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

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CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

LAOS - NAM NGUM II LOAN

Room 1203 NSL

AID-DLC/P-2031

UNCLASSIFIED

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

UNCLASSIFIED
AID-DLC/P-2031
May 22, 1974

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Laos - Nam Ngum II Loan

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed five million United States dollars (\$5,000,000) to the Government of Laos to assist along with other nations and in a project administered by the Asian Development Bank, in financing the foreign exchange and local currency costs of goods and services required for the expansion of hydroelectric facilities at the Nam Ngum and for other related facilities, the Project to be carried out by Electricite Du Laos ("EDL").

This loan proposal is scheduled for consideration by the Development Loan Staff Committee on Wednesday, May 29, 1974. Also, please note your concurrence or objection is due at the close of the meeting on May 29. If you are a voting member a poll sheet has been enclosed for your response.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
ANNEXES I - VI

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Nam Ngum II Loan

May 21, 1974

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SUMMARY AND RECOMMENDATION

1. **The Project:** The Asian Development Bank (ADB) will administer a fund for the expansion of hydro-electric facilities at the Nam Ngum Dam and for related transmission lines and other facilities. This project activity will be known as the second phase of the Nam Ngum Project. The Nam Ngum II project will expand generating capacity from the present 30 MW to a total of 110 MW through the installation of two additional 40 MW turbine generator units.

2. **AID Contribution:** An AID Development Loan of \$5,000,000 is proposed as a U.S. contribution to the approximately \$25,000,000 foreign exchange and local costs of the Second Phase of the Nam Ngum Project.

3. **Justification of the AID Contribution:** It is anticipated that Laos will initially export most of the energy produced by the new generators. Initially Nam Ngum II is estimated to earn \$2.2 million/year in foreign exchange. In addition Laos will have a reliable low-cost source of electrical energy for its development. These developments will reduce Laos' dependence on U.S. balance of payments support.

4. **History and Background:** AID financed slightly less than half of the cost of the construction of the Nam Ngum Dam including the initial 30 MW of generating capacity under Supporting Assistance Grants in 1966 and 1968. AID has pledged that if other donors will meet the remainder of the cost of Phase II, the U.S. will lend Laos up to \$5,000,000 toward the cost of expansion. The ADB has agreed to serve as Administrator of Phase II and has obtained sufficient pledges from other donors to proceed with the project if \$5,000,000 is made available from AID loan funds.

5. **Statutory Criteria:** AID statutory criteria have been met. (See Annex 4).

6. **Issues:** None

7. **Recommendation:** It is recommended that a loan to Laos of not to exceed \$5,000,000 be approved for a U.S. contribution to the Second Nam Ngum Development Fund subject to the following conditions:

(a) Interest Rate and Terms of Repayment

Borrower shall repay the loan to AID within forty (40) years from the date of first disbursement under the loan, including a grace period of not to exceed ten (10) years. Borrower shall pay interest on the unrepaid principal and any interest accrued thereon at the rate of (a) two percent (2%) per annum during the grace period and (b) three percent (3%) per annum thereafter.

(b) Currency of Repayment

Borrower shall repay the loan and pay interest thereon in United States dollars.

(c) Other Terms and Conditions

(1) Borrower shall relend the proceeds of the loan to EDL to be repaid with interest to Borrower in local currency ("Kip") in the amounts equivalent to the value of the currency lent to Borrower at the respective rates and at the respective times at which Borrower is obliged to repay principal and to pay interest on the loan.

(2) The proceeds of the loan, or an equivalent amount from other contributions to the Project, shall be utilized for the procurement of goods and services from the United States, less a reasonable amount in relation to other nation's contributions to cover local currency costs.

(3) The Government of Laos shall cause EDL, and in a related undertaking the Government of Thailand shall cause the Electricity Generating Authority of Thailand ("EGAT"), to enter into an agreement under which the current Energy Supply Agreement between EDL and EGAT shall be extended for a period of not less than fifteen (15) years from the date of its expiry and under which EDL and EGAT shall determine the price of energy supplied to EGAT during the extension period taking into consideration, inter alia, the cost to EGAT of obtaining power from alternative sources.

(4) The proceeds of the loan will not be disbursed, except as AID agrees otherwise, until all conditions precedent to the effectiveness of other contributions to the Project have been satisfied.

(5) The loan shall be subject to such other terms and conditions as AID may deem advisable.

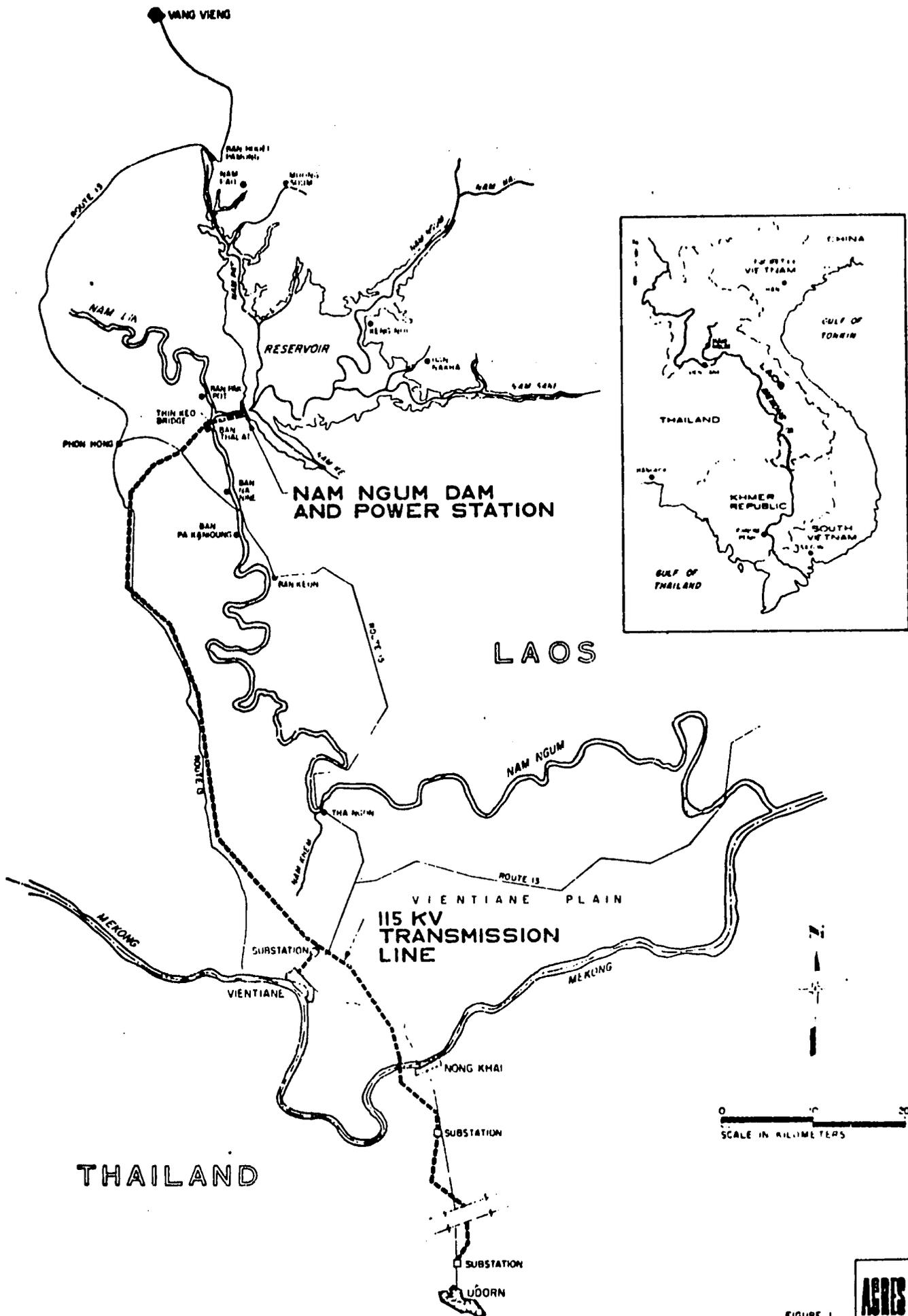


FIGURE 1 

May 21, 1974

Part I: History and Background

A. Project Background

In May 1965, in response to an initiative by the Secretary-General of the United Nations, the United States pledged to contribute one-half of Nam Ngum Dam construction costs on a grant, untied basis. The other half of the project costs came from eight other nations. The World Bank (IBRD) administered Phase I of the Project.

In June 1971, the Thai and Lao Governments signed an agreement (effective through 1981) by which Thailand will buy from Laos all the excess power produced by the Nam Ngum Dam both at its existing capacity and when it reaches full capacity.

In December 1971, the Nam Ngum Dam was completed and began to generate power for the first time. The Dam, about 40 miles north of Vientiane, with its ancillary power equipment sufficient to generate 30 megawatts of power, cost \$28,815,000.

In October 1973 the Asian Development Bank (ADB) obtained from potential donors sufficient pledges of financing to proceed with the second phase of Nam Ngum development. On the basis of IBRD and ADB engineering consultants' reports, it was determined that this development should initially comprise two additional 40 mw units. Cost estimates were adjusted for known inflation to approximately \$25,000,000 for these improvements, inclusive of a 15% allowance for contingencies.

The ADB circulated a draft Fund Agreement in November 1973 which has been revised at U. S. and other donor insistence and to which the U.S. has indicated its intention to adhere. The Fund Agreement provides that the U.S. contribution will be combined with contributions from the Governments of Australia, India, Netherlands, New Zealand, the U.K., the Overseas Economic Cooperation Fund (OECF) of the Government of Japan, and such other donors as may adhere to the Fund Agreement for the general purposes of the project. The terms of these contributions are described in Section 3.A. below. Their approximate value is \$25 million.

The fund agreement embodying donor pledges was initialled April 19, 1974. The donors also approved ADB/EDL action to initiate consulting engineering services. The consultant firm Motor Columbus (SWISS) began preparation of procurement documents April 25 under an interim arrangement deferring payment for these services until September.

In addition, the Government of the Federal Republic of Germany will finance transmission and substation improvements required and the engineering consultant services associated with this part of the project. The Government of Canada will finance up to CAN \$2.5 million of Canadian services, equipment or materials as required for the project. Canada is separately providing \$500,000 of technical assistance to EDL outside this project.

In the fall of 1973 AID made available \$27,000 to the IBRD for an environmental analysis of the Nam Ngum Project. This analysis has indicated that Phase II can be constructed without significant adverse environmental effects. The environmental analysis is attached as Annex 5 to this loan paper.

- B. Description of Project - the project includes:
- (a) installation in the spillway structure of four radial gates to increase the storage capacity of the reservoir by approximately 3,100 million cubic meters;
 - (b) civil works for the extension of the existing power house to accommodate three additional generating units each of 40 mw capacity;
 - (c) installation of turbines, generators and ancillary equipment for two additional generating units each of 40 mw capacity.
 - (d) installation of intake gates and additional stoplogs, removal of temporary steel bulkheads and completion of penstocks for the two additional generating units;
 - (e) construction of an additional double circuit 115 kv transmission line from Nam Ngum through Vientiane and across the Mekong River at Nong Khai to connect with additional transmission facilities to be constructed in Thailand;
 - (f) installation of additional facilities at the main Vientiane sub-station;
 - (g) installation of facilities for electrification of villages in the vicinity of the Nam Ngum reservoir; and
 - (h) construction of site offices, housing and construction camps.

The ADB estimates project costs as follows:

	<u>(US\$'000)</u>
Spillway Gates	840
Generating Equipment	8,630
Gates and Penstocks	1,400
Civil Works	4,690
Transmission Lines & Substation Extension & Erection	3,950
Village Electrification	260
Consulting Services (Swiss)	2,050
Advisory Services	210
Not Allocated	<u>2,670</u>
	\$ 24,700

C. Justification of Project

This loan will help solve the economic and social development problems in the field of power of Laos and Thailand. Power from the new hydroelectric plant will serve the Vientiane Plain, the Vientiane metropolitan area, and flow through the Thai transmission system in the rural Northeast area of Thailand to the Bangkok metropolitan area. It will substitute for electric energy which otherwise would be generated from imported petroleum fuels.

The Laotian areas served are the most populous agricultural and urban centers in the country. The Thai areas served are a relatively underdeveloped rural section and the principal urban center. Both countries are attempting to meet the power requirements of industry and agriculture within the constraints of foreign exchange availabilities; hydropower resource utilization is the most economic approach to meeting these requirements.

It is anticipated that in the initial years of operation most of the energy produced by Phase II of the project will be exported

to Thailand. The Electricity Generating Authority of Thailand (EGAT) and the Laotian power authority (Electricite du Laos, EDL) have agreed that EGAT will take all Nam Ngum project energy excess to Laotian requirements. Thus, Laos will earn needed foreign exchange.

The Fund Agreement includes undertakings by Laos and Thailand that the current Energy Supply Agreement between EDL and EGAT will be extended for not less than 15 years beyond the date of its expiry, December 31, 1981. The extended Agreement will take into consideration costs to EGAT of obtaining power from alternative sources.

Foreign exchange earnings will be dependent upon the price established for sales of Phase II energy to EGAT, but the value of such sales is expected to reach at least \$2.2 million by 1979, first year of commercial operation and to diminish thereafter as electrical energy consumption in Laos increases.

