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FEASIBILITY STUDIES, ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS, CAPITAL PROJECTS

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FEASIBILITY STUDIES

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS

CAPITAL PROJECTS

DEPARTMENT OF STATE

AGENCY FOR INTERNATIONAL DEVELOPMENT

OFFICE OF ENGINEERING

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ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS CAPITAL PROJECTS SUBMITTED FOR A. I. D. FINANCING

INTRODUCTION

I. ECONOMIC AND TECHNICAL SOUNDNESS CRITERION FOR A. I. D. DEVELOPMENT LOANS AND GRANTS

The Foreign Assistance Act of 1961 establishes six major criteria which must be taken into account in exercising the authority granted to the President to make loans and grants to promote the economic development of less-developed friendly countries and areas. For both loans and grants one of these criteria is "the economic and technical soundness of the activity to be financed."

II. PURPOSE OF MANUAL

The purpose of this Manual is to provide guidance as to the kinds and extent of information which should accompany applications for loans and grants as evidence of the soundness of proposed capital projects,

A. To applicants to the Agency for International Development (A. I. D.) for financing.

B. To A. I. D. personnel who have a responsibility for determining whether the projects meet the soundness criterion.

III. DEFINITION OF CAPITAL ASSISTANCE

A capital assistance activity is defined to include:

A. A "Capital Project," which, in turn, is defined as the construction expansion, equipping, or alteration of a physical facility or facilities financed by AID dollar assistance of not less than $100,000 (including related advisory, managerial and training services) and not undertaken as part of a project of a predominately Technical Assistance character;
B. An AID-financed feasibility study of a specific potential capital project or of several specific potential capital projects, except such feasibility studies as may be financed as Surveys of Investment Opportunities pursuant to Section 231 of the FAA, as amended; or
C. AID dollar assistance, and any accompanying advisory assistance to one or more development banks or other intermediate credit institutions.

The guidance contained herein applies to (a) and (b) above, whether the A.I.D. assistance sought is in the form of a development loan, a development grant, a supporting assistance grant, or any other A.I.D. dollar or local currency funds which may be used for the purpose.

IV. ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS

A. Required for all Development Loans and Grants. The material submitted with the application for a loan or grant which shows the extent to which the proposed project meets the soundness criterion is referred to throughout this Manual as the "Economic and Technical Soundness Analysis", "the Soundness Analysis" or simply "the Analysis." This Analysis, which is commonly referred to as an Engineering/Economic Feasibility Study, must accompany all applications for A.I.D. financial assistance for capital projects of the type defined in III (a).

B. Purpose of the Analysis. The Soundness Analysis is a judgment aid, relied upon by the prospective owner and by the financing agency to evaluate the advisability of undertaking the project. It should integrate the results of engineering, economic, financial and other studies to arrive at a clearcut exposition of the reasons why, insofar as technical soundness and the economic benefits and costs are concerned, the project is sound. The burden of proof is upon the applicant. The Analysis must be sufficiently complete, consistent with its size and complexity, to permit A.I.D. to make its own independent appraisal of the validity of the applicant's conclusions on the basis of the facts submitted and the assumptions used.

C. General Criteria for Soudness. The soundness of a project will be judged by the following general criteria:

1. Technical Soundness. A project will be considered technically sound if:

   a. all pertinent technical aspects of the project have been taken into account in the analysis,
   b. the planned construction or procurement conform to accepted engineering standards and practice,

c. the estimated cost of the project is as low as any other reasonably available alternate which would produce the intended results.

2. Economic Soundness. A project will be considered economically sound if the resulting economic benefits over a stated period will equal or exceed the total costs of construction, maintenance and operation over the same period.

   a. Revenue Producing Projects: The revenue must be sufficient to cover fixed charges, amortization, and maintenance and operating costs, and in addition produce an adequate return on the investment.
   b. Non-Revenue Producing Projects: There must be a reasonable showing that the value of the benefits to the national economy will equal or exceed the total costs of construction, operation and maintenance; or (if applicable), the service of the loan.
   c. Non-profit Revenue Producing Projects: Non-profit projects which produce revenue may or may not be completely self-liquidating. The total revenue and other economic benefits which can be evaluated must exceed the total costs over the life of the project.
   d. Water or Related Land Resources Projects: Sec. 101 of the Foreign Aid and Related Agencies Appropriation Act of 1963, requires that none of the funds therein appropriated (other than funds appropriated under the authorization for "International organizations and programs") shall be used to finance the construction of any new flood control, reclamation, or other water or related land resources project or program which has not met the standards and criteria used in determining the feasibility of flood control, reclamation and other water and related land resource programs and projects proposed for construction within the United States of America as per memorandum of the President dated May 15, 1962.

