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PD-AAS-127-B1

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

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

524-L-024

NICARAGUA - FEASIBILITY STUDIES AND SURVEYS (SECOND)

AID-DLC/P-962

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May 26, 1971

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Nicaragua - Feasibility Studies and Surveys (Second)

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed $2,800,000 to the Government of Nicaragua to assist in financing the United States dollar and local currency costs of a project to conduct general surveys and pre-feasibility and feasibility studies.

Please advise us as soon as possible but in no event later than close of business on Wednesday, June 2, 1971, if you have a basic policy issue arising out of this proposal.

Rachel R. Agee
Secretary
Development Loan Committee

Attachments:
Summary and Recommendations
Project Analysis
ANNEXES I-IV

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NICARAGUA: SECOND FEASIBILITY STUDIES & SURVEYS

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NICARAGUA: SECOND FEASIBILITY STUDIES & SURVEYS

PART ONE: SUMMARY AND RECOMMENDATIONS

1. BORROWER: The Government of Nicaragua

   Executing Agency: The Coordinating Committee

2. AMOUNT OF LOAN:

   Not to exceed two million eight hundred thousand dollars (US$ 2,800,000.00).

   Use of Loan Funds:

   The loan funds will finance the US dollar costs of studies and part of the local currency costs of consultant contracts.

3. TOTAL COST OF THE PROJECT:

   The loan will be the major source of financing for all studies and surveys. The Borrower's contribution at the equivalent of $200,000 will consist primarily of GON overhead costs in the individual projects.

4. DESCRIPTION OF THE PROJECT:

   The proposed loan will help finance cost of certain AID approved contracts with private individual consultants or firms for surveys, pre-feasibility and feasibility studies. The following areas have been selected by the Coordinating Committee, which are in line with the priorities of the Government of Nicaragua as they appear in the latest report submitted to the CIAP review:

A. Infrastructure

a - Power
b - Transportation
c - Communications, including Educational TV

B. Natural Resources

a - Minerals
b - Other natural resources

C. Improve, increase and diversify production centered mainly on export possibilities.

a - Agriculture
b - Industry

5. PURPOSE OF THE PROJECT:

To expand domestic production and diversify the economy by identifying worthwhile projects and attract the necessary financing therefor. The general surveys will identify the fields in which studies should be undertaken. The pre-feasibility studies and feasibility studies will provide data for determining whether particular capital projects should be undertaken and will aid in formulating development projects to be submitted in support of loan applications to international or national lending agencies.

6. ALTERNATE SOURCES OF FINANCING:

The Export-Import Bank informed AID on August 3, 1970 that it was not interested in this project. The Inter American Development Bank has informally indicated that it is not interested in financing this project.

7. VIEWS OF THE COUNTRY TEAM:

USAID/N and the Country Team strongly support and highly recommend this loan.

8. STATUTORY CRITERIA:

All statutory criteria have been or will be met.

9. ISSUES: None

10. RECOMMENDATIONS:

Authorization of a loan of up to US$ 2,800,000.00 to the Government of Nicaragua under the following terms and conditions:

Terms: a - Repayment within 40 years from the date of the first disbursement, including a grace period of 10 years.

b - Interest of two percent (2%) during the grace period and three percent (3%) thereafter.

c - Repayment of principal and interest shall be made in US dollars.

Other terms and conditions:

a - Each survey or study to be financed partially or totally with loan funds will be subject to prior AID approval.

b - All contracts for services under this loan will be subject to prior AID approval.

c - The Borrower will provide AID with at least five copies of each survey or study financed with loan funds.

d - Procurement under this loan will be only for services of private enterprise consultants chosen to make the surveys and/or studies. Consultant contracts shall include specifically the cost of goods and/or equipment, if any, needed to carry out the survey or study.

e - The loan shall be subject to such other terms and conditions as AID may deem advisable.

11. PROJECT COMMITTEE:

Capital Resources Development Officers:	Joseph Charette/Jean M.E. Artaud
General Engineer:	Carl M. Forsberg
Development Program Officer:	Allen Goldstein
Controller:	Milton E. Eshleman
Regional Legal Advisors:	Arthur Mudge/Robert Parker

Draft: Artaud/Forsberg

PART TWO - THE PROJECT

Section I. NATURE OF THE PROJECT

A. Description and Justification of the Project

1. Purpose

To expand domestic production and diversify the economy by identifying worthwhile projects and attract the necessary financing therefor. The general surveys will identify the fields in which studies should be undertaken. The pre-feasibility studies, feasibility studies and, when warranted, engineering plans and specifications will provide data for determining whether particular projects should be undertaken and will aid in formulating development projects to be submitted in support of loan applications to international or national lending agencies.

2. Borrower and Executing Agency

The Government of Nicaragua will be the Borrower and the Ministry of Finance will sub-delegate the responsibility for the approval, execution and follow-up on the survey and study contracts to the Coordinating Committee, which will act as Executing Agency.

The Coordinating Committee for International Financial and Technical Assistance consists of the following members: Dr. Luis Valle Olivares, Assistant to the Presidency; Dr. Roberto Incer Barquero, President of the Central Bank; Lic. Juan José Martinez, Minister of Economy and General Gustavo Montiel, Minister of Finance. In July 1970, it was given the responsibility to coordinate all activities and programs that are carried out by the Government, Decentralized Agencies, and Autonomous Agencies utilizing external assistance from international organizations. A law establishing a National Planning Office under the Office of the Presidency is

presently before the Nicaraguan Congress. Under this law the Planning Office will be directly responsible to the Coordinating Committee in the exercise of its functions.

The Coordinating Committee is served by a Group of experienced technicians (Grupo Asesor Tecnico) which will make specific recommendations to the Coordinating Committee on each survey or study requested by Ministries, autonomous public entities or the Central Bank.

With the experience of contracting with foreign consulting and management firms gained in the previous loans and with the active collaboration of the USAID in working out appropriate scopes of work and contracts, the Government of Nicaragua should have no undue difficulties in making effective use of the proposed loan funds.

B. Project Background

1. Evaluation of Results of First Loan

In June 1965, the Government of Nicaragua obtained from AID a loan of US$ 1,300,000 to assist in financing the costs of pre-feasibility investigations and feasibility studies. The following general areas were identified for study:

Power (hydroelectric and geothermal)
Irrigation
Port Development
Navigation
Roads

In addition, studies in other areas of activities could be financed with loan funds upon agreement between the Borrower and AID.

As of December 31, 1970 the following studies had been contracted for under Loan 524-L-011:

a. Transportation System - Lake Nicaragua and San Juan River:

Scope: To investigate the economic feasibility of a modern transportation system on Lakes Nicaragua and Managua and the upper reaches of the San Juan River to serve the surrounding land areas and the Island of Ometepe.

Amount: US$ 233,300.00

Date of Completion and Final Report:

This study was completed in September 1970 and the final report was submitted on November 1, 1970.

Summary:

The contractor recommended the following for Lake Nicaragua and the upper reaches of the San Juan River:

i. Construction of five port sites.

ii. Procurement of cargo barges, express cargo and passenger ferry equipment to provide service between the western and eastern shores and with the Island of Ometepe.

iii. An Organization for operation and management of the recommended transportation system.

Use of Study:

On the basis of the recommendation of the consultant the Government of Nicaragua has applied to AID for the financing of the first phase of the project and USAID/Nicaragua has submitted an IRR for a proposed US$ 2 million loan.

b. Water & Sewer System Studies:

Definition: Investigate the feasibility of improving and/or installing domestic water and sanitary sewer systems in ten cities of Nicaragua, and prepare appropriate recommendations.

Amount of Contract: US$ 261,111.00
(Note: US$ 42,850 from GON sources, US$ 218,261 from Loan 011)

Date of Completion and Final Report:

The study was completed in November 1969 and the final report was submitted in April 1970.

Use of the Study:

The Government has held preliminary discussions with IDB regarding financing for this project. The findings provided master plans for water and sewer systems for ten major cities in Nicaragua (except Managua) and recommended stage construction at five year intervals for all of the projects to be undertaken as a group. The IDB has expressed interest, and negotiations preliminary to formal application have started.

c. Geothermal Resources Study:

Definition: Stage I of a three-stage project was undertaken to determine the feasibility of development of geothermal resources in the generation of electric power. Stage I consisted of the location and delineation of potential geothermal fields. The overall plar of investigation stipulated that Stage II, in which the existence of a geothermal field would be proven through deep exploratory drilling, would be undertaken only if the results of Stage I were favorable. Similarly, if the existence of a satisfactory geothermal field were determined then Stage III would be undertaken to design and develop a power plant to utilize the steam. No commitments were made by AID to participate in the project after completion of the Stage I investigation.

The Contract: A contract between the GON represented by the Minister of Economy, Industry and Commerce and the U.S. firm of Texas Instruments, Inc. was executed June 12, 1969 in the amount of $455,479 and subsequent increases in scope of work increased this total to $639,400. In addition the GON provided $80,000 to allow completion of drilling of a 2000 foot well.

The investigation under Stage I was completed in December 1970 and the final report by Texas Instruments dated February 1971 was submitted to A.I.D. by the GON shortly thereafter.

Conclusions and Recommendations: The final report of Stage I in 10 volumes includes the technical data obtained during the intensive shallow drilling such as (1) Electrical Geophysical Surveys to delineate regions of conductive rock associated with hot water in detail and depth, and depths of porous hot-water-saturated rocks which occur in the areas; (2) Geochemistry tests of water samples obtained from the drillings and (3) temperature gradients. Toward the end of the investigation, the recommendation of geothermal consultants to drill a 2000 foot well at the most promising site was accepted. The purpose of the deep well was to determine if the base temperatures exceeded 200° C, a critical parameter in evaluating the economic potential of a steam reservoir. Some mechanical difficulties were experienced in the drilling of this well. Although steam was found at a depth of 1995 feet in December, 1970, temperature measurements could only be obtained at 725 feet where a temperature of 205°-209° C was measured. The well accomplished its objective by showing that a steam reservoir exists with a base temperature exceeding 200° C and additional investigation is warrented.

The Final Report by Texas Instruments contains a recommendation that the Stage II investigation be undertaken. A Work Plan for Stage II is proposed which can be used as a basis for preparing a Scope of Work for a Stage II contract.

d. Industrial Studies:

Definition: The Consultant was required to review and analyse approximately 27 general studies on natural resources and preliminary studies carried out by the GON and various international agencies and, subsequently, analysed and reviewed new project concepts under consideration or developed by the Ministry of Economy and other GON agencies for which actual studies had not been completed.

Analysis of the completed studies and the new concepts took into account the following criteria:

a) Developing the need of the economy in the fields of agro-industry, wood processing, mining, chemical industry, deep sea fishing, marketing and tourist resources, in conformance with the following priorities:

b) Selecting foreign exchange generating projects:

1. Projects that will have world market export potential.
2. Projects that will have export potential within the CACM.
3. Import substitution projects.

c) Projects which will utilize domestic resources and/or raw materials.

d) Projects that will generate a high value added.

e) Incentive investment projects.

From the foregoing series of investigations, the Consultant was instructed to conclude and derive from the surveys some rationale for projects to be recommended for pre-feasibility investigation and feasibility studies that would identify and appraise specific projects and new industrial development opportunities in sector areas (above mentioned) and using specific locally produced raw materials.

