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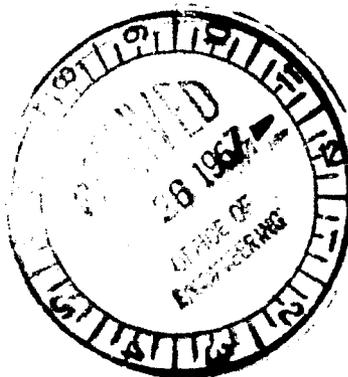
DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

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AFGHANISTAN - KAJAKAI HYDROELECTRIC POWER PLANT



AID-ILC/P-546

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

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AID-DLC/P-546
April 25, 1967

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Afghanistan - Kajakai Hydroelectric Power Plant

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed \$12,000,000 to the Royal Government of Afghanistan to finance the foreign exchange costs for the construction of a two 16.5 Megawatt unit hydroelectric generating plant at the Kajakai Dam, other attendant physical facilities in the Kandahar- Girishk area of the Helmand- Arghandab Valley, and the furnishing of technical, supervisory and training services for related Afghan electric authorities.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at a meeting on Friday, April 28, 1967.

Rachel C. Rogers
Assistant Secretary
Development Loan Committee

Attachments:

Summary and Recommendations
Project Analysis
ANNEXES A-J

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KAJAKAI HYDROELECTRIC PROJECT

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AFGHANISTAN

KAJAKAI HYDROELECTRIC PROJECT

Summary and Recommendations

1. Borrower : The Royal Government of Afghanistan with the Afghan Electric Authority as the ultimate recipient.
2. Amount of Loan : \$12.0 million.
3. Total Cost of Project and Source of Funds : Total cost is estimated at the equivalent of \$15.4 million. The foreign exchange requirement of \$12 million would be met from the AID loan. Local currency costs, estimated to be the equivalent of \$3.4 million will be provided by the Royal Government of Afghanistan. *
4. Purpose : To finance the foreign exchange costs of increasing the electric facilities servicing the Kandahar-Girishk area in the Helmand-Arghandab Valley, Afghanistan.
5. Project Description : The Project consists of (1) generating plant; (2) transmission and distribution lines; (3) substations; (4) general plant and (5) a training program. The system, into which the Project will be incorporated, now consists of small hydro and diesel stations. By 1972, when the Project commences operations, 38.4 megawatts will be available to the system.
6. Background of Activity : An AID-financed survey of the electric requirements of the Helmand-Arghandab Valley was made by a U.S. engineering firm in 1964. It is upon the recommendations of this firm that the Project is being considered.
7. Export-Import Bank Interest : On April 13, 1967, the Export-Import Bank indicated that it was not interested in considering the subject application.

*/ The exchange rate used throughout this presentation is Afghani 70 to one U.S. dollar.

8. Statutory Criteria : All statutory criteria have been met. See Annex H.
9. Recommendation : It is recommended that a loan for no more than twelve million dollars (\$12,000,000), subject to the conditions noted in Annex I, be authorized.

Capital Assistance Committee

Loan Officer: Jack M. Adelman
Engineer: Ray P. Stokely
Economist: Leonard G. Rosenberg
Counsel: John R. Liebman
Desk: Howard F. Thomas

Drafting Officers: Adelman, Stokely, Rosenberg, Thomas

-1-

I. INTRODUCTION: Helmand-Arghandab Valley Development

A. Geography - The Helmand Arghandab Valley with its numerous tributaries, located in the southwestern portion of Afghanistan, occupies nearly half of the total area of the country. (See maps of Afghanistan showing Helmand Valley Watershed following Summary and Recommendations). The Helmand River rises in a westerly extension of the Hindu Kush Mountains west of Kabul and runs southwest for about 600 miles to an inland sink known as the Seistan or Chakhansur Basin, which straddles the border between Iran and Afghanistan. The Arghandab River, the chief tributary of the Helmand, passes within a few miles of Kandahar, the principal city in the Valley, and joins the main river some 250 miles above its outlet. Most of the flow in the rivers comes from melting snows in the high mountains, which rise to elevations as high as 20,000 feet.

The Valley is in the temperate zone between latitudes 30 degrees and 34 degrees north. Land elevations vary from about 1,500 feet above sea level in the Seistan Basin to about 3,000 feet at the base of the mountains surrounding the upper part of the Valley. Average yearly rainfall in the valley areas is about four inches, most of which occurs between January and May. Temperatures range from 18 to 110 Fahrenheit, with occasional lows of 6 to 10 degrees. Humidity is normally low, and strong dry winds frequently blow in the western part of the Valley during July and August. The wide, shallow wash, stemming from cloudburst run-off, is a feature of the Valley area.

Little vegetation is to be found except in bottom lands along the river where irrigation is practiced or winter flooding occurs. Much of the area is desert, with the scant ground cover fully utilized by grazing livestock. The basin as a whole is similar in climate and appearance to the Mojave Desert in southeastern California or to the southern part of Arizona.

The Valley soils are principally alluvium or old river terrace soils, moderate to low in fertility and organic matter content. In benchland areas, the soil profile is frequently found to be thin and underlain by impermeable conglomerate. Waterlogging, with the consequent formation of saline or alkali soil areas, is a constant hazard and constitutes a prime problem in irrigation management.

The Helmand-Arghandab Valley may be reached by rail from Karachi in West Pakistan to Chaman near the Afghanistan border and then by an all-weather AID-financed road to Kandahar. An AID-financed paved all-weather road from Kabul to Kandahar is now completed. A Russian-financed concrete paved road going from Kandahar to Herat and the northern provinces has recently been completed.

The new Russian road will also connect with the planned AID-financed all-weather road from Herat to the Iranian border. Air service connects Kandahar with Kabul and other points in Afghanistan and with Quetta in Pakistan. Within the project area are 1,027 kilometers of gravel road, although many sections still need feeder roads.

B. Historical Background - There is evidence that many parts of the Valley were extensively cultivated 2,000 or more years ago and that successive hordes of invaders from the north and west destroyed large cities and major irrigation canals, rendering much of the area desolate. An exception is the area around Kandahar which has been continuously cultivated for a great many years.

The first major modern works were for irrigation of Valley lands started by the RGA in the late 1930's. This work was done with some German and Japanese help and was interrupted by World War II. After the delay caused by the war, the RGA reactivated the program and in 1946 employed an American Company to undertake surveys and plans and commenced construction. The contract provided for the reconstruction of the road from Kandahar to the Pakistan border and the reconstruction and extension of a major diversion canal from the Helmand River, known as the Boghra Canal, which had been started under the supervision of Japanese engineers in about 1937. This initial work was financed entirely by the RGA with its own resources.

Two additional contracts were awarded to the American firm in 1950 and 1954. Under these contracts, two storage dams and reservoirs, one on the Helmand River at Kajakai and the other on the Arghandab River north of Kandahar were constructed. Also included under these contracts were: (1) diversion dams and main canal systems capable of gravity delivery of irrigation water to about 300,000 acres of land; (2) the Girishk power plant at a drop in the Boghra Canal and related transmission lines; and (3) roads throughout the project areas. The contracts were financed in part by loans from the U.S. Export-Import Bank totalling \$39.5 million.

With the initial availability of completed canal systems in 1953 and at the request of the RGA, AID's predecessor agencies provided technical assistance for operation and maintenance of the canal systems and for agricultural improvements on the newly irrigated lands. In 1953, AID provided experts to assist with the necessary engineering for the design and construction of the existing canal system; and in developing operation and maintenance practices and policies enabling it to install and manage water delivery controls for efficient and dependable irrigation water deliveries. AID grant assistance to the Helmand-Arghandab Valley since the inception of the program in 1953 has been in excess of \$17 million. It is estimated that with the AID and Export-Import Bank assistance, the total investment that has been made in the Valley since the late 1930's comes to about \$115 million.

In recent years some foreign assistance and interest other than American have been displayed in the Helmand Valley. The British have provided technical and financial assistance for the establishment of a cotton gin, which is now operating, and similar assistance for the establishment of a cottonseed oil extraction plant, which is now under construction. The Czechs have assisted in the establishment of a canning factory in Kandahar and the Russians have assisted in road development toward the northeast.

C. Present Plans - Although the development of the Helmand-Arghandab Valley was begun without U. S. assistance, the program has become identified with the United States through the use of an American contractor, the substantial Export-Import Bank loans, and AID grant assistance over the last decade. The success of the program is therefore related to American prestige in Afghanistan. Political overtones are also a factor in the RGA's involvement in the program because of its very substantial investment. Beyond the political interest of both governments in the success of the program is the desire to benefit from the existing investment, obtain substantial increases in agricultural production, develop electric power, and encourage the development of industry.

II. BACKGROUND OF KAJAKAI PROJECT

In furtherance of the Helmand-Arghandab Valley Development Program, AID under a Project Agreement, agreed to provide up to \$2,778,372 of development grant funds to assist the Royal Government of Afghanistan (RGA) to accomplish the following objectives 1/.

A. Determine the most economic source of electric power in the Helmand-Arghandab Valley Region through a power survey and the preparation of electrification plans;

B. Provide a satisfactory interim power supply for the Girishk and Kandahar areas by repairing the 2400 KW hydroelectric power station at Girishk and the 1000 KW diesel electric generating station at Kandahar and training operators to assure the safe and effective use of these facilities;

C. Provide for satisfactory distribution of power from these and other sources in the area by repairing the Girishk transmission and distribution systems and the Kandahar distribution system and training Afghan personnel to operate and maintain these systems; and

D. Adopt a course of action designed to establish (1) a fully adequate public utility organization for the operation and management of the electric power system or systems in the Helmand-Arghandab Valley Region; and (2)

1/ Project Agreement No. 306-12-220-041, dated June 28, 1959. Revision No. 7, dated June 6, 1964, redefines the scope of the project and supersedes the terms and conditions of the original agreement and all previous revisions.

regulatory arrangements for the adequate control of the system(s).

Under this Project Agreement, AID contracted with R.W.Beck and Associates^{2/} (Beck) for a survey of the electric power requirements of the Helmand and Arghandab Valleys and the preparation of an electrification plan, including one or more feasibility reports, on the most economical and practical means of supplying these requirements.

In November 1964, Beck completed its Electric Power Survey Report, Helmand and Arghandab Valleys. Part I of the Report consists of an Electrification Plan - Facilities; and Part II, of an Organization and Management Plan^{3/}. In Part I, Beck recommended:

- (a) installation of hydroelectric generating units at the existing Kajakai Dam on the Helmand River;
- (b) construction of high-voltage transmission lines from Kajakai to the Kandahar and Girishk areas;
- (c) construction of new step-down sub-stations at these load centers;
- (d) construction of new and rehabilitation of old distribution facilities in the Kandahar and Girishk areas; and
- (e) installation of diesel-electric generating capacity in the Kandahar area during the interim period prior to the completion of the Kajakai hydroelectric power project and its associated transmission facilities.

In Part II, Beck recommended:

- (a) establishment of a separate Power Division in the Helmand Valley Authority (HVA) which would be responsible for the generation and delivery of power to the major load centers in the area;
- (b) establishment of two local companies, the Boghra Electric Agency and the Kandahar Electric Agency, which would buy power at wholesale from the HVA Power Division and distribute it to consumers in the Girishk and Kandahar areas;
- (c) establishment of an Afghanistan Power Commission which would regulate the activities of power supply agencies and natural gas producers and distributors; and,
- (d) the planning and implementation of an extensive training program

^{2/} R.W. Beck and Associates is a firm of engineering consultants with its principal offices in Seattle, Washington and Denver, Colorado. The contract between AID and Beck was signed on January 4, 1964.

^{3/} In January, 1967, Beck submitted revised costs estimates for the hydroelectric plant and transmission lines as well as refinements of organization and training. This supplemental study was financed under the same Project Agreement as the original study.

for the Afghan personnel who will be needed to operate and maintain the facilities recommended in Part I of the Report and to manage the organizations recommended in Part II.

As a result of Beck's recommendations, AID authorized a loan of \$800,000 to finance two-1500 KW diesel electric generators in Kandahar. ^{4/}

The RGA has now requested AID to assist in the financing of two-16.5 MW hydroelectric power units and related equipment, attendant transmission lines, and distribution lines to the Kandahar Airport. The Borrower would be the RGA which in turn would make the funds available to the Afghan Electric Authority (AEA) as the executing agency.

III. THE ELECTRIFICATION PLAN

A. Distribution and Transmission - Beck found that most of the existing distribution and transmission systems could be used in the future, although only after extensive rehabilitation. In Kandahar, these facilities consist of 3300 volt primaries and of secondaries of various voltages from 120 volts to 380 volts. There is also a short 6300 volt line from one small hydro plant (Filkoh) to Kandahar. In the Girishk area, the primary and secondary voltage is the same. There is a 44,000 volt transmission system from the Girishk Hydro plant to several load centers. The two areas to be serviced by the Project are some 80 miles apart and are not electrically connected. The distribution and transmission systems are currently undergoing an extensive rehabilitation program under the direction of the Harza Engineering Company and two U.S. technicians (hired directly by the RGA). This program, financed by AID under the grant program, is now underway and is estimated to cost \$2,000,000. Beck believes that the existing transmission and distribution lines, once rehabilitated, will be serviceable.

B. Generation - Some of the existing generation was installed in the late 1950's by an American firm with minor additions made subsequently by the RGA. Improper operating and inadequate maintenance practices plus poorly planned expansion practices have caused the deterioration of these facilities. Under the AID-grant program, the 2,400 KW hydroelectric station at Girishk and the two 500 KW diesel stations at Kandahar (Diesel "B") were rehabilitated. Also, a used 1,000 KW diesel unit was installed as a standby to the Girishk Hydro Station in 1964.

^{4/} AID Loan No. 306-H-009 was authorized February 21, 1966. Beck has been awarded the consulting engineering contract for this project.

Table I outlines generation facilities existing now and anticipated for 1970:

Table I

<u>Plant</u>	<u>Number of Units</u>	<u>Available Capacity</u>		<u>Remaining Life after 1970</u>
		<u>1966</u>	<u>1970</u>	
Kandahar:				
Filkoh Hydro	2 ^{5/}	320	-	None
Patow Hydro	1	110 ^{6/}	-	None
Diesel "A"	1	250	-	None
Diesel "B"	2	1,000	1,000	4 years
Diesel "C" ^{7/}	2	-	3,000	19 years
Girishk:				
Girishk Hydro	2	2,400	2,400	30 years
Diesel	1	1,000	1,000	None
Total		5,080 ^{8/}	7,400	

The installation of the two-1500 KW Diesel "C" units at Kandahar was recommended by Beck as an interim measure to provide power until the construction of the Project. Only the generation of the Girishk hydro units and the Kandahar Diesel "C" units can be relied upon when planning an electrification system for the area.

C. The Kajakai Dam - Completed in 1955 the Kajakai dam is located - approximately 60 miles from Kandahar and almost 80 miles from Girishk - in the foothills of the Hindu-Kush mountains. Situated in a narrow, steep walled gorge of stepped dolomite limestone, the dam is a rock-filled structure with an earth-filled core; has a maximum height of 320 feet and is 885 feet long and 33 feet wide at the top. With an ungated spillway and intake and outlet works for controlling water releases, the dam impounds an initial reservoir of 1,495 thousand acre-feet of gross storage.

^{5/} One generator burned out and beyond repair.

^{6/} Generator damage reduces useful capacity.

^{7/} To be installed in 1969.

^{8/} An additional 5,100 KW is being generated in the area by consumer-owned facilities. Since this generation is not available to the system, it is being completely discounted.

With a gated spillway, the gross storage could be increased to 2,300 thousand acre-feet.

The design capacity of the spillway is sufficient to allow a hypothetical flood with a peak inflow of 381,000 cubic feet per second to be routed through the reservoir without encroachment on the normal freeboard of the dam; or a flood with a peak inflow of 480,000 cubic feet per second could be routed without overtopping the dam.

Two horseshoe-shaped tunnels, each 34.4 feet in diameter, are located in the left abutment (looking downstream). The tunnels, unlined and about 197 feet apart, served as diversion conduits during construction of the dam. The outer tunnel operates as the irrigation tunnel and is 2,340 feet long. The inner tunnel, 1,890 feet long, has been plugged for power use. Review by Beck of snow runoff and rainfall, as well as water storage, irrigation and flood control requirements revealed that there is sufficient water available to provide at least 22 MW of firm power.

During a low water year, however, the reduced head at the dam would effectively reduce, as an example, the capacity of a 16.5 MW unit to 11 MW. Beck's investigation of prospective hydroelectric generating capacity at Kajakai was based on firm power during a low-water year. The lowest water years of record, in order, were 1947, 1962 and 1963. Firm generation at the rate of 22 MW would have been possible during these years without effecting planned irrigation or flood control. With re-regulation and a gated spillway, the ultimate firm capacity at low-water is estimated to be 16 MW which would require a total of 150 MW of installed generating capacity.

Both Beck and a representative at the U. S. Department of Interior inspected the dam in 1964 and found it well operated and maintained with minimal leakage and low siltation. Both concluded that there was nothing to preclude the installation of power generating facilities at Kajakai.

D. New Facilities Recommended by Beck - On the basis of Beck's projected power demand ^{2/}, Beck recommended, in addition to the Kandahar Diesel "C" units, (1) three - 16.5 MW hydroelectric generating units and related units to be installed at the Kajakai Dam site; and (2) construction of 11 miles of 115 KV transmission lines from the generation site to the Kandahar and Girishk substations.

^{2/} Beck's power demand forecasts are discussed in "Economic Aspects" Section.

IV. ECONOMIC ASPECTS

A. The Power Market - All electricity generation in the Kandahar-Girishk area is provided, as noted in Table I, by several small hydro and diesel stations. The market to be served by the Project would result from the current and prospective consumer demand in the area. The problem of projecting electric power demand in the Kandahar-Girishk area is made more difficult by the lack of historical and current data on even the existing small power system, the deficiency in economic information as to per capita incomes or family incomes, and the general gap in almost all forms of census-type data useful in forecasting electric power requirements (number of households, family units per household, electric appliances, etc.).