In addition to these foreign exchange earnings, which will reduce Laos' dependence on U.S. and other donors' support for normal import requirements, Laos will have a reliable low-cost source of electrical energy for its development. This electrification benefit will reduce dependence on imported fuel to generate the electric power required in the principal urban center (Vientiane). Reasonably priced power will also stimulate development of small communities and agriculture within the project service area. Certain agricultural pumping uses for this energy may be made economically feasible only because hydroelectric energy will be less costly than alternative fossil fuel generation and because use of Nam Ngum energy will not require foreign exchange expenditures.

Although these additional benefits are expected from the project, only revenues from sale of energy to EGAT or from service to EDL customers have been quantified in Part II of this loan paper.

D. AID Input Into Project

In addition to above-mentioned funds made available for the environmental analysis of the Nam Ngum Project (a total of \$ 27,000) an AID development loan of \$5,000,000 is proposed as a U.S. contribution to total project cost estimated at approximately \$25,000,000.

Under terms of the Fund Agreement, the value of the AID contribution will except for a reasonable part of total local currency expenditures for the project, be disbursed for the foreign currency costs of goods and services procured from U.S. sources.

E. Policy Objectives

Subsequent to the Laos ceasefire accord of February 1973, there was a lessening of hostilities in Laos to the point that military activities virtually ceased, thus allowing steady progress toward a political solution to the conflict there. This progress established an auspicious climate for the formation of the Provisional Government of National Union (PGNU) which was invested by the King of Laos on April 5, 1974. The fundamental objective of U.S. policy in Laos now is to help Laos make the transition from war to peace by supporting the political solution that is evolving. For the U.S. economic assistance program, this will entail continuing humanitarian and reconstruction assistance to help sustain the victims of the war and to help repair the human and material damage stemming from that war; maintaining the U.S. contribution to the stability and daily functioning of the Lao economy; and aiding in the effort to move Laos along the path to eventual economic self-sufficiency.

Political, Military and Economic Background

Although sparsely populated and one of the least developed countries in the world, Laos is situated in a position of unique geopolitical importance which has attracted diplomatic and military conflict for many years. Laos has common borders with China, North Vietnam, South Vietnam, Cambodia, Thailand, and Burma.

Since 1964, when the dissident Lao Patriotic Front (EPF) withdrew from the tripartite Government of National Union, until February 21, 1973 when the Laos ceasefire agreement was signed, the Royal Lao Government was confronted by the active military hostility of the LPF combined with the military occupation of parts of Laos by North Vietnam, which at one time had about 100,000 troops in Laos.

The ceasefire in Laos has been effective and the two sides have made slow but steady progress toward an effectively functioning coalition government. Eventually national elections will be followed by a permanent Government of National Union. Arrangements have been made for the neutralization and joint policing of the administrative capital of Luang Prabang.

The economy of Laos traditionally has been based on subsistence agriculture, but the war has disrupted even this subsistence base. Growing urbanization and the movement of people to the Lao Government zones have made Laos increasingly dependent on food imports,

largely financed by foreign assistance. Industry and infrastructure remain rudimentary throughout Laos. One significant achievement, even in the midst of hostilities, was the successful completion of a hydroelectric dam on the Nam Ngum River which since December 1971 has been producing electricity for Lao consumption and for "export" to Thailand. Tin and timber currently are the other major exports. Recorded exports rose from about \$2.6 million in 1972 to \$5 million in 1973 and are expected to continue to rise as conditions stabilize.

During the long period of hostilities, U.S. economic assistance was directed toward (1) stabilization assistance to control the war-induced inflationary pressure that threatened the country's economic and political stability, (2) humanitarian assistance to relieve the human suffering caused by the hostilities, and (3) project assistance to help the Royal Lao Government provide essential services and facilities in rural areas.

Other countries and international organizations also have provided economic assistance to Laos, concentrating on economic development and stabilization. We are hopeful that recognition of the post-war needs and opportunities in Laos will lead to an increase in assistance from those sources.

Fiscal Year 1974 saw the beginning of efforts by the Royal Lao Government and friendly governments to redirect foreign assistance from support for a war effort to support of peacetime development. In January 1974, the Royal Lao Government began the process of demobilizing its armed forces from their peak strength of about 80,000 to lower levels appropriate to the shift from military to political competition between the opposing factions.

During a decade of military conflict, over 700,000 persons (about one-third of the population under Lao Government control) have been refugees at one time or another. The number at any one time peaked in October 1973, at 380,000 but dropped substantially when the rice crop was harvested toward the end of last year.

F. Other Donor Assistance to Laos

Over the past several years Laos has received financial, technical, humanitarian, and commodity assistance offered by the many countries that are friendly toward Laos, interested in maintaining its stability, and in contributing to its economic and social development. Most of the assistance that donor nations have made available to Laos is concentrated in such activities as support of the Foreign Exchange Operations Fund (FEOF) to maintain monetary stability in Laos, teachers for several Lao schools and institutions of higher learning, scholarships to Lao students for study abroad, technical

advisors to assist the ministries, and financing of major capital projects such as the Nam Ngum Dam.

The total level of other donor assistance for 1974 is estimated at \$25.0 to \$27.0 million. The two largest other donors to Laos are France, approximately \$7.0-\$8.0 million, and Japan, approximately \$6.0-\$7.0 million.

G. Other Donor Assistance to the EDL

The EDL has received the following loans: two from the ADB for the Vientiane distribution system, three West German loans for provincial and Vientiane distribution systems, and five French loans for generating equipment, Pakse Hydropower Dam, Luang Prabang Hydropower Dam. France has provided technical assistance experts and equipment, staff training and teachers for the EDL school. Canada has provided degree training, on-the-job training in Canada, and short-term training in Thailand at EGAT for EDL personnel. It is anticipated that Canada will provide further degree training grants and will provide assistance for the expansion of the EDL School. Japan has provided four technical experts (hydropower facility operation and maintenance) who have been assigned to the Nam Ngum Dam site since operations began in 1972.

II. Project Evaluation

A. Borrower and Executing Agency

The borrower will be the Kingdom of Laos and the project will be executed by EDL.

EDL began operations in 1962 as an independent public utility under a seven member Board of Directors consisting of representatives from Ministries of Public Works and Transportation, Plan and Technical Cooperation, Finance and National Economy and also representatives of stockholding Government banks and agencies. The EDL is responsible for generation, transmission distribution and sales of electrical energy throughout the Kingdom of Laos.

The Director, USAID/Laos, has determined that the Royal Laos Government and EDL can effectively maintain and utilize the project. Attached as annex two to this loan paper is a copy of his determination that the requirements of 611(e) of the Foreign Assistance Act of 1961 have been met.

In carrying out the Phase II project, EDL will be operating under the terms of the multilateral Fund Agreement and a Project Agreement between the Kingdom of Laos, EDL and the Asian Development Bank (ADB). These documents will set forth relationships between EDL and the ADB as Administrator of the project. In addition a Financing Agreement between the Kingdom of Laos and EDL will set forth the obligations of EDL to repay loans from the U.S. and other donors. These relationships are further described in part III, Implementation, of this loan paper.

It is a condition of these agreements that a qualified firm of consulting engineers will assist EDL in the design, construction and initial operation of the project. Further, EDL will engage the services of an individual hydro-power engineer to assist EDL's project management unit.

Experience with the operation of Phase I of the Nam Ngum Project has indicated to USAID/Laos and the AID/W Loan Committee that the EDL has managed and operated the facility in a thoroughly competent, technical and professional manner. Careful and skillful use was made of the Phase I consulting engineering firm during the first year guarantee period.

3. Nam Ngum Phase II Development

1. Engineering Soundness Analysis

After a review of all available engineering data, feasibility reports and other material, it is concluded that the technical requirements of the proposed work are sufficiently well defined to execute the project on an orderly schedule. It is considered that the degree of engineering planning undertaken and the determination of costs are adequate to meet the applicable requirements of Section 611 of the Foreign Assistance Act. (Annex 3 is the full Engineering Analysis.)

2. Economic Soundness Analysis

a. IBRD Study

An IBRD evaluation of Phase II dated May 15, 1973 appraised the project as indicated below. Subsequently the ADB asked donors to contribute to the project on the basis of the IBRD study's findings.

Generating capacity currently operated by EDL is as follows:

Generating Capacity (kw)

	<u>Hydroelectric</u>	<u>Diesel</u>
Vientiane	30,000 (Nam Ngum I)	8,000
Pakse	2,400 (Selabang)	--
Laung Prabang	1,200 (Nam Cong)	450
Savannakhet	---	4,000
Thakkek	---	320
Champassak	---	48
	---	---
	<u>33,600</u>	<u>12,818</u>

From 1968 to 1972 power was also imported from Thailand, primarily for construction of the Nam Ngum Project but also for use in the Vientiane area. Besides the publicly-owned generating capacity there is also about 11 MW of privately-owned and operated generation in the vicinity of Vientiane.

The 115-kv single circuit line connecting Nam Ngum to the EGAT system is the only high voltage transmission line in Laos. Interconnection of the Nam Ngum with other provincial centers by the construction of new high-voltage transmission lines in Laos does not appear economically justified because of the long distance involved and the small loads to be served. However, EDL and EGAT are proceeding with arrangements to construct underwater cables across the Mekong to join Thakkek

and Savannakhet to the EGAT system.

The systems taken over by EDL in 1962 had been in use for over 30 years without major extensions or upgrading. Between 1969 and 1971, systems in the provinces were renewed and extended with financial assistance from the Federal Republic of Germany. In Vientiane, EDL was faced with the problem of meeting the needs of a rapidly growing population with inadequate and obsolete distribution facilities. To maintain at least minimum standards of power supply, EDL has reinforced the system in recent years with 15 kV sub-transmission lines and temporary 15/6.6 kV substations. Financing for these works included grants from the United States Agency for International Development and suppliers' credits. A Master Plan for renovation and extension of the Vientiane system was prepared in 1970 by consultants from the Federal Republic of Germany. This plan includes the extension of the existing main Vientiane sub-station at Phon Tong (located on the 115 kV line from Nam Ngum), the construction of four new substations, a 22 kV sub-transmission system, 400/200 V distribution lines and transformers, street lighting and consumer connections, and a communications system and load dispatching center. The Vientiane Power Distribution Project, as outlined in the Master Plan, is being financed by Loans from the Asian Development Bank and the Federal German Republic. The cost of the project will be on the order of US \$9.2 million.

Hydroelectric Potential

Laos has a number of sites suitable for large-scale hydroelectric development both on the tributaries on the Mekong within Laos and on the Mekong itself which, over part of its course, forms the border between Laos and Thailand. This potential is far in excess of any foreseeable power demands in Laos. Therefore, such large potential developments as Pa Mong on the mainstem of the Mekong, or Nam Theun one of the largest tributary projects, would only be implemented in the context of an international power system. Some of the smaller projects might however be developed for local needs, to eliminate fuel imports, as in the case of the two existing plants at Luang Prabang and Pakse.

None of the major projects on the Mekong or its tributaries is likely to be fully developed before the late 1980's. Moreover, residual energy demands in Thailand, even after the implementation of a major project such as Pa Mong, would continue to serve as a market for fuel-saving energy from Nam Ngum. Therefore, the long-term prospects for major hydroelectric development do not materially influence the economic merits of the Phase II project.

Power and Energy Demands

As a basis for the evaluation study it was necessary to review and up-date the load forecasts for the Vientiane system. This was done by representatives of IBRD and the study consultants in consultation with EDL. Demands for power and energy, at the main Vientiane sub-station, for the period 1970-2000 are summarized below. In the near term the forecast takes into account the effects of the renovation and extension of the Vientiane system, and the consequent reduction in system losses which at present are very high. Also taken into account is an increase in sales as some larger consumers with privately owned generators transfer to the EDL system. After 1980, growth rates in sales are projected to decline from 10% in the early 1980's to 8% in the late 1990's. System load factors are expected to increase from 45% at present to about 55% by the late 1990's.

Power and Energy Demands for Vientiane

	<u>Energy</u> (GWh)	<u>Peak</u> (MW)
1975	80	19
1980	154	35
1985	246	54
1990	379	81
1995	555	141
2000	813	164

Tariffs

EDL's tariffs for Vientiane, following an across the board reduction of 2 kip per kWh in January 1972 are:

<u>Classification</u>	<u>Rate</u> (kip per kWh)
Domestic Lighting and Fans	38
Public Lighting	30
Multiple Use (including air conditioning)	30
Industrial	18

Average revenue in 1972 was 35 kip per kWh. Because of contractual arrangements for bulk sales of energy to users at present served by private generating units, average revenue is expected to decline to about 31 kip per kWh in 1973.

Project Evaluation - Alternatives Considered

To reach a judgement about the economic merit of the earliest possible expansion of the present power facilities of the Nam Ngum project by two or three additional units, a number of alternative installation schedules have been compared on the basis of the present value of net benefits (i.e., revenue minus costs) computed over a range of discount rates. These schedules are defined as follows:

Case A, in which the installation of the additional 40 MW units at Nam Ngum is phased to meet the capacity requirements of the Vientiane system. Taking account of requirements for system reserve, Unit 3 is commissioned in 1977, Unit 4 in 1982 and Unit 5 in 1990.

Case B, in which the installation of Unit 4 is advanced to the same date as Unit 3 (1977) to take advantage of the sale of surplus energy to Thailand, while Unit 5 remains at 1990.

Case C, in which all three units are installed at the earliest feasible date (1977) to take maximum advantage of the sale of surplus energy.