The memorandum of the President dated May 15, 1962, approved a statement on policies, standards and procedures for water and related land resources

projects for use by affected Government Departments and the Bureau of the Budget. The statement is printed in Annex B. The President has directed the agencies to undertake a study of cost allocation and recreational benefits.

V. DEGREE OF PLANNING REQUIRED BY THE FOREIGN ASSISTANCE ACT OF 1961

A. Section 611 of the Act requires that-
"engineering, financial and other plans necessary to carry out ..... assistance" and "a reasonably firm estimate of the cost to the United States providing such assistance" shall be completed, before a loan or grant agreement is entered into, when the loan or grant fits the following description:

1. It comes under the provisions of one of the following sections of Part I of the Act.

   Chapter 2, Title I (development loans)
   Chapter 2, Title II (development grants)
   Chapter 4, (supporting assistance)

2. If approved it would constitute an obligation of the United States Government in excess of $100,000 under Section 1311 of the Supplemental Appropriation Act of 1955 as amended (31 U.S.C. 200).

3. It requires substantive technical or financial planning. (All capital projects as defined in paragraph III will be considered to require "substantive" planning).

B. Completed Engineering Plans. This refers to preliminary plans, sufficiently complete to provide the basis for a reasonably firm estimate of cost. The Soundness Analysis should include:

1. Preliminary investigations and surveys sufficient to identify all significant technical problems, establish the location, and fix those general criteria and standards of construction which will have a major effect on the final cost.

2. A justification for the specific location, criteria and standards recommended, as compared with available alternatives.

3. Preliminary designs in sufficient detail to permit a reasonably accurate estimate of work quantities.

4. An analysis of the construction operations in sufficient detail to provide a sound basis for the cost-estimate.

The preliminary engineering should extend only as far as will give reasonable assurance that all foreseeable costly and time-consuming factors which may occur in the course of final design and construction have been eliminated.

C. Reasonably Firm Estimate of Cost. This refers to a preliminary cost estimate, based on the preliminary design discussed in the foregoing paragraph. As in the case of the design, the estimate should be carried only to a point which will insure that all significant factors which will determine the total cost of the project have been taken into account. Construction in less-developed countries is subject to unforeseen delays and built-in impediments due to local customs, laws and regulations, which affect the cost materially. All such contingencies should be evaluated as completely as possible in the Soundness Analysis, but to the extent that their probable effect on the project cost cannot be firmly established, they must be provided for in a contingency item.

In addition to the cost of construction the cost estimate should include the costs of the final engineering, design and supervision of construction, and any other costs for services in connection with management and training activities to be performed during construction and initial operation of the facility.

D. Organization for Operation and Maintenance. A major factor in judging the economic and technical soundness of a project is the completeness of the planning as concerns its management and organization for operation and maintenance after completion of construction. With competent management a project may be successful despite

inadequacies in the original concept. But no project, however well conceived, can overcome the handicap of poor management. On the other hand no manager, however competent or experienced, can succeed without the necessary personnel, equipment and materials required for effective operation and maintenance. The Soundness Analysis must show that these matters have been given thorough consideration.

If the project is of the public works type, to be operated by a Government Department or Ministry, the Analysis should give a description of the Departmental organization and strength, its budget, and its experience in managing projects of the type in question. In particular it should bring out in detail the suitability and adequacy of the agency in the field for handling the operation and maintenance of the specific project, with particular reference to maintenance equipment and personnel.

In the case of an industrial or power project the names, qualifications and experience of the proposed general manager and the key personnel of his staff should be submitted, together with detailed charts and tables showing the proposed operating and maintenance organization.

Projects involving advanced technology will usually require operation over an extended period under the direction of qualified contract personnel in key positions, as a condition of the loan or grant.