Beck classified its projections of the power requirements and the units to be served into customer groups as follows: (1) residential; (2) small commercial businesses requiring less than five Kw peak demand; (3) large commercial businesses requiring five to twenty Kw peak demand; (4) industrial businesses requiring in excess of twenty Kw peak demand; (5) street lighting; (6) government; and (7) a special category for the Kandahar Airport. Annex A summarizes Beck's projected annual kilowatt-hour sales, kilowatt-hour requirements to the system and annual peak demand for the years 1967 through 1978. ^{10/}

In order to review the Beck electric power projections, the Rural Electrification Administration (REA) undertook, at AID's request, an independent power demand survey. ^{11/} The REA report, submitted in July 1966, projected greater power demand than that projected by Beck.

In order to adopt a conservative approach, our analysis of the Kajakai project is based on the Beck demand projections and not on the higher REA estimates. Beck's projections with respect to residential, small business and the Kandahar Airport have been revised downwards. (An exception is the relocated Afghan Army Camp, which was not planned at the time of the Beck Report but was included in the REA report; it has been included in our projections.)

(1) Residential - Beck projected annual residential consumers and kilowatt-hour sales for the 1967-78 period as follows:

^{10/} Beck's electric power projections are for the years 1964-75; 1964 coincides with the completion of the report. Since, however, three years have elapsed since the completion of the report, Beck's 1964-75 forecasts have been moved forward three years to 1967-78 without adjustment of the figures.

^{11/} "Economic Appraisal Study and Power Requirements Study of Kandahar and Girishk Areas Afghanistan". A report to AID and the RGA written by Thomas M. Hill, Power Requirements Officer, Rural Electrification Administration, Department of Agriculture, July 1966.

Table II

Beck's Projected Residential Sales of Electric Power
1967-1978

Year	Consumers		Sales per Unit		Total Residential Sales	
	Number	% Increase	Kwh	% Increase	Kwh (000)	% Increase
1967	4,233		1,128		4,776	
1968	4,296	1.5	1,167	3.5	5,014	5.0
1969	4,936	14.9	1,269	8.7	6,266	25.0
1970	5,370	7.8	1,430	13.7	7,680	22.6
1971	6,349	18.2	2,054	43.6	13,039	69.8
1972	7,824	23.2	2,736	33.2	21,403	64.1
1973	8,257	5.5	2,924	9.1	24,647	15.2
1974	8,692	5.3	3,232	10.8	28,018	13.7
1975	8,928	2.7	3,443	6.8	30,739	9.7
1976	9,165	2.7	3,655	6.2	33,479	8.9
1977	9,404	2.6	3,833	4.9	36,045	7.7
1978	9,643	2.5	4,039	5.4	38,544	8.0
Average annual compounded increase				14.8%	22.3%	

Beck's projections of consumption for 1964 (moved forward to 1967 in Table II -- see note 10) of 1,128 Kwh per residential unit appear optimistic. By way of comparison, sales per residential unit were 468 Kwh per year in Kandahar City in 1965 ^{12/}, 607 Kwh per year in North Jordan in 1966 ^{13/}, and 1,315 Kwh per year in Israel in 1966 ^{14/}. Furthermore, using the 1968 estimated average rate of 3.7¢ per Kwh ^{15/}, annual sales per residential unit as shown in Table II would cost \$42 in 1967 and \$101 in 1972, which would be about 8% and 15%, respectively, of estimated annual household income ^{16/}. While information as to the availability of electric appliances now in use in the area is non-existent, the Beck estimates seem high.

^{12/} Based on the REA's Report of metered demand in two months, November and December 1965. The average for the two months was multiplied by 12 to derive the annual figures.

^{13/} Table 4, "North Jordan Estimated Power Requirements, 1961-1975". A report to AID, April 1967, written by Herschel Jones, Utility Consultant, in conjunction with Jay B. Carter, NESA/ENGR, and Arthur J. Thivierge, Jr., NESA/CDF. Hereafter this report will be referred to as the "A.I.D. North Jordan Power Requirement Study".

^{14/} "The Israel Electric Corporation", 43rd Annual Report, 1965-66.

^{15/} As informally reported by the several Afghan electric companies serving the area. See Section "Financial Aspects" which discusses the rate structure.

^{16/} Annual household income was estimated at \$514 in 1967 by assuming that there are three wage earners in each Afghan residential unit, each earning Af's. 12,000 (or \$171 at 70 afghanis = \$1.00). By 1972 the household income is projected to increase to \$656 by assuming a 5% compounded increase in income per household unit. In the Second Plan period (1962/63-1966/67), annual growth in GNP has been estimated at 3.3% per annum and at 1.5% per capita. The 5% increase in household income adopted in this report would presuppose either

Accordingly, we adjusted the Beck estimates downwards by cutting approximately in half (from 2,736 to 1,316 Kwh) the sales per residential unit for 1972. The cost of the power thus projected is about 7-8% (as opposed to 15%) of estimated average household income. The reduced level of consumption is equivalent to the 1966 level in Israel. Although it is about 60% higher than the 1972 level estimated for North Jordan in the A.I D. North Jordan Power Study, the average number of families per residential unit assumed in that study (1.3) is probably lower than the number of families per unit in the Kandahar-Girishk area.

The estimates before and after 1972 were made by assuming an average compound annual increase in sales per unit of about 16% up to 1972 and 10% thereafter. The average compound annual increase for the entire period, 1965-1978, is 14.7% which is about the same as Beck's estimate.

Applying these revised estimates to Beck's projections of the number of residential units results in an average compound annual increase in total sales of 22.7%, which again is about the same as Beck's estimate. But because our projections start from a lower base in the early years, our projection of total sales in 1978 is approximately 42% below Beck's projection for that year (22,448 Mwh as opposed to 38,544 Mwh).

Table III provides our revision of the Beck projections for residential consumption of electric power.

Table III

AID Adjusted Projected Residential Sales of Electric Power
1967-1978

Year	Consumers		Sales Per Unit		Total Residential Sales	
	Number	% Increase	Kwh	% Increase	Kwh (000)	% Increase
1965			468			
1966			542	16		
1967	4,233		628	16	2,652	
1968	4,296	1.5	728	16	3,127	17.9
1969	4,936	14.9	844	16	4,165	33.2
1970	5,370	7.8	979	16	5,257	26.2
1971	6,349	18.2	1,135	16	7,200	37.1
1972	7,824	23.2	1,316	16	10,296	42.8
1973	8,257	5.5	1,447	10	11,947	16.0
1974	8,692	5.3	1,597	10	13,828	15.0
1975	8,928	2.7	1,750	10	15,624	13.0
1976	9,165	2.7	1,925	10	17,642	12.9
1977	9,404	2.6	2,117	10	19,908	12.8
1978	9,643	2.5	2,328	10	22,448	12.8
Average annual compounded increase				<u>14.7%</u>		<u>22.7%</u>

a 7% average annual increase in GNP during the period included in the loan projections or a growth rate in the Kandahar-Girishk area above the national average (which seems more likely).

(2) Small Commercial - Beck defines small commercial business as "any unit solely or partly for conducting any business or commercial enterprise requiring less than 5 KW peak demand". Table IV below presents the Beck projections for electric power consumption by small commercial businesses for the period 1967 through 1978. 17/

Table IV

Beck's Projected Small Commercial Sales of Electric Power
1967-1978

<u>Year</u>	<u>Consumers</u>		<u>Sales per Unit</u>		<u>Total Small Commercial Sales</u>	
	<u>Number</u>	<u>% Increase</u>	<u>Kwh</u>	<u>% Increase</u>	<u>Kwh</u> (000)	<u>Increase</u>
1967	1,280		532		681	32.7
1968	1,292	0.9	700	31.6	904	32.7
1969	1,904	47.3	1,109	58.4	2,112	133.6
1970	2,216	16.4	1,900	71.3	4,210	35.6
1971	3,008	35.7	2,360	34.7	7,703	83.0
1972	3,841	27.7	3,131	22.3	12,028	56.1
1973	3,904	1.6	3,380	7.9	13,195	9.7
1974	3,947	1.1	3,600	6.5	14,208	7.7
1975	3,990	1.1	3,780	5.0	15,082	6.2
1976	4,034	1.1	3,971	5.1	16,020	6.2
1977	4,078	1.1	4,164	4.9	16,979	6.0
1978	4,122	1.1	4,379	<u>5.2</u>	18,052	<u>6.3</u>
Average annual compounded increase				<u>23.4</u>		<u>15.1</u>

As in the case of residential consumption, Beck's estimate of small commercial consumption appears too high. Beck's definition of small commercials excludes "automobile repair shops, small machine shops and other small craft shops operating a few small motors in addition to lights, electric heaters and hot plates." 18/

17/ It should again be mentioned that the load projections presented in the 1964 Beck Report were lagged by three years to take account of the approximate three years since the presentation of that report. See footnote 10.

18/ Beck's large commercial classification includes these commercial enterprises.

In 1970 and 1975 its projections are 1,900 Kwh and 3,780 Kwh, respectively. By comparison, the A.I.D. North Jordan Power Requirement Study estimated per unit annual consumption figures for commercial customers in North Jordan at 2,218 Kwh for 1970 and 3,035 Kwh for 1975, but this estimate was based on a broader definition that included in good part the Beck concept of large commercials ^{19/} as well as small commercials. Beck's projections, moreover, show a compound rate of annual increase per unit for the period 1967-1978 of 23.4%, as opposed to 14.8% for residential units. The 50% higher rate of increase for small commercial sales appears optimistic in view of the fact that the small commercial business category as defined by Beck seems to have similar characteristics to the residential category.

Our revisions cut the Beck projections for 1972 almost in half, and from that base project unit sales backwards at a 15% annual compound increase and forward to 1978 at a 10% annual compound increase. The average annual compound increase for the entire period is 14.3%, about the same as our projections in the case of residential units. Using Beck's estimate of the number of small commercial businesses, the total sales increase at an annual compound rate of 25.6% to 11,846 Mwh in 1978, as compared to Beck's increase (from a higher base) of 22.7% annually to 22,448 Mwh in that year.

Table V presents the AID adjusted estimates of small commercial sales.

Table V

AID Adjusted Projected Small Commercial Sales of Electric Power
1967-1978

Year	Consumers		Sales per Unit		Total Small Commercial Sales	
	Number	% Increase	Kwh	% Increase	Kwh (000)	% Increase
1965			613			
1966			754	15		
1967	1,280		809	15	1,035	
1968	1,292	0.9	930	15	1,201	16.1
1969	1,904	47.3	1,069	15	2,035	69.4
1970	2,216	16.4	1,229	15	2,723	33.8
1971	3,008	35.7	1,413	15	4,250	56.1
1972	3,841	27.7	1,625	15	6,241	46.8
1973	3,904	1.6	1,786	10	6,972	11.8
1974	3,947	1.1	1,364	10	7,751	11.2
1975	3,990	1.1	2,160	10	8,618	11.2
1976	4,034	1.1	2,376	10	9,584	11.2
1977	4,078	1.1	2,613	10	10,655	11.2
1978	4,122	1.1	2,874	10	11,846	11.2
Average annual compounded increase				<u>14.3%</u>		<u>25.6%</u>

^{19/} Which Beck defines as any unit used solely or partly for conducting any business or commercial enterprise requiring 5 KW through 20 KW peak demand.

(3) Kandahar International Airport and the Afghan Army Camp - Beck's projections for the Kandahar Airport increase from 2,190 Mwh in 1972 to 5,250 Mwh in 1978, or an increase of 140% . Since the relocation of the Army Camp was not planned at the time of the Beck Report, Beck did not include this prospective consumer. The REA Report, however, projected consumption of the Army Camp at 4,730 Mwh in 1972, increasing to 7,370 Mwh by 1976.

Since the airport has failed to attract additional traffic over the past several years, the prospects of its increasing its current operations substantially would appear to be negligible. The uncertainty at this time of the facilities to be incorporated into the relocated Army Camp plus the fact that the relocation is planned to take five years add an element of doubt to the Army Camp's power requirements as projected by REA.

Accordingly, to be conservative, we adjusted Beck's projection for the airport to hold firm at the 1974 level of 3,500 Mwh and reduced the REA projection for the Army Camp to a maximum of 3,300 Mwh.

(4) Summary of Projected Total Sales and Total Generation Required - Annex B summarizes AID's adjusted projected annual kilowatt-hour sales (by classification), kilowatt-hour requirements to the system and annual peak demand for the years 1967 through 1978. Table VI compares, on an annual basis, the Beck's projection and the AID adjustments of these (and the REA) projections for total sales and total gross generation required. The only adjustments in demand estimates are those summarized in paragraphs (1) -(3) above; Beck's projections for large commercial businesses, industrial businesses, street lighting and government consumption were not revised.

Table VI

Beck's and AID's Adjusted Projected
Total Sales and Total Generation Required
1967-1978

(in thousands of Kwh's)

<u>Year</u>	<u>Total Sales</u>		<u>Total Generation</u>		<u>Adjusted as % of Beck</u>
	<u>Beck</u>	<u>Adjusted</u>	<u>Beck^{20/}</u>	<u>Adjusted^{21/}</u>	
1967	11,360	9,590	12,483	11,987	96.0
1968	11,987	10,397	13,162	12,996	98.7
1969	18,146	15,968	19,918	19,960	100.2
1970	24,665	18,565	27,049	23,206	85.8
1971	34,903	23,427	38,289	29,283	76.5
1972	49,977	36,401	54,763	45,501	83.1
1973	55,648	40,465	61,057	50,581	82.8
1974	61,401	44,052	67,367	55,065	81.7
1975	66,308	47,509	72,733	59,486	81.8
1976	71,391	51,538	78,311	64,422	83.5
1977	76,027	55,546	83,373	69,432	83.3
1978	80,981	59,829	88,824	74,786	84.2

B. Alternatives of Supplying Power - On the basis of the AID adjusted projections and the resultant load demand, the alternative means of supplying the required power are:

1. The installation of two 16.5 MW hydro units at Kajakai Dam and attendant transmission lines to Kandahar and Girishk; with an additional 16.5 MW unit installed in 1977 - Hydro Development "A".
2. The installation of three 16.5 MW hydro units at Kajakai Dam and attendant transmission lines to Kandahar and Girishk - Hydro Development "B"
3. The periodic installation of a series of 1.5 MW and 2.0 MW diesel units at Kandahar and Girishk - Diesel Development.
4. The installation of three 11 MW steam generating units at Kandahar and attendant transmission lines to Girishk - Thermal Development.

^{20/} Includes 9-10% loss.

^{21/} Includes 20% loss.

The present worth of the cost streams for each alternative was computed with the results summarized in Table VII. 22/

Table VII

	<u>Summary of Present Worth of Costs</u>			
	<u>1968-2007</u>			
	(present worth at 8 percent)			
	Hydro Development "A"	Hydro Development "B"	Diesel Development	Thermal Development
<u>(000)</u>	<u>(000)</u>	<u>(000)</u>	<u>(000)</u>	
Hydro Units and Transmission Lines	\$12,660	\$13,306		
Diesel Units	763	517	\$ 4,466	\$ 517
Thermal Units				13,438
Operating Costs (incl. fuel)	<u>3,700</u>	<u>3,737</u>	<u>14,024</u>	<u>10,018</u>
Total Costs	\$17,123	\$17,560	\$18,490	\$23,973

A comparison of the alternatives' present worth of total costs reveals that the cheapest means of supplying the necessary generation would be the installation of the two 16.5 MW units at Kajakai Dam in 1972 and deferring the remaining unit until the load increases. 23/

22/ An explanation of the method and assumptions employed as well as the detailed findings is attached as Annex C.

23/ Several other alternatives were investigated and rejected for obvious technical reasons and/or the inability to meet demand. These were two 25 MW units at the Kajakai Dam; a hydroelectric installation at the Arghandab Dam; extension of the Girishk hydroelectric plant; and a hydroelectric installation at the Baba Wali wasteway.

V. THE PROJECT

The Project consists principally of two 16.5 MW turbine generator units at the Kajakai Dam plus 110 miles of 115 KV transmission lines from the Kajakai Dam to the Kandahar (63 miles) and Girishk (47 miles) load centers. The detailed description at the Project, which also includes training and distribution lines is in Annex D.

A. Costs - The estimated costs of the Project, including contingencies, are:

Table VIII

Cost Estimates^{24/}
(in thousands of dollars or dollar equivalents)

	<u>Foreign Exchange</u>	<u>Local Currency</u>	<u>Total</u>
Generating Plant	\$5,864.4	\$2,105.2	\$7,969.6
Transmission and Distribution Lines	2,690.0	700.0	3,390.0
Substations	1,500.9	192.5	1,693.4
General Plant	409.0	83.6	492.6
Training Program	<u>1,535.7</u>	<u>318.7</u>	<u>1,854.4</u>
Total	\$12,000.0	\$3,400.0 ^{25/}	\$15,400.0

B. Generating Capacity - Upon completion of the Kajakai Project, the installed and firm capacity of the system would be 38.4 MW and 11.0 MW, respectively. Table IX compares the capacities of the system with the adjusted maximum demand.

^{24/} A detailed breakdown of all costs, except the distribution lines and the training program, are attached as Annex E.

^{25/} The equivalent of \$292.2 thousand in RGA-owned Pakistan rupees and \$3,107.8 thousand in Afghan afghanis.

Table IX

Installed and Firm Capacity of the System and Maximum Demand
1972-1981

(All figures in megawatts)

Year	Installed Capacity			Firm Capacity ^{27/}		Maximum Demand
	Existing ^{26/}	Kajakai Hydro	Total	Design	Low Water	
1972	5.4	33.0	38.4	21.9	16.4	11.6
1973	5.4	33.0	38.4	21.9	16.4	12.8
1974	5.4	33.0	38.4	21.9	16.4	14.0
1975	5.4	33.0	38.4	21.9	16.4	15.1
1976	5.4	33.0	38.4	21.9	16.4	16.4
1977	2.4	49.5	51.9	35.4	24.4	17.7
1978	2.4	49.5	51.9	35.4	24.4	19.0
1979	2.4	49.5	51.9	35.4	24.4	20.6
1980	2.4	49.5	51.9	35.4	24.4	22.3
1981	2.4	49.5	51.9	35.4	24.4	24.1

Table IX reveals that through 1976 the two 16.5 MW units, along with the existing generation, will be adequate to supply the maximum demand even during a low water year - when each hyar unit can be operated at only two-thirds of design capacity (11 MW instead of 16.5 MW). ^{28/} If, in 1977, an additional 16.5 MW unit is installed at Kajakai (allowing the re-commissioning of the Diesel "C" units), firm capacity -- during a low water year -- would be sufficient to satisfy maximum demand through 1981.