Amount of Contract: US$ 292,014.00

Date of Completion and Final Report:

The study was completed on May 13, 1970 and the final report was submitted on August 25, 1970.

Present Status:

Following is a list of the 19 project studies prepared by the consultant and submitted to the Ministry of Economy.

1. Review and Analysis of 27 General Studies on Natural Resources and Preliminary Studies.

2. The Expanding Market for Nicaraguan Meat and Meat Products in the United States and the Development of the Livestock Feed Industry for Molasses.

3. The Manufacture of Gelatin in Nicaragua.

4. A Tuna Shore Base at Corinto.

5. Establishment of a Fish Meal Industry in Nicaragua.

6. Establishment of a Fish Meal Industry in Nicaragua, Raw Materials and Boat Operations and Sources of Supply for Food Fish.

7. Establishment of a Lobster Fishery on the Pacific Coast of Nicaragua.

8. Establishment of a Lobster Fishery on the Atlantic Coast of Nicaragua.

9. Establishment of a Fishery for Red Snappers on the Atlantic Coast of Nicaragua.

10. Phosphate Deposits.

11. Potentials for Mineral Resource Development in the Republic of Nicaragua.

12. Manufacture of Fertilizers in Nicaragua.

13. Manufacture of Pesticides in Nicaragua.

14. Observations at the Madinsa Lumber Mill and Logging Operations in Bluefields.

15. Tourism in Nicaragua.

16. General Requirements for a Grey Iron Foundry

17. Cast Iron Soil Pipe Manufacturing.

The foregoing investigations were assigned to the consultants by the Ministry, through their technical advisor, INFONAC. These projects were investigated by the consultant using Basic Team members, Short Term Specialists and/or Home Office Support, as required.

All of the completed studies are largely qualitative and on the pre-feasibility level. They have contributed positively to the present momentum in the following areas. The study on "The Expanding Market for Nicaragua Meat and Meat Products in the United States and the Development of the Livestock Feed Industry for Molasses" has directly encouraged the local slaughter houses to seriously consider investment in equipment for preparing processed cuts. One slaughter house has obtained an AID sub-loan from INFONAC to finance the purchase of process equipment. "A Tuna Shore Base at Corinto" has supplied basic preliminary findings of the highest interest to at least two potential investors, IBEC Foods Inc. of the U.S. and Mitsui of Japan. At present, Mitsui is finalizing a feasibility study which is scheduled for submission to INFONAC about November 30, 1971 (IBEC, who conducted a preliminary survey here recently, is following the course of the Mitsui negotiations). The investigations of the Madinsa Lumber Mill and Logging operations have resulted in a priority recommendation for a Forest Inventory of the Madinsa concession. The findings from the proposed study could importantly influence the availability of external financing necessary for Madinsa to reach its potential peak of development and production.

USAID is hopeful that other completed studies will stimulate interest in additional areas in the near future.

e. Road Studies:

Definition: To provide economic engineering and construction cost data for pilot feasibility studies of Penetration and Feeder Road improvement in two regions of Nicaragua.

Amount of Contract: US$ 37,458.02

Date of Completion and Final Report:

The study was completed in December 1970 and the final report was submitted in March 1971.

Present Status:

The data developed in these studies and the companion economic study financed by the GON are being used in the preparation of the Capital Assistance Paper for the Penetration Road Improvement Project, to be submitted to AID/W before the end of FY 1971.

2. Response to CAEC Comments on IRR

All the comments made by the CAEC at the time of approval of the IRR are treated in Annex II, Exh. 1.

3. Justification of Additional AID Financing

a - Effective Demand

The Government of Nicaragua has, over the past ten years, shown an increasing acceptance and endorsement of the feasibility study concept. This is in part due to the concerted action of the international lending agencies in requiring sound project preparation. Among the fifteen projects, tentatively selected by the GON for submission to the CIAP review in 1971, as part of its development program forecasts, eight are feasibility and pre-feasibility loan and grant applications to the IDB, IBRD, CABEI, AID and the OAS.

The Coordinating Committee, which is composed of the Secretary to the Presidency, the President of the Central Bank and the Ministers of Finance and Economy sets the order of priority for all borrowings. The present loan is regarded as of the highest priority because the list of the proposed areas for studies reflects the strong demand from various sectors of the Nicaraguan economy.

b - Non-Availability of Local or other Financing

The IDB, IBRD and EX/IM Bank have advised AID in writing that they are not interested in financing this project. The GON, through the Coordinating Committee has advised the USAID that the pressures for funds for other purposes in the National Budget make it impossible for GON to contribute to this project more than a sum estimated at about $ 2,00,000.00, which it expects to use in relation to this project, in the form of manpower and logistic support for Nicaraguan counterparts in the Coordinating Committee, the Technical Advisory Group, the Central Bank and personnel of the various ministries which will be involved in the execution of the project during the next three years (mid 71 to mid 74). The USAID considers that due to the indirect nature of the economic returns of this project and its need for concessional financing, AID is the only free-world source of financing on satisfactory terms.

4. Place of the Project in A.I.D. Program

This Project is consistent with the USAID Program which has had as a main objective the fostering of sound planning and adequate project preparation in Nicaragua. It is also responsive to A.I.D. policy of encouraging financial participation in development projects from other free-world sources.

In the early 1960's the USAID supported and assisted the GON with the organization and administration of a central planning body. Like all new institutions of this kind the National Planning Office has had its ups and downs until recently when the Government of Nicaragua took steps to revise and strengthen the Planning Office which will become a dependency of the Executive Office of the President, working under the Coordinating Committee. This decision of the Government, announced during the recent CIAP review of the Nicaraguan Program, was warmly received by the representatives of AID, IBRD and IDB who, over the years, had strongly advocated the creation and effective use of a central planning entity in Nicaragua.

SECTION II. PROJECT ANALYSIS

A. General Scope

The project will include the financing of surveys, prefeasibility and feasibility studies. The general surveys will identify the fields in which prefeasibility and feasibility studies should be undertaken. The prefeasibility and feasibility studies will provide the data necessary to determine the economic and technical soundness of various projects. Scopes of work for prefeasbility and feasibility studies contracted under the loan and selection of contracting firms and qualifications of their personnel assigned to carry out the studies will be reviewed for approval by the USAID to satisfy it that completed studies can provide sound bases for investment decisions. Completed studies will be reviewed by the USAID prior to final payment of contractors. As warranted, AID/W, at USAID request, will stand ready to provide advice and assistance in discharging these responsibilities. The Coordinating Committee of the Government of Nicaragua has established high priorities in the areas listed below. USAID/ Nicaragua agrees with these priorities and recognizes that the areas mentioned require immediate investigation.

B. Proposed Components

The following is an illustrative list of studies which have been discussed with the Government of Nicaragua and which the USAID would consider for approval:

1. Infrastructure Projects

a - Power US$ 1.5 million

(i) Geothermal Power: The primary use of geothermal energy has been in electric power generation. World geothermal power capacity at the end of 1969 was about 680 MW compared to about 850,000 MW from all methods of generation. Most of this geothermal capacity is in Italy (383 MW), New Zealand (170 MW) and the United States (86 MW). Programs for the development of geothermal power are currently underway in Mexico, the United States, the USSR and Japan. Besides Nicaragua, limited exploration activity is under way in Turkey, Ethiopia, Kenya, Indonesia, the Philippines, Taiwan, Chile, El Salvador and the West Indies. Because of the existing small number of known sources of geothermal energy, geothermal generation cannot be considered a substitute for other methods of electric power generation at this time. However, in areas where geothermal resources are available and fossil fuels are expensive or are not indigenous, the use of geothermal energy is a good

possibility as a supplier of power needs of a developing country where large power markets do not yet exist. Geothermal power generation is ideally suited to production of power on a small scale and is only slightly influenced by economies of scale. It provides an inexpensive source of power that can be developed in small increments as power demands increase. Geothermal power has been found to be competitive with power generated from conventional thermal sources, particularly where fuels are imported at high cost.

The use of geothermal energy in the production of electricity began in 1904 with the operation of the first geothermal power station at Larderello, Italy. In the 1950's interest in geothermal power exploration was renewed with the opening of geothermal power stations in California and New Zealand. During the 1960's scientific and economic data on geothermal power was developed through the auspices of the United Nations. In 1961, several sessions were devoted to geothermal energy at a UN-sponsored New Sources of Energy Symposium. In September 1970, representatives of fifty countries attended a one-week UN-sponsored Development and Utilization of Geothermal Resources symposium held at Pisa, Italy.

(ii) Application to Nicaragua: Areas located close to or within volcanic belts usually show promise for geothermal power development. The area under investigation in Nicaragua is located in a volcanic belt. Since the early 1960's, the United Nations Development Program has been interested in geothermal power development in El Salvador, Guatemala and Nicaragua. In 1966 the UNDP selected El Salvador as the country in which to begin its intensive investigations and at this time the El Salvador investigations have progressed to the deep well drilling stage with promising results. The Nicaraguan fields of investigation initiated with Feasibility Studies Loan I are in the same general volcanic range and are also expected to yield favorable results.

(iii) Selection of Contractor and Consultant Services: Under Feasibility Studies Loan I, Stage I of the three-stage investigation described on pages 4 and 5 was executed. Because of the limited amount of geothermal exploration in the United States and in the world, Texas Instruments, a firm having the most staff capability in this field, was selected as the contractor with the requirement that it associate with known experts in geothermal exploration for consultation. The

services of three internationally known experts in the field of geothermal exploration were obtained: Dr. Fred Berry, University of California, Dr. George Keller, Colorado School of Mines and Dr. Gunnar Bodvarsson, University of Oregon.

The Scope of Work in the Texas Instruments contract was developed with the assistance of the team of three consultants. Because of the limited geothermal expertise and the fact that only a few isolated geothermal projects have been undertaken, a pattern of investigation has not been developed. Consequently, the final Scope of Work for the contract reflected the knowledge of some of the few people who had experience in this field and whose advice and assistance was invaluable.

Because of the need for expert advice in carrying out this project A.I.D. obtained under PASA arrangement with the United States Geological Survey the services of Dr. Donald E. White, Geologic Division of Field Geochemistry and Petrology. Dr. White is a widely known expert in the field of geothermal exploration and has worked on such projects throughout the world. Dr. White was used as consultant to A.I.D. since the beginning of the project in Nicaragua and has made field reconnaissance of areas in Nicaragua for geothermal possibilities, has selected areas for preliminary investigation and has developed a scope of work through which technical proposals were submitted by contractors. He has also made a technical evaluation of the proposals with recommendations for contractor selection, has prepared qualification requirements for the geothermal experts picked by the consultant, and gave general advice and assistance in preparing the scope of work included in the contract for Stage I investigation.

Because of the specialized nature of the study, control points were established at critical stages in the investigation activities. Almost continuous monitoring and reporting by the contractors and consultants provided assurance that work was carried out in an area under consideration only as long as necessary to determine its geothermal power potential. Dr. White participated in these monitoring activities and his recommendations became the bases for A.I.D. recommendations and approvals.

