a legal opinion as to the validity of the Loan Agreement and naming of the Borrower's representatives will apply.

A convenant in the Loan Agreement will provide that the GOJ assure full and ready access to all selected sites for well drilling and assure that such sites are free of mines and other explosive devices.

ANNEX 1

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

Name of Country: Jordan Name of Project: Jordan Rift Valley Water Resources Study

Pursuant to Part II, Chapter 4, Section 532 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan to Jordan (the "Cooperating Country") of not to exceed Five Million United States dollars ($5,000,000) the ("Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project consists of a water resources investigation to determine the quantity, quality and location of water in the Jordan Rift Valley.

The entire amount of the A.I.D. financing herein authorized for the project will be obligated when the Project Agreement is executed.

I hereby authorize negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and convenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate:

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in United States Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Goods and services financed by A.I.D. under the project shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

c. Initial Conditions Precedent

Prior to any disbursement, or the issuance of any commitment

documents under the Project Agreement, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance satisfactory to A.I.D.;

1. Agreement between the National Resources Authority (NRA) and the Jordan Valley Authority (JVA) or other suitable arrangements, to insure timely initiation and coordination of all studies and surveys contributing to the overall assessment of Jordan Valley water resources.

d. Covenants

The Cooperating Country covenants to assure full and ready access to all selected sites for well drilling and to assure that such sites are free of mines and other explosive devices.

Joseph C. Wheeler
AA/NE

JORDAN FY 1978

6C(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 Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

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 consistent pattern of gross violations of internationally recognized human rights?	No, it cannot. The Department has not so determined.
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 U.S. unlawfully?	No.
3.	~~FAA Sec. 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?~~	* REPEALED *
4.	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?	The Secretary of State has so determined.
5.	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?	Jordan is not known to be in violation of this section.
6.	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?	Jordan is not known to be in violation of this section.

A

7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos?	Jordan is not considered a Communist Country. Assistance will not be provided to those countries.
8. 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?	No.
9. 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?	No.
10. 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?	The Government of Jordan (GOT) has instituted such a program.
11. FAA Sec. 620(o); Fishermen's Protective Act, 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 Fishermen's Protective Act been made? b. has complete denial of assistance been considered by AID Administrator?	No such action has been taken by the GOJ.
12. FAA Sec. 620(q); App. Sec. 504. (a) Is the government of the recipient country in default 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, unless debt was earlier disputed, or appropriate steps taken to cure default?	The GOJ is not in default on any such loans.
13. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).)	These points were taken into account in preparation of A.I.D.'s annual 620(s) report to Congress and consideration of these points was not considered a bar to the furnishing of assistance.

A

14. 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? — No.

15. 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? — Jordan is not current in its UN obligations.

16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? — No.

17. 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? — No.

18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.? — No.

19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? — No.

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

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

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.

(3) Increasing the public's role in the developmental process.

(4) (a) Allocating available budgetary resources to development.

(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.

(5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

(6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?

2. Security Supporting Assistance Country Criteria

a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section?

Country has not engaged in a pattern of gross violations of internationally recognized human rights. Program is in accordance with policy of this Section.

b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

Yes.

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?

N/A.

JORDAN - RIFT VALLEY GROUNDWATER (278-0229)

6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT? COUNTRY CHECKLIST WAS PREPARED IN CONNECTION WITH THIS PROJECT. STANDARD ITEM CHECKLIST HAS BEEN REVIEWED.

A. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)

(a) Describe how Committees on Appropriations 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 plus 10%)?

(a) Advice of Program Change will be forwarded to the Committees.

(b) Yes.

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); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

Not applicable. While the project is water-related, it is not financing construction.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

N/A.

6. FAA Sec. 209, 619. 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. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?

Project is not so susceptible and there is no indication it will contribute to regional development programs. Jordan is not a newly independent country.

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). 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.

If project finds sufficient water resource in Rift Valley, area could be open to agriculture development by private sector and cooperatives.

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).

U.S. private interprise will provide engineering services and are elegible to provide drilling services.

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 so provide.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

Jordan is not an excess currency country.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 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, spreading investment out from cities to small towns and rural areas; and (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?

92

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, 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?

3. Project Criteria Solely for Security Supporting Assistance

FAA Sec. 531. How will this assistance support promote economic or political stability?

By investigating the water resources of the Rift Valley and thereby its potential for economic and agricultural development, the project will contribute to Jordan's economic stability.