Of equal importance with the management and organizational structure is the planning of the manpower, materials and equipment requirements for successful operation of the project. Manning tables should be submitted, showing types and degrees of skill required for both the operating and the maintenance functions. The availability of local manpower to fill all key positions must be explored, and plans must be presented for the procurement and training of all personnel lacking, either as to numbers or skills. An adequate supply of special tools and equipment, and particularly of repair parts, must be foreseen and provided for. Where the operation

is dependent upon an uninterrupted flow of some vital material, all possible causes of interruption to the flow must be thoroughly analyzed and guarded against.

If the plans for handling these and other problems are dependent upon assistance from or actions by outside agencies, the Soundness Analysis should show what assurance there is that such assistance will be furnished in the amount, and where and when required. The overall cost estimate for the project should include realistic estimates of the cost of implementing the plans for handling these problems of management, personnel training and maintenance, and should show how those costs are planned to be met.

VI. FORM AND CONTENT OF THE SOUNDNESS ANALYSIS

A. Matter which must be Provided. In addition to the soundness criterion, the Act prescribes other criteria which must be taken into account in approving A. I. D. loans and grants. In general the justification of conformance with these other criteria will be in other documents accompanying the application. To the extent that such matters have a significant bearing on the soundness of the project they should also be mentioned in the Soundness Analysis.

B. Use of Existing Documents. Reference may be made to documentation submitted previously to A. I. D. However there is no assurance that such material will be readily available to the reviewing office; therefore the study must be self-contained.

C. Form of the Soundness Analysis. Chapters I through XIII of this Manual contain suggested outlines of the desired scope of the Economic and Technical Soundness Analysis for various types of projects. The material contained in Chapter I is applicable to all projects. Each of the remaining chapters contains the material applicable to a particular type of project. The Soundness Analysis need not be arranged to follow these outlines exactly; it is desired, however, that they be followed in general, with such modifications as may be dictated by the nature of the specific project.

Most projects will present particular aspects which are not covered by the outline or are covered inadequately. It is of the utmost importance that any such hidden factors which have a significant bearing on the soundness of the project be identified, analyzed, and fully treated in the Analysis. To insure that this is done Applicants should entrust the task of preparing the Soundness Analysis only to experienced consulting firms or individuals of established and recognized standing in their profession. There is no substitute for experience and proven professional judgment in this connection. Indications that the outlines have been used solely as check lists without any attempt to ferret out the problems peculiar to the specific project may be expected to delay consideration of the application.

D. Extent of Analysis in Relation to Size and Complexity of Project. The foregoing discussion does not mean that all of the topics mentioned in the outlines must necessarily be covered specifically, regardless of cost, in the Economic and Technical Soundness Analysis. They must all be given consideration, however. The extent of the analysis of each topic, whether listed or unlisted, and whether or not it is mentioned, discussed or documented in the Soundness Analysis must be determined by the Applicant and his Consultants in light of the complexity of the project and the information which has to be presented to demonstrate its soundness. For all but very unusual projects the cost of the Soundness Analysis should not exceed 1 or 2 percent of the total project cost. Generally speaking the larger projects should cost proportionally less to analyze, but the degree of complexity will tend to counteract this general rule. Thus the analysis of a small but straightforward project may cost as much proportionally as a much larger project offering considerable technical difficulty and complex interrelationships with other elements of the long-range development program.

Funds spent on properly conducted Soundness Analyses are seldom wasted. Much of the data, such as wage rates, materials prices, transport charges, climatic data, etc., will be available for future Soundness Analyses, even though the particular project for which they were assembled may not be carried out.

CHAPTER I

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS ALL TYPES OF CAPITAL PROJECTS

(Topics listed in this Chapter apply to all types of projects, and to the extent applicable should be covered in summary form in an Introductory Section of the Economic and Technical Analysis).

I. APPLICANT

Official name.
Type of entity: individual, corporation, governmental agency, etc.
Date of establishment.
Principal purpose.
Organization chart.
If the Applicant does not itself plan to execute the project, give details of the intended arrangement with the agency which will have this responsibility, and a description of its organization.

II. PROJECT

Nature, size and location of project.
Relationship to country's economic development.