Texas Instruments' final report in 10 volumnes on Stage I of the study was completed in February 1971. The final report has been reviewed by Dr. White and a copy of his evaluation is included as Annex IV. Dr. White supports the conclusions of Texas Instruments and recommends continuation of the investigation into its second stage.

(iv) Economic Analysis: In conjunction with the basic engineering study, an economic analysis will precede or coincide with the initial stages of Phase II. This analysis will estimate the demand for power which would be delivered as a result of the contemplated investment over the life of the project. The study will compare the advantages of obtaining power from geothermal sources and by alternate means on the basis of relevant considerations of costs (capital, operating and maintenance), convenience, dependability and flexibility of systems to accommodate varying levels of output with fluctuations in demand. The economic analysis will also evaluate the options to the project and their relative desirability on the basis of the project's scale, projected demand, costs, etc. Benefit-cost relationships will be analyzed in terms of internal rates of return of the geothermal project and its alternatives.

b - Transportation:

(i) Roads: $400,000

Although the GON has a general road plan, studies are needed to develop a reliable network of national roads and accurately evaluate the mileage goals of the road construction program. This will include approximately 250 kilometers of feeder roads to be selected by the Coordinating Committee in close collaboration with the Ministries of Agriculture and Public Works. A new factor added is the proposed Lake Transportation System which will provide better transportation service to the areas east of Lake Nicaragua.

(ii) Others: $50,000

Other studies may include the updating of a study on the Nicaraguan Railroad and the feasibility and cost of coordinating its services with those contemplated in the first phase of the proposed Lake Transportation program.

c - Irrigation: $150,000

This study will consider specific irrigation projects in coordination with agricultural diversification and use of water discharged from the Santa Barbara hydroelectric plant and pumping of lake water.

d - Education: $20,000

This study will consider the feasibility and cost of communications as a means of improving Nicaragua's educational system. For example, although costly, educational television programs have been successful

in El Salvador and Colombia and the advantages indicated by these programs might be applied to Nicaragua: ETV is a multiplier of skilled teaching talent and permits approaches to instruction that cannot normally be demonstrated in remote areas with teacher shortages. ETV provides a built-in mechanism for in-service teacher education and can be used in curriculum reform and adult education programs in agriculture, health and family planning. The study will also consider alternate approaches to ETV that might be more consistent with available resources, educational levels and facilities in Nicaragua.

e - Communications: $80,000

This study will develop proposals for improving the country's inter-city telecommunications systems.

2. Natural Resources:

a - Minerals: $300,000

During the course of the Cadastral Loan Project (524-L-012) geologic structures and relationships indicating probable ore body locations were identified from surface features. This was done mainly from studies of aerial photographs which showed drainage and erosion patterns characteristic of areas containing ore bodies as well as occasional outcroppings of the ore itself. In order to definitely establish that ore bodies are present and that they have industrial value, ground examinations are needed and in the most promising locations drilling, trenching, and sampling must follow to establish rough estimates of depth, extent, and quality. Information on ore bodies having potential commercial value would be made available to the private sector for development. Private entrepreneurs would then use their funds for the intensive drilling analysis needed to determine more accuratedly the extent and qualities of the ore bodies and to enable them to decide on the most feasible mining methods and refinement processes. The type of exploration proposed for AID financing under this loan is the same as that carried out under Colombia loans 058 and 030. Colombia loan 058 permitted the use of AID funds for "extensive" exploration, "extensive" being described as "studying the minerals deposits of a specific area to the point where preliminary or probable reserve strength can be estimated." Colombia loan 030 permitted "field investigations to drill, trench, and sample the most likely mineralized zones in order to further delineate areas that may eventually justify detailed prospecting for commercial ore deposits."

The activity financed by the United Nations Special Fund covered a very limited area and was geared mainly to draw up the basis for the new mining code and the specialized

training of Nicaraguan geologists. The new studies will not duplicate the work already done by the United Nations.

b - Others: $100,000

Other studies such as surveys of local construction materials; up-dating forest inventory data and conservation plans; tourism promotion surveys and studies etc. will be carried out.

3. Improvement, Increase and Diversification of Production Centered on Export Possibilities: $200,000

Nicaragua, as a member of the Central American Common Market, has for the past seven years concentrated its efforts toward production for domestic consumption and for the CACM. With the recent trend centered to diversification and production of non-conventional export commodities, Nicaragua must not only compete with the other four sister countries for an equitable share in the CACM but also gear itself to the production of export commodities for markets outside the region. USAID/Nicaragua has provided grant funds beginning in FY 1971 to help the Chamber of Industries in cooperation with the Central Bank to establish a joint organization for export promotion. It is expected that, parallel to the infrastructure of the organization a series of specific studies on both agricultural and industrial export commodities will have to be carried out. With a diversification of production and concentrated effort on non-traditional exports Nicaragua will be able to maintain a rate of economic growth which will not only offset the demographic growth but will also leave a substantial balance of foreign exchange to meet an ambitious but well balanced investment program. The future growth of the economy undoubtedly depends on an expansion of exports and their diversification.

In the industrial field, experienced consultants financed under the first loan made pre-feasibility and feasibility studies on new projects. During the same period, various evaluations of the industrial sector of studies aiming at up-grading the quality and skill of management in particular industries will be made in order to improve and increase the return in their investments. USAID/Nicaragua has provided grant funds to help the Chamber of Industries and the Central Bank evaluate and provide guidance to existing industries and develop export promotion policies and programs.

In the light of the recommendations made and at the request of the private sector it is contemplated that part of the loan funds will be used for specific management surveys.

Illustrative of the revenue producing projects which are to be studied are the following:

a - Improvement and increase of hog production in Nicaragua combined with pre-feasibility and feasibility studies of the industrial uses of the meat and by-products of the porcine stock, aiming at both the export and domestic markets.

b - Use of local raw materials in the production of animal feed for export and domestic use, and the management techniques therein.

c - Industrial Park in the vicinity of the Las Mercedes Airport (Managua) for the installation of some substantial export oriented transformation industries.

d - Woodworking and furniture industries.

e - Agri-business - Peanut oil and by-products.

f - Novelty items including native casual wear.

In summary it is expected that the above mentioned potential studies will be made for the benefit of the private sector and will fit within the general categories of pre-feasibility surveys of export markets and production and feasibility studies of specific export production projects which fits within the new policy stressed by President Nixon in his recent declarations concerning new initiatives. It should be noted that USAID approval will be required for each survey or study. Thus USAID/Nicaragua will be able to avoid duplication of efforts of other lending agencies such as CABEI and the IDB and coordinate the use of loan funds with other loan or grant projects sponsored by AID or other international institutions.

4. Other Surveys and Studies:

The GON may present any sub-projects for consideration whether they were shown in the application or have been previously discussed with the USAID. If any categories have to be added however the GON will be requested to submit full details of all such sub-projects to A.I.D. including an indication of their relative priority.

C. Economic and Financial Analysis

1. Economic Analysis

a. General Economic Panorama

Economic growth as measured by the Gross Domestic Product (GDP) continued to stagnate. In 1970, GDP rose by only 3.7 percent as

measured against a population increase of about 3.2 per cent. There were several factors that caused this low rate of growth. The value of agricultural output declined by 5.0 per cent in 1970 compared to a minus 0.2 per cent in 1969. In addition, while the output of the fishing sector grew by 14.5 per cent in 1969, it actually fell by 7.4 per cent in 1970. Thus the output value of the primary sector actually declined slightly (0.7) in 1970, compared to an increase of 2.9% the previous year. The secondary sector rose 5.1 per cent in 1970 thereby compensating in part for the decline in the primary sector, but even this increase was less than in 1969. Two reasons account for this: (1) a decline (8.7%) in the construction sector compared to a 7.8 per cent in 1969 and (2) a sharp fall in mining output (-24.0%) compared to a decline of "only" 9.3 per cent the previous year. Manufacturing output continued to grow (9.5%) but at a smaller rate than in the previous year (15.0%). The tertiary sector (commerce, transportation and communication, etc.) continued to rise and in 1970 increased by 4.1 per cent.

Despite the poor general growth, other economic factors were favorable in 1970. Central government revenue reached a peak of $ 81.5 million in 1970, an increase of more than $ 10 million over the previous year. The GON projects an additional $ 10 million increase in 1971. Government savings and capital expenditures also rose and are expected to increase further in 1971.

Loans from the banking sector to the private sector rose at 6.5 per cent, approximately at the previous year's rate of growth. This was a relatively tight credit ceiling as measured by rates of growth in 1968 and 1967 (9.4% and 13.7 per cent respectively). Meanwhile banking claims on the government and official entities declined somewhat, with the result that total domestic credit of the banking system increased by only 5.2 per cent, compared to rates of growth of 8.6 per cent and 6.3 per cent in 1969 and 1968 respectively. Savings and time deposits rose by 18.8 per cent, considerably higher than rates of growth prevailing in the last several years. The money supply (currency in circulation and demand deposits) also continued its upward trend, after declining in 1967 and 1968. The monetary situation remains stable in Nicaragua. The Government has not had

to resort to inflationary financing to cover the budgetary deficit, and the control over credit has prevented a surge of inflation.

The Balance of Payments also has improved in 1970. Total exports rose to $ 178.7 million, an increase of $ 21.2 million over the previous year. Imports increased to $ 177.9 million (f.o.b.) from $ 158.4 million in 1969. Including services, the balance on current account did remain at a high deficit level, i.e. minus $ 36.8 million. The large inflow of capital, both private and public, exceeded the current account deficit and permitted the GON to increase its reserves by $ 12.5 million in 1970 after a decline of $ 6.5 million the previous year.

b. Economic Aspects

One of the major problems placed by the Government of Nicaragua has been the relative shortage of feasible, well-conceived and designed projects that would contribute to the country's development. This problem has been recognized by all the international lending organizations. The Government of Nicaragua has begun to revitalize the Planning Office as one means of developing a national plan as well as preparing programs and projects that would lend themselves to domestic and international financing. This loan will be another facet of this effort in that it will prepare studies for industrial, agricultural and infrastructure projects that will lend themselves to further reviews and analysis by Planning Office. This organization will then be able to integrate these projects into the national plan where feasible and present them to the international lending agencies for their support. Those projects that are more appropriately financed by the private sector can be made available to that sector through the efforts of the Planning Office. In any event, the Government of Nicaragua will have a shelf of projects that will permit it to plan and organize for the future growth of the economy within a coherent development framework.

2. Financial Analysis

a. Disbursement Projections:

The total cost of the project will be up to $ 3 million. The dollar vs. local currency will depend on consultants selected and contract negotiations. The Government of Nicaragua will contribute the equivalent of $ 200,000 in services and support for contracting, monitoring and evaluation of reports survey and studies. A.I.D. loan funds will be used to cover consultant services and ancillary costs. The breakdown of the use of A.I.D. funds is expected to be as follows: an amount estimated at $2,400,000 to cover the U.S. dollar costs and an amount not to exceed $400,000 to cover the local costs. Assuming authorization in June 1971 and completion of loan negotiations, execution of loan agreement, meeting of conditions precedent by the end of the year, the funding of the Project is projected as follows:

	GON	AID-Dollar Costs	AID Local Costs	TOTAL
CY 1972	50,000	500,000	100,000	650,000
CY 1973	80,000	1,000,000	150,000	1,230,000
CY 1974	70,000	900,000	150,000	1,120,000
	200,000	2,400,000	400,000	3,000,000

b. Alternative Sources of Financing

There is no local currency under AID control which could be made available for this Project.