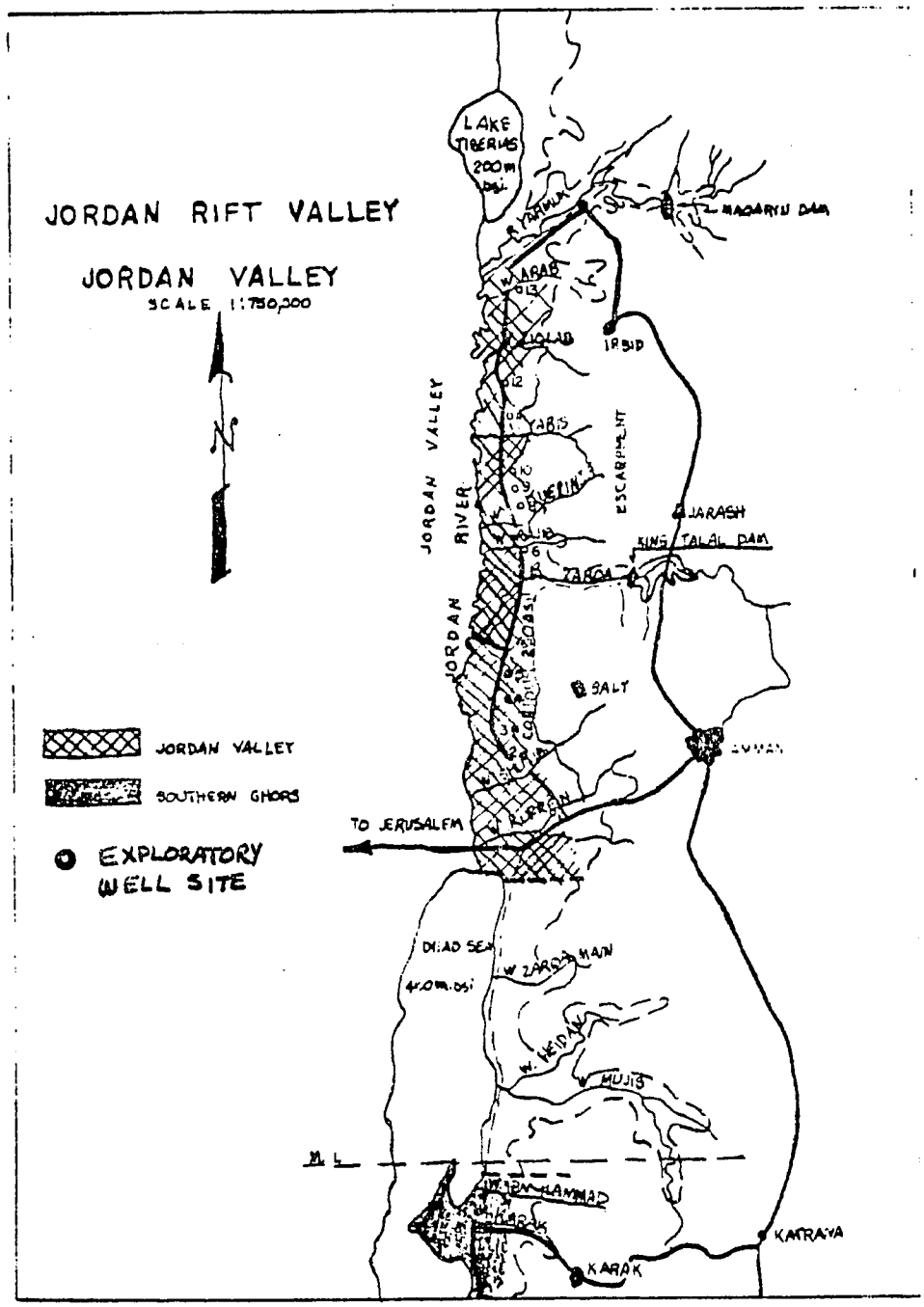
4. Additional Criteria for Alliance for Progress