^{26/} The Kandahar Diesel "C" (3.0 MW) and the Girishk hydro units (2.4 MW).

^{27/} Defined as the capacity available if the largest unit of the system is out of service.

^{28/} See "III. The Electrification Plan" which, under "C. The Kajakai Dam", describes the significance of the low water years.

C. Mobilization - The construction of the Kajakai Project and associated facilities will involve earthwork, reinforced concrete and steel structures for the powerhouse; extensions to the power tunnel with attendant rock excavation; penstock construction; installation of mechanical, electrical and hydraulic equipment; construction of transmission lines, switchyard and substations; construction of general plant facilities and permanent housing for personnel. This work will require a full range of construction skills as well as a wide variety of construction materials and equipment.

The presence of foreign construction firms in Afghanistan during the past has served to create a small pool of skilled manpower with varying degrees of training. This is particularly true in the Valley where many learned their skills in the highway construction program. Among these are some who have the capability of serving as foremen and supervisory personnel. The Afghan Construction Unit has also assisted materially in continuing to improve the availability of trained men in the construction field, both in the Valley and in other areas. It may be in a position to subcontract for some of the work where the construction schedule permits.

The successful U.S. contract bidder or bidders for the work contemplated under the Kajakai Project will have to provide a complete construction staff so that the work will adhere to an established schedule. In about a year, Afghan personnel should be ready to assume some of the duties initially performed by foreign nationals.

One of the main purposes of an on-the-job training program should be to select and prove the ability of future line crews, metermen, power plant operating and maintenance crews, warehousemen and supervisory personnel who would ultimately be employed by the various power supply authorities.

With the exception of sand, gravel, rock and fill material all material must be imported. This will result in sizeable transportation cost. Although some cement is produced in Afghanistan, it can currently be used only in non-structural areas due to the wide variation in its quality. The improvement of quality and use of Afghan cement should be further investigated prior to the time construction work is actually scheduled to begin order to realize to the extent possible any savings in the cost of cement used in the project.

The lack of both timber and steel locally and the availability of good cement for the manufacture of concrete poles will be a factor in determining the final selection of materials for the electric power transmission line. Transportation costs, useful life and maintenance were factors in concluding that pressure-treated creosoted wood poles were the most suitable material for transmission line structures.

Special cranes and heavy material handling equipment as well as many standard varieties of motor vehicles will be required during construction. The tunnel and transmission line construction require specialized equipment. Almost without exception, this equipment would have to be imported. Although trucks have been imported recently from several different countries, these are suitable only for the transport of bulky boxed materials and commercial supplies and would not be appropriate for construction work.

Heavy equipment remaining in Afghanistan from previous construction programs has, in the past, been used to good advantage by the Afghan construction units. However, since maintenance of such equipment is a problem, facilities presently available at the Kajakai Reservoir should be considered; and assuming that the Afghan authorities would be agreeable, a substantial cost saving could be achieved by utilizing such facilities. Some rehabilitation, however, may be required to suit the special needs of the project and to up-date the facilities.

The facilities at Kajakai Reservoir which were constructed at the time the dam was installed are now 12 to 13 years old. Stone construction was used primarily and the maintenance program of the Helmand-Arghandab Valley Authority has kept them in good condition. These facilities could also be used for housing operating personnel at the completion of the project in order to minimize costs for additional facilities. Some additional housing may be required, however, if the use of these facilities for recreational purposes is continued. There are no existing power facilities in the Kajakai area other than a small 93 kva service generator in the Kajakai dam valve house. This unit should continue to be available for lighting and general purpose use in the present camp area. Additional portable diesel generating capacity would have to be supplied by the powerhouse and power tunnel portions of the project and other construction needs.

Based on known geological conditions, no unusual or difficult construction problems should be encountered in the Kajakai powerhouse construction or other phases of the work, including the power tunnel and transmission lines. Similarly, there would be very little, if any, adverse weather conditions which would hamper normal construction schedules of the type and scope described herein.

The road which branches off from the main Kandahar-Girishk highway and then extends up the Helmand River Valley to the Kajakai dam site is an all-weather gravel road. Extra-heavy rainstorms may cause occasional washouts but these can be repaired. The road is suitable for the transport of all types of equipment and material to the construction site of the powerhouse. Access for construction of the transmission line between Kajakai and Kandahar is somewhat more difficult with some deep washes and fairly rugged terrain being noted. The old construction road which ran from just below the Arghandab dam across to the Kajakai dam can be rehabilitated where necessary and can be utilized for access to the proposed transmission line right-of-way. The transmission line route between Kajakai and Girishk is readily accessible from the roads in the Valley, and there are no difficult terrain conditions involved.

Local trucking firms could offer proposals to haul bulk and boxed materials and commercial supplies, including foodstuffs, household equipment and office supplies. It would, however, be advisable for the construction contractor to establish initially its own truckline and perhaps gradually phase it out if warranted by satisfactory experience with local truckers. The possibility does exist of contracting with the construction unit of HAVA for hauling supplies and heavy equipment, but their present stock of transportation equipment may need to be supplemented because of other construction commitments.

The closest seaport is Karachi, Pakistan. At this port, most construction materials can be loaded onto freight cars and hauled approximately 600 miles by rail to Chaman, Pakistan. A road exists from Karachi to Chaman, but it crosses mountainous country and truck travel would be slow. At Chaman, equipment and materials must be loaded onto trucks for road transportation for approximately 180 miles to the Kajakai dam site.

Four other alternate routes that could be considered are:

- a. By rail from Karachi to Quetta then by truck to Kandahar and Kajakai.
- b. By truck from Karachi to Kandahar and Kajakai.
- c. By rail for Khorramshar to Tehran and Meshed, Iran and then by truck to Herat, Kajakai, and Kandahar.
- d. By rail from Karachi to Peshawar, Pakistan and then by truck by Kabul and Kandahar, and Kajakai.

A normal delivery time for materials and supplies by surface means from the United States to the Project site would be three to four months. Air shipment, if they are properly expedited at Beirut, can be received in about ten days.

D. Plan for Execution of the Project - The construction of the transmission lines is a particularly specialized operation as is the rock excavation for the power tunnel emphasizing the need for an experienced general contractor or contractors to undertake applicable phases of the work, each with a centralized responsibility. In this regard, a maximum of two prime contracts should be let; one for the powerhouse work and one for the transmission lines and related facilities such as the switchyard. These two elements could be constructed simultaneously.

Construction of the facilities required for the power development at Kajakai can be accomplished by conventional procedures. The reservoir can be

drawn from approximately October to March following the peak irrigation season for construction of the intake shaft excavation and construction of the lower section of the intake structure and bellmouth. The contractor would then have the option of installing the gate and trashracks during this same season or providing a temporary bulkhead utilizing the embedded gate steel of the trash-rack. With a temporary bulkhead installation, the intake gate, gate hoist, gate guides and trashracks can then be installed the following season. Access to the shaft portal is available along the berms on the upstream face of the dam from the access road on the right abutment. Additional access road construction will be required on the left abutment for access to the deck of the intake and to the switchyard area.

Extensive geological investigations were conducted during construction of the Kajakai dam. Foundation borings consisted of 12 holes in the river channel and one horizontal hole in the left abutment. These investigations and the nature of the rock encountered in the tunnel excavations have revealed the consistent excellent quality of the rock. Consequently, no unusual or costly foundation problems are expected to be encountered in the shaft and powerhouse area prior to construction. Grouting of the new intake bellmouth and the new tunnel plug for the penstock installation in the existing power tunnel will be required.

Unwatering of and construction in the powerhouse area can be accomplished by constructing a cofferdam. The cofferdam will extend across the river upstream of the location where spillway flows and irrigation releases empty into the Helmand River. The top of the cofferdam will be approximately 100 meters long and 8 meters above the streambed. Tailrace excavation can be performed in the unwatered area behind the cofferdam. Access will be available to both ends of the powerhouse during construction.

Construction of the transmission lines, switchyard and installation of related electrical equipment could take place as the powerhouse work is proceeding. The general plant and permanent housing structures can start to function as planned when power is placed on the transmission line at Kajakai.

The Kajakai Project requires the services of an engineering firm with experience in the actual design of major hydro-electric facilities and associated transmission facilities. Also, the firm should have had experience in consultation on the operating and management functions of public utility systems as the operating entities proposed herein must be developed while the construction work is in progress.

The final success of the system requires that its projects not only be well-designed and constructed, but that its management be carefully guided and closely supervised in the critical early years of its growth. Careful training of the Afghan employees in the management of money, manpower and maintenance will be one of the keys to the ultimate success of the entire undertaking as is more fully discussed later. (See Training and Advisors).

Design and construction should be separate responsibilities. The design firm should have the responsibility for preparation of all design drawings and specifications, and should handle all bidding procedures through the awarding of contracts. After the construction contract or contracts have been awarded the same engineering firm should supervise the construction doing all necessary expediting, inspecting, testing and periodic reporting to the owner. The responsibility for budget control during the construction period should also rest with this firm.

During the construction period, Afghan personnel who are being trained under the training program, could be assigned in a training status at the construction site. These same men would, upon completion of training, assume responsibilities in connection with the operation of the generating and transmission facilities. For example, future operating personnel could be utilized as assistant inspectors during the period in which the powerplant equipment is being installed to assist in their familiarization with the plant and equipment. Such a training arrangement could contribute materially to the development of trained operating and maintenance staffs. The engineering design firm serving as consultant should assist in preparing the final list of bidders after prequalifications are met.

The basic relationship between the engineering design firm and the implementing authority would be one of consultant and client with regard to matters involving relationships with third parties such as contractors. As an option, and in the interest of providing more complete services, the engineering design firm could also be designated as its agent. As such, a greater amount of authority in connection with all matters pertaining to the execution of the project would rest with the design firm which would have familiarity with the details involved in such a major undertaking.

For the physical facilities, one or more U.S. consulting engineering firms will be required to perform the following:

1. Prepare detailed designs for equipment and construction services.
2. Prepare tender documents for equipment and construction services.
3. Supervise bidding and make recommendations to the owners with respect to the award of contracts for equipment and construction services.
4. Monitor contract execution and contract administration with respect to equipment and construction services contracts.
5. Supervise construction including expediting, inspecting, testing, budget control, and reporting.
6. Schedule and supervise acceptance tests.
7. Supervise initial operations.

8. Optionally, act as the owner's agent.

In the performance of the above duties, the consulting firm shall take particular cognizance of (a) transportation difficulties to and within Afghanistan (b) the experience of Afghans in performing tasks required (c) the need for unsophisticated but highly reliable equipment and materials and (d) the possibility of alternate routing of the transmission lines.

For operating, management, and training assistance the consulting engineer will:

1. Prepare an outline of the training program.
2. Assist in screening Afghan personnel to be assigned for training.
3. Arrange for training both in and outside of Afghanistan.
4. Review training possibilities in neighboring countries such as Iran and determine how such possibilities can be effectively used.
5. Determine the need for and supply U.S. advisors during construction and the first years of operation.

Instead of the consulting engineer, one of the public or private U.S. power groups could be retained for this assistance.

Assuming that the loan agreement is signed and the conditions precedent for initial disbursement (to fund the costs of the consulting engineer) are met by September, 1967, the following general schedule is anticipated:

<u>Function</u>	<u>Date</u>
Engineering Design Begins	January, 1968
Procurement Begins	July, 1968
Construction Begins	May, 1969
Construction Completed	November, 1971

VI. THE BORROWER AND IMPLEMENTING AGENCY

The Borrower will be the Royal Government of Afghanistan (RGA) and the ultimate recipient of the loan funds will be the Afghan Electric Authority, an agency reporting to the Minister of Mines and Industry.

The Afghan Electric Authority (AEA) was formed in 1966. AEA was established to coordinate the Afghan electric industry as well as operate existing and establish new power facilities. In the case of private individuals and institutions, AEA has the authority to licence power production and distribution.

The Kandahar Electric Agency (KEA) and Boghra Electric Agency (BEA) are expected to purchase the power wholesale from Kajakai, and, as distributing branches of AEA, will sell the power to the ultimate consumer. KEA, the proposed successor of the Kandahar Electric Company, and BEA, the successor of the Girishk Electric Company, will service the Kandahar and Girishk areas, respectively.

It is expected that AEA will be the implementing agency for the construction and operation of the Kajakai Project. However, since AEA, at least at this time, has no construction complement, the actual construction may be done by the construction unit of the Helmand-Arghandab Valley Authority (HAVA) under the supervision of AEA.

The ultimate responsibilities of the several authorities are not firm now. Thus, it is not possible to detail the required staffing of each organization. However, it is expected that these responsibilities will be firm by the time the loan funds for the construction phase of the project will be disbursed.

AID Manual Order 1052.1 provides that if an AID loan is made for a revenue producing enterprise, relending arrangements should be set. Although the expected executing agency, AEA, is revenue-producing, it is budget-financed by the RGA and, thus, has no authority to borrow money.²⁹ Accordingly, a waiver of this provision will be requested of the Administrator, as part of the Loan Authorization.

^{29/} See, however, Annex G which sets out the prospective ability of the system to repay the loan.

VII. FINANCIAL ASPECTS

A. Financial Management - The financial management practices of the Afghan Electric Authority (AEA) and its distributing branches, the Kandahar Electric Agency (KEA) and the Boghra Electric Agency (BEA), are seriously deficient. As noted in more detail in the following section, meaningful accounts are not kept and there is no apparent rationale for setting rates for electric service. The integrated system of budgets, accounts, records and reports, and audits that is necessary to manage an effective business operation is totally lacking. Owing to pilferage and an inefficient system of metering, billing, and collections, it has only been since 1965 that the operating authorities have received payment for more than fifty percent of the power they have generated. The authorities' daily operations are characterized by an absence of cost-consciousness.

KEA and BEA, with virtually no control over their finances, remit their entire gross revenue to AEA. The parent company, in turn, provides its branches with sufficient funds to cover their operating and administrative expenses and the actual cost of renewals and replacements. The revenues and costs of KEA and BEA are included in those of AEA.

B. Accounts and Rates - A West German consulting firm, Vorm W. Lahmeyer & Company, studied AEA's accounts and found that they were incomplete and unreliable. Lahmeyer's principal findings are summarized below:

Cost accounting is not understood and no costing is undertaken. The concept of depreciation in value of capital assets is unknown. These assets retain their original value until they are completely destroyed or become unserviceable. In the case of repairs of plant and equipment the materials used are added to the value of the object repaired but no allowance is made for the cost of labor, even in connection with building projects. The common accounting practice is single-entry bookkeeping and the bad handwriting and manner in which records have been changed renders even these accounts practically illegible. Because of inadequate original entries the valuations of assets shown in the balance sheets are highly unreliable.

The Mission has also reviewed statements prepared by the authorities and found that they were based on data unsystematically collected and organized, were not developed through accepted public utility accounting practices, and thus, did not provide valid insights into the authorities' financial operations.

Beck made some projections indicating the estimated cost of power generated in the area; however, these alone do not provide a sound basis for estimating probable levels of sales, costs and resultant profits.

Although the Afghan authorities recently advised that the system rate, when roughly weighted by classification and distribution, is 3.7¢ per Kwh, no effort seems to be made to establish a relationship between rates and costs of delivered power. The present accounting system does not present an accurate record of the costs of delivered power. Although there is evidence to suggest that the determination of such costs would guide the establishment of rates if they were available, the setting of rates now appears to be arbitrary. AEA with the assistance of foreign advisors will undertake to establish rates based upon accepted public utility accounting practices and policies.

C. Present and Future Earnings - Owing to the absence of meaningful financial data, only the most general comments can be made about the earnings picture of the authorities. The cost of generating power in the system is undoubtedly high. Diesel and small hydro units provide the bulk of the base-load. The diesels, for the most part, are relatively old, small, high-speed generators using expensive fuel. These factors contribute to a high cost of producing power even though indirect expenses are not prorated and added to direct operating costs.

The cost of delivered power at this time would be even higher if KEA and BEA were obliged to pay indirect charges for which utilities are normally accountable. For example, neither authority is required to repay or pay for the use of capital advanced for the construction of facilities since these funds have been either donated by the RGA or by foreign assistance grants. By virtue of these indirect subsidies, it is possible that the distributing agencies have been able to pay their own way on a cash basis, and have not needed to turn to either AEA or the RGA to make up cash deficits. This could be true even though the distributing authorities have not received revenue for a significant portion of the power generated. The Mission reports that KEA and BEA are now engaged on a program that is geared to further increases in the rate of collection.

If KEA and BEA are to generate sufficient revenue not just to break even on a cash basis, but to offset realistic depreciation charges, pay a reasonable return on invested capital, and perhaps even put some money aside for future capital investments, the rate of collection must climb appreciably and/or the rates raised. The latter may not, however, be practical since it may inhibit power consumption and encourage pilferage.

Given the absence of data on current operations, it is not possible to be precise in assessing the impact of the proposed loan upon earnings of the system. However, a discussion of the earnings of the system is found in Annex G.

VIII. TRAINING AND ADVISORS

There is a widespread shortage of individuals skilled in the management and operation of utilities in Afghanistan. The complexity of the many tasks involved in administering, operating and maintaining the proposed system is such that employees without adequate training or experience would not be able to provide uninterrupted service to customers. Thus a deficiency in properly and adequately trained personnel could seriously limit the functioning of Kajakai. Beck included certain recommendations for training of Afghan personnel in management and operations and recommended a comprehensive five-year training program, supervised by U.S. advisors, for the years 1968-1972.