The DIB, IBRD, and EXIMBANK have formally stated that they are not interested in financing this Project (See Annex II, Exh. 2). The USAID has been advised by ROCAP that CABEI funds cannot be expected to be available for this Project. The IDB is considering a loan to the Banco Nacional to finance agro-industrial projects. At one time the project included $100,000 to fund feasibility studies for such projects but this element was later eliminated during loan negotiations. IDB has expressed an interest in the proposed AID loan in that agro-industrial studies financed thereunder could lead to projects financed under the IDB loan.

AID appears to be the only free world source of financing for this Project on satisfactory terms.

c. Justification of Local Currency Financing

i. Other Sources of Local Currency

As mentioned previously, AID appears to be the only source of financing for this Project. There are no PL 480 or other programs generating local currency for AID project use. All feasibility studies projects inevitably include a substantial component of local costs. Borrowing Governments generally cannot take up all the local costs.

The USAID believes that by agreeing to finance a substantial part of the local cost component with loan funds, which will be used mainly to finance ancillary costs of the service contracts, timely performance of the services will be assured. Although the GON's revenue rose by $12 million in 1970 and is expected to increase by an additional $10 million in 1971, investment requirements also are increasing. Other proposed AID loans will require the GON to cover local currency costs amounting to the equivalent of about 4.3 million in the next 3 years. In addition the increase in revenues is heavily dependent on capital inflows from foreign aid. From a budgetary standpoint current estimates indicate that a budget deficit of about $4.5 million will prevail in 1971, necessitating recourse to internal borrowings. It is therefore unlikely that the GON could contribute more than one third of the estimated total local cost of the Project.

d. Impact of Project on US Balance of Payments

The Surveys and Studies financed with loan funds are expected to generate capital investment projects from various lending sources. A conservative estimate is that eighty per cent (80%) of the project will consist of feasibility studies. Assuming that sixty percent (60%) of the

studies will be positive and that the cost of such studies represents about five percent (5%) of the total investment cost, the resulting total investment will be in the range of $ 60 to $ 80 million.

During the years 1967-68-69-70, Nicaragua's propensity to buy US exports with foreign exchange earnings was in the range of .40. It is expected that about 40 percent (40%) of the $ 400,000 spent to finance local currency, that is $ 160,000 will return to the United States in payment for U.S. exports.

Over the long run the US balance of payments with Nicaragua should receive additional compensation through the increased purchases of capital goods and spare parts to be used in the projects offering opportunities for the export of US products. The amount of the resulting net additionality however, is impossible to predict.

e. Prospects of Repayment

Repayment of the Loan will be an obligation of the Republic of Nicaragua. The Government of Nicaragua is current in meeting its external debt service. Nicaragua's medium and long-term external public debt is approaching US$ 177 million. The USAID expects it to increase over the next decade. The annual debt service obligation is currently about $ 25 million and in this decade it is expected to increase as drawdowns accelerate, grace periods expire and the effects of higher interest rates are felt. However this increase is expected to be more than offset by increases in the foreign exchange earnings.

Foreign exchange earnings now approximate $ 178 million annually. Even allowing for fluctuations in returns from cotton, coffee, meat production and fishing which represent 54% of the total, the foreign exchange earnings are expected to rise gradually in the future.

Consequently it appears that the ratio of debt service to export earnings may stabilize at around 15% throughout the amortization term of this loan, providing ample foreign exchange cover.

It therefore appears that there are reasonable prospects of repayment.

f. Conclusion

In consideration of the fundamental importance of encouraging the process of planning and programming and project identification which fosters development in a rational and efficient manner; the existence of an effective demand for funds with which to do this; and the non-availability of funds on satisfactory terms from any source other than AID, the USAID concludes that the AID financing requested is justified.

D. Plan for Execution of the Project

1. GON Request

When loans funds can be made available the Coordinating Committee will present the USAID with a specific request for the funding of each individual survey or study. The request will include the following information:

a) Name and location of the project;

b) A short description of the project;

c) A general justification for the project;

d) The priority of the project in the GON program;

e) The Agency or Ministry which requested the survey or study;

f) A description of previous studies made and their availability;

g) The proposed scope of work of the contract (USAID can assist in the development of the scope of work);

h) A general estimate of cost of the survey or study;

i) An estimate of the time necessary for completing the survey or study;

of the notice to be published in the Commerce Business Daily and the outline for the technical proposals to be obtained from interested firms or individual consultants (USAID can assist in the development of the scope of work).

2. USAID Approval of Survey or Study

The Government of Nicaragua, through the Coordinating Committee will have each project approved separately by the USAID.

3. Advertisement

After receipt of approval, in writing, from the USAID, the Government of Nciaragua will advertise the need for specific technical services in the Commerce Business Daily. Since the loan funds will be untied, the Government of Nicaragua may also choose to advertise such need for the benefit of other eligible countries provided that the means and conditions of such advertisement be acceptable to the USAID.

4. USAID Approval of Contractor and Contract

When a technical firm or individual consultant has been chosen by the Government of Nicaragua, through the Coordinating Committee, and approved in writing by the USAID, a contract will be negotiated between the Government of Nicaragua and the firm or individual consultant. Upon approval of the draft contract by the USAID, the contract can be signed and the work initiated.

6. Inclusion of Ancillary Cost in Service Contracts

Whenever the type of survey or study so justifies, the contract with the technical firm or individual consultant will cover the ancillary cost of the studies and surveys, i.e. - equipment, including transportation equipment, supplies, materials, office space, secretarial help, translations, and technical aids. However, AID funds will not be provided for any custom duties, fees, charges and taxes levied on the ancillary items listed. Every contract which includes ancillary costs shall contain a stipulation concerning the destination of the material and equipment after the survey or study is completed.

In the light of past experience in Nicaragua, which does not differ much from other countries having similar loans, the USAID believes that by including such ancillary costs as part of the contract price for which the consultant would be reimbursed, timely performance will be more readily obtained.

7. Inclusion of Pre-Loan Expenditures on Geothermal Study Project

The original scope of work of the consultant in the Geothermal Resources Study financed under AID Loan 524-L-011 did not specify what deep drilling level should be reached in order to have a basis for evaluating the results of the first phase of the Studies. The Government of Nicaragua, by letter dated July 8, 1970 requested that AID accept to reimburse from the fund of the proposed Second Feasibility Studies Loan the additional cost of drilling to a depth of 2000 feet. By letter dated July 24, 1970 USAID/Nicaragua authorized the deep drilling with the understanding that part of the proceeds of the Second Feasibility Studies Loan would be

made available to reimburse the approved expenditures if and when the Second Feasibility Studies Loan became operative.

Adequate provision will be made in the Loan Agreement to cover this point.

It must be noted that reimbursement should be made for these expenditures regardless of the inclusion of Phase II of the Geothermal Studies in this Second Loan.

8. GON and USAID Approval of Draft Final Report

When a survey or study has been completed, the draft report will be reviewed by both the authorized representations and the USAID before it is released for reproduction.

Section III. LOAN IMPLEMENTATION

A. Execution Plan and Schedule

The steps prior to sub-project implementation include:
Loan authorization; negotiations and execution of the Loan Agreement accompanied by First Implementation Letter; satisfaction of conditions precedent to initial disbursement; satisfaction of conditions precedent to first specific sub-project, all these steps may be completed by October 1971 if the Loan is authorized before the end of FY 1971.

The mechanics of sub-project implementation have been described in Section C III 4.

While a specific list of sub-projects could not be anything more than tentative at this time, it appears reasonably certain that the loan will be fully committed to signed contracts by the fourth quarter of CY 1973 and disbursed by mid 1974.

B. Execution Responsibilities

1. The Coordinating Committee

The Coordinating Committee and its Advisory Technical Group will be responsible for sub-project selection and justification. The involved Agency will be responsible for contractor selection, contract negotiation and contract administration throughout the sub-project execution term, including certifying to progress and payments. Approval of The Coordinating Committee or its designee will be required for each consultant recommended and for each contract.

2. The USAID

Presumably the USAID will continue to be responsible for approving survey and study projects; approving the texts of Invitation for Proposals and advertising them in the United States; approving the firm selected for contract negotiations; approving the negotiated draft contract, detailed scope of work and cost breakdown; approving payment requests, and approving final reports. Primary responsibility for processing these approvals will be vested in the Office of Capital Resources Development which will be backstopped by the USAID Chief Engineer and the USAID Controller in mattes within their expertise.

C. Implementation Procedures

1. Procurement

The professional services to be included in this project and financed under the Loan will be procured by the Borrower in a manner consistent with AID Capital Projects Guidelines (M.O. 1442.1). Appropriate attachments to the first Implementation Letter will be provided to assure compliance by the Borrower, particularly in the use of dollar funds for procurement from eligible countries.

As mentioned in the Plan for Execution of the Project, Section II D 6, above, whenever ancillary costs are deemed necessary to obtain timely performance of the consultants, such costs will be included in the contract.

2. Disbursement

Disbursement of Loan funds for Project dollar cost will be effected through the AID Letter of Commitment procedure or through other customary AID procedures, as appropriate.

Disbursement of loan funds for local costs will be made according to AID procedures. These costs, consisting mainly in ancillary costs, will be specifically established in each contract.

3. Reporting

Each consultant contract will include provision for English copies of their Monthly Progress reports to be transmitted to the USAID following review and acceptance by the Executing Agency. Draft copies of their Final Reports also will be submitted to the USAID by the Executing Agency during the period in which these reports are being reviewed and accepted.

The USAID does not intend to request other types of reports directly from the Executing Agency except for a Global Evaluation Report and Shipping Reports when the importation of commodities is included in a Consultant's contract. However the USAID will insist upon receiving the Consultant's reports through the Executing Agency and with the comments of such agency.

D. Terms, Conditions and Covenants

1. Terms

The following terms are recommended for a loan not to exceed $ 2,800,000:
Repayment in 40 years including a grace period of 10 years.
Interest 2% during the grace period and 3% thereafter.

2. Conditions and Covenants

There are no conditions proposed to be met prior to the signing of the Loan Agreement.

The following Conditions Precedent to financing each individual survey or study will be included in the Loan Agreement:

a - Survey or study to be made by private enterprise consultant or firm.

b - AID approval of the survey and study prior to advertisement.

c - AID approval of contractor selected prior to contract negotiations.

d - AID approval of the negotiated draft contract, including a detailed scope of work and cost breakdown.

e - Joint review of Project progress by AID and Borrower 12 months after execution of Loan Agreement and annually thereafter throughout disbursement period.

f - The loan may be subject to such other terms and conditions as AID may deem advisable.

Section IV ISSUES

There are no other issues than those raised by the CAEC at the time of approval of IRR, which are treated separately in Annex II, Exh. 1.