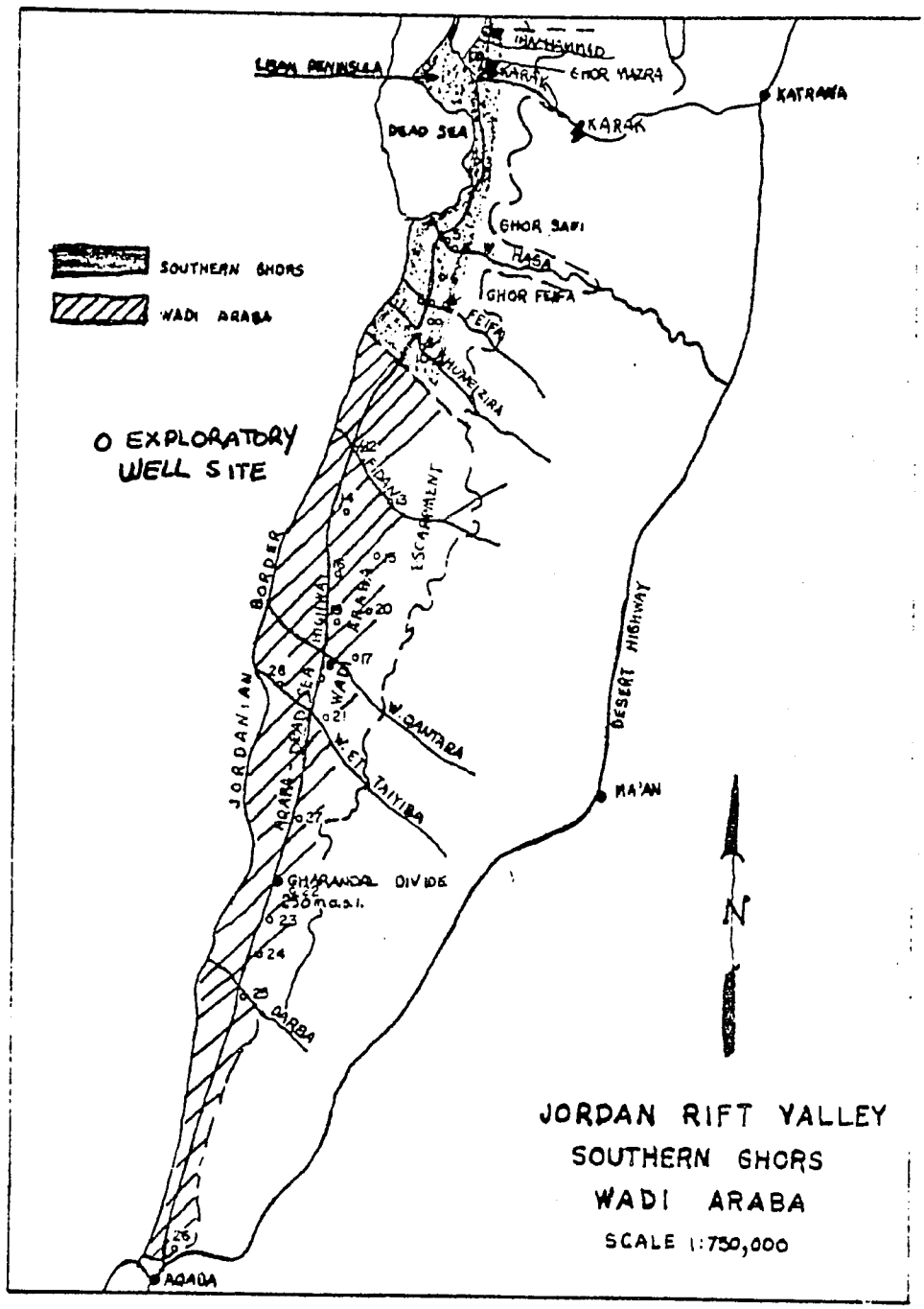
[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(3). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

N/A.

b. FAA Sec. 251(b)(3); 251(c). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?


JORDAN RIFT VALLEY
JORDAN VALLEY
SCALE 1:750,000
N
JORDAN VALLEY
SOUTHERN GHORS
EXPLORATORY WELL SITE
LAKE TIBERIAS 200m bsl
R. YARMUK
W. ARAB
IRBID
JORDAN VALLEY
JORDAN RIVER
ESCARPMENT
YABIS
BUEIRA
JARASH
KING TALAL DAM
ZARQA
SALT
AMMAN
KUFRAIN
TO JERUSALEM
DEAD SEA 400m.bsl
W. ZARQA MAIN
W. KEFRAIN
W. MUJIB
M L
W. EL HAMMAD
KARAK
KATRANA


LISAN PENINSULA
MACHAWWAD
KARAK
GHOR HAZRA
KATRANA
DEAD SEA
KARAK
GHOR SAFI
HASA
GHOR FEIFA
FEIFA
SOUTHERN GHORS
WADI ARABA
O EXPLORATORY WELL SITE
AHUNEIZRA
FEDAN3
ESCARPMENT
BORDER
ARABA
WADI
W. GANTARA
W. EL TAYIBA
JORDANIAN
ARAVA
DEAD SEA
DESERT HIGHWAY
MA'AN
GHARANDAL DIVIDE
250 m.a.s.l.
W. ARABA
AQABA
N
JORDAN RIFT VALLEY
SOUTHERN GHORS
WADI ARABA
SCALE 1:750,000