A. The Training Program - The program would provide training of managerial, technical, supervisory and administrative personnel of the Afghan Electric Authority (AEA), Kandshar Electric Agency (KEA) and Boghra Electric Agency (BEA); and would consist of the following:

- (1) Assignment of top-level Afghan managerial and technical personnel (already proficient in the English language) to a comparable utility firm in the U.S. for a period of twelve months;
- (2) An intensive 18-month English language course in Afghanistan for supervisory and administrative personnel, followed by twelve months of technical training in the U.S.; and
- (3) On-the-job training for all Afghan personnel during the construction phase of the Kajakai project using Afghans trained in the U.S. as instructors.

Training in the U.S. for managerial and technical personnel would be distributed over the first three years of the program (1968-1970). This would minimize the effect of the program upon the current duties of the trainees. The English language training for supervisory and administrative personnel would simultaneously take place during the first year of the program (1968) with these personnel receiving training at the U.S. utility during the following year (1969). The on-the-job training phase would commence in the third year and continue to the end of the program (1970-1972).

Implementation of the proposed training program would be conducted by a U.S. consulting engineering firm or a U.S. power utility. Beck recommends that the implementing group should investigate the possibility of providing some of the training in Iran as a possible means of reducing dollar costs of training.

B. U.S. Advisors - Since operation and administration of a utility system requires experienced personnel not yet available in Afghanistan and since the training program will require several years to produce trained people, U.S. advisors with extensive backgrounds in utility management and operations will assist Afghan personnel to insure an orderly beginning of the new power facilities and administration and operating agencies. The U. S. advisors will train and assist their Afghan counterparts in utility management, operation and maintenance for a five-year period beginning in 1968.

Twelve U.S. advisors, representing 35 man-years, will assist the several Afghan power authorities, including AEA, in management, transmission and distribution. Since the functions of these various agencies, are not, at this time clearly defined, it is impossible to specify the exact responsibilities and positions that will be required of the U.S. advisors other than supervising the training of Afghan personnel. Moreover, the activities of the advisors to AEA would have to be coordinated with those of other foreign advisors to that authority. However, it will be required, prior to the disbursement of funds beyond those necessary for the consulting engineer, that the appropriate Afghan authorities, after consultation with the consulting engineer, submit, for AID's approval, their recommendations of the duties to be assumed by the U.S. advisors.

Since the need for the U.S. advisors is expected to diminish as the Afghans become familiar with their assignments, the program calls for a phased withdrawal of the U.S. advisors by the end of the five-year period, 1973. However, it is intended that, prior to the completion of the five-year period, a review of the several authorities' operations will be made in order to determine the advisability of continuing the advisors for an additional period. The RGA will be asked, as a condition to the Kajakai loan, to agree to undertake such a review and to supply the necessary funds for the continuation of the advisors, if required.

C. The Cost of the Training Program and U.S. Advisors - Table X outlines the costs of training programs and U.S. advisors. Detailed costs may be found in Annex F^{30/}

Table X

Cost of Training and U.S. Advisors
(in thousands of dollars)

	<u>Foreign Exchange</u>	<u>Local Currency</u>	<u>Total</u>
Afghan Personnel	\$ 265.5	\$182.0	\$ 447.5
U.S. Advisors	1,117.3	103.2	1,220.5
Contingencies	<u>152.9</u>	<u>33.5</u>	<u>186.4</u>
Total	\$1,535.7	\$318.7	\$1,854.4

^{30/} Annex F includes interest charges which should be deducted.

IX. DISBURSEMENT SCHEDULE

The estimated schedule for issuance of letters of commitment and disbursement of the loan is: (in thousands of dollars)

U. S. Fiscal Year	<u>Letters of Commitment</u>			
	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
	\$1,380	\$2,520	\$4,200	\$3,900

U. S. Fiscal Year	<u>Disbursements</u>				
	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>
	\$ 720	\$1,320	\$3,720	\$4,680	\$1,560

X. IMPACT OF LOAN ON U.S. ECONOMY

All of the equipment, components, spare parts, materials and services to be financed under the proposed loan will be purchased in the U. S. The initial effect on the U.S. balance of payments will be neutral. This procurement will, however, create a demand for additional parts, materials and supplies produced in the U.S. which will continue during the estimated life of the project. Also, since the Afghan operation and maintenance crews will have been trained in the use of American equipment and since spare parts inventories will contain U.S. components, it is likely that future equipment orders will be placed in the U.S. with non-A.I.D. funds. Thus the long-term effect of the project on the U.S. balance of payments will tend to be favorable.

XI. EFFECT OF LOAN ON PRIVATE ENTERPRISE

The loan proceeds will be used to purchase equipment and services from U.S. firms and thus will have a favorable effect on U.S. private enterprise. In Afghanistan the equipment will be used by a public utility agency and will have no direct impact on private business or credit institutions. The project's ultimate purpose, however, is to assist in developing a viable economy, including private entrepreneurs, in the area. In addition the training received by Afghan personnel may help create a reservoir of skills from which private as well as public institutions will benefit.

XII. REPAYMENT PROSPECTS OF AFGHANISTAN

Afghanistan's present foreign debt totals about \$355 million.^{31/} Annual debt service will be \$ 8.0 million in 1966-67 (or about 10 percent of total export earnings), \$14.0 million in 1967-68, and rise to a level of \$24.0 million in 1968-69. By 1970 and thereafter, the annual service will be

^{31/} The \$355 million represents that amount of loan funds that have been disbursed. The equivalent of \$555 million has, thus far, been authorized to Afghanistan by all foreign lenders.

about \$12-13 million reflecting resumption of full servicing on Soviet debt. Servicing of the Soviet debt is expected to be more than offset by exports of natural gas to the Soviet Union from 1968 onward. Afghanistan's international liquidity position presently stands at \$44.0 million, consisting of \$37 million of gold holdings and \$17 million in convertible foreign exchange. Convertible exchange holdings are up from \$9 million at the end of 1965 as a result of increased exports to the multilateral area, increased value of karakul exports in particular, and a slight decline in commercial imports from the same area. Afghanistan currently maintains a positive commercial trade balance of \$12-13 million annually with all currency areas, of which about \$6 million is held with the convertible currency area. This trend toward increased multilateral trade is expected to continue, and probably increase as further export incentives are provided for karakul, cotton and other important agricultural exports, and bilateral trade balances persist in Afghanistan's favor. Non-commercial imports from Bloc and Western countries are expected to decline somewhat in the future as large capital infrastructure projects are completed. Principal and interest payments on U.S. Development Loans and Export-Import Bank loans to Afghanistan, total \$55.0 million, are currently being made as scheduled. The prospects for repayment of the proposed loan appear favorable.

ANNEX A

BECK'S ANNUAL PROJECTED TOTAL SALES BY CLASSIFICATION,
TOTAL REQUIRED GENERATION AND MAXIMUM DEMAND OF ELECTRIC POWER ^{1/}
1967 - 1978

(All figures are in megawatt-hours except Maximum Demand which is in megawatts)

Year	Residential	Small Business	Large Commercial	Street Lighting	Industrial	Government	Kandahar Airport	Total Sales	Total Required Generation ^{2/}	Maximum Demand
1967	4,776	681	439		4,256	1,708		11,360	12,483	4,294
1968	5,014	904	466		4,308	1,315		11,987	13,162	4,487
1969	6,266	2,112	505	168	7,626	1,469		18,146	19,918	6,345
1970	7,680	4,210	726	333	7,939	1,587	2,190	24,665	27,049	8,075
1971	13,039	7,703	848	495	8,454	2,174	2,190	34,903	38,289	13,236
1972	21,403	12,026	1,063	652	9,621	2,582	2,630	49,977	54,763	15,108
1973	24,647	13,195	1,192	807	9,971	2,776	3,060	55,648	61,057	16,571
1974	28,018	14,208	1,293	905	10,483	2,994	3,500	61,401	67,367	18,057
1975	30,739	15,082	1,449	1,032	10,841	3,225	3,940	66,308	72,733	19,427
1976	33,479	16,020	1,517	1,097	11,463	3,432	4,380	71,391	78,311	20,605
1977	36,045	16,979	1,624	1,193	11,748	3,618	4,820	76,027	83,373	21,741
1978	38,944	18,052	1,703	1,288	11,948	3,736	5,250	80,981	88,824	22,986

^{1/} Excludes the "rural" projections.

^{2/} Includes 9 - 10% loss through transmission and distribution.

ANNEX B

AID ADJUSTED ANNUAL PROJECTED TOTAL SALES BY CLASSIFICATION,
TOTAL REQUIRED GENERATION AND MAXIMUM DEMAND OF ELECTRIC POWER
1967 - 1981

(All figures are in megawatt-hours except Maximum Demand which is in megawatts)

<u>Year</u>	<u>Residential</u>	<u>Small Business</u>	<u>Large Commercial</u>	<u>Street Lighting</u>	<u>Industrial</u>	<u>Government</u>	<u>Kandahar Airport</u>	<u>Afghan Army Camp</u>	<u>Total Sales</u>	<u>Total Required Generation</u> ^{2/}	<u>Maximum Demand</u>
1967	2,652	1,035	439		4,256	1,208			9,590	11,987	3,050
1968	3,127	1,201	446		4,308	1,315			10,397	12,996	3,290
1969	4,165	2,035	505	168	7,626	1,469			15,968	19,960	5,085
1970	5,257	2,723	726	333	7,939	1,587			18,565	23,206	5,900
1971	7,206	4,250	848	495	8,454	2,174			23,427	29,283	7,460
1972	10,296	6,237	1,063	652	9,621	2,582	3,350	2,600	36,401	45,501	11,600
1973	11,947	6,972	1,192	807	9,971	2,776	3,500	3,300	40,465	50,581	12,800
1974	13,828	7,751	1,293	905	10,483	2,994	3,500	3,300	44,052	55,065	14,000
1975	15,624	8,618	1,449	1,032	10,841	3,225	3,500	3,300	47,589	59,486	15,100
1976	17,642	9,548	1,517	1,097	11,466	3,432	3,500	3,300	51,538	64,422	16,400
1977	19,908	10,655	1,624	1,193	11,748	3,618	3,500	3,300	55,546	69,432	17,680
1978	22,448	11,846	1,703	1,288	11,948	3,796	3,500	3,300	59,829	74,786	19,000
1979									64,913 ^{1/}	81,142	20,600
1980									70,431	88,039	22,300
1981									76,418	95,552	24,100

^{1/} Extrapolated to 1981 at an 8½% annual increase.

^{2/} Includes 20% loss through transmission and distribution.

COMPARISON OF HYDRO, THERMAL, AND DIESEL POWER ALTERNATIVES ^{1/}

Method - The task is to compare alternative ways to produce electricity to meet the same expected demand, and the economic selection problem is simply to determine which way is the cheapest. It is assumed that the expected demand for power must be met. The question is not whether to invest in power or in some other sector but rather which type of power investment represents the best use of resources given the decision to invest in power. In other words, benefits from the investment, however measured, are the same regardless of which system of development is chosen. Only the costs are different.

Note that this is not simply a question of comparing generating and transmission costs of hydro, thermal, and diesel plants. The choice of a hydro, diesel or thermal project will affect differently the operation, and cost, of the whole power system. The path of expansion of capacity will differ in each alternative. The hydro and thermal development includes some diesel plants. The correct cost comparison relates therefore to alternative system developments rather than to alternative hydro, thermal, or diesel plants.

The comparison of costs between the alternatives is not absolute, as the alternatives have different patterns of expenditures over time. The hydro and thermal alternatives will involve higher expenditures in the early years as compared to the diesel alternative with its higher expenditures in the later years. In a simplified way, the choice can be stated in terms of whether higher investment costs of hydro in the early years are or are not justified by its lower operating costs in the later years. The only way a proper comparison can be made between series of expenditures with different time patterns (cash flows) is by making specific allowance for the time factor and summing them up as of a particular point in time. This is accomplished by discounting the four cash flows to a common year. The sum of the discounted values, that is the "present values", can then be compared directly. This procedure involves three types of decision -- what is to be included in the costs or expenditures, over what length of time should the computations be extended, and what interest rate should be used for discounting.

In the calculation of costs, only actual expenditures on goods and services should be included and these should be entered in the year in which they occur. Financial charges and accounting items, such as interest, depreciation and amortization, should be excluded. Depreciation and interest on capital investment are taken into account by the discounting procedure itself. Amortization and interest on loans are financial items dependent on specific terms of financing and not inherent in the nature of the project. They are not relevant for the economic appraisal.

1/ Extracted from "The Economic Choice Between Hydroelectric and Thermal Power Development", Herman G. Van Der Tak, International Bank for Reconstruction and Development, 1966 Pages 7-8. (The paper from which the above was extracted does not necessarily represent the views of the Bank and affiliated organizations.)

Assumptions - In this analysis, the capital and operating costs of each alternative are those, excluding taxes and duties, necessary to generate the power and transmit it to the load centers. All costs, such as training, standby generating facilities, etc., common to each alternative are not included. The hydro alternatives do not include an allocation of the dam costs. The computations are for a period of 39 years which, in the case of the hydro and thermal developments, would include a four-year construction period and a 35 year operating period. In the case of the diesel development, the entire 39 years represent both construction and operating years.

Note that the assumed useful operating lives for the hydro plants are 40 years, for the thermal plant - 35 years, and for the diesel units - 20 years each (which are individually replaced after the end of that period). Therefore, since the study is for an operating period of 35 years for the hydro and thermal alternatives, and an operating period of 39 years for the diesel alternative, both the hydro alternatives as well as the second series of diesel units have a depreciated value beyond the period computed. The interest rate used for discounting is 8% which is assumed to be the "opportunity cost" of money in Afghanistan.

Annex C, pages 3, 4, 5 and 6 show the details and the individual alternative's assumptions; and page 7 is the table of factors employed in arriving at the present worth of costs of each alternative.

HYDRO DEVELOPMENT "A" ^{1/}
 Present Worth of Costs
 1968 - 2007
 (in thousands of dollars)

ANNEX C
Page 3

Year	Capital Assets		Operating Expenses		Net	Present Value ^{8%}
	Diesel ^{2/}	Hydro ^{4/}	Diesel ^{6/}	Hydro ^{4/}		
1968		\$3,423	\$161		\$3,584	\$3,315
1969	\$845	3,423	251		4,519	3,873
1970	420	3,423	342		4,185	3,319
1971	855	3,423	472		4,625	3,491
1972	(1,072) ^{3/}			\$283	(789)	(536)
1973				285	285	180
1974				297	297	173
1975				308	308	166
1976		1,500		318	1,818	909
1977	(418) ^{3/}	1,500		329	1,411	653
1978				338	338	142
1979				347	347	138
1980				350	350	128
1981-2006				350 ^{7/}		1,286
2007		(2,537) ^{5/}			(2,537)	(117)
Total present worth of costs:						\$17,123

^{1/} Installation of two 16.5 MW hydro units by 1972 and an additional 16.5 MW unit in 1977 at Kajakai dam.

^{2/} Prior to commencement of hydro operations, 9 MW of diesel generation will supply the required power as an interim measure. In 1972, 5.5 MW of the diesel power will no longer be needed and it is assumed that these units will be sold; leaving 3.5 MW of diesel as standby to the hydro plant until the third hydro unit is in operation in 1977.

^{3/} Assumes that the diesels will be sold at their depreciated value.

^{4/} Includes all costs of generation and transmission to the Kandahar and Girishk load centers.

^{5/} Depreciated value of hydro plant at the end of 35 years of operations.

^{6/} Includes fuel costs.

^{7/} Assumes that operating expenses remain constant at \$350 thousand per year for years 1981 - 2006.

HYDRO DEVELOPMENT "B" 1/
 Present Worth of Costs
 1968 - 2007
 (in thousands of dollars)

ANNEX C
Page 4

Year	Capital Assets		Operating Expenses		Net	Present Value <u>8%</u>
	Diesel <u>2/</u>	Hydro <u>4/</u>	Diesel <u>6/</u>	Hydro <u>4/</u>		
1968		\$4,048	\$161		\$4,309	\$3,893
1969	\$845	4,048	251		5,144	4,409
1970	420	4,048	342		4,790	3,815
1971	855	4,048	472		5,375	3,951
1972	(1,718) <u>3/</u>			\$286	(1,423)	(974)
1973				288	288	181
1974				300	300	175
1975				311	311	168
1976				321	321	161
1977				330	330	153
1978				339	339	145
1979				348	348	138
1980				356	356	131
1981-2006				356 <u>7/</u>		1,308
2007		(2,024) <u>5/</u>			(2,024)	(93)
Total Present Worth of Costs:						\$17,560

1/ Installation of three 16.5 MW hydro units by 1972 at Kajakai dam.

2/ Prior to commencement of hydro generation 9 MW of diesel generation will supply the required power as an interim measure. In 1972, the diesels will no longer be needed and it is assumed that they will be sold.

3/ Assumes that the diesels will be sold at their depreciated value.

4/ Includes all costs of generation and transmission to the Kandahar and Girishk load center.

5/ Depreciated value of hydro plant at the end of 35-years of operations.

6/ Includes fuel costs.

7/ Assumes that operating expenses remain constant at \$356 thousand per year for years 1981-2006.

DIESEL DEVELOPMENT
 Present Worth of Costs
 1968 - 2007
 (in thousands of dollars)

ANNEX C
 Page 5

<u>Year</u>	<u>Capital assets</u> ^{1/}	<u>Operating expenses</u> ^{3/}	<u>Net</u>	<u>Present Value</u> ^{8%}
1968		\$ 161	\$161	\$1,485
1969	\$845	251	1,096	940
1970	420	342	762	604
1971	855	472	1,327	975
1972	1,300	826	2,126	1,446
1973		910	910	573
1974	435	1,026	1,461	852
1975	430	1,117	1,547	835
1976	435	1,229	1,664	837
1977		1,310	1,310	607
1978	430	1,424	1,854	794
1979		1,532	1,532	608
1980	870	1,700	2,270	833
1981		1,700	1,700	3,321
1982		1,700	1,700	
1983		1,700	1,700	
1984		1,700	1,700	
1985		1,700	1,700	
1986		1,700	1,700	
1987		1,700	1,700	
1988		1,700	1,700	
1989	845	1,700	2,545	466
1990	420	1,700	2,120	360
1991	855	1,700	2,555	401
1992	1,300	1,700	3,000	438
1993		1,700	1,700	230
1994	435	1,700	2,135	267
1995	430	1,700	2,130	245
1996		1,700	1,700	182
1997	430	1,700	2,130	211
1998		1,700	1,700	156
1999	870	1,700	2,576	211
2000		1,700	1,700	690
2001		1,700	1,700	
2002		1,700	1,700	
2003		1,700	1,700	
2004		1,700	1,700	
2005		1,700	1,700	
2006		1,700	1,700	
2007	(1,720) ^{2/}		(1,720)	(79)

Total Present Worth of Costs \$18,490

^{1/} The installation, at Kandahar and Girishk, of a total of 27 MW of 1.5 MW and 2.0 MW diesel units as the load demand increases from 1969 through 1980; and the replacement of each unit after the completion of each unit's useful life of 20-years.