In addition, the following considerations led to the formulation of a further alternative. The two existing 15 MW units at Nam Ngum plus the 8 MW of diesel plant in Vientiane could meet the projected demand of the Vientiane system until 1981, except for short periods when the units are out of service for maintenance. Thus, the requirement for reserve capacity could also be met by installing gas turbine generators. This type of plant, which has a low capital cost, but high fuel costs per kilo-watt hour (using fuel oil in the Case of Laos), is well suited to peaking operations or as system reserve. For this reason, a further alternative was also examined, termed "Case M," consisting of a mixed thermal/hydro development. This alternative, which was selected following a study of a number of possible mixed thermal/hydro installation schedules, essentially represents a deferment by five years of Phase II of Nam Ngum.

The installation schedules for each alternative are set out below. It is to be noted that for Cases A, B, and C, gas turbines are introduced in 1996 to meet system demand. This enables each schedule to be evaluated on a strictly comparable basis and eliminates any distortion that might arise due to unequal installations at the end of the period of analysis.

Installation Schedule (MW)

	Peak Demand in Laos (MW)	Case A	Case B	Case C	Case M
1977	24.8	40H	80H	120H	15G
1982	41.4	40H			80H
1990	80.6	40H	40H		
1993	99.2				25G
1996	123.5	40G	40G	40G	40H

H = Hydro units at Nam Ngum
G = Gas turbines

Economic Comparison of Alternatives

The analysis extends over the period from 1973 to 2000 and covers all costs incurred in Laos and revenue accruing to EDL from the sale of Phase II energy in Laos and Thailand. The costs for each alternative were estimated on the following basis:

- Capital costs of Phase II project works based on the cost estimates.
- Operation and maintenance costs at US\$ 40,000 per year for each additional 40 MW unit at Nam Ngum.
- Costs of gas turbine generators at US\$ 100 per kW installed, with 3% annual O & M costs and fuel costs at US\$ 12 mills/kWh.
- Cost associated with distribution and sale of Phase II output in the Vientiane system at an equivalent annual figure of US\$ 1.0 million per year from 1981 onwards.

For purposes of this evaluation, the sale of energy in Laos after 1976 was priced at an average tariff of 26 kips per kWh (US\$ 4.3 cents) to reflect possible reductions from present levels. However, since each of the alternatives will meet EDL's need for future power and energy requirements, the projected average tariff in Laos does not affect the comparison of alternatives, but only the financial rate of return. Differences in benefits among the alternatives arise only through the export of energy to Thailand.

All costs and revenues are expressed in 1973 prices. The generally employed assumption that inflation affects both costs and revenues equally was used in the analysis. However, specific allowance had to be made for the fact that inflation would reduce the real value of export revenue (contractually agreed upon at US\$ 4.5 mills/kWh). For this purpose an assumed rate of inflation of 3% per annum was used. From 1982 onwards, the rate of 4.5 mills/kWh is not adjusted for inflation as it is assumed that when the agreement is extended, a rate will be negotiated that offsets the effects of inflation.

For each alternative installation schedule the costs and revenue were discounted over a range of interest rates to establish the present value of the net benefit. These values (expressed in 1973 US\$) and the ranking of alternatives of discounting rates between 4% and 11% are shown below:

Present Value of Net Benefits (US\$ million)

Discounted at:

4%	5%	6%	7%	8%	9%	10%	11%
C (53.4)	B (41.1)	B (31.6)	B (24.0)	B (17.9)	B (13.0)	M (9.3)	M (6.7)
B (52.8)	C (40.9)	C (30.8)	A (23.2)	A (17.4)	A (12.8)	A (9.0)	A (6.0)
A (50.9)	A (39.5)	A (30.4)	C (22.8)	M (16.8)	M (12.7)	B (8.9)	B (5.7)
M (47.7)	M (37.1)	M (28.8)	M (22.1)	C (16.2)	C (10.7)	C (6.6)	C (3.0)

In addition to the basic comparison of alternatives, sensitivity tests were carried out for two of the more important assumptions in the analysis. In the first sensitivity analysis, a lower load forecast for Laos was used, which projects a demand for energy in 1980 of 130 GWh (85% of the EDL forecast) and 310 GWh (80% of the EDL forecast) in 1990. In the second sensitivity analysis, the project cost was reduced by about 10% to correspond with the estimates prepared by Acres. Neither of these changes significantly altered the relative positions of Cases A, B, and C. The two sensitivity tests yielded the following ranking of alternative installation schedules:

Ranking of Alternatives in Sensitivity Analysis

15

Discounted at:

4%	5%	6%	7%	8%	9%	10%	11%
Lower Load Forecast in Laos							
C	B	B	B	B	B	M	M
B	C	C	A	A	A	A	A
A	A	A	C	M	M	B	B
M	M	M	M	C	C	C	C
Lower Cost Estimate for Nam Ngum Phase II							
C	B	B	B	B	B	B	B
B	C	C	C	A	A	A	M
A	A	A	A	C	M	M	A
M	M	M	M	M	C	C	C

An analysis was made in which a variant of Case C (the early installation of three additional units) was added to the list of alternatives. Three 35 MW units were substituted for the three 40 MW units of Case C. This analysis showed that the 35 MW variant ranked below Cases B and C at all discount rates. A further analysis in which 35 MW generating units were substituted for 40 MW units in all of the alternative installation schedules, showed that the relative rankings of the alternatives were essentially the same for 35 MW units and 40 MW Units.

Recommended Installation Schedule

The comparative studies show that at discount rates between 5% and 10%, Case B, that is the earliest possible installation of two 40 MW units, is the recommended alternative. At discount rates of 10% and above, deferment of the investment in additional hydro capacity has the highest ranking, whereas at discount rates of 4% and below, Case C, the inclusion of Unit 5 in the accelerated installation schedule has the highest ranking. However, differences in the present value of net benefits are small throughout the range of discount rates considered.

Given the present limited absorptive capacity of the Laotian economy for project aid, which reflects the unsettled conditions within the country and general region, it would not appear justified to invoke opportunity costs for the use of aid capital in Laos in excess of 6 to 8%. Against this background, and on the basis of the results derived in the above analysis, it is recommended that Case B, the earliest possible installation of two additional 40 MW units, be adopted with Unit 5 deferred until needed to meet capacity requirements in Laos. This recommendation is further supported by the fact that this course of action would maximize the net foreign exchange

earnings for the further development of the Nam Ngum project during the late 1970's and throughout the 80's when foreign exchange might be expected to be in short supply to the Laotian economy.

It has been noted that at discount rates below 4%, Case C emerges with the highest present value of net benefits. Since funds may be available to Laos at rates of interest below 4%, a case could be argued for installing all three units in 1977. There are, however, two reasons why this course of action is not recommended. Firstly, it would lead to a smaller net flow of foreign exchange to Laos, since incremental loan repayments for Unit 5 would exceed additional foreign exchange earnings from Thai sales. Secondly, the incremental energy production resulting from the installation of Unit 5 is subject to a measure of uncertainty due to the limited hydrological data on which it is based. Accordingly, the installation of Unit 5 should be deferred until it is required to meet the capacity requirements of the Vientiane system.

Financial Aspects

For the investment in the recommended installation schedule, the financial rate of return is 15%. This is based on the revenue from sales to Laos and Thailand of the energy attributable to Phase II of the Nam Ngum project for a forty year period beginning 1977. Should the demand in Laos develop in line with the lower load forecast, the rate of return would be reduced to 14 percent. With the cost for the units at Nam Ngum lowered by 10% to correspond with the estimates prepared by Acres, the financial rate of return would increase to 16%.

An indicative cash flow for EDL, arising from the Vientiane system for the period from 1973-1985, is shown on the following page. The income and expenditure for the other power systems in Laos are relatively small and roughly in balance, and have therefore been neglected in the presentation. For the purpose of this case flow forecast, it has been assumed that Phase II of Nam Ngum would be financed on average terms of 3% interest and 3/4% service charge, with repayment over 30 years with a 4-year grace period. On this basis, the financial position of EDL would be satisfactory and no problems of liquidity are likely to arise either under the recommended installation schedule of two 40 MW units or under the alternative of three 40 MW units.

Projected sales of energy to Thailand up to the year 2000 from the installations at Nam Ngum are summarized below for the case of a two unit Phase II installation and for the case of a three unit installation.

<u>Year</u>	<u>Energy Sales to Thailand</u>		<u>(GWh)</u> <u>Total</u>	<u>Revenue from</u> <u>Sales to</u> <u>Thailand</u> (US\$ Million)	<u>Phase II</u> <u>Loan</u> <u>Repayment</u>
	<u>Phase I</u> (Units 1 & 2)	<u>Phase II</u> (Units 3 & 4)			
1975	160	-	160	0.72	0.25
1980	88	513	601	2.71	1.39
1985	41	467	508	2.28	1.44
1990	-	376	376	1.69	1.28
1995	-	200	200	0.90	1.12
1999	-	2	2	.01	1.00

<u>Year</u>	<u>Phase I</u>	<u>Phase II</u>	<u>Total</u>	<u>Revenue from</u> <u>Sales to</u> <u>Thailand</u> (US\$ Million)	<u>Phase II</u> <u>Loan</u> <u>Repayment</u>
	(Units 1&2)	(Units 3,4,&5)			
1975	160	-	160	0.72	.393
1980	88	578	666	3.00	2.09
1985	41	532	573	2.57	1.88
1990	-	441	441	1.98	1.66
1995	-	265	265	1.19	1.47
1999	-	67	67	.30	1.30

Comparison of these figures shows that the net foreign exchange contribution of the two unit Phase II installation is greater than that of the three unit Phase II installation.

With Phase II, the contribution from Nam Ngum energy to the net foreign exchange income to Laos (i.e. revenue from Thailand less loan repayment) would amount to about US\$ 1.0 million in 1980, equivalent to above 5% of present imports to Laos, and equal to the revenues earned at present from the two major Laotian exports, tin and timber. As the load in Laos absorbs a greater proportion of the energy generated, net foreign exchange earnings for the Nam Ngum Project will decline to about US\$ 0.4 million in 1990.

b. Subsequent Analysis:

Since the May 1973 IBRD study, operating experience under Phase I of the Nam Ngum Project, shifts in world energy supply and pricing, and some developments within the major consuming area of Laos (Vientiane), indicate the uncertainties of projecting the growth of the electrical energy consumption. Given these uncertainties, the projections of EDL and consultants upon which the IBRD study was based are quite good. USAID/Laos and the Loan Committee regard these projections as the best possible under the circumstances.

Actual 1973 results showed Nam Ngum Phase I energy delivered to Vientiane was 65.85 (GWh vs. 56.56 projected; actual sales were 53.07 GWh vs 48.8 projected. A special circumstance was USAID consumption which EDL projected at 10 GWh but which reached 14.41 GWh, accounting for most of the increase on sales.

At the close of 1973, USAID loads were 20-30% below the year's peak due to cold weather (coolest in 50 yrs.), personnel reductions, and energy conservation measures reflecting world-wide AID practices. The late 1973 would energy crisis also accelerated requests for EDL service from industrial customers. EDL is connecting them and household service applicants within the limits of its distribution capacity. Distribution improvements under ADB and German loans are within months of completion, EDL expects to have main lines in by end of 1974 and low voltage service connections completed in 1975 to accomodate this bulge in demand. Once this suppressed demand is met, load growth may slow substantially.

Peaking requirements and distribution system characteristics will require some diesel generation until Phase II energy is on line and related transmission and distribution improvements are completed. However, EDL, its advisors, and other donors are acting promptly to eliminate dependence on imported energy sources for the Vientiane service area.

Because of the different characteristics of project benefits from energy delivered for domestic consumption and from energy exported to EGAT, projections have also been made assuming a 20% higher load growth for Vientiane. The effect of the higher Vientiane load growth projection is a more conservative statement of foreign exchange earnings from sales to EGAT. However, in this projection, total project benefits are stated more optimistically as the revenue per kwh of energy sold within the EDL system is expected to be higher than that per unit exported.

A further offset to these calculations is the high proportion of EDL domestic sales to USAID. In 1973, approximately 27% of EDL energy sold in the Vientiane service area was sold to USAID. These sales were for foreign exchange as were some other sales to other international organizations and foreign mission. Sales to USAID principally came during off-peak hours of demand from the remainder of EDL's customers. USAID sales displaced self-generation by diesel units using imported fuel.

A similar foreign exchange offset will occur as industrial customers, now generating their own power with imported diesel fuel, are incorporated into the Vientiane service area and supplied with Nam Ngum hydropower. EDL is revising planned transmission and distribution improvements to incorporate industrial establishments presently outside its service area. These improvements should be completed in time to serve these industries with Phase II Nam Ngum power.

Projected benefits from energy exports are conservative in that they are projected at the current rate, \$0.0045 or 4.5 mills per kwh. This rate was established for Phase I power prior to recent increases in energy costs. This rate is being reviewed by the ADB, EGAT and EDL. It is anticipated that any rate revision for Phase II energy exports would provide for a higher price.

Rates for sales to domestic customers are under study by EDL, on the basis of November 1973 report by an expert from Electricite de France (EDF). The ADB expects to review EDL's domestic rate structure further in the coming months. The present rate structure favors industrial customers over household consumers. It provides bulk rates for USAID and for a Japanese-sponsored agricultural pumping project. The USAID rate represents a very substantial saving to the United States against the cost of diesel generation. An even further reduction is offered for the agricultural project.

Taking into account the projected Vientiane load growth and a 20% higher load growth; the internal rate of return on the project is 8.4 and 8.6 respectively. Foreign exchange earnings are \$2.2 million annually from 1979 in both cases. At the projected load growth they diminish starting in 1985 and end in 1999. At 20% higher load growth they diminish starting in 1984 and end in 1994.