ANNEX 3

PROPOSED LOCATIONS FOR EXPLORATORY WATER-WELL DRILLING IN THE JORDAN VALLEY ESCARPMENT

No.	Location	Approximate Coordinates E	N	Estimated Depth (m)	Out Crop	Target Aquifers
1.	Wadi Kufrein	214.25	141	400-450	B2, A7	A1-2
2.	Wadi Sakne	209	147.3	400-450	A7	A4, A1-2
3	Wadi Husseiniyat (Karamah)	207	149	200-250	A7	A4, A1-2
4.	Ghor Kebid	209.5	164	200-250	Z	Z.Ram Sandstone
5.	Dahrot Er-Ramel	208.5	159	200-250	Z	Z.Ram Sandstone
6.	Wadi Abu Obeida	209.3	182.2	200-250	A4, A3	A1-2
7.	Wadi Khirbat	208.5	184.7	400-450	B1/2,A7	A4, A1-2
8.	Wadi Es Sarar	207	189.8	250	A5/6	A4, A1-2
9.	Wadi Suleikhat	207.75	19[illegible]	200	A4, A3	A1-2
10.	Wadi N. Suleikhat	207.4	194.1	350-500	A11,B1/2	A4, A1-2
11.	Tabaqat Fahl	210.2	206.2	300	B3	A2, A7
12.	Wadi Ibn Ziad	208.3	210.8	400-500	JVI, B3	B2, A7
13.	Wadi Zahar	213.5	222	350-700	B2	B2, A7, A4, A1-2

WADI ARABA

PROPOSED LOCATIONS FOR EXPLORATORY WATER-WELL DRILLING

- 4 -

ANNEX 3

LOCATION	APPROXIMATE COORDINATES E	N	PROPOSED DEPTH(M)	TARGET Aquifer
Ghor Haditha	201.5	78	50-150	A4
Wadi Karak	205.3	75.3	250	A1, A4
Ghor Numeira	201	60	100	Alluvium & S. Stone
Wadi Hasa	196	48.5	100-120	sandstone
Ghor Safi	195.8	48.5	= 50	Qal
Safi - Feifa	195	43.5	40 - 50	=
Wadi Feifa	194	38	100-120	sandstone
Ghor Feifa	193.5	38	50 - 60	Qal
Feifa Khneizira	192	36.5	40 - 60	Qal
Wadi Khneizira	191.5	34.5	100-120	sandstone
Ghor Khneizira	191	34.5	= 60	Qal
Wadi Fidan 1	182	10	70-90	=
Wadi Fidan 2	193	04	120-150	=
Wadi Abu Dubana (1)	179.4	2	70-90	=
= = = (2)	183	1	120-150	=
Wadi Buweirida	180.8	997.2	90-120	=
Wadi Siyah Buweirida	179.8	991.5	120-150	=
Wadi Musa	179	976.5	120-150	=
Tilal El Masqara	175	995.5	80-100	=
Wadi Tasan	185.5	996.2	150-180	=
Wadi Ghumeid Musa	175	975.3	100-120	=
Wadi Gharandal	170	944	100-150	B2 /A7
Rakiya & Heimer	165	936	100-120	Qal
W.Sig & Rakiya	165.6	940.5	100-120	=
Wadi Darba	164	925	120-150	=
Wadi Mulghan	155	891	100-120	=

ANNEX 4

COST ESTIMATE

1. Well Drilling - Estimate based on cost of JD 40 per meter drilled for the small diameter holes and JD 100 per meter for the larger production test wells. This estimate is based on known drilling prices in Jordan resulting from both competitive and negotiated bidding. Based on the number of meters of drilling proposed (both high and low range) an average was used for the estimate. The calculation was made as follows:

	Wadi Araba and S. Ghors		Jordan Valley	
Unit Cost	Low Range 2500 meters	High Range 3100 meters	Low Range 3850 meters	High Range 4800 meters
@,40 JD	100,000	124,000	154,000	192,000
@100 JD	275,000	341,000	425,000	480,000
Total Costs	375,000	465,000	579,000	672,000
Low Range	JD 954,000			
High Range	JD 1,137,000			
Total:	2,091,000	Average is about JD 1 Million or		$3,200,000

2. Well Development and Pumping Tests Estimated at 10% of drilling costs by JVA and AID technical personnel.

3.&4. Meteorological/Stream Gauging and Equipment and Instrumentation

Estimate based on prior experience by NRA in setting up similar stations throughout Jordan.

5. Artificial Recharge This is a pure estimate. Work will consist of making a series of embankments on alluvial fans to contain flood or seasonal flows. Number of embankments will depend on results of surface water investigations in Wadi Araba and Southern Ghors.

6. Equipment Annex 8 Lists total equipment required, costs based upon JVA/NRA experience.

7. Field Camps and Offices This estimate is based on JVA experience in establishing similar camps. 3 camps proposed.

8. Engineering - Assumptions were as follows:

A. Prime Contractor

Personnel

1 Chief of Party (Ground Water)	24 months (family of 4)
1 Ground Water Specialist	24 months " " "
1 Surface Water Hydrologist	6 months TDY (2 visits)
1 Geologist TDY	3 months " " "
Total:	57 months

Average cost per man month $8,000	57 man months	$456,000
Insurance $1000/man month		57,000
Housing $15,000 year for two families		30,000
Travel, International 11 round trips @ $1500		17,000
Per diems: TDY personnel 9 months @ $65 per day; permanent personnel Wadi Araba/ S. Ghor (Aqaba and Field)		18,000
H.H.E. shipments, 2 families @ $10,000 each shipment		40,000
Schooling 4 children 2 years @ $6,300 each per diem year		50,000
Visas, Medical Exams, Equipment, Supplies, Misc.		10,000
		$678,000

THE CONSULTANTS SERVICES

1. The Consultant's services, which are expected to cover a period of twenty four (24) months will be directed to investigate and evaluate the ground water resources in the Jordan Rift Valley (JRV) and the surface water resources of Wadi Araba hereinafter referred to as the "project water resources".