^{2/} Depreciated value of the second series of diesel units.

^{3/} Includes estimated fuel costs of 21.6¢ per gallon purchased from Iran, including transportation but less taxes.

THERMAL DEVELOPMENT ^{1/}
 Present Worth of Costs
 1968 - 2007
 (in thousands of dollars)

ANNEX C
Page 6

Year	Capital Assets		Operating Expenses			Net	Present Value 8%
	Diesel ^{2/}	Thermal ^{4/}	Diesel ^{2/}	Thermal	^{4/} ^{5/}		
1968		\$4,080	\$161			\$4,241	\$3,022
1969	\$845	4,080	251			5,176	4,436
1970	420	4,080	342			4,842	3,840
1971	855	4,080	472			5,407	3,974
1972	(1,718) ^{3/}			\$726		(992)	(675)
1973				790		790	498
1974				857		857	500
1975				914		914	494
1976				974		974	487
1977				1,037		1,037	480
1978				1,100		1,100	471
1979				1,173		1,173	466
1980				1,257		1,257	461
1981-2006				1,257 ^{6/}			4,620

Total Present Worth of Costs: \$23,973

^{1/} Installation of three 11 MW thermal units by 1972 at Kandahar.

^{2/} Prior to commencement of thermal operations, 9 MW of diesel generation will supply the required power as an interim measure. In 1972, the diesels will no longer be needed and it is assumed that they will be sold.

^{3/} Assumes that the diesels will be sold at their depreciated value.

^{4/} Includes all costs of generation and transmission to the Girishk load center.

^{5/} Includes fuel costs.

^{6/} Assumes that operating expenses remain constant at \$1,257 thousand per year for years 1981-2006.

Present Value of 1
at 8% Discount
1 through 40 periods

<u>Year</u>	<u>Years from base period</u>	<u>Present Value of 1 at 8% annual discount</u>
1968	1	.925
1969	2	.857
1970	3	.793
1971	4	.735
1972	5	.680
1973	6	.630
1974	7	.583
1975	8	.540
1976	9	.500
1977	10	.463
1978	11	.428
1979	12	.397
1980	13	.367
1981	14	.340
1982	15	.315
1983	16	.291
1984	17	.270
1985	18	.250
1986	19	.231
1987	20	.214
1988	21	.198
1989	22	.183
1990	23	.170
1991	24	.157
1992	25	.146
1993	26	.135
1994	27	.125
1995	28	.115
1996	29	.107
1997	30	.099
1998	31	.092
1999	32	.085
2000	33	.078
2001	34	.073
2002	35	.067
2003	36	.062
2004	37	.057
2005	38	.053
2006	39	.049
2007	40	.046

April 25, 1967

ANNEX DDetailed Description of the Kajakai Project1. Generating Plant:

- a. Hydraulic Turbines - 2 - 16.5 MW units; design head - 214 feet; Indorr Francis type; vertical shaft.
- b. Generators: - 2 - 21 MVA units; .8 power factor; 50 cycle 13.8 KV; WYE connected 230.8 rpm.
- c. Step-up Transformers: - 2 18/24 MVA OA/FA; 50 cycle; 3 phase; 13.8/115 KV delta/wye connected; necessary auxiliaries.

2. Transmission and Distribution Lines: (a) Transmission: 110 miles;

- a. Transmission: - 110 miles; 115 KV, light loading; 477 MCM ACSR 27/7 Conductor; base pole 55 feet, class 2; static 3/8" H.S. steel.
- b. Distribution: - 15 miles 13.2 KV distribution lines; 4/0 ACSR; step-down substations 13.2 KV primary, three phase, 50 cycles, Total Capacity 2000 KVA.

3. Substation Facilities - Receiving:

- a. Kandahar - 115/7 - 6/13.2 KV delta/wye; 21/28 MVA OA/FA; 50 cycles; three phase and necessary appurtenances;
- b. Girishk - 115/44 KV delta/wye; 7.5/9.375 MVA OA/FA; 50 cycles three phase and necessary appurtenances;
- c. Spare - 115 KV delta/44/13.2/3.3 KV wye; 15/50 MVA - 1/4 capacity 3.3 KV; OA/FA 50 cycles three phase.

4. Distribution Substations:

- a. Kandahar - 13.2/3.3 KV; 3750/4690 KVA;
- b. Bost - 44/3.3 KV; 2500/3125 KVA;
- c. Girishk - 44/3.3 KV; 1000 KVA;
- d. Marja - 44/3.3 KV; 750 KVA.

5. General Plant Equipment:

Warehouses, garages, maintenance headquarters, furniture, shop equipment, transportation equipment, communication and dispatching equipment, and spare parts.

6. Training Program

ESTIMATED CAPITAL COSTS (1)
KAJAKAI HYDROELECTRIC PRODUCTION PLANT

Item	Description	Stated in U. S. Dollars			Total
		Foreign Exchange	Afghanis	Pak Rupees	
A.	Land and Land Rights	\$ ---	\$ ---	\$ ---	\$ ---
B.	Structures and Improvements	660,100	574,300	34,500	1,268,900
C.	Reservoirs, Dams and Waterways	766,500	441,900	37,200	1,245,600
D.	Turbines and Generators	2,220,700	201,300	28,700	2,450,700
E.	Accessory Electrical Equipment	233,700	36,600	3,500	273,800
F.	Plant Step-Up Substation (Transformers Only)	218,500	20,000	5,500	244,000
G.	Accessory Mechanical Equipment	206,300	24,000	3,800	234,100
H.	Roads, Railroads and Bridges	7,000	101,000	---	108,000
I.	*Other - Mobilization and Demobilization	297,000	76,700	14,600	388,300
	TOTAL DIRECT COST	\$4,609,800	\$1,475,800	\$ 127,800	\$6,213,400**
	Construction Contingency (A through H)(1)	449,600	277,800	22,800	750,200
	Supervision, Engr., Surveys, Soils Invest.	684,000	108,000	---	792,000
	Start-Up and Test (3)	45,000	9,000	---	54,000
	Administration (4)	---	72,000	---	72,000
	Contingency on Engr. and Administration (5)	76,000	12,000	---	88,000
	TOTAL CONSTRUCTION COST	\$5,864,400	\$1,954,600	\$ 150,600	\$7,969,600

*Lump Sum Figure - No contingency included.

**Includes approximately \$498,300 for pricing allowance contingencies representing 15% of all costs exclusive of costs of turbines, governors, generators, main transformers and butterfly valves estimated to cost \$2,202,000.

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ESTIMATED CAPITAL COSTS (2)
TRANSMISSION - BASIC PLAN WITH WOOD POLE STRUCTURES

<u>Item</u>	<u>Description</u>	<u>Stated in U. S. Dollars</u>			<u>Total</u>
		<u>Foreign Exchange</u>	<u>Afghanis</u>	<u>Pak Rupees</u>	
<u>115 Kv New Construction</u>					
A.	Right of Way Procurement and Clearing	\$ 60,900	\$ 13,800	\$ ---	\$ 74,700
B.	Poles, Towers and Fixtures	855,800	197,400	56,600	1,109,800
C.	Overhead Conductors	551,800	126,300	19,200	697,300
D.	Insulation and Hardware	122,100	28,000	4,300	154,400
E.	Grounds and Ground Wires	160,300	36,800	6,900	204,000
	TOTAL DIRECT COST	\$1,750,900	\$ 402,300	\$ 87,000	\$2,240,200
	Construction Contingency (A through E) (2)	437,700	100,600	21,800	560,100
	Engineering	277,000	3,000	---	280,000
	Administration (4)	---	42,000	---	42,000
	Contingency on Engr. and Administration (5)	27,700	4,500	---	32,200
	TOTAL CONSTRUCTION COST	\$2,493,300	\$ 552,400	\$ 108,800	\$3,154,500

ESTIMATED CAPITAL COSTS (2)
SUBSTATIONS - BASIC PLAN

<u>Item</u>	<u>Description</u>	<u>Stated in U. S. Dollars</u>			<u>Total</u>
		<u>Foreign Exchange</u>	<u>Afghanis</u>	<u>Pak Rupees</u>	
A.	Kajakai 115 Kv Switchyard	\$ 344,100	\$ 54,300	\$ 1,800	\$ 400,200
B.	Girishk Area Receiving Station (115 Kv to 44 Kv)	231,600	25,600	1,700	258,900
C.	Kandahar Area Receiving Station (115 Kv to 13.2 Kv)	272,700	29,200	2,600	304,500
D.	Additional Substation Capacity				
	Kandahar - 13.2 Kv to 3.3 Kv	43,900	4,500	500	48,900
	Bost - 44 Kv to 13.2 Kv	48,400	5,500	800	54,700
	Marja and Girishk - 44 Kv to 3.3 Kv	24,100	2,500	300	26,900
E.	Spare Transformer - 3Ø 15/20 mva - 115/44/13.2/3.3 Kv	104,600	2,300	1,600	108,500
	TOTAL DIRECT COST	<u>\$1,069,400</u>	<u>\$ 123,900</u>	<u>\$ 9,300</u>	<u>\$1,202,600</u>
	Construction Contingency (A through E) (2)	267,400	31,000	2,300	300,700
	Engineering	149,200	1,100	---	150,300
	Administration (4)	---	22,500	---	22,500
	Contingency on Engr. and Administration (5)	14,900	2,400	---	17,300
	TOTAL CONSTRUCTION COST	<u>\$1,500,900</u>	<u>\$ 180,900</u>	<u>\$ 11,600</u>	<u>\$1,693,400</u>

ESTIMATED CAPITAL COSTS (2)
GENERAL PLANT - BOST AND KANDAHAR

Item	Description	Stated in U. S. Dollars			Total
		Foreign Exchange	Afghanis	Pak Rupees	
A.	*Central Warehouse (At Kandahar)	\$ 20,500	\$ 18,700	\$ 800	\$ 40,000
B.	Office Furniture and Equipment	16,800	2,700	500	20,000
C.	Transportation Equipment	61,900	2,400	5,000	69,300
D.	Maintenance Shop, Garage, and Local Warehouse (Bost)	40,500	2,900	1,400	44,800
E.	Tools and Work Equipment	27,400	1,100	2,300	30,800
F.	Communication and Dispatch Equipment	21,700	800	1,600	24,100
	TOTAL DIRECT COST	\$ 188,800	\$ 28,600	\$ 11,600	\$ 229,000
	Construction Contingency (A through F)(2)	47,200	7,200	2,900	57,300
	Engineering	28,100	500	---	28,600
	Administration (4)	---	4,300	---	4,300
	Contingency on Engr. and Administration(5)	2,900	400	---	3,300
	TOTAL CONSTRUCTION COST	\$ 267,000	\$ 41,000	\$ 14,500	\$ 322,500

*HVPPA warehouse located at Kandahar.

ESTIMATED CAPITAL COSTS (2)
GENERAL PLANT - OTHER (KAJAKAI DAM)

Item	Description	Stated in U. S. Dollars			Total
		Foreign Exchange	Afghanis	Pak Rupees	
A.	Warehouses, Garages and Other Miscellaneous Structures	\$ 8,100	\$ 11,500	\$ 300	\$ 19,900
B.	Office Furniture and Equipment	8,500	1,300	200	10,000
C.	Transportation Equipment	22,400	800	1,600	24,800
D.	Tools and Work Equipment	48,000	1,500	1,600	51,100
E.	Communication and Dispatch Equipment	13,800	900	300	15,000
	TOTAL DIRECT COST	\$ 100,800	\$ 16,000	\$ 4,000	\$ 120,800
	Construction Contingency (A through E)(2)	25,200	4,000	1,000	30,200
	Engineering	14,800	300	---	15,100
	Administration (4)	---	2,300	---	2,300
	Contingency on Engr. and Administration(5)	1,200	500	---	1,700
	TOTAL CONSTRUCTION COST	\$ 142,000	\$ 23,100	\$ 5,000	\$ 170,100

FOOTNOTES AND DETAILED ASSUMPTIONS FOR COST ESTIMATE

ASSUMPTIONS:

The cost estimate tables which have been discussed in this Section have been prepared based on certain assumptions and using certain criteria. A full understanding of these factors is necessary for other parties to evaluate the reasonableness of the Consulting Engineer's estimates. The footnotes that follow are applicable to places in all of the capital cost estimate tables where the corresponding footnote number appears except where noted otherwise on the table.

FOOTNOTES:

(1) Basis for Estimating the Kajakai Hydroelectric Production Plant

Unit Costs. The majority of the unit costs used in preparing the estimates for construction costs of the Kajakai Hydroelectric Plant have been based on those for similar work in the area. The primary source of this unit cost data has been Morrison Knudsen Afghanistan's cost records and data which have been furnished by the Afghan Construction Unit. These unit costs have been escalated to 1966 price levels where necessary. Unit costs have been developed for certain items where unit cost data were not available.

The unit costs used include the contractor's plant, equipment, overhead, profit, transportation costs, performance bonds, taxes, and insurance. An allowance has been included for the contractor's mobilization and demobilization costs. The power plant equipment costs include manufacture, transportation and installation. The estimated costs of the turbines and governors, generators, main transformers, and valves are based on U.S. manufacturers' quotations. All unit costs used in preparing the estimates expressed as equivalent U.S. dollars have been based on 1966 price levels.

Pricing Allowance. A pricing allowance has been added to allow for the possible difference between unit prices developed from previous known prices for similar work and the average of the expected prices of the three low bidders on the Project. This allowance is 15 percent of the subtotal of extended

(Continued)

FOOTNOTES FOR COST ESTIMATE

(1) Basis for Estimating the Kajakai Hydroelectric Production Plant (Continued)

Pricing Allowance.(Continued)

amounts for each major class of work. This allowance is, therefore, part of the estimated basic construction cost shown as the Total Direct Cost in the cost estimate. This pricing allowance was not applied to the turbines, governors, generators, main transformers and butterfly valve for which manufacturers' quotations were obtained, which quotations have, in the Consulting Engineer's experience, generally been approximately 15 percent higher than final bid prices.

Construction Contingency. A contingency allowance has been added to the Total Direct Cost to cover omissions from the estimate, differences between estimated preliminary and final quantities, uncertainties related to overseas construction and subsurface conditions and variations in unit prices. This contingency allowance of 25 percent has been applied to all items except the turbines, governors, generators, main transformers and butterfly valve. For these items, quantity and size are fully determinable and a pricing allowance already in fact exists in the quotations received from manufacturers.

(2) Transmission Lines, Substations, General Plant, and Miscellaneous Estimates

Basic Unit Costs. The majority of the costs for work on all parts of the Project other than the Kajakai Hydroelectric Plant were based on 1964 United States price levels escalated to 1966 price levels, and include a normal pricing allowance.

The unit costs that have been used include the contractor's plant, equipment, overhead, profit, performance bonds, taxes and insurance and are 1966 costs expressed as equivalent U.S. dollars. Transportation costs have been added separately.

FOOTNOTES FOR COST ESTIMATE

(2) Transmission Lines, Substations, General Plant, and Miscellaneous Estimates (Continued)

Afghan Differential Allowance. To the basic U.S. costs as developed (not including transportation cost), 25 percent has been added to cover the total cost of performing the same work under conditions as encountered in Afghanistan. This 25 percent figure was arrived at as the consensus of experience of U.S. contractors currently doing construction work in Afghanistan. This allowance is 25 percent of the subtotal of extended amounts for each major class of work. In the case of all equipment items, the 25 percent differential was also applied since only estimated costs rather than manufacturers' quotations were used in preparing the estimate. This allowance is, therefore, part of the estimated basic construction cost shown as the Total Direct Cost in the tables.

Construction Contingency. A contingency allowance has been added to the Total Direct Cost to cover omissions from the estimate, differences between estimated preliminary and final quantities, uncertainties related to overseas construction, foundation and specific site conditions and variations in unit prices. This contingency allowance of 25 percent has been applied to all items, including equipment.

(3) Start-Up and Test

Start-up and test costs for a 6-month period prior to commercial operation of the plant apply to the Kajakai generating plant only. The afghani cost reflects Afghan salaries. The dollar cost reflects materials, supplies and foreign personnel salaries.

(4) Administration

Administration costs are principally those costs incurred by the Owner during construction consisting mainly of salaries and expenses of the Owner's employees who are performing liaison coordination and contract administration functions. Legal costs associated with construction are also included in this item. The total administration costs are estimated at 1-1/2 percent of the Total Direct Cost, including construction contingencies.

FOOTNOTES FOR COST ESTIMATE

(5) Contingency on Engineering and Administration

An allowance of 10 percent for contingencies has been added to all estimated engineering and administration costs with the exception of conversion and rehabilitation cost estimates for the distribution systems for which the cost estimates are already adequate to cover contingencies.