3. Financial Analysis

A. Total A.I.D. Financing Required

Not more than \$5,000,000 of A.I.D. loan financing is required for Phase II of the project. The ADB, as Administrator of the project, has obtained undertakings from other donors to finance the remainder of the project. The Fund Agreement indicates that the other donors contributions will be as follows:

<u>Government</u> <u>of</u>	<u>Amount</u>	<u>Est. Dollar Equivalent</u> <u>(thousands)</u> <u>(Per ADB, April 1974)</u>
Australia	US\$500,000 (grant). For any project expenditures, whether or not for any foreign currency or kip (local currency) costs. Australia is considering a substantial increase in its untied grant	\$500
India	1 million Indian rupees (grant). Tied to rupee costs of goods of Indian origin.	\$153
Japan	Up to 3,180,000,000 Yen (loan for 30 years, with 10-year grace period, at 2% interest) from its OECF.	\$11,357

<u>Government of</u>	<u>Amount</u>	<u>Est. Dollar Equivalent</u>
Netherlands	\$144,545 (Grant), for any project cost, untied as to procurement.	\$145
New Zealand	NZ\$500,000 (Grant). Except for a reasonable part of total kip expenditures, tied to New Zealand commodities.	\$724
United Kingdom	£32,000 (Grant) and a loan of £48,000 (interest free for twenty-five years including a seven-year grace period), for British goods used in rural electrification.	\$190
Federal Republic of Germany	DM11.5 Million (Loan - 3/4 of 1% interest for fifty years including a ten-year grace period to be agreed between EDL and the German aid organization, KFW) engineering costs associated with the transmission lines and substation facilities.	\$4,475
Canada	CAN\$2,500,000 (Loan - interest free for fifty years including ten years grace period) for Canadian services, equipment, or materials.	\$2,577

Under terms of the Fund Agreement and related documents, the Kingdom of Laos undertakes to finance any further amount required for the project.

B. EDL Financial Planning:

EDL projections of debt service for Nam Ngum Phase II and for other improvements have been made on the basis of realistic amortization periods but at very concessional interest rates.

EDL projects amortization of the project in 35 years for the principal generation plant and 20 years for transmission facilities with an average interest cost of 1 1/2%.

EDL acquired the Phase I works almost entirely on a grant basis (contributions from Thailand are being repaid in kind by energy exports; all other Phase I contributions were grants. Most of Phase II will be financed by Japanese and U.S. loans bearing 2% interest during a ten-year grace period and 3% thereafter for the U.S. Loan (for a total of 40 years), and 2% thereafter for the Japanese (for a total of 30 years). The remainder of the project is expected to be financed on more concessional loan terms or by grants. Even with this assistance, a short-term failure to cover all EDL costs is projected by the Electricite de France (EDF) expert for 1974 and 1975.

4. Impact on Laos Balance of Payments:

During the period of project construction, an estimated \$2,700,000 of kip costs of the project will be spent in Laos but will be financed by the donors to the project. In addition, minor kip purchases by expatriate personnel associated with the project are to be expected. This local spending will have a favorable impact on Laotian payments over the short run despite interest on project loans during construction.

The U.S. and other donor loans are estimated to require debt service on the schedule shown on the following page. Projected foreign exchange earnings from sales to EGAT are also shown. A net foreign exchange effect is projected in the third column of the table. The fourth column projects earnings from sales to EGAT if Vientiane area load growth is 20% higher than forecast. This is a more conservative estimate of foreign exchange receipts although it is a less conservative estimate of the project's rate of return. The final column projects the net foreign exchange effect for this latter load growth.

In the years of declining earnings from sales to EGAT, the Phase II energy consumed in Laos will displace electrical energy produced from imported fuels. This will enable Laos to develop industrial and other power consuming activities (e.g. pumped irrigation) without undue balance of payments drain for electrical generation. Because of the high cost of importing fuels for generation, the net balance of payments effect is a far greater savings from energy consumed in Laos than would be offset by the earnings from sales to EGAT.

5. Capacity to Service Debt

As the schedule on the following page indicates, this project will enhance the capacity of EDL and Laos to service debt. Even after foreign exchange receipts fall below annual debt service obligations under this project, they will partially offset the debt service obligation. The excess of foreign exchange receipts over debt service obligations in the early years of the project will exceed the value of subsequent excesses of debt service over export earnings under the projected circumstances (third column, next page) by almost \$10 million. Even under 20% higher Vientiane load growth (fifth column, next page) the almost \$5 million excess of debt service over export earnings over the 50 year repayment period would vanish if discounted to a "present value" at any reasonable interest rate.

If there is an upward adjustment in the price paid by EGAT for exported energy, this debt service capacity benefit will be even more pronounced.

6. Loan Terms to EDL

The second-step loans to EDL under this project and other ADB and other donor assistance to EDL are made on the same terms as the first stage loan to Laos. The U.S. has deferred to this arrangement at the request of the ADB to facilitate multilateral project arrangements and because the terms from other donors are no harder than AID terms for this project. EDL will also assume the exchange rate risk.

Debt Service and Foreign Exchange Earnings from Nam Ngum II

Thousands of Dollars

<u>Year</u>	<u>Debt Service</u>	<u>Projected Fx Earnings from Sales to EGAT</u>	<u>Annual Net Fx Effect (loss)</u>	<u>Fx Earnings @ 20% Higher Vientiane Load Growth</u>	<u>Annual Net Fx Effect @ Higher Growth (loss)</u>
(Cumulative 1975-77)	484		(484)		(484)
1978	274	1,000	726	1,000	726
1979	347	2,200	1,853	2,200	1,853
1980	365	2,200	1,835	2,200	1,835
1981	365	2,200	1,835	2,200	1,835
1982	372	2,200	1,828	2,200	1,828
1983	372	2,200	1,828	2,200	1,828
1984	372	2,200	1,828	2,100	1,728
1985	1,135	2,100	965	2,000	865
1986	1,135	2,100	965	1,900	765
1987	1,135	2,000	865	1,700	565
1988	1,135	1,900	765	1,500	365
1989	1,135	1,800	665	1,400	265
1990	1,135	1,700	565	1,200	65
1991	1,135	1,500	365	1,000	(135)
1992	1,135	1,300	165	700	(435)
1993	1,135	1,300	(165)	500	(635)
1994	1,135	1,100	(35)	200	(935)
1995	1,135	900	(235)		(1,135)
1996	1,135	700	(435)		(1,135)
1997	1,135	400	(735)		(1,135)
1998	1,135	200	(935)		(1,135)
1999	1,135		(1,135)		(1,135)
2000	1,128		(1,128)		(1,128)
2001	1,128		(1,128)		(1,128)

Annual Debt Service (not offset by sales to EGAT) is:

\$1,128,000 for 2000 through 2004

449,000 for 2005 through 2014; and

194,000 for 2015 through 2024.

7. U.S. Interests:

The U.S. contribution to this project will be tied to procurement from the U.S. except for a reasonable part of local currency costs (estimated at 15-20%). Because most of the value of other donor contributions will not be tied, U.S. suppliers may also provide some project goods and services financed by other donors. The net effect will not be adverse to the U.S. balance of payments.

The U.S. will receive some additional benefits from the reduced cost of electrical energy required for its operations in Laos through the provision of hydroelectrical power from the Nam Ngum project.

LOAN ADMINISTRATION

A. Implementation Plan

The ADB will administer the Phase II Project under terms of the Second Nam Ngum Development Fund Agreement, 1974. The donors, the Lao and Thai Governments, and the ADB will be parties to the Fund Agreement. The proposed AID Loan Agreement will generally refer to the Fund Agreement for the manner of project implementation.

The Fund Agreement embodying donor pledges was initialled April 19, 1974. The donors also approved ADB/EDL action to initiate consulting engineering services. The consultant firm, Motor Columbus (SWISS) began preparation of procurement documents April 25.

As procurement contracts are awarded, the ADB will assure that five million dollars, less the U.S. appropriate share of local currency costs, is expended for goods and services of U.S. source and origin. As the consulting engineer completes procurement plans, U.S. and other donor-tying requirements will be incorporated into tender documents. On price and other considerations, this is one feasible way to utilize the U.S. contribution.

B. Implementation Schedule

The ADB plans to contract for consulting engineering services in April 1974 and to begin other procurements shortly thereafter. The ADB estimates commercial operation of the two new generating units in 1978.

C. Loan Disbursements

The ADB will call for issuance of letters of commitment (L/COM's) for procurement of U.S. goods and services and/or for cash disbursements into the Second Nam Ngum Development Fund as required for project implementation. Both disbursement mechanisms will be permitted by the Loan Agreement.

KINGDOM OF LAOS

MINISTRY OF PLAN
AND COOPERATION

COMMISSION GENERAL
OF THE PLAN

BEST AVAILABLE DOCUMENT

CAPITAL PROJECT APPLICATION TO THE UNITED STATES

AGENCY FOR INTERNATIONAL DEVELOPMENT:

NAM NGUM PHASE II HYDROPOWER PROJECT, LAOS

CAPITAL PROJECT APPLICATION TO THE UNITED STATES
AGENCY FOR INTERNATIONAL DEVELOPMENT:
NAM NGUM PHASE II HYDROPOWER PROJECT, LAOS

(A) Description of the Project

The Second Phase of construction of the Nam Ngum Hydropower project will increase the energy generating capacity of the dam from 30 megawatts to 110 megawatts. Two 40 megawatt generators will be installed to complement the two 15 megawatt generators which were installed during the First Phase. In addition to the installation of the two 40 megawatt generators the proposed Second Phase project includes: (1) installation of four spillway gates; (2) civil works for the extension of the existing power house to accommodate three additional generating units of 40 MW each; (3) installation of intake gates and completion of penstocks for the two additional 40 MW generating units; (4) construction of an additional 115 KV transmission line from Nam Ngum through Vientiane and across the Mekong at Nong Khai; (5) installation of additional facilities at the main Vientiane substation; (6) installation of facilities for electrification of villages in the vicinity of the Nam Ngum reservoir; (7) consultant services to assist the Electricite du Laos (EDL) prepare designs, supervise construction, and supervise the initial operations of the facility.

Location

The Nam Ngum dam is located approximately 70 kilometers north of the city of Vientiane on the Nam Ngum river, a tributary of the Mekong. It is 15 kilometers east of the main Vientiane-Luang Prabang all-weather road. An all-weather road connects the dam site to this road.

History

Under the Nam Ngum Development Fund Agreement of 1966 the Nam Ngum Development Fund was established to finance the first phase of construction of the Nam Ngum hydropower facilities. The project was financed by a consortium of nine donor nations with the World Bank (IBRD) serving as the administrator of the project which cost a total of \$29.2 million. Construction commenced in 1968 and operation of the facility began during December 1971. First phase construction included the dam, which is a concrete gravity-type structure 66 meters high, the power house, transmission lines from Nam Ngum through Vientiane and across the

Mekong at Nong Khai, and the main Vientiane substation. Two 15 megawatt generators with ancillary equipment were installed. In June 1971 Laos and Thailand concluded a ten-year agreement under which Thailand will purchase all excess energy produced at Nam Ngum at the rate of 4.5 mills per kilowatt hour.

Present and contemplated activities

Since January 1972 Nam Ngum produced energy has been supplied to Thailand under the ten-year agreement. As a part of the agreement with Thailand, in kind repayment for the energy and cement borrowed from Thailand for use during phase one construction must be completed before Thailand will begin to make payment for the energy it is supplied. It is estimated that this repayment will be completed by mid-1974.

At the present time approximately 30 percent of the energy produced at Nam Ngum is utilized in the city of Vientiane, and the remainder is supplied to Thailand.

It is contemplated that at the completion of the second phase that the increased energy production will be supplied to Thailand. It is anticipated that the existing ten-year energy agreement between Laos and Thailand will be extended for an additional period of not less than fifteen (15) years.

Pertinent preliminary engineering, economic data, and market studies

Information relating to these subjects is contained in the following documents: (1) "Laos: Nam Ngum Project. Evaluation Study of Phase II"; World Bank (IBRD); March 1973; annexes 1, 2, 3, 4, 9, 10, and 11; pages 3 to 7, 9 to 11, and page 19; (2) "Project Review Report on the Nam Ngum Hydropower Project, Phase II in Laos"; Asian Development Bank; September 1973; pages iii-iv, pages 8 to 11, 14 to 22, and 26 to 29.

(B) Volume of Production

The energy generation capacity will be increased by 80 megawatts for a total energy generation capacity of 110 megawatts. The present volume of energy production is 240 million kilowatt hours per annum, and the volume of energy production that will be achieved at the completion of phase two is estimated at 755 million kilowatt hours per annum.

Pricing

The rate for the sale of energy to Thailand as set under the existing Lao-Thai energy supply agreement is 4.5 mills per kilowatt hour. As a part of the Second Nam Ngum Development Fund Agreement, Laos and Thailand have agreed to extend the present energy supply agreement for a period of not less than fifteen (15) years, and to take into consideration when determining the price of the energy supplied during the period of such extension the cost to Thailand of obtaining energy from alternative sources.

Information relating to the rate schedule within Laos is contained on pages 46, 47, and 63 of the Asian Development Bank's "Project Review Report on the Nam Ngum Hydropower Project, Phase II in Laos."

Demand

Information relating to demand is contained in the following documents: (1) Asian Development Bank's "Project Review Report on the Nam Ngum Hydropower Project, Phase II, in Laos"; pages 14 to 20; (2) World Bank's "Laos: Nam Ngum Project, Evaluation Study of Phase II"; page 5.

Competition, foreign and domestic

None.

(C) Amount already invested

Total cost of the first phase was \$29.2 million.