2. The scope of the Consultant's services shall be governed by, but not limited to, the following technical considerations in so far as they may be necessary:

a. The Consultant shall review and appraise all available reports and documents related to the project water resources including previous geological, geographical and hydrogeological surveys and existing hydrological and meteorological records. Specifically he shall review JVA's planned investigation.

b. The Consultant shall supplement the results of the review and appraisal of existing information with his own study and evaluations of field conditions, with a view to prepare and submit an Inception Report not later than 60 days after the effective date of the Contract. The Inception Report shall contain the Consultant's initial findings and preliminary appraisal of the water resources potential, and shall include a detailed program with cost estimates and, time schedule of such additional investigations and surveys identified by the Consultant as being required for the proper evaluation of the project water resources.

The program recommendations may consist of, but not be limited to, the following:

- Setting up of stream gauging and meteorological stations.

- Geophysical survey.

- Drilling of exploratory and observation boreholes.

- Well development and testing.

- Artificial ground water recharge studies.

c. The Consultant shall acquaint himself with the facilities for geophysical prospecting, laboratory testing and installation and operation of hydrological and meteorological observations available through the departmental facilities of the JVA and the Natural Resources Authority.

d. The Inception Report shall include recommendations in regard to the most expeditious and efficient mode of implementation of the survey

and investigation works, including identification of such works which are suited for execution through contracts to be awarded by the JVA or sub-contracts by the Consultants, such as drilling and testing of wells etc. or through JVA's own specialized departments.

e. Upon approval of the Inception Report the Consultant shall assist JVA to implement the approved elements of the investigation works. Specifically the Consultant shall, (1) prepare any requisite tender documents and technical specifications required to assist JVA in letting any Contracts and provide the services for supervision and administration of the Contract works; (2) provide the technical guidelines for the performance of the works assigned to JVA, including such coordination and supervision as may be considered necessary to obtain results to the Consultant's satisfaction.

f. At the conclusion of each set of survey and investigation works related to a particular region, sub-region or area, the consultant shall submit a separate report to the JVA containing records, analyses, interpretation and recommendations in regard to the available and exploitable quantities of water in the respective areas. The report shall be accompanied with the requisite maps pertaining to geology, hydrogeology and water quality etc. including location, design and estimated yield of the wells.

PROJECT AREA DESCRIPTION:

The project area is divided into three regions, the Jordan River Valley, the Southern Ghors and Wadi Araba.

The Jordan River Valley is defined as the part of the Jordan Rift Valley occurring between the Yarmouk River in the north, the northern edge of the Dead Sea in the south, the sea level contour to the east (except in the Zerqa and Yarmout River Valleys where it is at the 300 meter contour level) and the Jordan border to the west.

The Southern Ghors constitute the area from Wadi Ibn Hammad in the north, Wadi Khanzeira to the south, the 500 meter topographic contour to the east and the Jordan border to the west.

Wadi Araba is defined as the area between Wadi Khanzeira in the north, the northern city limits of Aqaba in the south, the 500 meter contour level to the east and the Jordan border to the west.

The project area will not be confined to any contour level in the escarpment areas if exploratory drilling is required above the defined contours in order to determine aquifer parameters directly related to the project.

JORDAN RIVER VALLEY:

The Jordan River Valley is a part of the African Rift structure, one of

the largest fault systems in the world. Consequently, the area is quite complex geologically. The valley floor contains a series of evaporite and marl deposits interbedded and overlayed by alluvial sediments. The sediments are Plio-Pleistocene in age and are primarily silty clays and marls with occasional coarser material; the marl and the evaporite deposits are friable and often contain large amounts of salts especially sodium chloride.

The escarpment is made of rock ranging in age from Jurassic to Eocene. They are collectively part of the Belqa and Ajlun series, consisting of marlstone, chert, and limestone of varying thicknesses. The formations are numbered from A-1 through A-7 representing the Ajlun series, and B-1 through B-4 to represent the Belqa series. Sandstone (Kurnub) underlies the A-1 formation which in turn is underlain by Jurassic limestones, the oldest rocks cropping out in the escarpment of the Jordan River Valley.