ANNEX F

SUMMARY OF COMBINED TRAINING PROGRAM COSTS
FOR THE KAJAKAI PROJECT

Agency	Afghan Funds in Dollars						Foreign Funds in Dollars					
	1st Year	2nd Year	3rd Year	4th Year	(1) 5th Year	Total Afghan Funds	1st Year	2nd Year	3rd Year	4th Year	(1) 5th Year	Total Foreign Funds
AFGHAN ELECTRIC AUTHORITY												
U.S. Advisors	\$ 7,200	\$ 7,200	\$ 7,200	\$ 7,200	\$ 2,400	\$ 31,200	\$ 73,800	\$ 73,800	\$ 73,800	\$ 73,800	\$ 22,900	\$ 318,100
Interest During Construction	432	864	1,296	1,728	1,872	6,192	2,583	5,166	7,749	10,332	11,133	36,963
Subtotal (2)	\$ 7,632	\$ 8,064	\$ 8,496	\$ 8,928	\$ 4,272	\$ 37,400	\$ 76,383	\$ 78,966	\$ 81,549	\$ 84,132	\$ 34,033	\$ 355,100
HELMAND VALLEY POWER PRODUCTION AGENCY												
U.S. Advisors	\$ 4,800	\$ 9,600	\$ 9,600	\$ 9,600	\$ 4,800	\$ 38,400	\$ 50,900	\$112,000	\$112,000	\$112,000	\$ 50,900	\$ 437,800
Afghan Personnel	9,460	18,560	29,800	27,390	---	85,210	8,850	70,800	79,650	---	---	159,300
Subtotal	\$ 14,266	\$ 28,160	\$ 39,400	\$ 36,990	\$ 4,800	\$ 123,610	\$ 59,750	\$182,800	\$191,650	\$112,000	\$ 50,900	\$ 597,100
Interest During Construction	856	2,545	4,909	7,133	7,417	22,860	2,091	8,489	15,197	19,117	20,898	65,792
Subtotal (2)	\$ 15,116	\$ 30,705	\$ 44,309	\$ 44,123	\$ 12,217	\$ 146,500	\$ 61,841	\$191,289	\$206,847	\$131,117	\$ 71,798	\$ 662,900
KANDAHAR ELECTRIC AGENCY												
U.S. Advisors	\$ ---	\$ 2,400	\$ 4,800	\$ 4,800	\$ 4,800	\$ 16,800	\$ ---	\$ 28,000	\$ 50,900	\$ 50,900	\$ 50,900	\$ 180,700
Afghan Personnel	4,220	5,520	16,890	21,740	---	48,370	8,850	17,700	26,550	---	---	53,100
Subtotal	\$ 4,220	\$ 7,920	\$ 21,690	\$ 26,540	\$ 4,800	\$ 65,170	\$ 8,850	\$ 45,700	\$ 77,450	\$ 50,900	\$ 50,900	\$ 233,800
Interest During Construction	253	728	2,030	3,622	3,910	10,543	310	1,909	4,620	6,401	8,183	21,423
Subtotal (2)	\$ 4,473	\$ 8,648	\$ 23,720	\$ 30,162	\$ 8,710	\$ 75,700	\$ 9,160	\$ 47,609	\$ 82,070	\$ 57,301	\$ 59,083	\$ 255,200
BOCHRA ELECTRIC AGENCY												
U.S. Advisors	\$ ---	\$ 2,400	\$ 4,800	\$ 4,800	\$ 4,800	\$ 16,800	\$ ---	\$ 28,000	\$ 50,900	\$ 50,900	\$ 50,900	\$ 180,700
Afghan Personnel	4,220	6,820	15,590	21,740	---	48,370	8,850	26,550	17,700	---	---	53,100
Subtotal	\$ 4,220	\$ 9,220	\$ 20,390	\$ 26,540	\$ 4,800	\$ 65,170	\$ 8,850	\$ 54,550	\$ 68,600	\$ 50,900	\$ 50,900	\$ 233,800
Interest During Construction	253	806	2,030	3,622	4,030	10,741	310	2,219	4,620	6,401	8,183	21,733
Subtotal (2)	\$ 4,473	\$ 10,026	\$ 22,420	\$ 30,162	\$ 8,830	\$ 75,900	\$ 9,160	\$ 56,769	\$ 73,220	\$ 57,301	\$ 59,083	\$ 255,500
TOTAL WITH INTEREST	\$ 31,694	\$ 57,443	\$ 98,945	\$113,375	\$ 34,029	\$ 335,500	\$156,544	\$374,633	\$443,686	\$329,851	\$223,997	\$1,528,700
Plus 10% Contingencies	3,169	5,744	9,894	11,337	3,403	33,547	15,654	37,463	44,369	32,985	22,400	152,871
TOTAL COST	\$ 34,863	\$ 63,187	\$108,839	\$124,712	\$ 37,432	\$ 369,000	\$172,198	\$412,096	\$488,055	\$362,836	\$246,397	\$1,681,600

- (1) Training costs for fifth year are included as cost of Project. A portion of Afghan salary costs for that year may be charged to operation if desired.
- (2) Interest during construction period on cost of training program assumed to be 3-1/2% on foreign funds and 6% on Afghan funds.

N.B. The above including interest which should be deducted.

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Annex G

Page 1

Rates and Earnings of the System

In order to establish a basis for projecting revenues and determining economic benefits of the system into which Kajakai will be incorporated, we undertook an analysis that is roughly patterned after the method of establishing power rates as practiced in the U.S. Note that this analysis is for illustrative purposes and is not an attempt to fix the rate structure for the system.

Rates - Electric utilities normally establish rates that will permit them to meet all operating expenses, including depreciation, plus a reasonable return on the investment base. Since the project does not include working capital, the investment base can be defined as the depreciated value of the capitalized assets at the end of any given year.

It is estimated that the depreciated value of all capitalized assets of the Helmand-Arghandab Valley system, excluding an allocation of the cost of the dam, would be \$23,064 thousand at the beginning of the year Kajakai will go on stream (1972).^{1/} Also, incremental investments are made yearly, including the third 16.5 MW unit which would go on stream in 1977. By deducting annual depreciation, the ending book, or depreciated, value of the assets is calculated. It is upon this yearly depreciated value that the desired rate of return is based. Table 1 is the year by year calculations arriving at the depreciated values of the assets.

Table 1
Yearly Value of Assets of the System
1972-1981
(all figures are in thousands of dollars)

<u>Year</u>	<u>Investment</u>	<u>Book Value (Beginning)</u>	<u>Depreciation^{2/}</u>	<u>Book Value (Ending)</u>
1972	\$23,064	\$23,064	\$601	\$22,463
1973	200	24,463	606	23,857
1974	190	24,047	611	23,430
1975	210	23,640	616	23,024
1976	180	23,204	621	22,583
1977	2,812	25,395	660	24,735
1978	215	24,950	665	24,285
1979	205	24,490	670	23,820
1980	205	24,025	675	23,350
1981	95	23,445	677	22,768

^{1/} Existing facilities - \$5,510 thousand; Diesel "C" units - \$718 thousand; and Kajakai - \$16,836 thousand.

^{2/} Annual depreciation for all facilities other than the diesel units - 2.5% per year; for the diesel units - 5.0% per year.

Several rates of return were calculated: from 2.5% (the interest of the AID loan) to 8.0% (the assumed "opportunity cost" of money in Afghanistan). The total of the rates of return and the operating expenses (including depreciation) represents that amount of revenue that must be earned by the system through the sale of power in order to meet its financial requirements. Table 2 details, on a yearly basis, the required earnings.

Table 2

Earnings Required by the System
1972-1981

(all figures in thousands of dollars)

<u>Year</u>	<u>Total Costs plus Return on Investment of:</u>			
	<u>2.5%</u>	<u>4%</u>	<u>6%</u>	<u>8%</u>
1972	\$1,618	\$1,955	\$2,404	\$2,853
1973	1,665	2,023	2,500	2,977
1974	1,676	2,027	2,496	2,964
1975	1,689	2,034	2,495	2,955
1976	1,698	2,037	2,488	2,940
1977	1,812	2,184	2,678	3,173
1978	1,820	2,185	2,670	3,156
1979	1,828	2,185	2,662	3,138
1980	1,840	2,190	2,657	3,124
1981	1,841	2,183	2,638	3,093

The rate per kilowatt-hour that is necessary to meet the financial requirements is arrived at by dividing the total required funds by the actual or projected sales of kilowatt-hours. Table 3 details the rate that would be required to be charged using the AID-adjusted projected sales (See Annex B).

Table 3

Required Rates of the System
1972-1981

<u>Year</u>	<u>Rate per Kwh in Order to Meet Costs and Earn a Return of:</u>			
	<u>2.5%</u>	<u>4%</u>	<u>6%</u>	<u>8%</u>
1972	4.4¢	5.4¢	6.6¢	7.8¢
1973	4.1	5.0	6.2	7.4
1974	3.8	4.6	5.7	6.7
1975	3.6	4.3	5.2	6.2
1976	3.3	4.0	4.8	5.7
1977	3.3	3.9	4.8	5.7
1978	3.0	3.7	4.5	5.3
1979	2.8	3.4	4.1	4.8
1980	2.6	3.1	3.8	4.4
1981	<u>2.4</u>	<u>2.9</u>	<u>3.5</u>	<u>4.1</u>
Weighted Average	3.2¢	3.8¢	4.7¢	5.6¢

In order to maintain the estimated present average rate of about 3.7¢ per Kwh and thus encourage continued and increased consumption, it would be consistent to maintain approximately that rate which would allow a return on investment of 4% per year over the ten-year period. Further, the 4% return compares favorably with relending provisions of other AID loans to comparable facilities in the NESAs area, including the Kandahar Diesel "C" loan.

Earnings- Assuming that the weighted average rate of 3.8¢ per Kwh is charged over the ten-year period, the following cash-flow reveals that the Kajakai loan could be repaid by the system on reasonably non-subsidized terms, i.e., 30 years, including a six and one-half year grace period; at an annual interest of 4%. ^{3/}

Table 4

Cash Flow of the System
Selected Years, 1972-1980

(all figures except coverage in thousands of dollars)

	<u>1972</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1978</u>	<u>1980</u>
Revenue	\$1,398	\$1,692	\$1,827	\$1,979	\$2,297	\$2,707
Costs	1,056	1,090	1,113	1,133	1,213	1,256
Profit	342	602	714	846	1,084	1,451
Depreciation	601	611	616	621	665	675
Cash Available	943	1,213	1,330	1,467	1,749	2,126
Debt (P&I)	707	945	1,183	1,183	1,183	1,183
Coverage	133%	128%	112%	124%	148%	180%

The beginning of principal repayment in mid-1974 accounts for the drop in coverage in that year. There would be a further decline of coverage in 1975, the first full year of principal repayments. The coverage, however, recovers by 1976 and progressively improves.

Internal Rate of Return - In the internal rate of return analysis, the gross investment costs of the system (as opposed to the depreciated costs), as noted in Table 1, are coupled with the cash operating expenses to represent the dollar input (costs) of the project. The annual revenue gained by selling the power at 3.8¢ per Kwh, as noted in Table 4 represents the dollar output (benefits) of the system. The discount rate which equalizes, over the assumed 40-year life of the system, the present worth of the benefits and the costs is considered the rate of return on the system. By employing this method, a 7.5% internal rate of return for the system was determined.

^{3/} Interest only through mid-1974; thereafter, 46 level semi-annual payments of principal and interest.

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ANNEX H
Page 1

CHECK LIST OF STATUTORY CRITERIA

Development Loan Fund

In the right-hand margin, summarize for each item the information or conclusion requested. As necessary reference the section(s) of the Capital Assistance Paper, or other clearly identified and available document, in which the matter is further discussed. This form may be made a part of the Capital Assistance Paper.

The following abbreviations are used:

FAA - Foreign Assistance Act of 1961, as amended by the Foreign Assistance Act of 1966.

App. - Foreign Assistance and Related Agencies Appropriations Act, 1967.

1. FAA §.102. Precautions that have been or are being taken to assure that loan proceeds are not diverted to short-term emergency purposes (such as budgetary, balance of payments, or military purposes) or any other purpose not essential to the country's long-range economic development. The loan proceeds will be disbursed only for goods and services to construct a hydroelectric power project. See Section V, The Project.
2. FAA §.102. Information on measures taken to utilize U. S. Government excess personal property in lieu of procurement of new items. The U.S. excess property program is in operation in Afghanistan and full advantage of the program is being taken by the RGA.
3. FAA §.102. Information whether the country permits or fails to take adequate measures to prevent the damage or destruction, by mob action, of U. S. property. Afghanistan is not presently in violation of this provision.
4. FAA §.201(b). Manner in which loan will promote country's economic development, emphasizing help for long-range plans and programs designed to develop economic resources and increase productive capacities. The loan will provide the means for generating power not presently available. This, in turn, will foster economic development. See Section IV. Economic Aspects.
5. FAA §.201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within the United States. The Export-Import Bank is not prepared to consider the loan application. No free world sources have indicated an interest in financing the project.
6. FAA §.201(b)(2). Information and conclusion on activity's economic and technical soundness, including the capacity of the recipient country to repay the loan at a reasonable rate of interest. It is concluded that the project is economically and technically sound. See Section III. Electrification Plan, Section IV. Economic Aspects, and Section XII. Repayment Prospects.

7. FAA §.201(b)(3). Information and conclusion on existence of reasonable promise activity will contribute to development of economic resources or increase of productive capacities.

The project is designed to contribute to the maximum extent to the long-range economic development, and to industrialization of the region to be served. See Section IV. Economic Aspects.
8. FAA §.201(b)(4). Information and conclusion on activity's relationship to other development activities, and its contribution to realizable long-range objectives.

This project complements the development of the region and contributes to attaining economic development objectives of Afghanistan. See Section I of the Loan Paper.
9. FAA §.201(b)(5). Country's self-help measures, including institution of Foreign Assistance Act investment guaranty programs.

Afghanistan has instituted the guaranty program, and contributes to its own development within the confines of the present resources.
10. FAA §.201(b)(6). Information and conclusion on possible effects on U. S. economy, with special reference to areas of substantial labor surplus.

Commodities and services supplied under the loan are to be of U.S. source and origin; no particular effect with regard to the labor supply is noted.
11. FAA §.201(b)(7). Information and conclusion on the degree to which the country is making progress toward respect for the rule of law, freedom of expression and of the press, and recognition of the importance of individual freedom, initiative, and private enterprise.

Afghanistan meets the standards established by this provision.
12. FAA §.201(b)(8). Information and conclusion on the degree to which the country is taking steps to improve its climate for private investment.

Afghanistan recently past a new private investment law and is attempting to set-up a development bank.
13. FAA §.201(b)(9). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.

The project is designed to improve prospects for indigenous agricultural and industrial development.
14. FAA §.201(b). Information on applicability of the ten-country ceiling.

Afghanistan is one of the ten countries authorized to receive U.S. development loans.
15. FAA §.201(b). Information and conclusion on reasonable prospects of repayment.

It is concluded that the prospects of repayments are reasonably good. See Section XII. of the Loan Paper,

16. FAA §.201(d). Information and conclusion on legality (under laws of the country and the U. S.) and reasonableness of lending and relending terms.

The terms of lending are the interest rate and maximum maturity established under the FAA. Relending provision will be waived. See Section VI. of Loan Paper.
17. FAA §.201(e). Information and conclusion on availability of an application together with sufficient information and assurances to indicate reasonably that funds will be used in an economically and technically sound manner.

See Section VI. of the Loan Paper and the Implementation Letter. It is concluded that the loan funds will be used in the prescribed manner.
18. FAA §.201(f). If a project, information and conclusion whether it will promote the economic development of the requesting country, taking into account the country's human and material resource requirements and the relationship between the ultimate objectives of the project and the country's overall economic development.

See Section I. and IV. of the Loan Paper.
19. FAA §.201(f). If a project, information and conclusion whether it specifically provides for appropriate participation by private enterprise.

The project provides for expansion of public utilities, an area in which private enterprise does not participate in Afghanistan.
20. FAA §.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.

The loan proceeds are earmarked for expenditures on commodities and services furnished by U.S. private sector sources. See Section VII. Financial Aspects.
21. FAA §.281. Extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the developing countries, through the encouragement of democratic private and local governmental institutions.

The project is designed to promote the establishment of viable utility administrative structures need for achieving long-range objectives.
22. FAA §.601(a). Information and conclusions whether loan 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; (f) strengthen free labor unions.

(a) This loan will encourage international trade by encouraging the import of commodities, utilizing electricity and encouraging the manufacture of exportable items by providing a source of power; (b) increased private enterprise activity will be directly encouraged; (c) the loan will have no direct effect on the development and use of cooperatives, credit unions and savings and loan associations; (d) the loan would have no measurable effect on monopolistic practices; (e) technical efficiency will be greatly improved through the existence of a reliable source of electric power; (f) the loan will have no effect on the strengthening of free labor unions.

23. FAA §.601(b). Information and conclusion on how the loan will encourage U. S. private trade and investment abroad, and how it will encourage private U. S. participation in foreign assistance programs (including use of private trade channels and the services of U. S. private enterprise).
- The commodities and services to be procured from the US with the loan proceeds will be largely additional to present US exports to Afghanistan; all of the loan proceeds will be expended in the US private sector.
24. FAA §.601(d). Conclusion and supporting information on compliance with the Congressional policy that engineering and professional services of U. S. firms and their affiliates are to be used in connection with capital projects to the maximum extent consistent with the national interest.
- The services of US consulting engineers are a requirement of the loan. All such services shall be of US source and origin.
25. FAA §.602. Information and conclusions whether loan will permit American small business to participate equitably in the furnishing of goods and services financed by it.
- The loan agreement shall provide for small business notification; project requirements will be advertised in the Small Business Bulletin.
26. FAA §.604(a); App. §.108. Compliance with restriction of commodity procurement to U. S. except as otherwise determined by the President and subject to statutory reporting requirements.
- There will be procurement in Afghanistan not incompatible with this provision.
27. FAA §.604(b). Compliance with bulk commodity procurement restriction to prices no higher than the market price prevailing in the U. S. at time of purchase.
- The Loan Agreement shall provide for this restriction.
28. FAA §.604(d). Compliance with requirement that marine insurance be purchased on commodities if the participating country discriminates, and that insurance be placed in the U. S.
- The Loan Agreement shall provide for this restriction.
29. FAA §.611(a)(1). Information and conclusion on availability of engineering, financial, and other plans necessary to carry out the assistance and of a reasonably firm estimate of the cost of the assistance to the United States.
- See Section IV. of the Loan Paper.
30. FAA §.611(a)(2). Necessary legislative action required within recipient country and basis for reasonable anticipation such action will be completed in time to permit orderly accomplishment of purposes of loan.
- The Loan Agreement shall require such action.