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AID 1240-2 (1-71)

CHECKLIST OF STATUTORY CRITERIA

(Alliance for Progress)

In the right-hand margin, for each item write answer or, as appropriate, a summary of required discussion. As necessary, reference the section(s) of the Capital Assistance Paper, or other clearly identified and available document, in which the matter is further discussed. This form may be made a part of the Capital Assistance Paper.

The following abbreviations are used:

FAA - Foreign Assistance Act of 1961, as amended.

App. - Foreign Assistance and Related Agencies Appropriations Act, 1971.

MMA - Merchant Marine Act of 1936, as amended

COUNTRY PERFORMANCE

Progress Towards Country Goals

1. FAA Sec. 208; Sec. 251 (b)

A. Describe extent to which country is:

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

(1) The GON is continuing to make substantial efforts to increase food production and improve food storage and distribution facilities. AID Loan 524-L-022 (Basic Crops) required that the GON match the amount of $9 million with its own funds. The GON is complying beyond the requirement. In addition the GON has received and is using Funds from the EXIMBAN to increase storage capacity. The GON has also signed a grant agreement with the USAID for a TC Program in marketing and distribution to improve food storage and distribution system.

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.	(2) The GON has created a favorable climate for foreign and domestic private enterprise and investment. Only the size of the markets and the scarcity of skilled human resources can be considered as limiting the participation of the foreign and domestic private investors.
(3) Increasing the public's role in the developmental process.	(3) The proposed studies (Part II Sect. II B) will lead to improved planning and identification of sound development projects which will be the result of priorities established on the basis of public demand and national interest.
(4) (a) Allocating available budgetary resources to development.	(4) (a) The GON allocates a significant portion of its National Budget to activities related to Development. Twenty-five percent of total budgetary expenditures was allocated to investment.
(4) (b) Diverting such resources for unnecessary military expenditure (see also Item No. 16) and intervention in affairs of other free and independent nations. (See also Item No.14.)	(4) (b) Nicaragua does not appear to be making unnecessary military expenditures nor preparing to intervene in the affairs of any other free and independent nation.
(5) Willing to contribute funds to the project or program.	(5) The GON is contributing to this project to the extent of its capacity. In addition it is providing adequate budget funding for the Coordinating Committee and the National Planning Office which is being reorganized and reinforced. Both institutions will have substantial inputs in this Project.

(6) Making economic, social and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprises.	(6) Nicaragua has initiated various programs tending to social and political reforms, tax collection improvement, additional taxes, changes in land tenure, reliability on property records. AID Loan 524-L-012, (tax improvement) has been a great help. Nicaragua recognizes the value of freedom of expression and of the press as well as the importance of individual freedom, initiative and private enterprise.
(7) Adhering to the principles of the Act of Bogota and Charter of Punta del Este.	(7) Account has been taken of the Borrower's adherence to the principles of the Act of Bogota and the Charter of Punta del Este.
(8) Attempting to repatriate capital invested in other countries by its own citizens.	(8) In following a course of political stability and in its efforts to promote economic development Nicaragua gives an incentive to its own citizens to repatriate capital.
(9) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.	(9) Account has been taken of the Borrower's responsiveness to the vital economic political and social concerns of its people. Nicaragua is improving its educational system and its public health service.
B. Are above factors taken into account in the furnishing of the subject assistance?	Yes.

Treatment of U.S. Citizens

2. FAA Sec. 620 (c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?	2. The Borrower is not known to be indebted to any U.S. Citizen in any such manner.
3. FAA Sec 620 (e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?	3. The GON has not taken any such action.
4. FAA Sec. 620(o); Fisherman's Protective Act. Sec.5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel or account of its fishing activities in international waters.	4. The GON has not seized or imposed any penalty or sanction against any U.S. fishing vessel on account of its fishing activities in international waters.
a. has any deduction required by Fishermen's Protective Act been made?	a. N.A.
b. has complete denial of assistance been considered by A.I.D. Administrator?	b. N.A.

Relations with U.S. Government and Other Nations.

5. FAA Sec. 620 (d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	5. This loan is not directed to a specific productive enterprise which will lead to competition with any U.S. enterprise. To the extent that the surveys and studies may be made by qualified consultants from eligible countries of the Western Hemisphere. Private U.S. consultant may have to meet foreign competition on an equal basis, as a result of the new policies of the Present Administration.
6. 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?	6. Nicaragua has not permitted this and has taken adequate measures to prevent such damage or destruction.
7. FAA Sec. 620 (l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, in convertibility or confiscation, has the A.I.D. Administration within the past year considered denying assistance to such government for this reason?	7. The GON has instituted the investment guaranty program in which guaranties were issued for operations amounting to more than $25 million by the end of CY1970.
8. FAA Sec 620 (q). Is the government of the recipient country in default on interest or principal of any A.I.D. loan to the country?	8. No.

9.	FAA Sec. 620 (t). Has the country severed diplomatic relations with U.S.? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?	9. Nicaragua maintains diplomatic relations with the U.S.
10.	FAA Sec. 620 (u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearage taken into account by the A.I.D. Administrator in determining the current A.I.D. Operating Year Budget?	10. Nicaragua is not delinquent on its U.N. obligations.
11.	FAA Sec. 620 (a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?	11. Nicaragua does not furnish assistance to Cuba and has taken appropriate steps to prevent trade with Cuba.
12	FAA Sec. 620 (b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?	12. The Secretary has so determined.
13.	FAA Sec. 620 (f). Is recipient country a Communist country?	13. No
14.	FAA Sec. 620 (i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the U.S. or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	14. No

Relations with U.S. Government and Other Nations.

5. FAA Sec. 620 (d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	5. This loan is not directed to a specific productive enterprise which will lead to competition with any U.S. enterprise. To the extent that the surveys and studies may be made by qualified consultants from eligible countries of the Western Hemisphere. Private U.S. consultant may have to meet foreign competition on an equal basis, as a result of the new policies of the Present Administration.
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14. FAA Sec. 620 (l). Is recipient country in any way involved in (a) subversion of, or military aggression against, the U.S. or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	14. No

15. FAA Sec. 620 (n)
Does recipient country furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam?

15. Available information reveals no case of trafficking or permitting trafficking with North Viet-Nam.

Military Expenditures

16. FAA Sec. 620 (s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points to be coordinated with PPC/MAS.)

16. Approximately 11% of the budget goes for military expenditures. Foreign exchange resources spent on military equipment is minimal. No expenditure is made for the purchase of sophisticated weapons systems.

CONDITIONS OF THE LOAN

General Soundness

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

17. The proposed loan is legal under the laws of Nicaragua and the U.S. and its terms are considered reasonable for Nicaragua at this time.

18. FAA Sec. 251 (b) (2); Sec. 251 (e). Information and conclusion on activity's economic and technical soundness. If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to A.I.D. an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

18. The activity has been found economically and technically sound. (Part TWO-SECTION II C.). Satisfactory assurances have been given by the GON that loan funds received will be used in an economically and technically sound manner. In addition USAID will approve each project before final contract is made consultant.

19. FAA Sec. 251 (b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.	19. Nicaragua is current in meeting its external debt service obligations. It appears reasonably certain that Nicaragua will repay the loan. The country's foreign exchange position warrants the conclusion that dollars will be available as needed for repayment. (Part TWO- Section II C2 (e).)
20. FAA Sec. 611(a)(1). Prior to signing of loan will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	20. (a) N.A. (b) A reasonable estimate of the cost to the U.S. of the activity to be financed has been obtained.
21. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purposes of loan?	21. Congressional ratification is necessary. The stated interest of the GON in the Project and the terms of the loan are such that it is reasonable to expect prompt ratification and timely complementation of the Project.
22. FAA Sec. 611 (e). If loan is for capital assistance, and all U.S. assistance to project now exceeds $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?	22. Yes (See ANNEX II Exh. 2)

23. FAA Sec. 251 (b). Information and conclusion on availability of financing from other free-world sources, including private sources within the United States.	23. Financing for this activity is not available from other world sources including private sources in the U.S. (Part II Section IIC (2) (b)).
Loan's Relationship to Achievement of Country and Regional Goals.	
24. FAA Sec. 207; Sec. 251 (a). Extent to which assistance reflects appropriate emphasis on; (a) encouraging development of democratic economic, political, and social institutions; (b) self-help in meeting the country's food needs; (c) improving availability of trained manpower in the country; (d) programs designed to meet the country's health needs, or (e) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and voluntary agencies; transportation and communication; planning and public administration; urban development; and modernization of existing laws.	24. (a) The effect on democratic, economic, political, and social institutions is of an indirect nature. Identification of sound and worth-while development projects is a necessary precondition in the development of a country; (b) by identifying worth-while projects in the agricultural sector; (c) by improving availability of trained manpower in development planning and implementation (Part Two) and through the association of Nicaraguans with competent foreign consultants; (d) little direct effect; (e) the loan is expected to result in more effective and rational program development and implementation, thus it will have a positive effect in all these areas.
25. FAA Sec. 209. Is project susceptible of execution as part of regional project? If so why is project not so executed?	25. No

26.	FAA Sec. 251 (b) (3). Information and conclusion on activity's relationship to, and consistency with, other development activities, and its contribution to realizable long-range objectives.	26. This project is consistent with the host country's development plan and the AID program. Its realization is deemed essential to achieve long range development objectives. (Part Two- Section II C) (1 and 2).
27.	FAA Sec. 251 (b) (7). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.	27. Improvement in development planning and implementation in Nicaragua is essential to the country's economic development. This project will contribute to the achievement of self-sustaining growth.
28.	FAA Sec. 281 (a). Describe extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private and local governmental institutions.	28. This may be an effect of specific projects brought into being through the surveys and studies.
29.	FAA Sec. 281 (b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.	29. The studies and surveys to be made aim at identifying sound and worthwhile projects based on national needs and capacities. They will propose how to utilize Nicaragua .'s resources on a priority basis.

30. FAA Sec. 601 (a). Information and conclusions whether loan will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions.	30. (a) Part of the funds of the project will be used in improving, increasing and diversifying Nicaraguan production centered to export. Findings could result in projects that will have significant effect on increasing international trade; (b) In identifying potential areas of investment the loan contributes to fostering private initiative and competition; (c) activities of these groups may also increase as a result of the studies. (d) "b" above; (e) See response to No.26; (f) N.A.
31. FAA Sec. 619. If assistance is for newly independent country; is it furnished through multilateral organizations or plans to the maximum extent appropriate?	31. Nicaragua is not a newly independent country.
32. FAA Sec. 251 (h). Information and conclusion on whether the activity is consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress in its annual review of national development activities.	32. This activity is consistent with the findings and recommendations of the recent CIAP reviews held in March 1971 in Washington, D.C. which called for better planning and project preparation.
33. FAA Sec. 251 (g). Information and conclusion on use of loan to assist in promoting the cooperative movement in Latin America.	33. Some indirect assistance to the cooperative movement in Nicaragua may derive from some of the agricultural surveys and studies which will include production, promotion, distribution and marketing.