Ground water occurs throughout the Jordan Valley escarpments in varying amounts and qualities. Exploration drilling in other nearby areas of Jordan have shown the A-2, A-4 and A-7 formations of the Ajlun series to have secondary permeability (Karstic). The B-2 and B-4 of the Belqa series also are known potential aquifers. The B-2 and B-4 are thinly bedded limestone and chert. Exploratory drilling has also indicated that higher permeabilities in the limestone and chert formation are almost always associated with structural features, that is, anticlinal and synclinal axes and nearby faults. Whereas on the flanks of the fold structures permeability decreases by several magnitudes.

Ground water in the Jordan River Valley sediments varies in quantity and quality. Considerable ground water devel-pment has occurred in the South Shuneh area of the Jordan River Valley. MacDonald and Partners estimated an annual withdrawal rate of 44 MCM from this area and a recharge of 40 MCM prior to 1967. Water levels declined and salinity increased in most of the wells of the area until 1967 when almost all extraction stopped because of the war. This was for a period of about one year.

Exploratory drilling north of South Shuneh showed the presence of highly saline ground water except in a few areas near the escarpment. The saline water was associated with the "Lisan Marls".

An unknown quantity of ground water flows from the limestone aquifers of the escarpment east of the Jordan Valley into the Jordan Valley sediments. Some of this is presently utilized from wells in the Valley. That unknown quantity which is not utilized mostly becomes contaminated with the Jordan Valley evaporite sediments and eventually flows to the Dead Sea or evaporates.

In an attempt to determine if some of this ground water could be intercepted before it flowed into the Jordan Valley aquifers, five exploratory wells were drilled in the southern end of the Jordan River Valley

escarpment starting in 1967 and finishing after 1970. The five wells showed yields ranging from 70 to 90 M^3/hr. with drawdowns from 17 to 70 meters. The quality was good.

Subsequently, another five wells were drilled farther to the north in the escarpment. Their results were as follows:

Location	Yield M^3/hr.	Drawdown in Meters
1. Wadi Rajib (1)	98	44
2. Wadi Rajib (2)	50	--
3. Wadi Kufiurja	102	50
4. Wadi Subeira	160	23
5. Wadi Taiyba	60	80

All of the 10 wells were drilled with percussion rigs whose maximum drilling limits were slightly in excess of 300 meters. Consequently, the lower aquifers were usually not encountered. Attempts were made to increase yields by acidization or "shooting" the wells.

Prior to 1967, similar exploratory wells were started in the escarpment of the West Bank of the Jordan River Valley. The results were never known because of the 1967 war. Subsequently, it has been learned that three wells were drilled to depths of 750 meters and yields of 400 M^3/hr. were measured. The wells' yields increased by a magnitude of up to three after acidization.

Southern Ghors

The Southern Ghors are made up primarily of alluvium derived from sandstones, limestones and marls of the escarpments to the east of the area.

Ground water occurs in the limestones and sandstone rocks in the escarpment, and in the alluvium of the Ghors. The aquifers in the escarpment are almost entirely drained by springs along the side wadis which contribute to the base flows of these wadis.

Several wells have been drilled in the alluvium in Ghor Mazra, Safi and Feifa. All produce water of various qualities and yields. Some are used for irrigation. The proposed potash plant anticipates using ground water, both for processing and in a planned city to house employees.

All surface and ground water of the Southern Ghors drains into the Dead Sea where evaporation completes the hydrologic cycle.

Wadi Araba

Wadi Araba is the least known geohydrologically and hydrologically of the Jordan Rift Valley. It is located in an arid climatic region, and therefore has limited water resources. Its average rainfall is 50 mm per year in the valley floor, but ranges from 50-300 mm along the top of the escarpment to the east. The valley floor is made up of a series of alluvial fans. Its main drainage is an ephemeral stream draining north into the Dead Sea from Gharandal and to the Gulf of Aqaba south of Gharandal. Gravels, sands, silts, and clay comprise the alluvial material. The eastern escarpment is a highly faulted geologic complex containing sedimentary rocks ranging in age from Plio-Pleistocene to Pre-Cambrian conglomerates in the north with Pre-Cambrian granitic basement complex rocks of the Arbian Massif underlying the sedimentary rocks and cropping out in the southern escarpments.

Ground water occurs in the alluvium throughout the valley floor and in some of the limestone and sandstone formations of the escarpment. The quality is usually poor in the valley floor, but better quality water is expected to occur in the numerous fans overlaying the older valley alluvium. It is in these fans where most of the test drilling will be done. Drilling depths will not exceed 200 meters in most cases. Quantities in the fans will vary depending on the volume of the fan material, its aquifer characteristics, the size of the tributary draining into the fan, and the frequency of their flood flows.

Approximately 10 wells have been drilled in Wadi Araba, ranging in depth from 47 to 136 meters. Water levels ranged from 2 to 88 meters and salinity from 600 to 3,000 ppm total dissolved solids.