Contemplated additional investment

\$23.9 million.

Total cost (local and foreign currencies)

Detailed estimates of local and foreign currency costs for the second phase are contained on page 4 of the Asian Development Bank's "Proposals for Financing of the Second Phase of Construction of the Nam Ngum Hydropower Facilities, Laos." The estimate totals \$23.9 million (\$2.7 million local currency and \$21.2 foreign currency). This estimate does not include

any provision for the payment of interest on the loans during the construction period, which will commence in mid-1974 and is estimated to terminate at the end of 1977.

Sources of funds

The second phase will be financed by a consortium of nations with the Asian Development Bank serving as the administrator of the project. Proposed contributions include:

Australia	\$ 500,000	grant
Canada	2,497,000	loan
West Germany	3,156,000	loan
India	137,000	grant
Japan	11,950,000	loan
Netherlands	144,545	grant
New Zealand	740,000	grant
United Kingdom	206,000	grant/loan
Total	<u>\$19,330,545</u>	

The Asian Development Bank has indicated that in the event of a modest shortfall of the total funding requirement that the Bank would extend a special fund loan to cover the shortfall.

Repayment terms

(1) Canada: interest-free, 50 year maturity, 10 year grace period.

(2) West Germany: 3/4 percent per annum interest, 50 year maturity, 10 year grace period on principal repayments.

(3) Japan: 2 percent per annum interest, 30 year maturity, 10 year grace period on principal repayments.

(4) United Kingdom: \$123,600 loan, interest-free, 25 year maturity, 7 year grace period.

Security for repayment

Repayment of all loans secured for the second phase project will be guaranteed by the Royal Lao Government.

(D) Amount requested from the United States Agency for International Development (AID)

\$5.0 million.

Specific use to be made of the AID funds

This information is contained in Article IV of the Asian Development Bank's November 1973 draft "Second Nam Ngum Development Fund Agreement."

(E) Plans for Operation and Maintenance of the Facility when completed

Information relating to the organization of the Electricite du Laos (EDL) is contained on pages 34 to 37 of the Asian Development Bank's "Project Review Report on the Nam Ngum Hydropower Project, Phase II in Laos" and an organization chart is contained on page 57 of the same document.

The EDL presently has on its staff sufficient qualified hydropower plant operation and maintenance technicians to meet the personnel requirements that will result when the second phase of the Nam Ngum facility has been completed. There are approximately 75 EDL trained hydropower plant technicians either working or in training at the Nam Ngum facility at the present time. Of these 75 technicians, approximately 55 will be required to operate and maintain the Nam Ngum facility when the second phase has been completed. The remaining 20 technicians will be placed in other positions in the EDL, and will be available for assignment to the Nam Ngum facility if necessary.

Long term personnel requirements will be met by the training programs at the EDL technical school which was established with assistance received from the Government of France. The school's current teaching staff of 36 have all received advanced technical training under French study grants. The school presently has four teachers from the French Economic and Technical Assistance Mission assigned to its staff.

Presently the school can complete training for about 60 staff per annum, and it is anticipated that the school's training capability will be increased to 128 staff per annum in the near future.

(F) Repayment schedule

It is requested that the repayment schedule for the proposed loan from AID be of maximum maturity, maximum grace period, and of minimum interest that relevant U.S. statutes will allow.

(G) Efforts to obtain the required capital from other sources

The Mekong Coordinating Committee and the Asian Development Bank as well as the Royal Lao Government have sought to obtain the required capital from all possible sources. Many countries have declined to contribute. The amount requested from AID is absolutely necessary to achieve full funding of the project.

(H) EDL Financial Information

Information relating to (1) current balance sheet; (2) balance sheets for the prior three years; (3) profit and loss statement for the last five years; (4) current cash flow statement; (5) cash flow statements for the last three years; (6) pro forma balance sheets, profit and loss statements, and cash flow statements estimated for the number of future years it will take for operations to become fully developed is contained on pages 58 to 62 of the Asian Development Bank's "Project Review Report on the Nam Ngum Hydropower Project, Phase II in Laos."

(I) EDL Status

The EDL is the only legally established organization in Laos charged with the responsibility for the generation, transmission, and distribution of electric energy. By Royal Lao Government legal statute the EDL has unlimited capacity to borrow from both within and outside Laos.

EDL Organization to undertake Nam Ngum Phase II

Attachment I* is the organization chart for the EDL project management unit which will be responsible for the implementation of Nam Ngum Phase II.

*Not reproduced with this Loan Paper.

Repayment Guarantee

The Royal Lao Government will guarantee the repayment of the AID loan.

(K) Feasibility Studies

Information relating to the feasibility of the second phase of the Nam Ngum hydropower facility is contained in the following documents: (1) "Laos: Nam Ngum Project, Evaluation Study of Phase II," (2) "Project Review Report on the Nam Ngum Hydropower Project, Phase II in Laos."

BEST AVAILABLE DOCUMENT

Annex 2

SECTION 611 DETERMINATION

The requirements of Section 611(e) of the Foreign Assistance Act of 1961, as amended, have been met for the Second Phase of the Nam Ngum Hydropower Project as described in the World Bank (IBRD) Evaluation of Phase Two of the Nam Ngum Project, the Asian Development Bank (ADB) Project Review on the Nam Ngum Hydropower Project Phase II, and the ADB Proposals for Financing of the Second Phase of Construction of the Nam Ngum Hydropower Facilities, Laos. An assessment of the managerial and financial capabilities of the Royal Lao Government to effectively maintain and utilize the project has been completed. Taking into account the maintenance and utilization by the Royal Lao Government of the First Phase of the Nam Ngum Hydropower Project which has been in operation since December 1971 and for which the United States financed fifty percent of the cost, positive certification of the capability of the Royal Lao Government to effectively maintain and utilize the Second Phase of the Nam Ngum Hydropower Project is therefore made.

The supporting information is contained in the following documents:

1. World Bank (IBRD) Evaluation of Phase Two of the Nam Ngum Project.
2. Asian Development Bank Project Review on the Nam Ngum Hydropower Project, Phase II.
3. Asian Development Bank Proposals for Financing of the Second Phase of Construction of the Nam Ngum Hydropower Facilities, Laos.
4. Acres International Memorandum on Nam Ngum Phase I Training of Royal Lao Government Personnel



Charles A. Mann,

Director

Date: 19 1973

Clearances:

AD/FIN:TRBlacka (draft)
AD/M:HL Carr (draft)

PRO:SShepley (draft)
AD/P:GTBliss (draft)
DD:GBRaney (draft)



ENGINEERING SOUNDNESS ANALYSISNAM NGUM HYDROELECTRIC PROJECT (PHASE II)

1. Description of Original Project
2. Description of Phase II Project
3. Hydrology
4. Energy Studies
5. Engineering and Construction Plan
 - (a) General
 - (b) Civil Works
 - (c) Spillway Gates
 - (d) Intake Gates and Penstocks
 - (e) Powerhouse Equipment
 - (f) Transmission Facilities
 - (g) Rural Electrification
 - (h) Fisheries Development
6. Engineering Supervision
7. Cost Estimates
8. Construction Schedule
9. Project Management
10. Environmental Analysis
11. Technical Feasibility

1. Description of Original Project

The Nam Ngum Dam (Phase I), which was briefly described in Section IA above, was constructed during the period October 1968 - December 1971. Additional information relative to this structure is as follows:

Drainage area above dam site	-	8,640 km. ²
Mean annual precipitation	-	2,000 mm.
Estimated annual evaporation	-	1,885 mm.
Average annual runoff	-	10.65 billion m. ³
Maximum annual runoff	-	12.34 billion m. ³
Minimum annual runoff	-	9.02 billion m. ³
Type of dam	-	concrete gravity
Height of dam above foundation	-	70 m.
Crest length	-	368 m.
Crest elevation	-	202.5 m.
Storage capacity of reservoir at crest level	-	3.75 billion m. ³
Surface area of reservoir at crest level	-	280 km. ²
Spillway capacity	-	7,100 cms.
Operating Head Range	-	32 - 44 m.
Turbines, two	-	15,000 kw, 176.5 rpm
Generators, two	-	17,500 kva, 50 Hertz
Average annual energy production	-	240 gwh
Transmission Lines, single circuit	-	115 kv
Nam Ngum - Vientiane	-	72 km, capacity 70,000 kw
Vientiane - Udorn	-	70 km, capacity 50,000 kw

Consulting Engineers	- Nippon Koei Co., Ltd. (Japan)
Managing Engineers	- Acres International (Canada)
Contractors	- Hazama-Gumi, Mitsui and Hitachi, Ltd.

2. Description of Phase II Project

Phase II of the project, which is proposed to be partially financed by an AID Loan, is generally described in Section IB above. A cost estimate is also given in that section. Additional detailed information is as follows:

Radial spillway gates, four	- 12.5 m x 9.5 m
Elevation of top of gates	- 212 m.
Storage capacity of reservoir at top of gates	- 6.75 billion m. ³
Surface area of reservoir at top of gates	- 365 km. ²
Turbines, two	- 35,450 KW
Generators, two	- 40,000 kva, 50 Hertz
Average annual energy production	- 515 gwh. (Phase I plus Phase II 755 gwh.)
Transmission lines, double circuit	- 115 kv.

3. Hydrology

The first study of the hydrology of the Nam Ngum dam site was performed by Nippon Koei and presented in their feasibility report in 1964. Further studies were reported in their "Runoff Analysis" dated March 1967. At that time the hydrographic data obtained directly at dam site covered only about 2 years and measurements at surrounding stations covered a period of approximately 6 years. At present these records have been extended to 7 years at the site and 11 years at the surrounding stations. Based on these records it has been determined that the average flow for the period was 326 cms.

4. Energy Studies

Energy production at Nam Ngum for the existing and future units has been calculated by the IBRD from reservoir operation studies using a ten-year period of streamflow records (see following page). Estimates of average annual energy generation used as a basis for project formulation and evaluation are summarized below. The figures shown are after deduction of losses due to outages and transmission losses. Similar operation studies were also performed by Nippon Koei and Acres International.

UNITS	CAPACITY (MW)		ENERGY (gwh)	
	Incremental	Installed	Incremental	Installed
1 and 2	30	30	240	240
3	40	70	320	560
4	40	110	195	755
5	40	150	65	820

For these studies the reservoir has been operated between maximum and minimum levels of El.212 m. and El.202 m. in order to maintain the full peaking capability of the units (i.e., 15 MW for each of the existing units and 40 MW for the future units). This approach was adopted to be consistent with the installation schedules described in section IIB2b in which the maximum output of the units has been assumed. With an installed capacity of 110 MW the annual plant factor would be about 86% with monthly values ranging between 100% and 60%.

Since the period of streamflow record is comparatively short and may not be representative of the long term average, the incremental energy production from Unit 5 given above should be regarded only as a general indication of the quantity which could actually be generated. This poses no problem since it has been decided to defer indefinitely the installation of Unit 5.

By means of mass curves it has been established that, for the period of record, the reservoir could maintain sufficient outflow, at a high enough head, to ensure the continuous output of a 65 MW plant at rated capacity. Thus 65 MW may be assumed to be the limit of "firm" power which can be produced at Nam Ngum. The remaining generating capability would be considered "secondary" or "dump" power. Because of the sales agreement with Thailand, EGAT has contracted to purchase any and all power produced at Nam Ngum over and above that consumed by the EDL Vientiane system. The peak load for EDL is at present approximately 18 MW and the annual energy consumed

"Adapted from IBRD Nam Ngum Phase II Evaluation Study, May 15, 1973."

Power and Energy Generation

Year	River Inflow (MCH)	Annual Energy (gwh) at the plant	
		110 MW	150 MW
1960 - 61	9,548	739	816
1961 - 62	9,997	807	897
1962 - 63	11,353	850	919
1963 - 64	9,017	732	752
1964 - 65	12,336	887	970
1965 - 66	11,376	854	970
1966 - 67	10,346	871	970
1967 - 68	11,476	816	905
1968 - 69	9,782	872	959
1969 - 70	11,299	819	829
Average	10,653	825	899
After deduction of outage and transmission losses (2-1/2% + 6%)		755	822

is about 75 gwh. Thus all of the power provided, after satisfying the Vientiane load, may be considered as "dump" power since there is no requirement to maintain any specified capacity at a given time.

5. Engineering and Construction Plan

(a) General

The Nam Ngum Hydroelectric Plant has been producing power since December 1971. Under EDL management its operation has been completely satisfactory and very few problems have been experienced.

In January 1970, at the request of the Laotian National Mekong Committee, Acres International made a study relative to the need for installation of additional generating units. This was supplemented by additional operation and cost studies in April 1973 and was revised in June 1973.

In May 1973, the IBRD prepared an independent evaluation report on expansion of the project. After having considered several alternatives it was the unanimous decision that Units 3 and 4 (two 40 mw units) should be installed as soon as possible and that Unit 5 be deferred until needed to meet future capacity requirements.

In addition to the extension of the powerhouse and the installation of generating units and ancillary equipment, it will be necessary to install the spillway gates and to provide additional transmission facilities in Laos between Nam Ngum and the EGAT system in Thailand. The project also includes provision for rural electrification near the damsite and fisheries development in the reservoir. It should be pointed out that it will be necessary for EGAT to advance construction of transmission facilities in Thailand to be in service at the time of start up of the additional units.