34. FAA Sec. 209; Sec. 251 (b) (8). Information and conclusion whether assistance will encourage regional development programs, and contribute to the economic and political integration of Latin America.	34. The project will not hamper the regional development programs nor will it impede the economic and political integration of Latin America.
Loan's Effect on U.S. and A.I.D. Program.	
35. FAA Sec. 251 (b) (4); Sec. 102 Information and conclusion on possible effects of loan on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving the U.S. balance of payments position.	35. This project will have no foreseable adverse effects on the U.S. Economy on areas of labor surplus. Assistance will be furnished in a manner consistent with improving the U.S. balance of payment position within the most recent guidelines reflecting U.S. government policy on this matter. Expansion of production as a result of these studies will create a greater demand for U.S. capital goods, which will be beneficial to the U.S.
36. FAA Sec. 601 (b). Information and conclusion on how the loan will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	36. U.S. private trade and investment abroad will be indirectly encouraged through development of potential new markets for U.S. import in the projects identified by the studies and new areas open for investment.
37. FAA Sec. 601 (d). If a capital project, are engineering and professional services of U.S. firms and their affiliates used to the maximum extent consistent with the national interest?	37. Yes, Procurement of engineering and professional services will be made according to the new guidelines of the U.S. policy as announced by President Nixon.

38. FAA Sec. 602. Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and services finance by the loan.	38. U.S. small business will have a chance to participate in the furnishing of goods and services financed by the loan because all proposed procurement will be published in the Commerce Business Daily and AID Small Business Circular as specified in the AID Capital Projects Guidelines.
39. FAA Sec. 620 (h). Will the loan promote or assist the foreign aid projects or activities of the Communist-Bloc countries?	39. The Loan Agreement will provide that the assistance provided by this loan will not be used in a manner which promotes or assists foreign aid projects of Communist-Bloc countries.
40. FAA Sec. 621. If technical assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs.	40. The Loan will finance the procurement of goods and services from private enterprise on a contract basis. No utilization of the services of other Federal Agencies is contemplated.

41. FAA Sec. 252 (a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources.	41. All loan funds will finance procurement of goods and services from private sources in eligible countries.
Loan's Compliance with Specific Requirements	
42. FAA Sec. 201 (d). Is interest rate of loan at least 2% per annum during grace period and at least 3% per annum thereafter?	42. Yes
43. FAA Sec. 608 (a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.	43. Loan Agreement will so require.
44. FAA Sec. 604 (a) Will all commodity procurement financed under the loan be from U. S. except as otherwise determined by the President?	44. Procurement under the loan will be from the U.S. and other eligible countries as determined by the President of the United States. (Part Two Section III C 1).
45. FAA Sec. 604 (b). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market price?	45. No bulk commodity procurement is contemplated under this loan.

46.	FAA Sec. 604 (d). If the host country discriminates against U.S. marine insurance companies, will loan agreement require that marine insurance be placed in the U.S. on commodities financed by the loan?	46. Nicaragua does not so discriminate. The Loan Agreement will so provide.
47.	FAA Sec. 604 (e). If off-shore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	47. None anticipated.
48.	FAA Sec. 611 (b); App. Sec. 101. If loan finances water or water-related land resource construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962?	48. Loan is not for construction projects.
49.	FAA Sec. 611 (c). If contracts for construction are to be financed what provision will be made that they be let on a competitive basis to maximum practicable?	49. Loan is not for construction projects.
50.	FAA Sec 620 (g). What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property?	50. The Loan Agreement will preclude such use of loan funds.

51. FAA Sec. 612 (b); Sec 636 (h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.	51. See Part Two- Section II C 2 (c).
52. App. Sec. 104. Will any loan funds be used to pay pensions, etc., for military personnel?	52. No
53. App. Sec. 106. If loan is for capital project, is there provision for A.I.D. approval of all contractors and contract terms?	53. Yes (Part Two Section III C).
54. App. Sec. 108. Will any loan funds be used to pay U.N. assessments?	54. No
55. App. Sec. 109. Compliance with regulations on employment of U.S. and local personnel for funds obligated after April 30, 1964 (Regulation 7).	55. Regulation 7 will be complied with.
56. FAA Sec. 636 (i). Will any loan funds be used to finance purchase, long-term, or exchange of motor vehicle manufactured outside the United States, or any guaranty of such a transaction?	56. No
57. App. Sec. 401. Will any loan funds be used for publicity or propaganda purposes within U.S. not authorized by the Congress.	57. No

58. FAA Sec. 620 (k). If construction of productive enterprise, will aggregate value of assistance to be furnished by U.S. exceed $100 million?	58. Not for purpose of construction of a productive enterprise.
59. FAA Sec. 612 (d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?	59. No
60. MMA Sec. 901.b. Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and takers) financed with funds made available under this loan shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	60. Loan funds will be used primarily for procurement of services thus this requirement will not be directly applicable. A minimal amount may be used as ancillary costs for procurement of small quantities of goods. Appropriate clauses will be incorporated in the Service Contracts as need be.

58. FAA Sec. 620 (k). If construction of productive enterprise, will aggregate value of assistance to be furnished by U.S. exceed $100 million?	58. Not for purpose of construction of a productive enterprise.
59. FAA Sec. 612 (d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?	59. No
60. MMA Sec. 901.b. Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and takers) financed with funds made available under this loan shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	60. Loan funds will be used primarily for procurement of services thus this requirement will not be directly applicable. A minimal amount may be used as ancillary costs for procurement of small quantities of goods. Appropriate clauses will be incorporated in the Service Contracts as need be.

APPROVAL OF IRR AND COMMENTS

In Managua - AIDTO A-63 - sent August 1, 1970 AID/W advised the USAID that the CAEC approved the IRR with recommendations that the following points be treated adequately during intensive review and the appropriate recommendations be incorporated in the Loan Paper:

1. Justification of use $1.5 million to obtain the results expected from the Geothermal Study. Offer of technical assistance from AID/W to help USAID determine funding level for Geothermal study, including preparation of a draft scope of work.

   In order to assure that the GON would have all the data necessary to decide upon the undertaking of the Second Stage of the Geothermal Study and to determine the funding level required, the USAID granted a request of additional financing for a 2000 feet drilling operation to conclude the First Stage.

   The Final Report on the First Stage has been submitted to AID. The results of the Study are positive. The GON has requested the United Nations to make an evaluation of the results of the First Stage and USAID also requested Dr. Donald E. White of the U.S. Geological Survey to review the technical data, recommendations, scope of work and proposed budget for the Second Stage. Dr. White has reviewed the Final Report of Stage I and he concurs in the recommendations included in the Report. A copy of Dr. White's evaluation is included as Annex IV.

   Assuming completion of the Second Stage by the end of CY 1972 it is estimated that the Power and Light Co. of Nicaragua (ENALUF) will enter into negotiations with potential lenders by the first quarter of CY 1973.

MINUTES

Export-Import Bank - AID Liaison Group

811 Vermont Avenue, N. W. - Room 1275

August 3, 1970

PRESENT:

Export-Import Bank	AID
Seymour Pollack	Lawrence Berlin

The Eximbank representative stated that the Board of Directors had reviewed the following applications and decided to return them to AID for the reasons indicated.

Nicaragua - Government of Nicaragua (Feasibility Studies) $2 million

The Bank is expressing no interest in this proposal since it represents a continuation of an AID type activity on terms which are inappropriate for Eximbank.

INTER-AMERICAN DEVELOPMENT BANK
WASHINGTON D.C. 20577

CABLE ADDRESS
INTAMBANC

September 9, 1970

Mr. Robert Kanchuger
Bureau for Latin America
Office of Development Resources
Agency for International Development
Department of State
Washington, D.C.

Dear Mr. Kanchuger:

With reference to your letter dated July 22, 1970 regarding a proposed increase in an AID loan for the partial financing of pre-feasibility investigations and feasibility studies in Nicaragua.

In general, the loan program for Nicaragua does not foresee the possibility of considering similar operations nor have we received a request for financing the same type of projects. However, we do have under study a project to be executed by the Central Bank of Nicaragua for financing, in part, the identification of investment opportunities, as well as pre-feasibility studies and feasibility studies for agro-industries.

In conversations held with members of the AID Mission in Nicaragua by the IDB Operative Mission to that country (August-September, 1969), it was concluded that there would appear to be no conflicts between the proposed AID industry and private sector feasibility study programs and the proposed IDB operation in the agro-industrial field. On the other hand, the possibility was mentioned that some of the studies which would be prepared under the AID program might result in projects susceptible of financing under the proposed global credit for the development of agro-industries, also to be executed by the Central Bank, which is currently under consideration by the Bank.

Sincerely yours,

Sidney Schmukler
Assistant Program Advisor

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

1818 H Street, N.W., Washington, D.C. 20433, U.S.A.

Area Code 202 • Telephone - EXecutive 3 6160 • Cable Address - INTBAFRAD

April 26, 1971

Dear Mr. Schieck:

With reference to Mr. Robert Kanchuger's letter of July 22, 1970, a copy of which was received here on April 23, 1971, I am writing to advise you that the Bank is not interested in considering for financing the project for an increase in the USAID loan for Pre-Feasibility Investigations and Feasibility Studies in Nicaragua, outlined in the letter under reference.

With best regards,

Sincerely yours,

Edgar Gutierrez
Director
Central America and Caribbean Department

Mr. Frederick W. Schieck
Bureau for Latin America
Office of Development Resources
Department of State - AID
Washington, D. C. 20523

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

I, William R. Haynes, the principal officer of the Agency for International Development in Nicaragua, having taken into account, among other things, the maintenance and utilization of projects in Nicaragua previously financed or assisted by the United States, do hereby certify that in my judgment Nicaragua has both the financial capability and the human resources capability to effectively implement and utilize the capital assistance project Surveys, Pre-Feasibility and Feasibility Studies.

This judgment is based upon the improving implementation record of AID-financed projects in Nicaragua and the planning which has gone into this new project.

William R. Haynes

4/12/71
Date

PROJECTIONS - POWER NEEDS OF NICARAGUA

In a study completed in March, 1967 by ENALUF's consultant, ELEC Electroconsult, Milan, Italy the following projections were made for power generating units and investments required through 1983:

Plant	Type	MW	Yr. on Line	Investment $	$/MW
Managua	Steam	40	1969	7,620,000	190,500
Santa Barbara	Hydro	50	1971	16,342,000	326,840
Masaya	Gas	15	1975	2,242,000	149,467
Nicaragua	Hydro	35	1976	14,224,000	406,400
Managua	Steam	120	1978-80	21,278,000	177,317
Rafael Mora	Hydro	30	1983	11,707,000	390,233
TOTALS		290		73,413,000	253,148

Both the Managua and Santa Barbara plants are under construction, with the former more than one year behind schedule and the latter on schedule. Current on line estimates are as follows:

	On Line	MW
Managua	April, 1971	40
Santa Barbara	Dec., 1971	25
Santa Barbara	Feb., 1972	25

Costs of these two plants are expected to remain within the estimates.

Current studies being carried out by Electroconsult and ENALUF indicate that power demand will require an add-on schedule approximately as shown above. However, the estimated cost of the Nicaragua hydro project has recently been raised to $22.4 million, which would be a unit MW capital cost of $638,899. Consideration is therefore being given to the installation of a 60 MW steam unit at the Managua plant in 1975-76,

deferring the second 60 MW Managua steam unit and the Nicaragua hydro project until the 1978-80 period.