Initial Environmental Examination

Project Location: Jordan

Project Title: Water Resources Evaluation of the Jordan Rift Valley

Funding: FY 78 $5.0 million

IEE Prepared by: Robert E. Davis and Stanley M. Remington

Environmental Action Recommended: Negative Determination

It is considered that the proposed project will not have a significant effect on the environment and no further assessment is required.

Concurrence:

Christopher H. Russell
Mission Director
June 8, 1978

NE Bureau Decision:

APPROVED:

DISAPPROVED:

DATE: June 5, 1978

Clearances: G. Davidson
NE/GC: ~~J. Miller~~ DATE: 7/5/78
NE/PD/ENG: E. Callahan DATE: 7/5/78

Description of Project:

The project will evaluate the quality and quantity of ground water available for possible development for agricultural and domestic uses in the Jordan Rift Valley. In addition, the project will evaluate the quality and quantity of surface water available for possible development in the southern half of the Valley (Wadi Araba).

The evaluation will be done by test drilling, geologic, topographic and hydrogeologic mapping, inventorying of springs, rivers, etc., and making recommendations on quantities of water available for development.

IMPACT IDENTIFICATION AND EVALUATION FORM ANNEX 6

Impact Identification and Evaluation 2/
A. LAND USE
1. Changing the character of the land through:
a. Increasing the population ---------- N
b. Extracting natural resources ---------- N
c. Land clearing ---------- N
d. Changing soil character ---------- N
2. Altering natural defenses ---------- N
3. Foreclosing important uses ---------- N
4. Jeopardizing man or his works ---------- N
5. Other factors
_____ _____
_____ _____
B. WATER QUALITY
1. Physical state of water ---------- N
2. Chemical and biological states ---------- N
3. Ecological balance ---------- N
4. Other factors
Test well drilling L
Establishment of stream gauging stations L

1/ See Explanatory Notes for this form.

2/ Use the following symbols: N - No environmental impact
L - Slight environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

IMPACT IDENTIFICATION AND EVALUATION FORM

C. ATMOSPHERIC

1. Air additives ---------- N

2. Air pollution ---------- N

3. Noise pollution ---------- N

4. Other factors

_____ N

_____ N

D. NATURAL RESOURCES

1. Diversion, altered use of water ---------- N

2. Irreversible, inefficient commitments ---------- N

3. Other factors

_____ N

_____ N

E. CULTURAL

1. Altering physical symbols ---------- N

2. Dilution of cultural traditions ---------- N

3. Other factors

_____ N

_____ N

F. SOCIOECONOMIC

1. Changes in economic/employment patterns --------- N

2. Changes in population ---------- N

3. Changes in cultural patterns ---------- N

4. Other factors

_____ N

_____ N

3. [illegible] IDENTIFICATION AND EVALUATION FORM

[illegible]