(b) Civil Works

The civil works for the extension of the powerhouse will include all the structures needed to house and service the future generating units. Site offices, housing and construction camps would also be needed for the Phase II project since facilities constructed in the Phase I project are now occupied by operating personnel. The Phase I project included certain provisions designed to facilitate dewatering of the working area for the powerhouse extension. A divide wall was constructed to isolate the existing works from the working area and thereby permit continued operation of the two 15 MW units. An earth dam, part of which is still intact, extends from the downstream end of the divide wall to the right bank. This dam formed a part of the Phase I cofferdam and will be rehabilitated to serve as the downstream

cofferdam of Phase II. The rock underlying the powerhouse extension was excavated to the design elevation and capped with a concrete slab; this will allow an early start on the powerhouse substructure after dewatering of the working area. The consultants have concluded that it would be desirable to construct the downstream wall of the powerhouse over its entire length of the time Units 3 and 4 are installed. This will eliminate the need for costly cofferdams and dewatering when Unit 5 is installed.

(c) Spillway Gates

In order to provide adequate flow regulation for the additional units, it will be necessary to increase the reservoir storage capacity by the installation of spillway gates.

The spillway structure is designed for the installation of four 12.5 by 9.5 meter Tainter gates. Phase I construction included scaling surfaces on the spillway crest and piers. Ducts were also cast in the piers for anchorage cables. Most of the work needed for preparation of contract documents for the spillway gates was completed as part of the engineering for Phase I. With installation of the gates the reservoir retention level will be raised by 9.5 m. and the storage capacity will be increased by approximately 3.1 billion cubic meters.

(d) Intake Gates and Penstocks

Intakes for each of the three future units were constructed in the Phase I project. Downstream of the three intakes short sections of the 6 m. penstocks extend through the dam. Each penstock is presently closed by a temporary steel bulkhead. For Units 3 and 4 it will be necessary to provide control gates for each intake, to remove the temporary bulkheads, and to extend the penstocks. It will also be necessary to procure additional stoplogs.

(e) Powerhouse Equipment

The space provided for powerhouse extension is sufficient to accommodate three turbines capable of developing the equivalent of 35 MW at a head of 32 meters. This head is equivalent to a pool level of approximately El.200 m., which is close to the minimum reservoir level likely to be reached during project operation. At heads greater than 32 meters the full-gate output of the turbine would exceed 35 MW, and hence a larger generator could be installed.

The consultants were therefore requested to investigate the merits of installing generators with ratings exceeding 35 MW. It was found that it would be technically feasible to install 40 MW generators and that the relatively small additional cost compared with 35 MW generators would be justified by the additional energy generation.

Vertical Francis type turbines were chosen for Phase II in preference to adjustable blade Kaplans because it was felt that the simpler units would be inherently more reliable in the isolated circumstances of the Nam Ngum Plant.

(f) Transmission Facilities

The Nam Ngum Project is presently connected to the main Vientiane substation by a single-circuit 115 kv line. A second circuit will be needed to convey the output from Units 3 and 4. This will be carried on double-circuit towers since a third circuit will be needed at the time Unit 5 is installed. Additional switch-gear and reclosing devices will be installed at the Vientiane substation. From Vientiane to the Mekong, and across the Mekong to the EGAT system, there is presently a single-circuit 115 kv line. A double-circuit 115 kv line will be constructed to convey the additional output from Nam Ngum.

(g) Rural Electrification

The Government of Laos has expressed an interest in providing an electricity supply to the villages of Phone Hong and Ban Keun in the vicinity of the project.

Such a program, which is estimated to cost US\$260,000, would provide useful experience on which to base future plans for rural electrification in Laos. This cost has been included in the project estimate.

(h) Fisheries Development

Increasing numbers of villagers in the vicinity of the reservoir are now taking up fishing as their chief activity, but they face problems in marketing the fish because of poor roads and lack of suitable transport. There are good prospects for the establishment of a fisheries cooperative centered on the village of Huai Moi. This would require a short access road, a boat landing, and provision of credit for the purchase of an ice-making plant and insulated trucks. Also, the villagers could profit from technical assistance in fishing methods and in setting up the cooperative.

6. Engineering and Supervision

A firm of consulting engineers is being engaged by the Government of Laos to prepare engineering designs and bid documents, supervise construction, to advise and assist the government in all matters pertaining to the timely and efficient execution of the project. The consultants assignment will also include the preparation of contract drawings and detailed designs for the works associated with the future installation of Unit 5.

7. Cost Estimates

In order to arrive at a reasonably firm cost estimate the IBRD requested both Nippon Koei and Acres International to prepare separate estimates. The Nippon Koei costs exceeded the Acres' estimate by \$2.1 million. This difference was primarily due to the fact that the Acres' estimate excluded the cost of substation facilities in Vientiane and the 115 kv transmission line across the Mekong River. The IBRD used the higher estimate (\$21.8 million) as a conservative basis for establishing funding requirements. Approximately \$2.5 must be added to cover the costs of duties, taxes and interest during construction. The totals of the various cost estimates, including the one set forth by the ADB (detailed in Section IB above), are as follows:

<u>Agency</u>	<u>Estimated Cost (million \$)</u>
Acres International	19.7
Nippon Koei	21.8
IBRD	24.3
ADB	23.9

Since the ADB will administer the fund for Nam Ngum Phase II, their break-down of costs will be used as the official estimate.

8. Construction Schedule

A construction schedule for Phase II, prepared by Nippon Koei and updated by AID/W, is shown on the following page. The original schedule was based on the assumption that preparation of designs and bid documents would begin by the end of May 1973. According to that schedule it would have been possible, in no serious delays were encountered, for Units 3 and 4 to be in service by the end of 1976. However, since a slippage of approximately one year has been experienced, it now appears reasonable to assume that the preparation of bid documents can get underway on or before May 1974, with the two units coming on line by the end of 1977. However, to be conservative, economic and financial benefits are not projected until 1978 in the body of the loan paper.

A critical point in the construction operations is the need to complete certain elements of the powerhouse substructure before the cofferdam would be flooded in the second year of construction. The top of the divide wall forming the left side of the cofferdam is at a level of El.168 m. In most years the flow in the Nam Ngum is such that by the end of June or early July the downstream water level exceeds El,168 m. If the spillway gates were already installed it would be

NAM NGUM PROJECT PHASE II
 PROPOSED CONSTRUCTION SCHEDULE - 2

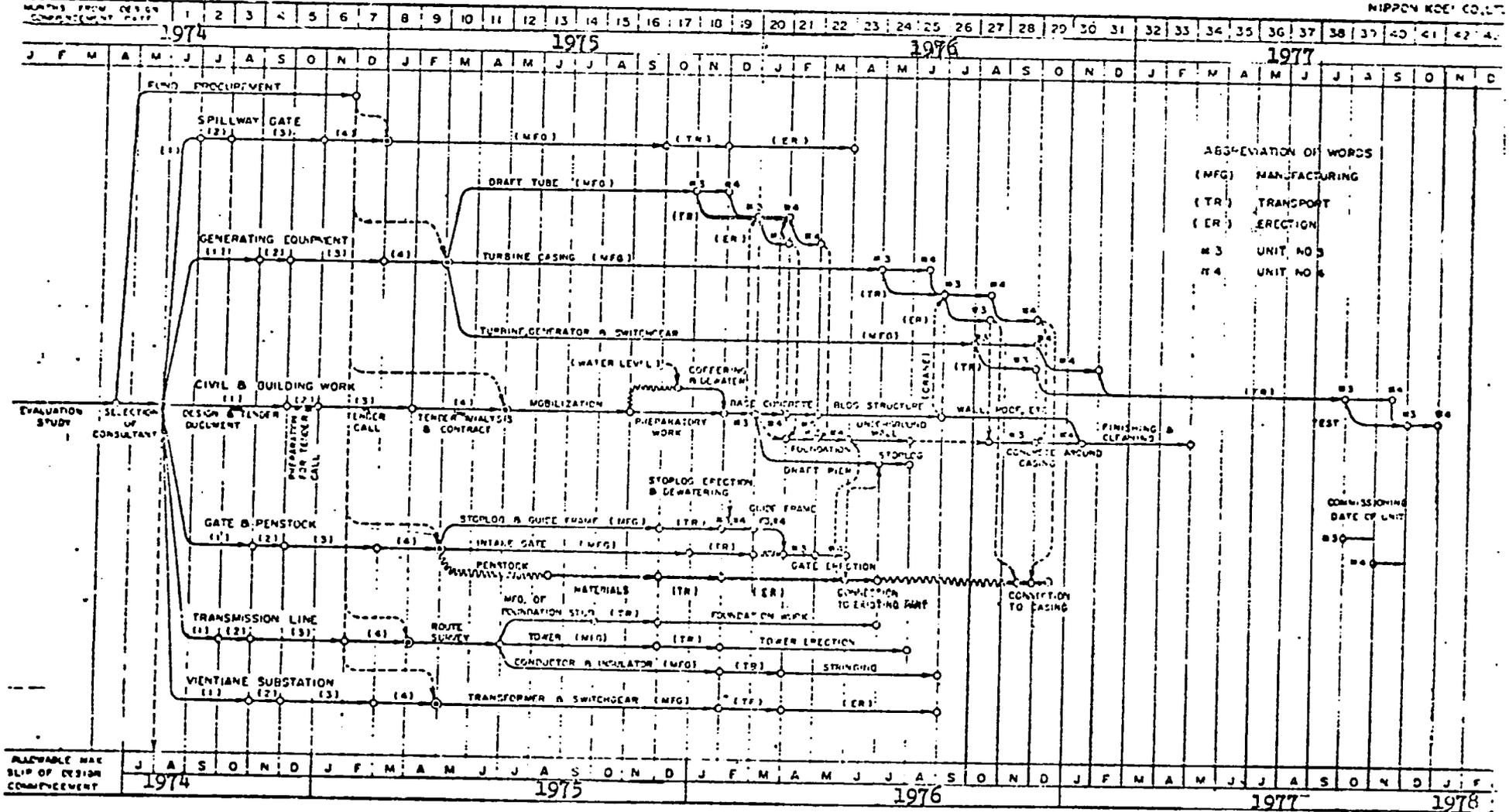
Updated by A/D/W
 March 1977.

INTERNATIONAL BANK FOR RECONSTRUCTION & DEVELOPMENT
 EVALUATION STUDY ON NAM NGUM PROJECT PHASE - II

(INSTALLATION SCHEDULE C B D - TWO UNITS INSTALLATION)

FEB 1973

NIIPPON KOGAKU CO. LTD.



possible to delay flooding of the cofferdam by about six weeks. The revised construction schedule calls for completion of the downstream wall of the powerhouse and the installation of stoplogs by the end of May 1976. If this were accomplished, work could continue in the powerhouse after the cofferdam is flooded.

9. Project Management

The EDL has placed considerable emphasis on the development of skilled and competent personnel for the operation and maintenance of the Nam Ngum Project. In the erection and testing of the Phase I plant some of the key personnel worked closely with the consultants and contractors. Since the units were commissioned in December 1971 the operating personnel have received the guidance of the supplier's technicians, whose services were financed as part of the equipment contracts, and by a team of advisors by the Overseas Technical Cooperation Agency of Japan. Financial support for training of EDL personnel at hydroelectric projects in Canada, and with EGAT in Thailand, was provided by the Nam Ngum Development Fund and the Canadian government. Provision has also been made under the Fund for strengthening EDL's own training program for operating personnel.

During the implementation of the Phase II Project EDL personnel will be closely associated with the erection and testing. The equipment contract will also provide for technical assistance and guidance during the first year of operation as was the case for the Phase I project. The costs of such assistance have been included in the cost estimates.

10. Environmental Analysis

As mentioned in section IA above, an environmental analysis of the project was made under the auspices of the IBRD using AID funds. The studies were conducted by Acres International Ltd., and their report was rendered in Jan. 1974 (See Annex 4). This analysis is in compliance with AID Manual Circulars 1214.1 and 1221.2.

The report concludes that, as far as can be determined, no significant detrimental environmental changes can be expected as a result of Phase II of the Nam Ngum Project. The only adverse effect, of any magnitude or duration, will be a reduction in quality of water discharged from the reservoir (lowering of dissolved oxygen, increase in nutrients and hydrogen sulphide and a small decrease in pH). The relative importance of this however, will be considerably diminished downstream from the confluence with the Nam Lik.

Coincident with the Acres environmental analysis the Smithsonian Institute is conducting an integrated ecological evaluation of the effects of the impoundment.

This study will be more intensive than the Acres analysis and will include: the use of remote sensing photography, identification and quantification of aquatic and terrestrial vegetation and derivation of an estimate of the organic biomass contribution to the water, overall limnological survey and a study of ecological effects on fish and any rare or endangered species present. This study, which is being undertaken for the Mekong Committee with AID funding, is scheduled for completion in July 1974.

11. Technical Feasibility

After a review of all available engineering data, feasibility reports and other material, it is concluded that the technical requirements of the proposed work are sufficiently well defined to execute the project on an orderly schedule. It is considered that the degree of engineering planning undertaken and the determination of costs are adequate to meet the applicable requirements of Section 611 of the Foreign Assistance Act.

STATUTORY CHECKLISTI. FULFILLMENT OF STATUTORY OBJECTIVESA. Needs Which the Loan is Addressing

1. FAA Section 103. Discuss the extent to which the loan will alleviate starvation, hunger and malnutrition, and will provide basic services to poor people enhancing their capacity for self-help.

Not applicable.

2. FAA Section 104. Discuss the extent to which the loan will increase the opportunities and motivation for family planning; will reduce the rate of population growth; will prevent and combat disease; and will help provide health services for the great majority of the population.

Not applicable.

3. FAA Section 105. Discuss the extent to which the loan will reduce illiteracy, extend basic education, and increase manpower training in skills related to development.