31. FAA §.611(b); App.§.101. If water or water-related land resource construction project or program, information and conclusion on a benefit-cost computation. See Section IV. of the Loan Paper.
32. FAA §.611(c). Compliance with requirement that contracts for construction be let on competitive basis to maximum extent practicable. The Loan Agreement and Implementation Letter shall cover this requirement.
33. FAA §.612(b) and 636(h). Appropriate steps that have been 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 RGA shall cover all local costs.
34. FAA §.619. Compliance with requirement that assistance to newly independent countries be furnished through multilateral organizations or plans to maximum extent appropriate. Not applicable.
35. FAA §.620(a); App.§.107(a) and (b). Compliance with prohibitions against assistance to Cuba and any country (a) which furnishes assistance to Cuba or failed to take appropriate steps by February 14, 1964, to prevent ships or aircraft under its registry from carrying equipment, materials, or supplies from or to Cuba; or (b) which sells, furnishes, or permits any ships under its registry from carrying items of primary strategic significance, or items of economic assistance. The RGA is not in violation of this section.
36. FAA §.620(b). If assistance to the government of a country, existence of determination it is not controlled by the international Communist movement. Afghanistan is not a Communist controlled nation.
37. FAA §.620(c). If assistance to the government of a country, existence of indebtedness to a U. S. citizen for goods or services furnished or ordered where such citizen has exhausted available legal remedies or where the debt is not denied or contested by such government or the indebtedness arises under an unconditional guaranty of payment given by such government. Afghanistan is not known to be in violation of this section.
38. FAA §.620(d). If assistance for any productive enterprise which will compete with U. S. enterprise, existence of 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. Not applicable.

39. FAA §.620(e)(1). If assistance to the government of a country, extent to which it (including government agencies or subdivisions) has, after January 1, 1962, taken steps to repudiate or nullify contracts or 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 appropriate steps to discharge its obligations. Afghanistan is not presently in violation of this section.
40. FAA §.620(f); App. §.109. Compliance with prohibitions against assistance to any Communist country. Afghanistan is not presently in violation of this section.
41. FAA §.620(g). Compliance with prohibition against use of assistance to compensate owners for expropriated or nationalized property. No part of the proposed loan or any other assistance will be used for the proscribed purposes.
42. FAA §.620(h). Compliance with regulations and procedures adopted to insure against use of assistance in a manner which, contrary to the best interests of the U. S., promotes or assists the foreign aid projects or activities of the Communist-bloc countries. The project does not assist the foreign aid projects or activities of the Bloc countries.
43. FAA §.620(i). Existence of determination that the country is engaging in or preparing for aggressive military efforts. Afghanistan is not known to be in violation of this section.
44. FAA §.620(i). Information on representation of the country at any international conference when that representation includes the planning of activities involving insurrection or subversion against the U. S. or countries receiving U. S. assistance. Afghanistan is not known to be in violation of this section.
45. FAA §.620(j). Indonesia restriction. Not applicable.
46. FAA §.620(k). If construction of productive enterprise where aggregate value of assistance to be furnished by U. S. will exceed \$100 million, identification of statutory authority. Not applicable.
47. FAA §.620(l). Consideration which has been given to denying assistance to the government of a country which after December 31, 1966, has failed to institute the investment guaranty program for the specific risks of inconvertibility and expropriation or confiscation. Afghanistan has instituted the investment guaranty program.
48. FAA §.620(n); App. §.107(b); App. §.116. Compliance with prohibitions against assistance to countries which traffic or permit trafficking with North Viet-Nam. Afghanistan is not known to be engaged in direct or indirect trade with North Vietnam.

49. FAA §.620(o). If country has seized, or imposed any penalty or sanction against, any U. S. fishing vessel on account of its fishing activities in international waters, information on the consideration which has been given to excluding the country from assistance. Not applicable.
50. FAA §.620(p); App. §.117. U. A. R. restrictions. Not applicable.
51. FAA §.620(q). Existence of default under any Foreign Assistance Act loan to the country. Afghanistan is not presently in default on any FAA loan to it.
52. App. §.102. Compliance with requirement that payments in excess of \$25,000 for architectural and engineering services on any one project be reported to Congress. The required report to Congress will be made.
53. App. §.104. Compliance with bar against funds to pay pensions, etc., for military personnel. No portion of the loan proceeds will be used for these purposes.
54. App. §.106. If country attempts to create distinctions because of their race or religion among Americans in granting personal or commercial access or other rights otherwise available to U. S. citizens generally, application which will be made in negotiations of contrary principles as expressed by Congress. Afghanistan makes no such distinctions.
55. App. §.111. Compliance with existing requirements for security clearance of personnel. Compliance with this section will be effected as applicable per the Loan Agreement.
56. App. §.112. Compliance with requirement for approval of contractors and contract terms for capital projects. The Loan Agreement will so provide.
57. App. §.114. Compliance with bar against use of funds to pay assessments, etc., of U. N. member. No portion of the loan proceeds will be used for these purposes.
58. App. §.115. Compliance with regulations on employment of U. S. and local personnel for funds obligated after April 30, 1964 (Regulation 7). Compliance will be a requirement of the Implementation Letter.
59. App. §.118. Viet-Nam iron and steel restrictions. Not applicable.
60. App. §.401. Compliance with bar against use of funds for publicity or propaganda purposes within U. S. not heretofore authorized by Congress. No portion of the loan proceeds will be used for these purposes.

ANNEX I

CAPITAL ASSISTANCE LOAN AUTHORIZATION

Provided from: Development Loan Funds
(Afghanistan - Kajakai Hydroelectric Power Plant)

Pursuant to the authority vested in the Administrator of the Agency for International Development (hereinafter called "A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the Delegations of Authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title 1, the Development Loan Fund, to the Royal Government of Afghanistan, of not to exceed Twelve Million Dollars, (\$12,000,000) such funds to be made available to the Royal Government of Afghanistan to finance the foreign exchange costs for the construction of a two 16.5 Megawatt unit hydroelectric generating plant at the Kajakai Dam, other attendant physical facilities in the Kandahar - Girishk area of the Helmand - Arghandab Valley, and the furnishing of technical, supervisory and training services for related Afghan electric authorities.

This Loan is subject to the following conditions:

1. Interest rate and terms of payment

This Loan shall be repaid by the Royal Government of Afghanistan within forty (40) years after the date of the first disbursement thereunder, including a grace period of not to exceed ten (10) years. The interest on the disbursed balance of the Loan shall be at the rate of one percent (1%) per annum during the ten (10) year grace period and at the rate of two and one half percent (2½%) per annum thereafter.

2. Currency of Repayment

Repayment of the Loan and payment of interest shall be in United States Dollars.

3. Other Terms and Conditions

3.1 Commodities and services financed under the Loan shall be of United States source and origin.

3.2 This Loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Date: _____

Administrator
Agency for International Development

AID-DLC/P-546
ANNEX J
April 25, 1967

A.I.D. Loan Number

Project Number

LOAN AGREEMENT

BETWEEN

THE ROYAL GOVERNMENT OF AFGHANISTAN

AND THE

UNITED STATES OF AMERICA

FOR

KAJAKAI HYDROELECTRIC POWER PLANT

Date:

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LOAN AGREEMENT dated _____ between the
Royal Government of Afghanistan ("Borrower"), and the UNITED STATES
OF AMERICA, acting through the AGENCY FOR INTERNATIONAL DEVELOPMENT
("A.I.D.").

ARTICLE I

The Loan

SECTION 1.01. The Loan. Subject to the terms and conditions of this Agreement, A.I.D. agrees to lend to the Borrower pursuant to the Foreign Assistance Act of 1961, as amended, an amount not to exceed Twelve Million United States Dollars (\$12,000,000) ("Loan") to assist the Borrower in carrying out the Project referred to in Section 1.02 ("Project"). The Loan shall be used exclusively to finance United States Dollar costs of goods and services required for the Project ("Dollar Costs"). The aggregate amount of disbursements under the Loan is hereinafter referred to as "Principal."

SECTION 1.02. The Project. The Project shall consist of the design, construction and initial operation of a hydroelectric power generating plant at the Kajakai dam site. The Project is more fully described in Annex 1, attached hereto, which Annex may be modified in writing. The goods and services to be financed under the Loan shall be listed in the implementation letters referred to in Section 8.03 ("Implementation Letters"); provided, however, that of the Loan, no less than the approximate sum of one million five hundred thousand dollars (\$1,500,000) shall be disbursed for the purpose of carrying

out the Training Program referred to in Section 3.02 hereof,
and the balance of the Loan shall be disbursed for the purpose
of acquiring the goods and services necessary to complete the
Project.

ARTICLE II

Loan Terms

SECTION 2.01. Interest. The Borrower shall pay to A.I.D. interest which shall accrue at the rate of one percent (1%) per annum for 10 years following the date of the first disbursement hereunder and at the rate of two and one half percent (2½%) per annum thereafter on the outstanding balance of Principal and on any due and unpaid interest. Interest on the outstanding balance shall accrue from the date of each respective disbursement (as such date is defined in Section 6.03), and shall be computed on the basis of a 365-day year. Interest shall be payable semi-annually. The first payment of interest shall be due and payable no later than six (6) months after the first disbursement hereunder, on a date to be specified by A.I.D.

SECTION 2.02. Repayment. The Borrower shall repay to A.I.D. the Principal within forty (40) years from the date of the first disbursement hereunder in sixty-one (61) approximately equal semi-annual installments of principal and interest. The first installment of Principal shall be payable nine and one-half (9½) years after the date on which the first interest payment is due in accordance with Section 2.01. A.I.D. shall provide the Borrower with an amortization schedule in accordance with this Section 2.02 after the final disbursement under the Loan.

SECTION 2.03. Application, Currency and Place of Payment.

All payments of interest and Principal under this Article II shall be made in United States Dollars and shall be applied first to the payment of interest due and then to the repayment of Principal.

Except as A.I.D. may otherwise specify in writing, all such payments shall be made to the Controller, USAID Mission Kabul, Afghanistan, and shall be deemed made when received by the Office of the Controller.

SECTION 2.04. Prepayment. Upon payment of all interest and refunds then due, the Borrower may prepay, without penalty, all or any part of the Principal. Any such prepayment shall be applied to the installments of Principal in the inverse order of their maturity.

SECTION 2.05. Renegotiation of the Terms of the Loan.

Borrower agrees to negotiate with A.I.D., at such time or times as A.I.D. may request, an acceleration of the repayment of the Loan in the event that there is any significant improvement in the internal and external economic and financial position and prospects of the country of the Borrower.

ARTICLE III

Conditions Precedent to Disbursement

SECTION 3.01. Conditions Precedent to Initial Disbursement.

Prior to any disbursement or to the issuance of any Letter of Commitment under the Loan, the Borrower shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

- (a) An opinion of the Attorney General of Afghanistan or of any other counsel acceptable to A.I.D. that this Agreement has been duly authorized or ratified by, and executed on behalf of, the Borrower, and that it constitutes a valid and legally binding obligation of the Borrower in accordance with all of its terms;
- (b) A statement of the names of the persons holding or acting in the office of the Borrower specified in Section 8.02 of this Agreement, and a specimen signature of each person specified;
- (c) An executed contract for engineering or other type of consulting services for the Project acceptable to A.I.D. with a firm acceptable to A.I.D.

SECTION 3.02. Conditions Precedent to Additional Disbursements.

Prior to any disbursement or to the issuance of any Letter of Commitment under the Loan subsequent to the initial disbursement, the Borrower shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D.

in form and substance satisfactory to A.I.D.:

- (a) Plans and specifications, bid documents, cost estimates and time schedules for carrying out the Project;
- (b) A contract in final draft for construction or other services for the Project acceptable to A.I.D. with a firm acceptable to A.I.D.;
- (c) Evidence that Borrower has made satisfactory arrangements for acquisition of all land and rights-of-way required for completion of the Project;
- (d) Evidence that Borrower has made satisfactory arrangements for financing all costs of the Project that will not be financed under the loan;
- (e) An executed contract relating to a program for the training of Afghan personnel to operate the Project ("Training Program").
- (f) Evidence that Borrower has made satisfactory arrangements for keeping complete and accurate records concerning the costs of the Project;
- (g) A complete implementation plan and schedule for the Project, approved by one of the representatives of the Borrower referred to in Section 3.01 (b), which shall describe in appropriate detail the manner and period of time in which the Project and each portion thereof will be performed; including, but not limited to, a description of the agency

or agencies of the Borrower that will assume responsibility for the Project.

- (h) A schedule listing the types, quantities and estimated costs of any and all Eligible Items to be imported for the Project.
- (i) Evidence of arrangements relating to the financing of expansion and improvement of sub-transmission and distribution systems;
- (j) A certified copy of the endorsement to this Agreement, duly executed by the agency or agencies of Borrower established pursuant to Section 3.02 (g) hereof, in haec verba as the same appears below the signatures of Borrower and A.I.D. hereto. Such additional plans, documents or other submissions as A.I.D. may request.

SECTION 3.03. Terminal Dates for Meeting Conditions Precedent to Disbursement.

- (a) If all of the conditions specified in Section 3.01 shall not have been met within ninety (90) days from the date of this Agreement, or such later date as A.I.D. may agree to in writing, A.I.D. at its option may terminate this Agreement by giving written notice to the Borrower. Upon the giving of such notice, this Agreement and all obligations of the parties thereunder shall terminate.

(b) If all of the conditions specified in Section 3.02 shall not have been met prior to January 1, 1968, or such later date as A.I.D. may agree to in writing, A.I.D. at its option may cancel the then undisbursed balance of the amount of the Loan or may terminate this Agreement by giving written notice to the Borrower.

In the event of a termination, as mentioned in subsections (a) or (b) above, upon the giving of notice, the Borrower shall immediately repay the Principal then outstanding and shall pay any accrued interest and, upon receipt of such payments in full, this Agreement and all obligations of the parties hereunder shall terminate.

SECTION 3.04. Notification of Meeting of Conditions Precedent to Disbursement. A.I.D. shall notify the Borrower upon determination by A.I.D. that the conditions precedent to disbursement have been met.

ARTICLE IV

General Covenants and Warranties

SECTION 4.01. Execution of the Project.

- (a) The Borrower shall carry out the Project with due diligence and efficiency, and in conformity with sound engineering, construction, financial and administrative practices. In this connection, the Borrower shall at all times employ suitably qualified and experienced consultants to be professionally responsible for the design and execution of the Project and suitably qualified and competent construction contractors to carry out the Project.
- (b) The Borrower shall cause the Project to be carried out in conformity with all of the plans, specifications, contracts, schedules, and other arrangements, and with all modifications therein, approved by A.I.D. pursuant to this Agreement.

SECTION 4.02. Funds and Resources.

The Borrower shall provide promptly as needed all funds, in addition to the Loan, and all other resources required for the punctual and effective carrying out, maintenance, repair and operation of the Project.

SECTION 4.03. Continuing Consultation. The Borrower and A.I.D. shall cooperate fully to assure that the purpose of the Loan will be accomplished. To this end, the Borrower and A.I.D. shall from time to time, at the request of either party, exchange views through their representatives with regard to the progress of the Project, the performance by the Borrower of its obligations under this Agreement, the performance of the consultants, contractors and suppliers engaged on the Project, and other matters relating to the Project.

SECTION 4.04. Management and Training. The Borrower shall

- (a) Provide qualified trainees for the Training Program, and to the extent possible, provide qualified and experienced management for the Project thereafter; and
- (b) Prior to the conclusion of the Training Program review the same with A.I.D. If it is determined by either or both the Borrower and A.I.D. that further training under the Training Program is required for the success of the Project, the Borrower agrees to provide the local currency and foreign exchange funds necessary for such further training.

SECTION 4.05. Operation and Maintenance. The Borrower shall operate, maintain and repair the Project in conformity with sound engineering, financial and administrative practices and in such manner as to insure the continuing and successful achievement of the purpose of the Project.

SECTION 4.06. Taxation. This Agreement, the amount agreed to be lent hereunder and any evidence of indebtedness issued in connection herewith shall be free from, and the Principal and interest shall be paid without deduction for and free from, any taxation or fees imposed under the laws in effect within the country of the Borrower. To the extent that (a) all parties to contracts financed hereunder to which the Borrower is a party and any property or transactions relating to such contracts and (b) any commodity procurement transaction financed hereunder, are not exempt from identifiable taxes, tariffs, duties and other levies imposed under laws in effect, in the country of the Borrower, the Borrower shall pay or reimburse the same under Section 5.03 of this Agreement with funds other than those provided under the Loan.

SECTION 4.07. Utilization of goods and Services.

- (a) Goods and services financed under the Loan shall be used exclusively for the Project, except as A.I.D. may otherwise agree in writing. Upon completion of the Project, or at such other time as goods financed under the Loan can no longer usefully be employed for the Project, the Borrower may use or dispose of such goods in such manner as A.I.D. may agree to in writing prior to such use or disposition.
- (b) Except as A.I.D. may otherwise agree in writing, no goods or services financed under the Loan shall be used to promote or assist any foreign aid project or activity associated with or financed by any country not included

in Code 935 of the A.I.D. Geographic Code Book as in effect at the time of such use.

SECTION 4.08. Disclosure of Material Facts and Circumstances.

The Borrower represents and warrants that all facts and circumstances that it has disclosed to A.I.D. in the course of obtaining the Loan are accurate and complete, and that it has disclosed to A.I.D., accurately and completely, all facts and circumstances that might materially affect the Project and the discharge of its obligations under this Agreement. The Borrower shall promptly inform A.I.D. of any facts and circumstances that may hereafter arise that might materially affect, or that it is reasonable to believe might materially affect, the Project or the discharge of the Borrower's obligations under this Agreement.

SECTION 4.09. Commissions, Fees and other Payments.

(a) Borrower warrants and covenants that in connection with obtaining the Loan, or taking any action under or with respect to this Agreement, it has not paid, and will not pay or agree to pay, nor to the best of its knowledge has there been paid nor will there be paid or agreed to be paid by any other person or entity, commissions, fees or payments of any kind, except as regular compensation to the Borrower's full time officers and employees or as compensation for bona fide professional, technical or comparable services. The Borrower shall promptly report

to A.I.D. any payment or agreement to pay for such bona fide professional, technical or comparable services to which it is a party or of which it has knowledge (indicating whether such payment has been made or is to be made on a contingent basis), and if the amount of any such payment is deemed unreasonable by A.I.D., the same shall be adjusted in a manner satisfactory to A.I.D.