III. FUNDS

Estimated total cost of the project.
Amount and source of funds supplied or to be supplied by Applicant for engineering, land, right-of-way, materials, equipment, labor, or other purposes.
Amount of financing requested from A. I. D.
Source and availability of any additional funds required.
Extent to which the local government will waive or defer payment of direct taxes or import duties affecting project construction and operation costs.
Nature and amounts of any subsidies (industrial and power projects).
Currency control regulations and effective rate of exchange used in evaluating local currency in terms of U. S. dollars.

IV. PRESENT STATUS OF THE PROJECT (if applicable)

The present status of investigations, surveys, borings, engineering design, extent to which construction contracts have been awarded (documented by tabulations and evaluations of principal bids thus far received), whether such awards were based on international bidding, and the progress of physical construction to date.

V. CONSTRUCTION AND FUNDING SCHEDULES

Planned construction schedule, broken down by major items of the project, in the form of a bar chart, with explanations.

Schedule of anticipated expenditures in foreign and local currencies. (Procurement and delivery schedules for equipment should be included, or shown in a supplement).

VI. ENGINEERING SERVICES

Plan for obtaining necessary engineering services for final design, preparation of specifications, preparation of contract documents, evaluating bids, awarding contracts and supervising construction, including expediting, inspecting, testing and reporting. Include mention of any special consultants, and responsibilities to be assigned to them.

VII. PROCUREMENT OF NON-LOCAL ITEMS

Planned procurement of major items of materials, supplies and equipment, recognizing current U.S. restrictions on source.

VIII. CONSTRUCTION

Plan for performance to carry out the project, particularly as to:

- Work to be done and materials and equipment to be supplied by Applicant.
- Work to be done by equipment suppliers.
- Work to be done by construction contractors and type of contract.
- Proposed methods of obtaining bids and awarding contracts.
- Provision for bond for satisfactory performance.

Availability of technical, skilled and unskilled construction labor.

Availability of competent local subcontractors.

Local laws and regulations pertaining to import duties on personal property of contractors' personnel, personal income taxes, security requirements, visas, etc.

Laws and regulations pertaining to contractors' payments, local taxes on contractors' operations and earnings, and transfer of dollar earnings to U.S.

IX. OPERATION AND MAINTENANCE

Plan for operating and maintaining the completed project, covering availability of competent personnel and proposed recruiting and training programs.

Source and availability of funds to be used for operation and maintenance, and foreign exchange funds required for imported supplies, spare parts, etc.

Source and availability of funds required for capital improvements and extensions of plant to obtain full utilization after completion of the project under consideration.

X. SOUNDNESS OF PROJECT

Conclusions regarding the economic and technical soundness of the project.

CHAPTER II

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS INDUSTRIAL PROJECTS

(Plants for production or processing of commodities or manufacture of products such as cement, steel, fertilizer, food, textiles, wearing apparel, chemicals, etc., including expansion of existing plants).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

(For a detailed discussion of a step-by-step procedure for developing an industrial type project, analyzing its technical and economic feasibility, and estimating both its commercial and national economic profitability the reader is referred to "INDUSTRIAL DEVELOPMENT - A Guide for Accelerating Economic Growth", by Murray D. Bryce (McGraw-Hill, 1960). Copies of this book will be available to all United States AID Missions, for the use of Applicants for A.I.D. financing).

I. SUMMARY

Type of plant and kind and quantities of commodities to be produced.
Location, illustrated by map showing surroundings and tie-in with transportation facilities and existing utilities.
Distances to sources of supplies and raw materials, and to markets.
Relation of project to Applicant's present operations, if any.
Benefits, cost and profitability.
Reference to any applicable reports (attached or readily available elsewhere).

II. COMMERCIAL ECONOMIC ASPECTS

A. Markets

Local or regional market trends during past five years for each major product and any closely related products, tabulated to show:

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Domestic production.
Imports and exports.
Net local consumption, and anticipated development of the local market.

Present per capita consumption in country, and comparison with other countries.

Local laws, regulations or customs affecting marketing of proposed products, including import and export duties, tariffs, quotas, restrictions and subsidies.