Not applicable.

4. FAA Section 106. Discuss the extent to which the loan will help solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development.

The loan will finance additional electric power generation which will largely be exported initially, but which will eventually go for domestic and urban industrial development and for agricultural pumping.

5. FAA Section 107. Discuss the extent to which the loan will support the general economy of the recipient country; or will support development programs conducted by private or international organizations.

Not applicable.

B. Use of Loan Funds

1. FAA Section 109. Have the funds with which the loan is to be made been authorized for an account different from the account from which the loan is to be made? (i.e., have the funds been transferred from another account?). If so, (a) do the funds so transferred exceed 15% of the total funds made available for the account from which the funds were transferred? (b) do the total funds so transferred exceed 25% of the funds made available for the account pursuant to which the loan is to be made? (c) has a determination been made that such a transfer is necessary? (d) has the authority of Sections 610(a) or 614(a) of the FAA been used to effect the transfer of funds?
- No.
2. FAA Section 110. Has the intended recipient country provided satisfactory assurances that it will provide at least 25% of the costs of the entire program, project or activity with respect to which such assistance is to be furnished under Sections 103 - 107 of the FAA?
- Not applicable, because multilateral project.
3. FAA Section 111. Discuss the extent to which the loan will strengthen the participation of the urban and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life.
- Power produced by the project will be available for both urban and rural development which will increase employment opportunities for the poor.
4. FAA Section 112. Will any part of the loan be used to conduct any police training or related program (other than assistance rendered under Section 515(c) of the Omnibus Crime Control and Safe Streets Act of 1968 or with respect to any authority of the Drug Enforcement Administration or the FBI) in a foreign country?
- No.
5. FAA Section 113. Describe the extent to which the programs, projects or activities to be financed under the loan give particular attention to the integration of women into the national economy of the recipient country.
- No special attention to integration of women.

6. FAA Section 114. Will any part of the loan be used to pay for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?

II. COUNTRY PERFORMANCE

A. Progress Towards Country Goals

1. FAA §§201(b)(5), 201(b)(7), 201(b)(8), 208. Discuss the extent to which the country is:

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

The RLG is giving priority attention to projects which aim at increasing food production. This project would directly assist those pump irrigation projects that would utilize electric pumping.

(b) Creating a favorable climate for foreign and domestic private enterprise and investment;

The RLG is encouraging domestic and foreign private investment in the current Five Year Development Plan.

The RLG Investment Code provides several incentives (Tax holidays) for new private investment.

(c) Increasing the people's role in the developmental process;

Major developments in this area are dependent on the newly invested Provisional Government of National Union (PGNU); however, the PFG presently has underway training for local government officials and a model district program, all of which are directed towards this goal.

(d) Allocating expenditures to development rather than to unnecessary military purposes or intervention in other free countries' affairs;

Though the ceasefire has been in effect since February 1973, the RLG still perceives continuing potential external threats to its security necessitating expenditure allocations to defense purposes. It is anticipated that substantial reduction of military manpower will be accomplished over the next few years.

(e) Willing to contribute funds to the project or program;

This project will be totally funded by a consortium of nine donors.

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

PGNU was formally invested on April 5, 1974 and has not yet formulated programs in these areas.

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

The PGNU has not yet demonstrated its capabilities to respond to these needs but has gone ahead with this loan and other international assistance efforts for which self-help measures are likely to be required.

B. Relations with the United States

1. FAA Sec. 620(c). Is the government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies; including arbitration, or (b) the debt is not denied or contested by the government, or (c) the indebtedness arises under such government's or a predecessor's unconditional guarantee?

No.

2. FAA Sec. 620(d). If the loan is intended for construction or operation of any productive enterprise that will compete with U.S. enterprise, has the country agreed that it will establish appropriate procedures to prevent export to the U.S. of more than 20% of its enterprises annual production during the life of the loan?

Will not compete with U.S.

3. FAA Sec. 620(e)(1). Has the country's government, or any agency or subdivision thereof, (a) nationalized or expropriated property owned by U.S. citizens or by any business entity not less than 50% beneficially owned by U.S. citizens, (b) taken steps to repudiate, or nullify existing contracts or agreements with such citizens or entity, or (c) imposed or enforced discriminatory taxes or other exactions, or restrictive maintenance or operation conditions? If so, and more than six months has elapsed since such occurrence, identify the document indicating that the government, or appropriate agency or subdivision thereof, has taken appropriate steps to discharge its obligations under international law toward such citizen or entity? If less than six months has elapsed, what steps, if any, has it taken to discharge its obligations? No.

If the recipient government has engaged in any of the activities described in (a), (b), or (c) above, has the President made a determination and certified to Congress that a waiver of the provisions of Section 620(e) is important to the national interests of the U.S.?

4. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S. property, and failed to take appropriate measures to prevent a recurrence and to provide adequate compensation for such damage or destruction?

No.

5. FAA Sec. 620 (l). Has the government instituted an investment guaranty program under FAA Sec. 221(b)(1) for the specific risks of inconvertibility and expropriation or confiscation?

No, under the recent unsettled circumstances the U.S. has not considered it appropriate to seek an agreement with Laos under this program.

6. FAA 8620(o). Fisherman's Protective Act of 1954, as amended, Section 5. Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? If, as a result of a seizure, the U.S.G. has made reimbursement under the provisions of the Fisherman's Protective Act and such amount has not been paid in full by the seizing country, identify the documentation which describes how the withholding of assistance under the FAA has been or will be accomplished.

No.

7. FAA Sec. 620(q). Has the country been in default, during a period in excess of six months, in payment to the U.S. on any FAA loan?

No.

8. FAA Sec. 620(t). Have diplomatic relations between the country and the U.S. been severed? If so, have they been renewed?

No.

C. Relations with Other Nations and the U.N.

1. FAA Sec. 620(i). Has the country been officially represented at any international conference when that representation included planning activities involving insurrection or subversion directed against the U.S. or countries receiving U.S. assistance? No.

2. FAA Secs. 620(a), 620(n). Has the country sold, furnished, or permitted ships or aircraft under its registry to carry to Cuba or North Vietnam, items of economic, military or other assistance? No.

3. FAA Sec. 620(u); App. Sec. 107.
 (a) What is the status of the country's U.N. dues, assessments or other obligations? (b) Does the loan agreement bar any use of funds to pay U.N. assessments, dues or arrearages?
 (a) Laos owes \$74,000 of 1973 dues but is not in arrears for more than two years; hence Laos is current for the purpose of retaining voting rights under Article XIX of the U.N. Charter.
 (b) Yes, loan funds are only available for project purposes.

D. Military Situation

1. FAA Sec. 620(i). Has the country engaged in or prepared for aggressive military efforts directed against the U.S. or countries receiving U.S. assistance? No.

2. FAA Sec. 620(s). What is
 (a) the percentage of the country's budget devoted to military purposes, and (a) 47% for FY 74.
 (b) the amount of the country's foreign exchange resources used to acquire military equipment, and (b) None.
 (c) has the country spent money for sophisticated weapons systems purchased since the statutory limitation became effective? (c) No.

Is the country diverting U.S. development assistance or PL 480 sales to military expenditures? Is the country diverting its own resources to unnecessary military expenditures? (Findings on these questions are to be made for each country at least once each fiscal year and, in addition, as often as may be required by a material change in relevant information.)

III. CONDITION OF THE LOAN

A. General Soundness

Interest and Repayment

1. FAA §§201(d), 201(b)(2). Is the rate of interest excessive or unreasonable for the borrower? Are there reasonable prospects for repayment? What is the grace period interest rate; the following period interest rate? Is the rate of interest higher than the country's applicable legal rate of interest.

Standard A.I.D. loan terms apply: 2% during ten-year grace period and 3% thereafter. These are reasonable terms, not higher than applicable legal rates. Repayment prospects are reasonable (Section II B 5 of Loan Paper.)

Financing

1. FAA §201(b)(1). To what extent can financing on reasonable terms be obtained from other free-world sources, including private sources within the U.S.?

This loan is part of a multilateral financing.

Economic and Technical Soundness

1. FAA §§201(b)(2), 201(e). The activity's economic and technical soundness to undertake loan; does the loan application, together with information and assurances, indicate that funds will be used in an economically and technically sound manner?

Yes.

2. FAA §611(a)(1). Have engineering, financial, and other plans necessary to carry out assistance, and a reasonable firm estimate of the cost of assistance to the U.S., been completed?

Yes.

3. FAA §611(b); App. §101. If the loan or grant is for a water or related land-resources construction project or program, do plans include a cost-benefit computation? Does the project or program meet the relevant U.S. construction standards and criteria used in determining feasibility?

Yes. (See Engineering Analysis, Annex 3.)

4. FAA §611(e). If this is a Capital Assistance Project with U.S. financing in excess of \$1 million, has the principal A.I.D. officer in the country certified as to the country's capability effectively to maintain and utilize the project?

Yes, attached. (Annex 2)

B. Relation to Achievement of Country and Regional Goals

Country Goals

1. FAA §§207, 281(a). What is this loan's relation to:

(a) Institutions needed for a democratic society and to assure maximum participation on the part of the people in the task of economic development?

The loan will provide a first capability of serving rural electrification and will further urban and industrial economic opportunities but will not specifically address institutional development.

(b) Enabling the country to meet its food needs both from its own resources and through development, with U.S. help, of infrastructure to support increased agricultural productivity?

A partial benefit will be power for agricultural pumping.

(c) Meeting increasing need for trained manpower?

Principal benefit will be urban and industrial power availability.

(d) Developing programs to meet public health needs?

Principal benefit will be urban and industrial power availability.

(e) Assisting other important economic, political, and social development activities, including industrial development, growth of free labor unions; cooperatives and voluntary agencies; improvement of transportation and communication systems; capabilities for planning and public administration; urban development; and modernization of existing laws?

Principal benefit will be urban and industrial power availability.

2. FAA §201(b)(4). Describe the activity's consistency with and relationship to other development activities, and its contribution to relizable long-range objectives.

A principal benefit will be assisting Laos to earn foreign exchange to approach long range self-sufficiency.

3. FAA §201(b)(9). How will the activity to be financed contribute to the achievement of self-sustaining growth?

Plentiful and reasonably priced electric power is essential to self-sustaining growth and will be provided for by the loan.

4. FAA §201(f). If this is a project loan, describe how such project will promote the country's economic development, taking into account the country's human and material resource requirements and the relationship between ultimate objectives of the project and overall economic development.

The electric power provided will make possible more industrial employment and may facilitate utilization of timber and mineral resources.

5. FAA §201(b)(3). In what ways does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities?

Electric power provided will contribute to these objectives.

6. FAA §281(b). How does the program under which assistance is provided recognize the particular needs, desires, and capacities of the country's people; utilize the country's intellectual resources to encourage institutional development; and support civic education and training in skills required for effective participation in political processes.

The loan does not directly assist human resources development, but associated assistance by Canada is developing personnel skills and other donors are assisting the development of electric utility as an indigenously managed institution.

7. FAA §601(a). How will this loan encourage the country's efforts to:
 (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions?

The loan will encourage and provide physical facilities for exchange of electrical power with neighboring countries and will provide electrical services to private enterprises and cooperatives to improve technical industries of agriculture and commerce. Most of the loan will be devoted to imports from private suppliers and procurement from private sources in Laos.

8. FAA §202(a). Indicate the amount of money under the loan which is: going directly to private enterprise; going to intermediate credit institutions or other borrowers for use by private enterprise; being used to finance imports from private sources; or otherwise being used to finance procurements from private sources.

Loan proceeds will finance imports from private sources and commodities and services of private Laotian enterprise.

9. FAA §611(a)(2). What legislative action is required within the recipient country? What is the basis for a reasonable anticipation that such action will be completed in time to permit orderly accomplishment of purposes of loan?

No legislative action is known to be required; however the opinion of the Minister of Justice will be obtained as to the validity and effectiveness of U.S. and ADB agreements relating to the project and the U.S. loan. If he determines that new legislative action is required, we expect it will be taken without delay.

Regional Goals

1. FAA §619. If this loan is assisting a newly independent country, to what extent do the circumstances permit such assistance to be furnished through multilateral organizations or plans?

Laos is not a newly dependent country but this loan is being furnished through a multilateral fund being ministered by the Asian Development Bank.

2. FAA §209. If this loan is directed at a problem or an opportunity that is regional in nature, how does assistance under this loan encourage a regional development program? What multilateral assistance is presently being furnished to the country?

This loan is being coordinated with other multilateral and regional assistance to Laos for power development and for development of the lower Mekong Basin.

C. Relation to U.S. Economy

Employment, Balance of Payments,
Private Enterprise.

1. FAA §§201(b)(6); 102. What are the possible effects of this loan on U.S. economy, with special reference to areas of substantial labor surplus? Describe the extent to which assistance is constituted of U.S. commodities and services, furnished in a manner consistent with improving the U.S. balance of payments position.

Most procurement under this loan will be from U.S. sources, except for a reasonable share of local currency costs.

2. FAA §§612(b); 636(h). What steps have been taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. and local currencies contributed by the country are utilized to meet the cost of contractual and other services, and that U.S. foreign owned currencies are utilized in lieu of dollars?

No U.S. owned currencies are available in Laos.

3. FAA §601(d); App. §108(a) If this loan is for a capital project, to what extent has the Agency encouraged utilization of engineering and professional services of U.S. firms and their affiliates?
(b) If the loan is to be used to finance direct costs for construction, will any of the contractors be persons other than qualified nationals of the country or qualified citizens of the U.S.? If so, has the required waiver been obtained?