No firm predictions on geothermal power development in Nicaragua can be made at this time. However, assuming positive proving and testing results and that the drilling, proving and testing of the Momotombo field could be completed by the end of 1973 and allowing a plant construction lead time of 3 to 4 years, power from geothermal sources could be on the line before 1980.

In analyzing the alternatives for the period 1976-80 ELC, Electroconsult estimates the following costs for the 35 MW Nicaragua Hydro Project and a 60 MW thermal plant as follows:

	Total Capital Cost $	Mills/kwhr - US$
Hydro	22.36 million	14.90 (mean for 50 yrs.)
Thermal	13.11 million	9.14 (mean for 30 yrs.)

Following are costs related to the production of geothermal power in various areas of the world:

Location	Capacity MW	Capital Costs $ Total	Capital Costs $ $/MW	Energy Cost - Mills per kwhr
Geysers-Initial	12.5	1,900,000*	152,000*	5.0
Geysers Units 1 & 2	26.0	3,800,000*	146,000*	5.65 1/
Geysers Units 2 & 3	56.0	6,900,000*	123,000*	4.71 2/
Iceland	15.0	5,500,000	367,000	7.9
Larderello, Italy	3.5	700,000	200,000	4.0
Larderello, Italy	25.0	7,000,000	280,000	5.0
Larderello, Italy	100.0	20,200,000	202,000	3.0
Larderello, Italy	300.0	36,200,000	121,000	7.0
Pathe, Mexico	3.5	200,000	57,000	6.0
Wairakei, N.Z.	192.2	44,000,000	229,000	4.6

1/ Actual energy cost to PG&E for steam - 2.5 mills/kwhr

2/ Actual energy cost to PG&E for steam - 2.27 mills/kwhr

Costs do not include cost of production wells, which are estimated at $30,000/MW. The Geysers field is in Sonoma County, California.

Dr. Gunnar Boduarsson of the geothermal experts on this Stage I investigation commented as follows in the Final Report:

Economic Background

1. Electrical Power

Central America has partically no resources of fossil fuel. Hydroelectrical resources are not abundant and are characterized by considerable seasonal variations. The annual load characteristis is therefore relatively poor. For power generation the region has consequently had to rely to a considerable degree on conventional thermal plants burning imported fuel.

The total capacity of present power plants in Nicaragua is of the order of 200 MW. During the coming one or two decades the demand for electric power may increase by as much as 20 to 25 MW/year.

Estimates of comparative costs of electrical energy in Central America, based on data from various sources, are given in the following Table 1. The data are quoted as generating costs at the plants excluding taxes, profits and other non-essential over-head.

Table 1 indicates that geothermal power, if available, has a considerable economical advantage over other sources in Central America. Since good hydroelectrical sources are relatively rare in the region, the data on the geothermal plants should be compared with the conventional steam plant under (a). The data are based on present interest rates and fuel prices, but these may, of course, vary from time to time. The data are, therefore, only indicative.

Table I

Comparative energy costs in Central America

	mills/kWhr
a) Conventional steam plants of modern design, capacity 50 to 100 MW, burning residual fuel oil, base load power	

	mills/kWhr
b) Hydroelectrical plants, capacity 100-250 MW, data from 2 projects, annual load 2,500 to 4,500 hr/year.	6-9
c) Geothermal steam plant, capacity 50 to 100 MW, based on natural steam from an easily accessible high-temperature reservoir, base load power.	4-6

Moreover, it should be noted that the data under (c) are based on the assumption of steam production from a relatively favorably located reservoir producing from depths of the order of 500 to 1,000 meters, and at a rate equivalent to 4 to 6 MW/borehole.

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

UNITED STATES COORDINATOR
ALLIANCE FOR PROGRESS

UNCLASSIFIED
AID-DLC/P-962/A
ANNEX III - Page 1 of 2

DRAFT
LOAN AUTHORIZATION

Provided from: Alliance for Progress Funds
NICARAGUA: Feasibility Studies and Surveys (Second)

Pursuant to the authority vested in the Deputy U. S. Coordinator, Alliance for Progress, by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title VI, Alliance for Progress, of said Act to the Government of Nicaragua ("Borrower") of not to exceed two million eight hundred thousand United States dollars ($2,800,000) to assist in financing the United States dollar and local currency costs of a project ("Project") to conduct general surveys and pre-feasibility and feasibility studies, the loan to be subject to the following terms and conditions:

1. Interest and Terms of Repayment:

(a) Borrower shall repay the loan to the Agency for International Development ("A.I.D.") in United States dollars within forty (40) years from the date of the first disbursement under the loan, including a grace period of not to exceed ten (10) years. Borrower shall pay to A.I.D. in United States dollars on the disbursed balance of the loan interest of two percent (2%) per annum during the grace period and three percent (3%) per annum thereafter.

2. Other Terms and Conditions:

(a) Goods, services (except for ocean shipping) and marine insurance financed under the loan shall have their source and origin in countries which are members of the Central American Common Market or in countries included in Code 941 of the A.I.D. Geographic Code Book. Marine insurance may be financed under the loan only if it is obtained on a competitive basis and any claims thereunder are payable in freely convertible currencies. Ocean shipping financed under the loan shall be procured in any

countries included in Code 941 of the A.I.D. Geographic Code Book, excluding countries which are members of the Central American Common Market.

(b) United States dollars utilized under the loan to finance local currency costs shall be made available pursuant to procedures satisfactory to A.I.D.

(c) All subprojects will be subject to prior A.I.D. approval.

(d) Unless A.I.D. otherwise agrees in writing, A.I.D. and Borrower shall jointly hold a formal review and evaluation of the progress of the Project no later than twelve (12) months after the execution of the Loan Agreement. Such reviews, unless otherwise agreed to in writing by A.I.D., will be held annually thereafter.

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

_____

Deputy U.S. Coordinator
Alliance for Progress

_____

Date

United States Department of the Interior

GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

April 22, 1971

Memorandum

To: Chris L. Schultz, Latin American Bureau, Office of Development Resources, Agency for International Development

From: Acting Chief, Office of International Geology

Subject: Transmittal of evaluation of report on Nicaraguan Geothermal Resources Project by D. E. White

In accordance with our conversation of this morning, I am transmitting herewith the evaluation of the final report on the AID-sponsored Nicaraguan Geothermal Resources Project, Stage I, by D. E. White of this organization, who has been acting as a consultant in some phases of the project. We hope that the evaluation will be of use to you.

Dr. White is sending direct a copy of the evaluation to your project chief in Nicaragua.

John Van N. Dorr II

183-5341

Enclosure

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Geologic Division
Branch of Field Geochemistry and Petrology
345 Middlefield Road, Menlo Park, California 94025

April 14, 1971

MEMORANDUM

TO : U.S.AID

FROM : Donald E. White, U.S. Geological Survey

THROUGH: Dallas Peck, Asst. Chief Geologist for Geochemistry and Geophysics

SUBJECT: Evaluation of AID-sponsored Nicaraguan Geothermal Resources Project, Stage One Final Report

The final report on Stage One, in ten parts, has just been received from the Contractor, Texas Instruments, Inc.

Summary Evaluation. 1) Contractor's Conclusions and Recommendations (Part 10, attached). Two promising geothermal fields, South Momotombo and San Jacinto-Tisate have been identified, and preliminary geological, geochemical, geophysical, and shallow drilling investigations have been completed. Contractor strongly recommends Stage Two, to consist of deep exploratory drilling for evaluating the geothermal potential of the two areas. I support these general conclusions.

2) Contractor's performance and quality of results were not consistently high, largely because of lack of previous geothermal experience (shared by all other contestants for the contract). Other important factors adversely affecting performance include remoteness of the area, changing personnel (e.g. drillers, Pt. 1, p. 4-5), and lack of consistent local support. However, I personally consider that no other applicant for the contract was better qualified, or was likely to obtain better results. (The two organizations likely to do a better job were not considered for different reasons: a) New Zealand government team of scientists and engineers; highly qualified from investigations on similar geothermal systems, and in working in remote areas (e.g. Tatio, Chile), but not qualified for AID contracts, and b) Union Oil Co., Geothermal Division; easily our most experienced domestic group in all commercial phases of investigation, but no expressed interest in Nicaraguan contract work; see Berry's comments, Pt. 10, p. A31.

3) The success of recommended Stage Two depends strongly on obtaining adequate financing and a satisfactory contractor.

U.S.AID - - 4/14/71

Detailed evaluation of Momotombo.--Momotombo's geothermal reservoir may be even larger than 6 km long, 2 km wide, and 2 km deep, presently indicated by geophysics, but boundaries are not yet defined adequately. This is definitely a hot-water system of the Wairakei, N.Z. type (White, Muffler, and Truesdell, 1971), with a satisfactory maximum temperature of at least 209°C (408°F). Eight gradient holes were drilled, each to about 200 feet, but all were sited on warm-ground areas influenced by local circulation of hot fluids, and provide little useful information on the deep reservoir. The one deep test of Stage One was drilled to 1995 feet, but inadequate casing (only a single string to 160 ft) and caving at 700 feet has prevented production testing, and obtaining deep temperatures and fluid samples. Because of lack of Contractor's experience, drilling and well-completion procedures of the type recommended by Union Oil Co. (see attached), or equivalent reliable procedures were not followed.

F.A.F. Berry (Part 10, A16-A19) summarizes the data and evaluations of Momotombo (attached). In general I agree with this summary, but note the following additions: The dominance of altered tuffs below about 180 feet in depth insures a reservoir of adequate porosity, but produced fluid (mostly steam with dispersed water droplets, incorrectly interpreted by some of Contractor's personnel as dry steam) suggests relatively low permeability, at least above the caved zone at 700-ft. depth.

The hazard of future volcanic activity of Volcan Momotombo on geothermal installations on the volcano's lower slopes is not adequately considered by Berry (see Bodvarsson, Pt. 10, B.16).

The lack of reliable deep fluid samples and deep temperatures raises unanswered questions. Only two samples of possible deep water were obtained (Pt. 9, appendix). One was "drilling fluid return with hole at 1550-ft. depth," and the second was "collected from cellar immediately after first eruption, 4 Dec. 1970," after well completion. Both well samples are less than half as high in total dissolved solids, Cl, and SiO_2 than the surface hot springs (Pt. 7, Table I), perhaps (but not certainly) because of dilution by drill water (Bodvarsson, Pt. 10, p. B13-B14). Temperature inversion and deep waters of low salinity provide alternate explanations.

Electrical geophysical surveys (Pt. 6) provide the basis for estimated reservoir size. These data have also been inspected informally by Dr. Manfred P. Hochstein, Chief of Geophysical Survey, DSIR, New Zealand, and Dr. L. J. P. Muffler, U.S.G.S. Both are critical of Contractor's strong reliance on dipole resistivity; the fact that one dipole was placed within known hot ground; the absence of other satisfactory dipole arrays; and the absence of deep resistivity profiling. (The latter, however, was almost impossible to accomplish at Momotombo because of steep topography, heavy vegetation outside the "hot spot" areas, and proximity to Lake Managua).