- (b) The Borrower covenants that no payments have been or will be received by the Borrower, or any official of the Borrower, in connection with the procurement of goods and services financed hereunder, except fees, taxes or similar payments legally established in the country of the Borrower.

SECTION 4.10. Maintenance and Audit of Records. The Borrower shall maintain, or cause to be maintained, in accordance with sound accounting principles and practices consistently applied, books and records relating both to the Project and to this Agreement. Such books and records shall, without limitation, be adequate to show:

- (a) the receipt and use made of goods and services acquired with funds disbursed pursuant to this Agreement;
- (b) the nature and extent of solicitations of prospective suppliers of goods and services acquired;
- (c) the basis of the award of contracts and orders to successful bidders; and
- (d) the progress of the Project.

Such books and records shall be regularly audited, in accordance with sound auditing standards, for such period and at such intervals as A.I.D. may require, and shall be maintained for five years after the date of the last disbursement by A.I.D. or until all sums due A.I.D. under this Agreement have been paid, whichever date shall first occur.

SECTION 4.11. Reports. The Borrower shall furnish to A.I.D. such information and reports relating to the Loan and to the Project as A.I.D. may request.

SECTION 4.12. Inspections. The authorized representatives of A.I.D. shall have the right at all reasonable times to inspect the Project, the utilization of all goods and services financed under the Loan, and the Borrower's books, records and other documents relating to the Project and the Loan. The Borrower shall cooperate with A.I.D. to facilitate such inspections and shall permit representatives of A.I.D. to visit any part of the country of the Borrower for any purpose relating to the Loan.

SECTION 4.13. Maintenance of Arrangements.

- (a) The Borrower shall take any and all steps necessary and appropriate to maintain in full force and effect each and every agreement and arrangement specified in Section 3.01 and Section 3.02 of this Agreement.
- (b) Borrower shall report promptly to A.I.D. any event or occurrence which materially affects the validity of such agreements and arrangements, or any of them.

SECTION 4.14. Power Rates. Except as A.I.D. and the Borrower shall otherwise agree, the Borrower, or the agency or agencies established pursuant to Section 3.02 (g) hereof, shall take all such action as may be necessary or advisable to cause its rates for the sale of electricity to be set and maintained at such levels as may be necessary to provide revenues sufficient to (a) cover all operating expenses of the system, including a reasonable charge for the cost of money, adequate maintenance, and depreciation in accordance with sound utility accounting practices, (b) provide for amortization payments of all debt to the extent not covered by depreciation charges, (c) provide a reasonable return on invested equity and (d) provide, in addition, some accumulated reserve to be applied to future expansion of the system's power facilities. The matter of determining what would be a reasonable return on invested equity and the amount of the accumulated reserve for future expansion will be a subject for consultation from time to time between the Borrower or the agencies and A.I.D.

SECTION 4.15. Exchange Rate. Borrower shall maintain a constant exchange of Afghan afghanis to U.S. dollars in connection with any and all transactions relating to the Project.

ARTICLE V

Procurement

SECTION 5.01. Procurement from the United States. Except as A.I.D. may otherwise agree in writing, disbursements made pursuant to Section 6.01 shall be used exclusively to finance the procurement for the Project of goods and services, including ocean shipping and marine insurance, having both their source and origin in the United States of America.

SECTION 5.02. Eligibility Date. Except as A.I.D. may otherwise agree in writing, no goods or services may be financed under the Loan which are procured pursuant to orders or contracts firmly placed or entered into prior to the date of this agreement.

SECTION 5.03. Goods and Services Not Financed Under Loan. Goods and services procured for the Project, but not financed under the Loan, shall have their source and origin in countries included in Code 935 of the A.I.D. Geographic Code Book as in effect at the time orders are placed for such goods and services.

SECTION 5.04. Implementation of Procurement Requirements. The definitions applicable to the eligibility requirements of Sections 5.01 and 5.03 will be set forth in detail in Implementation Letters.

SECTION 5.05. Plans, Specifications and Contracts.

- (a) Except as A.I.D. may otherwise agree in writing, the Borrower shall furnish to A.I.D., promptly upon preparation, all plans, specifications, construction schedules, bid documents and contracts relating to the Project, and any modifications therein, whether or not the goods and services to which

they relate are financed under the Loan.

- (b) Except as A.I.D. may otherwise agree in writing, all of the plans, specifications and construction schedules furnished pursuant to sub-section (a) above shall be approved by A.I.D. in writing.
- (c) All bid documents relating to goods and services financed under the Loan shall be approved by A.I.D. in writing prior to their issuance. All plans, specifications and other documents relating to goods and services financed under the Loan shall be in terms of United States standards and measurements, except as A.I.D. may otherwise agree in writing.
- (d) The following contracts financed under the Loan shall be approved by A.I.D. in writing prior to their execution:
 - (i) contracts for engineering and other professional services,
 - (ii) contracts for construction services,
 - (iii) contracts for such other services as A.I.D. may specify.

In the case of any of the above contracts for services, A.I.D. shall also approve in writing the contractor and such contractor personnel as A.I.D. may specify. Material modifications in any of such contracts and changes in any of such personnel shall also be approved by A.I.D. in writing prior to their becoming effective.

- (e) Consulting firms used by the Borrower for the Project but not financed under the Loan, the scope of their services and such of their personnel assigned to the Project as A.I.D. may specify, and construction contractors used by the Borrower for the Project but not financed under the Loan shall be acceptable to A.I.D.

SECTION 5.06. Reasonable Price. No more than reasonable prices shall be paid for any goods or services financed, in whole or in part, under the Loan. Such items shall be procured on a fair and, except for professional services, on a competitive basis in accordance with procedures therefor prescribed in Implementation Letters.

SECTION 5.07. Employment of Third Country Nationals under Construction Contracts. The employment of personnel to perform services under construction contracts financed under the Loan shall be subject to requirements with respect to third country nationals prescribed in Implementation Letters.

SECTION 5.08. Shipping and Insurance.

- (a) Goods procured from the United States and financed under the Loan shall be transported to the country of the Borrower on flag carriers of any country included in Code 935 of the A.I.D. Geographic Code Book as in effect at the time of shipment.
- (b) At least fifty percent (50%) of the gross tonnage of all goods procured from the United States and financed under the Loan (computed separately for dry bulk carriers, dry

cargo liners and tankers) which shall be transported on ocean vessels shall be transported on privately-owned United States - flag commercial vessels unless A.I.D. shall determine that such vessels are not available at fair and reasonable rates for United States-flag commercial vessels. No such goods may be transported on any ocean vessel (or aircraft) (1) which A.I.D., in a notice to the Borrower, has designated as ineligible to carry A.I.D. financed goods or (11) which has been chartered for the carriage of A.I.D. financed goods unless such charter has been approved by A.I.D.

- (c) If in connections with the placement of marine insurance on shipments financed under United States legislation authorizing assistance to other nations, the country of the Borrower, by statute, decree, rule or regulation, favors any marine insurance company of any country over any marine insurance company authorized to do business in any state of the United States of America, goods procured from the United States and financed under the Loan shall during the continuance of such discrimination be insured against marine risk in the United States of America with a company or companies authorized to do a marine insurance business in any state of the United States of America.
- (d) The Borrower shall insure, or cause to be insured, all goods procured in the United States and financed under the Loan against risks incident to their transit to the point of their

use in the project. Such insurance shall be issued upon terms and conditions consistent with sound commercial practice, shall insure the full value of the goods, and shall be payable in the currency in which such goods were financed.

SECTION 5.09. Notification to Potential Suppliers. In order that all United States firms shall have the opportunity to participate in furnishing goods and services to be financed under the Loan, the Borrower shall furnish to A.I.D. such information with regard thereto, and at such times, as A.I.D. may request in Implementation Letters.

SECTION 5.10. United States Government-Owned Excess Property. The Borrower shall utilize, with respect to goods financed under the Loan to which the Borrower takes title at the time of procurement, such reconditioned United States Government-Owned Excess Property as may be consistent with the requirements of the Project and so may be available within a reasonable period of time. The Borrower shall seek assistance from A.I.D. and A.I.D. will assist the Borrower in ascertaining the availability of and in obtaining such Excess Property. A.I.D. will make arrangements for any necessary inspection of such property by the Borrower or its representative. The costs of inspection and of acquisition, and all charges incident to the transfer to the Borrower of such Excess Property, may be financed under the Loan. Prior to the procurement of any goods, other than Excess Property, financed under the Loan and after having sought such A.I.D. assistance, the Borrower shall indicate

to A.I.D. in writing, on the basis of information then available to it, either that such goods cannot be made available from reconditioned United States Government-Owned Excess Property on a timely basis or that the goods that can be made available are not technically suitable for use in the Project.

SECTION 5.11. Information and Marking. Borrower shall give publicity to the Loan and the Project as a program of United States aid, identify the Project site, and mark goods financed under the Loan, as prescribed in Implementation Letters.

ARTICLE VI

Disbursements

SECTION 6.01. Disbursements for United States Dollar Costs - Letters of Commitment to United States Banks. Upon satisfaction of conditions precedent, the Borrower may, from time to time, request A.I.D. to issue Letters of Commitment for specified amounts to one or more United States banks, satisfactory to A.I.D., committing A.I.D. to reimburse such bank or banks for payments made by them to contractors or suppliers, through the use of letters of credit or otherwise, for Dollar Costs of goods and services procured for the Project in accordance with the terms and conditions of this Agreement. Payment by a bank to a contractor or supplier will be made by the bank upon presentation of such supporting documentation as A.I.D. may prescribe in Implementation Letters. Banking charges incurred in connection with Letters of Commitment and Letters of Credit shall be for the account of the Borrower and may be financed under the Loan.

SECTION 6.02. Other Forms of Disbursement. Disbursements of the Loan may also be made through such other means as the Borrower and A.I.D. may agree to in writing.

SECTION 6.03. Date of Disbursement. Disbursements by A.I.D. shall be deemed to occur, in the case of disbursements pursuant to Section 6.01, on the date on which A.I.D. makes a disbursement to the Borrower, to its designee, or to a banking institution pursuant to a Letter of Commitment.

SECTION 6.04. Terminal Date for Disbursement. Except as A.I.D. may otherwise agree in writing, no Letter of Commitment or amendment thereto shall be issued in response to requests received by A.I.D. after _____, and no disbursement shall be made against documentation received by A.I.D. or any bank described in Section 6.01 after _____. A.I.D. at its option, may at any time or times after _____, reduce the Loan by all or any part thereof for which documentation was not received by such date.

ARTICLE VII

Cancellation and Suspension

SECTION 7.01. Cancellation by the Borrower. The Borrower may, with the prior written consent of A.I.D., by written notice to A.I.D., cancel any part of the Loan (i) which, prior to the giving of such notice, A.I.D. has not disbursed or committed itself to disburse or (ii) which has not then been utilized through the issuance of irrevocable Letters of Credit or through bank payments made other than under irrevocable Letters of Credit.

SECTION 7.02. Events of Default; Acceleration. If any one or more of the following Events ("Events of Default") shall occur:

- (a) The Borrower shall have failed to pay when due any interest or installment of Principal required under this Agreement;
- (b) The Borrower shall have failed to comply with any other provision of this Agreement, including but not limited to the obligation to carry out the Project with due diligence and efficiency;
- (c) The Borrower shall have failed to pay when due any interest or any installment of principal or any other payment required under any other loan agreement, any guaranty agreement, or any other agreement between the Borrower, or any of its agencies, the USA, its agencies, or any predecessors of such agencies, then A.I.D. may at its option, give to the Borrower notice that all or any part of the unpaid Principal shall be due and payable sixty (60) days thereafter, and, unless the Event of Default is cured

within such sixty (60) days:

- (1) such unrepaid Principal and any accrued interest hereunder shall be due and payable immediately, and,
 - (ii) the amount of any further disbursements made under then outstanding irrevocable Letters of Credit or otherwise shall become due and payable as soon as made.

SECTION 7.03. Suspension of Disbursements. In the event that at any time:

- (a) An Event of Default has occurred;
- (b) An event occurs that A.I.D. determines to be an extraordinary situation that makes it improbable either that the purpose of the Loan will be attained or that the Borrower will be able to perform its obligations under this Agreement,
- (c) Any disbursement would be in violation of the legislation governing A.I.D., or
- (d) The Borrower shall have failed to pay when due any interest or any installment of principal or any other payment required under any other loan agreement, any guaranty agreement or any other agreement between the Borrower or any of its agencies and the Government of the United States or any of its agencies, then A.I.D. may, at its option:

- (i) Suspend or cancel outstanding commitment documents to the extent that they have not been utilized through the issuance of irrevocable Letter of Credit or through bank payments made other than under irrevocable Letters of Credit, in which event A.I.D. shall give notice to the Borrower promptly after the said suspension or cancellation,
- (ii) Decline to make disbursements other than under outstanding commitment documents,
- (iii) Decline to issue additional commitment documents, and
- (iv) At A.I.D.'s expense, direct that title to goods financed under the Loan shall be transferred to A.I.D. if the goods are from a source outside the country of the Borrower, are in a deliverable state and have not been off-loaded in ports of entry of the country of the Borrower. Any disbursement made or to be made under the Loan with respect to such transferred goods shall be deducted from Principal.

SECTION 7.04. Cancellation by A.I.D. Following any suspension of disbursements pursuant to Section 8.03, if the cause or causes for such suspension of disbursements shall not have been eliminated or corrected within sixty (60) days from the date of such suspension, A.I.D. may, at its option, at any time or times thereafter, cancel all or any part of the Loan that is not then either disbursed or subject to irrevocable Letters of Credit.

SECTION 7.05. Continued Effectiveness of Agreement.

Notwithstanding any cancellation, suspension of disbursement or acceleration of repayment, the provisions of this Agreement shall continue in full force and effect until the payment in full of all Principal and any accrued interest hereunder.

SECTION 7.06. Refunds.

- (a) In the case of any disbursement not supported by valid documentation in accordance with the terms of this Agreement, or of any disbursement not made or used in accordance with the terms of this Agreement, A.I.D., notwithstanding the availability or exercise of any of the other remedies provided for under this Agreement, may require the Borrower to refund such amount in United States Dollars to A.I.D. within thirty days after receipt of a request therefor. Such amount shall be made available first for the cost of goods and services procured for the Project hereunder, to the extent justified; the remainder, if any, shall be applied to the installments of Principal in the inverse order of their maturity. Notwithstanding any other provision in this Agreement, A.I.D.'s right to require a refund with respect to any disbursement under the Loan shall continue for five years following the date of such disbursement.

- (b) In the event that A.I.D. receives a refund from any contractor, supplier, or banking institution, or from any other third party connected with the Loan, with respect to goods or services financed under the Loan, and such refund relates to an unreasonable price for goods or services, or to goods that did not conform with specifications, or to services that were inadequate, A.I.D. shall first make such refund available for the cost of goods and services procured for the Project hereunder, to the extent justified, the remainder to be applied to the installments of Principal in the inverse order of their maturity.

SECTION 7.07. Expenses of Collection. All reasonable costs incurred by A.I.D., other than salaries of its staff, in connection with the collection of any refund or in connection with amounts due A.I.D. by reason of the occurrence of any of the events specified in Section 7.02 may be charged to the Borrower and reimbursed to A.I.D. in such manner as A.I.D. may specify.

SECTION 7.08. Non-Waiver of Remedies. No delay in exercising or omission to exercise any right, power, or remedy accruing to A.I.D. under this Agreement shall be construed as a waiver of any of such rights, powers or remedies.

ARTICLE VIII

Miscellaneous

SECTION 8.01. Communications. Any notice, request, document or other communication given, made or sent by the Borrower or A.I.D. pursuant to this Agreement shall be in writing or by telegram, cable or radiogram and shall be deemed to have been duly given, made or sent to the party to which it is addressed when it shall be delivered to such party by hand or by mail, telegram, cable or radiogram at the following addresses:

To Borrower:

Mail Address:

Cable Address:

To A.I.D. (two copies):

Mail Address:

Agency for International Development
c/o American Embassy
Kabul, Afghanistan

Other addressees may be substituted for the above upon the giving of notice. All notices, requests, communications and documents submitted to A.I.D. hereunder shall be in English, except as A.I.D. may otherwise agree in writing.

SECTION 8.02. Representatives. For all purposes relative to this Agreement, the Borrower will be represented by the individual holding or acting in the office of _____ and A.I.D. will be represented by the individual holding or acting in the office of _____. Such individuals shall have the authority to designate by written notice additional representatives. In the event of any replacement or other designation of a representative hereunder, Borrower shall submit a statement of the representative's name and specimen signature in form and substance satisfactory to A.I.D. Until receipt by A.I.D. of written notice of revocation of the authority of any of the duly authorized representatives of the Borrower designated pursuant to this Section, it may accept the signature of any such representative or representatives as conclusive evidence that any action effected by such instrument is duly authorized.

SECTION 8.03. Implementation Letters. A.I.D. shall from time to time issue implementation Letters that will prescribe the procedures applicable hereunder in connection with implementation of this Agreement.

SECTION 8.04. Promissory Notes. At such time or times as A.I.D. may request, the Borrower shall issue promissory notes or such other evidences of indebtedness with respect to the Loan, in such form, containing such terms and supported by such legal opinions as A.I.D. may reasonably request.

SECTION 8.05. Termination Upon full Payment. Upon payment in full of the Principal and of any accrued interest, this Agreement and all obligations of the Borrower and A.I.D. under this Loan Agreement shall terminate.

IN WITNESS WHEREOF, Borrower and the United States of America, each acting through its respective duly authorized representative, have caused this Agreement to be signed in their names and delivered as of the day and year first above written.

THE ROYAL GOVERNMENT OF AFGHANISTAN

UNITED STATES OF AMERICA

By: _____

By: _____

Title: _____

Title: _____

The undersigned, the duly constituted representative of _____, and on its behalf, agrees to perform or be bound by, as the case may be, each and every term and condition of the foregoing Agreement, excepting only the obligation to repay the Loan.

By: _____

Title: _____