If part of proposed production is intended for export, show for each major product:

Number of units expected to be exported.
Proposed markets and costs of transport and import duties.

B. Applicant's Present Operations, If Any

Description of present operations, including those of subsidiaries or parent companies.

Complete financial statements including balance sheets, profit and loss statements and dividends paid for past five years (see Annexes C, D and E. Annual reports are usually acceptable in place of Annex C if reasonably equivalent information is given).

Present production capacity for each product.

Sales volume and value of each product for past five years showing separate figures for domestic and export sales.

Domestic and export prices, f.o.b. plant for past five years.

Estimated production of each major product in present plant for next five years.

Estimated additional production required to meet overall demand for next five years, including intended exports.

C. Competitors

Names, location, present and future output, production costs and selling prices of present local competitors in the same field of production.

Information as to any anticipated changes in competition, such as expansions, modernization, new plants, new competing products, etc.

Information as to foreign competition and any anticipated changes in laws or regulations which might affect volume of imports.

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D. Competitive Position

Selling prices to be met in domestic and export markets.
Estimated transportation costs and export expenses.
Maximum competitive selling prices f.o.b. plant.
Competitive advantages of proposed project:
- Relative availability and cost of labor.
- Availability and quality of raw materials.
- Efficiency of modern production equipment and processes.
- Quality of products.
- Dependability of supply to consumers.

E. Summary of Commercial Prospects

Schedule showing forecast of sales volume for the domestic market and each export market, and the percentage of the total market claimed in each case, with full explanation and justification.
Justification of the proposed capacity of the plant to be constructed.

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Design

Plant layout including storage for raw materials and finished products and provision for possible expansion.
Tie-in with transportation systems.
Types and size of major installed equipment items and structures, and justification of the selection of units and processes. (Avoid both obsolescent and experimental technology).
Function performed by each major unit.
Process flow sheet.
Auxiliary capital equipment (standby, spare parts, transport, materials handling, etc.).
Patents and licenses involved.
Planned capacity and build-up of output after start-up.
Estimated output as percentage of plant capacity for each of first five years of operation.
Anticipated use of consultants on special phases of final project design.

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B. Utilities Available or to be Provided

Requirements, source, availability, cost and reliability of all utilities. Pertinent data on each system, and reason for selection of source in each case, including comparison of advantage of purchasing against in-plant production.

Power requirement in peak KW demand and annual KWH consumption, initial and future.

Electrical system shown by single line diagram covering major power uses.

Fuel for heat, steam and plant processes.

Water balance of the plant where applicable. Problems relative to water treatment, disposal of effluents (liquid and gaseous), including any which may be noxious or dangerous.

Transportation facilities for raw materials and finished products.

C. Materials for Use in Manufacturing Processes

Quantity, specifications, source and availability of raw and semifinished materials.

Proven reserves in case of minerals.

If semiprocessed materials are to be obtained from another plant, evaluate the technical and economic soundness of such plant.

Estimated costs, possible cost variations, custom duties, any preliminary agreements on price and delivery and details of any contracts entered into for supplies and major raw materials.

Available facilities for handling and storing.

D. Plans and Specifications

Preliminary plans for all construction work in sufficient detail to permit calculation of work quantities.

Outline specifications for equipment and construction defining particularly those standards of quality which will have a significant effect on the cost of construction, with specific justification for any unusual standards adopted to conform with local conditions.

E. Construction Labor, Materials and Equipment

Manpower requirements and availability, including skilled and unskilled labor, and technical and supervisory personnel.

Local availability of cement, steel, aggregates, water for concrete, building stone, lumber and other construction materials.

Types of construction equipment required for the work, indicating what is available locally and what must be imported.

F. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons as they affect construction schedule and equipment use.

Necessity of keeping an existing plant in service.

Time required to obtain delivery of imported materials and equipment.

G. Plan for Execution of Project

General construction plan.

Proposed methods of contracting for engineering, construction, and construction supervision (see Chapter I).

Tests to be performed on completed plant.

Equipment guarantees to be required.

Engineering and construction schedules (attached).

H. Operating Organization and Quality of Management

Description of organization which will manage the business and supervise its operation accompanied by organization chart, present and projected.

Required number and qualifications of management and technical employees.

Experience records of available key management and technical personnel.