Detailed evaluation of San Jacinto-Tisate.--The data are summarized and compared with Momotombo by Berry (Pt. 10, p. A16-A18, attached). San Jacinto is relatively small (perhaps 2-1/2 km long, 1 to 1-1/2 km wide, and 1 to 1.5 km deep). Four

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successful gradient holes were drilled to depths near 200 feet, with results consistent with a relatively small reservoir; the two holes farthest from the San Jacinto hot spring area showed no confirming data for a large deep reservoir; gradient hole SJ-3 nearest the springs had a maximum temperature of 106°C at 200 feet.

No deep drill-hole data were obtained for evaluating this system. The deepest test hole is an old one, drilled in 1953 to 287 feet in vertical depth (reviewed in Pt. 3, p. 23-24). Maximum temperature was 142°C (287°F) at 180 feet.

I agree with Contractor's and Consultants' conclusions that San Jacinto-Tisate is less attractive than Momotombo in nearly all respects, except for a chance that it may be of the specially attractive vapor-dominated type, similar to Larderello, Italy, and The Geysers, California.

Available physical and chemical data (not reviewed in detail here) are not yet clearly diagnostic. The possibility of a vapor-dominated reservoir, even though relatively small in volume, is so attractive economically that at least one well of Stage Two is recommended to test the possibility.

Enc.

GEOTHERMAL RESOURCES PROJECT-STAGE I

PART 10

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

The Stage I investigations undertaken by Texas Instruments to locate and evaluate a potential geothermal field or fields in western Nicaragua included compilation of data on thermal manifestations, regional and detailed geologic mapping, geophysical and geochemical surveys, drilling of shallow temperature-gradient wells, and drilling of a deep borehole test. Foregoing parts of this Final Report describe these investigations and present the resulting data, with some preliminary interpretation. Final interpretation of the data obtained during Stage I, with conclusions and recommendations of Texas Instruments' Staff and Consultants, comprise this part of the Final Report.

CONCLUSIONS

On the basis of the data obtained during Stage I, Texas Instruments' Staff and Consultants concur in the conclusion that the South Volcan Momotombo fumarole area shows strong indications that it can be developed into a commercial reservoir of

geothermal energy capable of supporting a 25 megawatt or larger power plant. The San Jacinto-Tisate fumarole area also appears to be a potentially commercial reservoir of geothermal energy. In this part of the Final Report, these two potential geothermal fields will be referred to as the Momotombo prospect and the San Jacinto prospect, respectively.

RECOMMENDATIONS

Texas Instruments' Staff and Consultants, in full agreement, strongly recommend that Stage II of the Nicaraguan Geothermal Resources Project be carried out in order to evaluate the economic potential of the Momotombo and San Jacinto prospects by deep exploratory drilling. Specific recommendations concerning the drilling program, associated geophysical studies, and production testing are embodied in a work plan which will form the basis for a Scope of Work statement. The WORK PLAN follows. Additional recommendations are:

1. That the optimum drilling techniques for the wells to be drilled in Stage II be determined in advance of drilling by means of a thorough geologic and geophysical evaluation in conjunction with expert drilling engineering. The proposed drilling technique should be subject to constant review and modification.

2. That no attempt be made to rework the existing deep well (MT-1) at the Momotombo prospect in order to make it suitable for extensive production testing. It is

probable that even after expenditure of large sums of money, the well will still not be in sufficiently good condition to permit extensive testing.

3. That if further evaluation of the Momotombo prospect by limited testing of the deep well MT-1 is contemplated, such testing can be accomplished without extensive remedial work, but must be done with great caution. Full production data cannot be obtained from the well in its present condition and no such attempt should be made.

4. That the Government of Nicaragua formulate a policy pertaining to certain possible social, economic and environmental side effects that may result from the drilling and possible development of these geothermal prospects prior to the initiation of Stage II. We recommend in particular that this policy should provide a framework of social and economic responsibility to the citizens of the village of San Jacinto for any damage or relocation that might result as a consequence of geothermal drilling and/or development. This policy should also provide guidelines of economic and environmental responsibility for any stream, lake, or ground water contamination that may result through the further delineation and possible development of these geothermal resources.

5. That the drilling in Stage II be done by a competent drilling contractor familiar with drilling in areas having special problems such as are involved in these geothermal prospects. The contractor should be accustomed to drilling in remote areas

with severe logistical problems. This recommendation is based on the fact that drilling is a very specialized operation that usually can be accomplished most efficiently and economically by experts. For this reason, and because of the relatively limited size of the drilling program anticipated in Stage II, it does not seem desirable for the Government of Nicaragua to purchase the equipment necessary to undertake this drilling program.

6. That the nine-well drilling program proposed in the WORK PLAN be considered flexible and not rigidly fixed at the outset of Stage II. The success of the entire program should be constantly reevaluated and each evaluation should determine the location of the subsequent hole. We recommend that the location of the last two wells be designated as optional at the outset of the program, their location to be dependent on results of previous drilling at Momotombo and San Jacinto. One of these optional wells might be drilled as a possible injection well for disposal of saline waste water, or one of them might be drilled at some additional test site other than Momotombo or San Jacinto.

7. That Stage II geophysical investigations include engineering-type studies to aid in determining the best drill sites, in-hole measurements in the wells to better evaluate existing data in both prospect areas, dipole resistivity work, and a micro-earthquake study as detailed in the WORK PLAN. We recommend that some or all of the geophysical work be subcontracted. We urge that some discretionary funds for

geophysical work be budgeted for unspecified contingencies.

8. That all of the drilling, testing and geophysical work of Stage II is subject to continual review and overall evaluation by competent geologists, geophysicists and engineers.

Comparison--Momotombo and San Jacinto Geothermal Prospects

	San Jacinto	Momotombo
Area of Prospect	Relatively small from surface geology, geophysics and gradient drilling. Geophysics indicates an area 2.5 km long by 1 - 1.5 km wide.	Very large. Prospect covers extensive area based on surface geology, geophysics, geochemistry, gradient and deep drilling Geophysics indicates an area greater than 6 km long and greater than 2 km wide.
Depth of Prospect	Limited. Finite depth limit of 1 - 1.5 km indicated by geophysical depth-sounding techniques.	Unlimited. No finite depth measured at a probe depth of 1-2 km.by geophysical depth-sounding techniques.
Gradient Drilling Results	Anomalously high temperatures in two of the four successful gradient holes. One thermal gradient gives a linearly extrapolated depth of 750 feet while another gives a 500 foot depth for 200°C temperatures. These depths probably are minimal. Highest recorded temperature is 105°C.	Anomalously high temperatures present in all eight gradient holes; all eight had temperatures equal to or greater than 90°C. Four holes had temperatures equal to or in excess of 140°C. Linearly extrapolated gradients in four holes give depths of 500, 300, 300, and 240 feet for temperatures of 200°C. The 500 foot extrapolation was verified by measured temperatures in MT-1 which was drilled adjacent to that particular gradient hole The other three extrapolations may indicate a depth slightly less than what actually exists. The gradient holes suggest the presence of 200°C temperatures at moderate depths over a wide portion of the Momotombo prospect.
Deep Drilling Results	No deep hole drilled.	One deep hole (MT-1) drilled to a total depth of slightly less than 2000 feet. A maximum temperature of 209°C was measured at 700 feet--thus establishing with certainty a base temperature at least as high as the 200°C value that is required for successful geothermal reservoirs. Pre-Volcan Momotombo tuffs probably were encountered from 215 feet to total depth. These tuffs should have a rather wide extent; they should provide a good geothermal reservoir rock. No valid results were obtained as to the nature of the reservoir fluids, productivity rates, pressures, etc.

Geochemistry	Negligible information except for one spring site on north edge of anomaly which suggests liquid-water saturated reservoir at depth. Temperature prediction of 156°C (SiO_2) and 210°C (Na/K).	Abundant surface springs and one valid subsurface sample from gradient hole M-1A; all suggest liquid-water saturated geothermal system at depth. Temperature prediction of 195-200°C (Na/K) and 150-165°C (SiO_2). Siliceous sinter on the surface indicates the presence of subsurface temperatures in excess of 180°C.
Accessibility for drilling and possible power plant	Good	Fair to difficult.
Water supply for drilling and power plant cooling.	Very limited supply--a major problem.	Unlimited supply in Lake Managua; no problem exists.
Drilling	No deep hole drilled so no experience. From gradient hole data, there should be no significant drilling problems within the first 200 feet	Most important drilling problem is to drill large diameter hole through surface basalts (215 feet in MT-1). Probably will require surface location at sites with temperatures significantly below 100°C and hopefully in a local area where the shallow basalts are not so dense. Cable tools probably will be required for shallow drilling. Very little drilling penetration problems should be encountered in the tuffs below the shallow basalts. Significant lost circulation zones were present in the tuffs within MT-1; the problem was minimized by the abundant water supply.
Expected Reservoir Temperature	Indications from surface geochemistry and gradient hole data presented above. I expect that a geothermal reservoir with the required minimum temperature of 200°C is present at depth.	Data from geochemistry, gradient and deep holes presented above. Minimum required temperature of 200°C for a geothermal reservoir already established by the single deep drill hole (MT-1). Most other data also indicate temperatures of 200°C or higher.
Expected type of geothermal reservoir	Uncertain. Single valid surface spring indicates liquid-water geothermal system. Complete absence of other chloride waters in boiling mud pots directly above center of geophysical anomaly is peculiar. A vapor-dominated system could be present.	Liquid-water saturated geothermal system is indicated by all chemical analyses. Production data from MT-1 are insufficient to be conclusive. Only steam was observed at well site during limited flow periods; Don White interprets pictures of flowing well as indicating a flow mixture of steam and finely-dispersed liquid water. It is very probable that this geothermal system is a liquid-water type.

Social Problems	Very significant social considerations--a major problem. Geophysical work indicates that the village of San Jacinto is directly over the heart of the anomaly. There will be significant noise problems during testing. If water pollution occurs, it will be an immediate social problem. Relocation of the village would probably be required should drilling indicate the desirability of development and power plant construction.	No social problems exist; there are no people living on or adjacent to the geothermal anomaly.
Legal Problems	There will be considerable legal problems associated with exploration drilling and any possible development drilling and power plant construction. These problems arise from the fact that San Jacinto is located directly on the anomaly and the surrounding land is used agriculturally. Extensive legal permits will be required.	Negligible legal problems.
Water Disposal Problem	Uncertain, depending principally on the nature of the geothermal reservoir. There would be essentially no problem if a vapor-dominated system were present; should a liquid-water system be present, then there would be a problem. However, there is an abundance of readily accessible land nearby. Hopefully, waste brine could be disposed of in injection wells located beyond the boundary of the geothermal reservoir.	A considerable problem-- probably the most significant problem that can be anticipated at this time for the Momotombo prospect. Large quantities of noxious waste brine water most probably will be produced along with steam at Momotombo. Dumping that waste water into Lake Managua probably would irretrievably contaminate the waters of the lake with certain inorganic chemical species. Injection wells would have to be drilled at a site beyond the immediate boundary of the geothermal reservoir that would be capable of disposing of large quantities of water. I expect that the tuffs encountered below the shallow basalts in the MT-1 hole may be widespread. If so, then rocks suitable for such disposal probably can be found. in other words, I anticipate that the water disposal problem can be solved satisfactorily.