1. Changing a natural environment ———— N

2. Elimination of an ecosystem element ———— N

3. Other factors

———— ————

———— ————

4. GENERAL

1. International impacts ———— N

2. Controversial impacts ———— N

3. Larger program impacts ———— N

4. Other factors

———— ————

———— ————

5. OTHER POSSIBLE IMPACTS (not listed above)

———— ————

———— ————

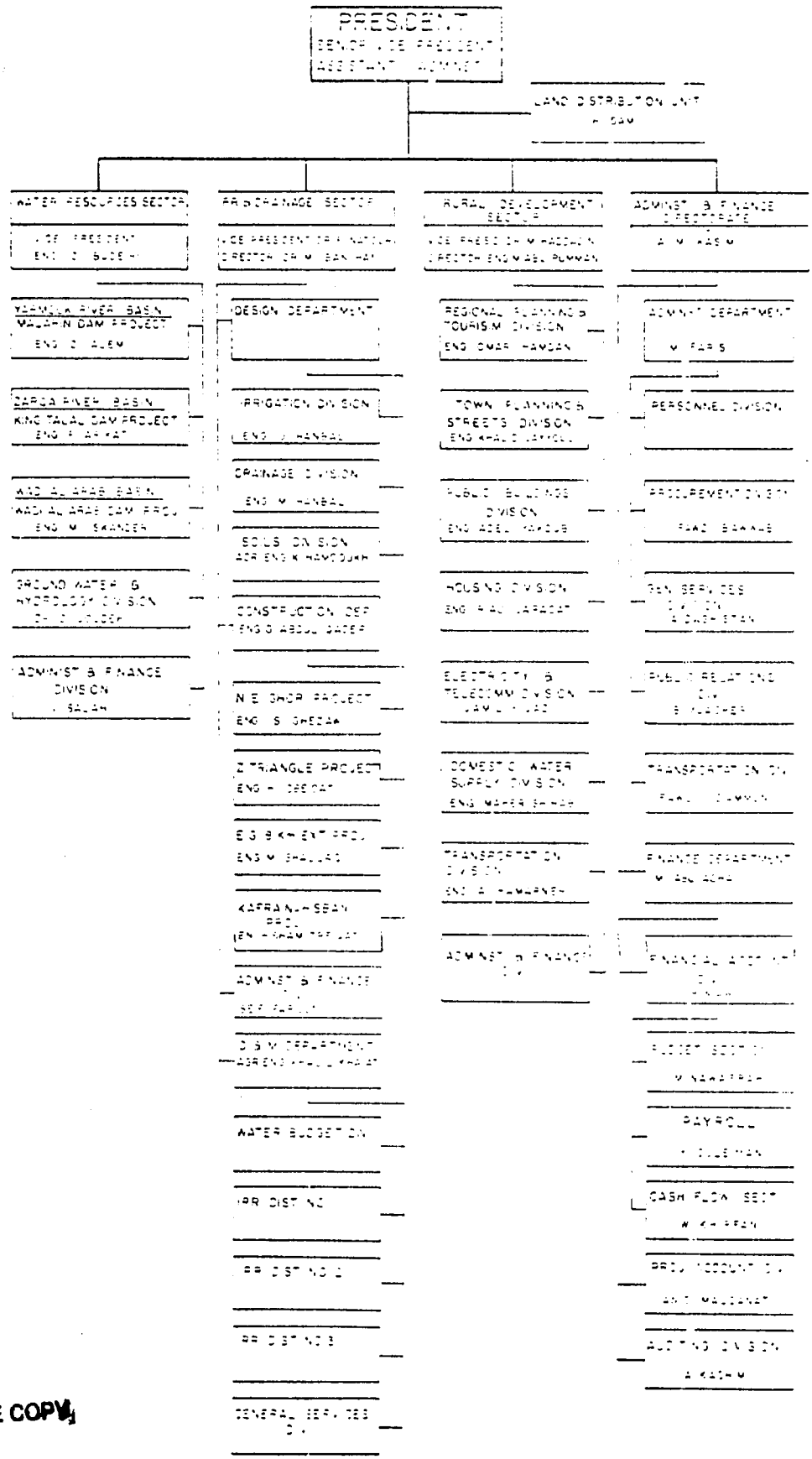
———— ————

See attached Discussion of Impacts.

ANNEX 7

JORDAN VALLEY AUTHORITY

ORGANIZATION CHART



ANNEX 8

EQUIPMENT LIST

	Number
Water Level Recorders (Stevens Type F)----------	20
Stream Gauges(1 Meter)----------	50
Current Meters (Type Price & Pigmy) ----------	4
Water Level Indicators----------	10
Depth Sounders----------	2
Electrical Conductivity Meters (Type)----------	3
Stereoscopes----------	2
Compass (Brunton)----------	2
Steel Tapes (50 & 100 meters)----------	5
Evaporation Recorders----------	2
Evaporation Stations----------	2
Rain Gauges	
- Automatic Recording----------	5
- Storage Type (Daily and Annual)----------	20
Water Flow Meters----------	2

بسم الله الرحمن الرحيم

ANNEX 9

THE HASHEMITE KINGDOM
OF JORDAN
Jordan Valley Commission
Amman
☎ 41472 - 41473
✉ 2759
Telex - 1692 Jvc Jo

No. JVA/7/3/1414
Date April 24,1978

المملكة الاردنية الهاشمية
هيئة وادي الاردن

الرقم
التاريخ

JUN 19 1978

ACTION TAKEN
Date | Initial
NAN
RETURN TO USAID C&R

Mr. Christopher Russell
Director
U.S. Agency for International Development
The Embassy of the United States of America
Amman

Dear Mr. Russell:

This letter constitutes my government's official request for a loan from the Agency for International Development to assist the Jordan Valley Authority in its program of investigating and evaluating the ground water resources in Jordan Valley, Southern Ghors and Wadi Araba, and the surface water in Wadi Araba. The estimated cost of this project is US $ 6.4 million, of which about U.S. $ 5.0 million will be in foreign currency.

We request the loan to be in the amount of U.S. $ 5.0 million, and the Jordan Valley Authority will make available the remaining portion of the project cost.

Background information of the project area were handed to your staff together with the objectives of the project, scope of work, work schedule, implementation plan and cost estimate.

It is intended to execute a contract with a private American consulting firm for the total project. Drilling, test-pumping and geophysical work will be contracted to other firms or agencies, local and/or foreign.

- 2 -

The authority by which the JVA can request loans from foreign sources is given in paragraph C of article 17 of the Jordan Valley Development Law of which you already have copies.

We will appreciate your early action on this request.

Yours truly,

Omar A. Dokhgan
President

cc: H.E. President
National Planning Council

42p