(a) To the extent U.S. loan funds are used, U.S. firms will be the eligible sources of these services.

(b) No.

4. FAA §608(a). Provide information measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.

A multilateral fund is being utilized which does not apply to U.S. Government excess property.

5. FAA §602. What efforts have been made to assist U.S. small business to participate equitably in the furnishing of commodities and services financed by this loan?

Appropriate provisions are made in the loan for this participation.

6. FAA §621. If the loan provides technical assistance, how is private enterprise on a contract basis utilized? If the facilities of other Federal agencies will be utilized, in what ways are they particularly suitable; are they competitive with private enterprise (if so, explain); and how can they be made available without undue interference with domestic programs?

Not applicable.

7. FAA §611(c). If this loan involves a contract for construction that obligates in excess of \$100,000, will it be on a competitive basis? If not, are there factors which make it impracticable?

Yes.

8. FAA §601(b). Describe the efforts made in connection with this loan to encourage and facilitate participation of private enterprise in achieving the purposes of the Act.

The project will be implemented by private firms.

Procurement

1. FAA §604(a). Will commodity procurement be restricted to U.S. except as otherwise determined by the President?

U.S. procurement is required except for a reasonable share of multilateral local currency costs.

2. FAA §604(b). Will any part of this loan be used for bulk commodity procurement at adjusted prices higher than the market price prevailing in the U.S. at time of purchase?

No.

3. FAA §604(e). Will any part of this loan be used for procurement of any agricultural commodity or product thereof outside the U.S. when the domestic price of such commodity is less than parity?

No.

4. FAA §604(f). Will the agency receive the necessary pre-payment certification from suppliers under a commodity import program agreement as to description and condition of commodities, and on the basis of such, determine eligibility and suitability for financing?

Not applicable.

D. Other Requirements

1. FAA §201(b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year?

No, this is a multilaterally-funded project, administered by the Asian Development Bank, and providing regional benefits to both Laos and Thailand

2. App. §105. Does the loan agreement provide, with respect to capital projects, for U.S. approval of contract terms and firms?

U.S. has approved rules and procedures for multi-lateral fund operations, including those rules governing ADB approvals of contracts and firms.
Not applicable.

3. FAA §620(k). If the loan is for construction of a production enterprise, with respect to which the aggregate value of assistance to be furnished will exceed \$100 million, what preparation has been made to obtain the express approval of the congress?

4. FAA §620(b), 620(f); Has the President determined that the country is not dominated or controlled by the international Communist movement? If the country is a Communist country (including, but not limited to, the countries listed in FAA §620(f)) and the loan is intended for economic assistance, have the findings required by FAA §620(f) and App. §109(b) been made and reported to the Congress?

Yes.

5. FAA §620(h). What steps have been taken to insure that the loan will not be used in a manner which, contrary to the best interest of the United States, promotes or assists the foreign aid projects of the Communist-bloc countries? Multilateral fund does not include any Communist-bloc countries.
6. App. §109. Will any funds be used to finance procurement of iron and steel products for use in Vietnam other than as contemplated by §110? No.
7. FAA §636(i). Will any part of this loan be used in financing non-U.S.-manufactured automobiles? If so, has the required waiver been obtained? No.
8. FAA §§620(a)(1) and (2), 620 (p). Will any assistance be furnished or funds made available to the government of Cuba or the United Arab Republic? No.
9. FAA §620(g). Will any part of this loan be used to compensate owners for expropriated or nationalized property? If any assistance has been used for such purpose in the past, has appropriate reimbursement been made to the U.S. for sums diverted? No.
10. FAA §201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise? Workers, suppliers and contractors in Laos are eligible sources for local currency costs of the project
11. App. §103. Does the loan agreement bar any use of funds to pay pensions, etc., for persons who are serving or who have served in the recipient country's armed forces? All funds under the loan are for particular purposes.
12. MAA §901.b. Does the loan agreement provide for compliance with U.S. shipping requirements, that at least 50% of the gross tonnage of all commodities financed with funds made available under this loan (computed separately by geographic area for dry bulk carriers, dry cargo liners, and tankers) be transported on privately owned U.S. flag commercial vessels to the extent such Yes.

vessels are available at fair and reasonable rates for U.S. flag vessels and that at least 50% of the gross freight revenue generated by all shipments financed with funds made available under this loan and transported on dry cargo liners be paid to or for the benefit of privately owned U.S. flag commercial vessels?

13. FAA §481. Has the President determined that the recipient country has failed to take adequate steps to prevent narcotic drugs produced or procured in, or transported through, such country from being sold illegally within the jurisdiction of such country to U. S. Government personnel or their dependents or from entering the United States unlawfully?

No.

14. App. §110. Is the loan being used to transfer funds to world lending institutions under FAA §209(d) and §251(h)?

No, however a special multi-lateral fund set up by several donors will be administered by the Asian Development Bank.

15. App. §601. Are any of these funds being used for publicity or propoganda within the United States?

No.

16. FAA §612(d) and Section 40 of PL 93 - 189 (FAA of 1973). Does the United States own host country excess foreign currency and, if so, what arrangements have been made for its release in compliance with Section 40 (FAA of 1973)?

No.

17. FAA §604(d). Will provisions be made for placing marine insurance in the U.S. if the recipient country discriminates against any marine insurance company authorized to do business in the U.S.?

Yes.

18. Section 29 of PL 93 - 189 (FAA of 1973). Is there a military base located in the recipient country which base was constructed or is being maintained or operated with funds furnished by the U.S., and in which U.S. personnel carry our military operations? If so, has a determination been made that the government of such recipient country has, consistent with security, authorized access, on a regular basis to bona fide news media correspondents of the U.S. to such military base?

No.

19. Section 30 and 31 of PL 93 - 189 (FAA of 1973). Will any part of the loan be used to finance directly or indirectly military or paramilitary operations by the U.S. or by foreign forces in or over Laos, Cambodia, North Vietnam, South Vietnam, or Thailand? No.
20. Section 37 of PL 93 - 189 (FAA of 1973); App. §111. Will any part of this loan be used to aid or assist generally or in the reconstruction of North Vietnam? No.
21. FAA Section 640(c). Will a grant be made to the recipient country to pay all or part of such shipping differential as is determined by the Secretary of Commerce to exist between U.S. foreign flag vessel charter or freight rates? No.
22. App. §104. Will any of the funds appropriated for this project be used to make a payment on any procurement contract to which the U.S. is a party and which does not contain a termination for convenience (to the U.S.) provision in it? No.
23. App. §106. Has it been determined that not more than \$12,000,000 has been used during fiscal year 1974 in carrying out research under FAA §241? Yes.
24. App. §112. Will any of the funds appropriated or local currencies generated as a result of AID assistance be used for support of police or prison construction and administration in South Vietnam or for support of police training of South Vietnamese? No.
25. App. §113. Have excess foreign currencies on deposit with the U.S. Treasury been used to underwrite local costs of U.S. foreign assistance programs in the recipient country, if available? None available.

26. App. §114. Have the House and Senate Committees on Appropriations been notified five days in advance of the availability of funds for the purposes of this project?

They will be.

27. App. §604. Will any of the funds appropriated for this project be used to furnish petroleum fuels produced in the continental United States to Southeast Asia for use by non-U.S. nationals.

No.

BEST AVAILABLE DOCUMENT

Environmental Analysis
Nam Ngum Hydro-Electric Project (Phase II)
Nam Ngum, Laos

April 25, 1974

Environmental Analysis
Nam Ngum Hydro-Electric Project (Phase II)
Nam, Ngum, Laos

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Environmental Analysis of the Construction of
the Nam Ngum, Laos, Hydro-Electric Project,
Acres International Limited, Niagara Falls, Canada
January 1974

Environmental Analysis
Nam Ngum Hydro-Electric Project (Phase II)
Nam Ngum, Laos

I. Project Analysis

The general project analysis has been prepared by the Office of Capital and Commercial Development of the Bureau for Supporting Assistance in conjunction with other AID offices and representatives of the Asian Development Bank, the Government of Laos, and USAID/Laos.

In accordance with M.C. 1214.1, II.C.3. and II.C.8., the environmental analysis was prepared as a joint effort of the AID Office of Engineering, AID Bureau for Supporting Assistance (Environmental Affairs Officer; Office of Capital and Commercial Development; and Mekong Coordinator/Regional Development), and members of the Mekong Committee. The persons contributing to the report are familiar with the Mekong Valley area from the different standpoints necessary to evaluate the environmental impact. The environmental aspects of the analysis were prepared by a special team of experts obtained by the International Bank for Reconstruction and Development through contract with Acres International Limited of Niagara Falls, Canada. Mr. Charles H. Atkinson headed the team, whose principal members included Dr. Thomas A. McMahon (Ph.D.) and Mrs. Leslie A. Smythe (M.Sc.).

II. Project Description and Environmental Aspects

See attached report entitled Environmental Analysis of the Construction of the Nam Ngum, Laos, Hydro-Electric Project, Acres International Limited, Niagara Falls, Canada, January 1974.

III. Alternatives

The original decision to construct the dam for hydroelectric purposes was made--using the dam's power and irrigation potential and the effect on the economy of Laos as a basis for decision--before examination of environmental implications became mandatory. Nevertheless, at that time informal evaluation of the dam's impact on the environment was made. It was believed that there would be no serious degradation of the area's environment. As the project would have a beneficial economic impact on Laos and no environmental damage could be foreseen, no alternative project was proposed.

After completion and utilization of the Phase I project for a period of approximately three years, there seems to be no evidence of appreciable

damage to the environment. The current study indicates that the Phase II project will give additional strength to the Laotian economy and that raising of the dam and expanding the reservoir area will not change the environmental position. For these reasons no alternative project for Phase II has been proposed.

IV. Reasons for Recommended Project Design and Environmental Measures Recommended

The project location was dictated by physical characteristics and economic considerations that combine to make possible a feasible project. The project design follows the generally accepted principles of hydroelectric dam construction for the site conditions encountered at its location.

Phase II will increase the impoundment area and change downstream characteristics. Recommendations affecting these areas are contained in Part II of this analysis. There are no features included in the design that could be described as being incorporated for environmental reasons.

V. Effects of Special Measures on Costs of the Project

As there are no specific environmental measures recommended, there has been no effect on the cost of the project.

VI. Environmental Aspects in Relation to Overall Cost/Benefit Analysis

It is not believed that there are enough factors reflecting environmental aspects of the project, either positive or negative, to affect the cost/benefit analysis one way or the other.

Attachment (Part II):

Environmental Analysis of the Construction of
the Nam Ngum, Laos, Hydro-Electric Project,
Acres International Limited, Niagara Falls, Canada
January 1974

April 25, 1974

CAPITAL ASSISTANCE LOAN AUTHORIZATION

Provided from: Selected Development Problems Funds
Laos: Nam Ngum II - Hydroelectric Power

Pursuant to the authority vested in the Administrator of the Agency for International Development ("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 I, Section 106, Selected Development Problems, and Part I, Chapter 2, Title I, the Development Loan Fund, to the Government of Laos ("Borrower") of not to exceed five million United States dollars (\$5,000,000) to assist, along with other nations and in a project administered by the Asian Development Bank, in financing the foreign exchange and local currency costs of goods and services required for the expansion of hydroelectric facilities at the Nam Ngum Dam and for other related facilities, the Project to be carried out by Electricite Du Laos ("EDL"). This loan is to be subject to the following conditions:

1. Interest Rate and Terms of Repayment.

Borrower shall repay the loan to A.I.D. within forty (40) years from the date of first disbursement under the loan, including a grace period of not to exceed ten (10) years. Borrower shall pay interest on the unrepaid principal and any interest accrued thereon

at the rate of (a) two percent (2%) per annum during the grace period and (b) three percent (3%) per annum thereafter.

2. Currency of Repayment.

Borrower shall repay the loan and pay interest thereon in United States dollars.

3. Other Terms and Conditions.

(a) Borrower shall relend the proceeds of the loan to EDL to be repaid with interest to Borrower in local currency ("Kip") in the amounts equivalent to the value of the currency lent to Borrower at the respective rates and at the respective times at which Borrower is obliged to repay principal and to pay interest on the loan.

(b) The proceeds of the loan, or an equivalent amount from other contributions to the Project, shall be utilized for the procurement of goods and services from the United States, less a reasonable amount in relation to other nation's contributions to cover local currency costs.

(c) The Government of Laos shall cause EDL, and in a related undertaking the Government of Thailand shall cause the Electricity Generating Authority of Thailand ("EGAT"), to enter into an agreement under which the current Energy Supply Agreement between EDL and EGAT shall be extended for a period of not less than fifteen (15) years from the date of its expiry and under which EDL and EGAT shall determine the price of energy supplied to EGAT during the extension period taking into consideration, inter alia, the cost to EGAT of obtaining power from alternative sources.

(d) The proceeds of the loan will not be disbursed, except as A.I.D. agrees otherwise, until all conditions precedent to the effectiveness of other contributions to the Project have been satisfied.

(e) The loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Assistant Administrator

Date

Clearances:

SA/RD:Kenneth Rabin	_____	Date	_____
SA/CCD:Frank Collins	_____	Date	_____
SA/PPB:Charles Breecher	_____	Date	_____
SA/IT:Norman Sweet	_____	Date	_____
SER/FM:Sidney Brown	_____	Date	_____
SER/ENGR:Merton Vogel	_____	Date	_____
GC/SA:Herbert Morris	_____	Date	_____
PPC/DPR:Frank Kimball	_____	Date	_____

Draft:

GC/SA:HEMorris:hp:5/8/74