Number, qualifications and availability of required operating employees.

Plans for recruiting and training.

Provisions for competent management and maintenance throughout the life of the proposed loan.

I. Overall Technical Soundness

Justification of selection of location for project.

Proven reliability of plant processes and equipment.

Superiority of adopted processes.

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Analysis of any adverse factors and measures to overcome them.

Assurance that plant described will produce the quantity and quality of products specified, on a continuing and dependable basis.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering and construction, prepared in accordance with Annex A so far as applicable.

Total estimated capital cost in U.S. dollars and local currency:
To be financed by Applicant.
To be financed by loan/grant.

B. Working Capital Requirements

Amount required at start-up of plant and at the end of the first, second and third years of operation, to cover raw materials, spare parts, auxiliary materials, goods in process, finished goods, accounts receivable and cash on hand.

Sources and availability of local and foreign currency funds required.

Anticipated occurrence of seasonal peaks in working capital requirements and method contemplated to meet such peak financial requirements.

C. Production Cost (broken down to local currency and dollar costs)

An estimate of the direct cost of producing each of the major products and any intermediate products, supported by detailed calculations. (See Annex F for suggested form).

Adopted wage rates and production factors used in production cost analysis, taking into account legal wage and salary scales, including all fringe benefits such as social security, vacation pay, medical allowances, displacement allowances and travel pay, etc.

Provisions included for personnel facilities such as transportation, housing, subsistence, recreation, medical care, etc.

Number of shifts and days of operation per year used in calculations, and basis for determination.

Governmental preferences or allowances taken into account such as 1. exemption from or deferment of any general or

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specific taxes on products, 2. exemption from or deferment of corporate or local taxation and 3. any special depreciation allowances for tax purposes.

Estimated effect of possible wide fluctuation of any cost factors entering into computations.

Where applicant is producing the same or equivalent products in an existing plant, show present production cost in same general form.

Availability of foreign exchange to permit necessary imports of materials and supplies.

D. Costs of Distributing and Selling

Description of methods of distributing and selling products and estimate of costs thereof.

Costs of advertising.

Administrative expense.

E. Selling Prices

Proposed selling prices in domestic and export markets.

Deduction for cost of selling, distributing and transportation.

Net selling prices at the plant and adjustments that might be made in case of wide fluctuation of any of the cost factors.

F. Profitability

Analysis of predicted Profit & Loss and Forecast of Earnings, Receipts & Expenditures, prepared as per Annex E.

Estimated level of production and sales at break-even point.

Estimate of net annual foreign exchange earnings from exports, if any.

General conclusions as to commercial profitability of the enterprise, including percentage of returns on total investment and on owner's equity.

V. NATIONAL ECONOMIC BENEFITS

List of benefits which will accrue to the economy, in addition to the profits earned by the project owners, such as:

Taxes paid to the government by the industry and import tariffs included in proposed sale prices of products.

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More effective utilization of labor as compared with other available occupations.

Provision of a market for local raw materials.

Foreign exchange gain if products are exported, after taking into account any foreign exchange costs in project operation.

Benefits to consumers on account of lower prices or more dependable supply of goods.

Stimulation of other industrial efforts.

Training of people in factory operation and management.

Evaluation of above and other possible benefits in monetary terms where feasible.

CHAPTER III

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS ELECTRIC POWER PROJECTS

(Projects for construction or expansion of electric generating plants, transmission systems or distribution systems or any combination thereof).

(All topics in this outline, the Introduction and Chapter I should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Scope and magnitude of the project and area served.
Location and relation to existing electric facilities, illustrated by a map of the area.
Major features included in project.
Estimate of cost and return on investment.
Compliance with criteria of the memorandum of the President dated May 15, 1962 (Annex B).
Reference to any applicable reports (attached or readily available elsewhere).

II. ECONOMIC ASPECTS AND BENEFITS

A. Power Market

Number of present consumers by classification (residential, commercial, industrial, government, railroad, etc.) and power demand and consumption, and past and estimated future rate of growth for each category.
Requested or potential service to large or special consumers.
Forecast of future KW demand and KWH energy requirements by years for 10 years properly related to historical and present demand and energy requirements and supported by appropriate graphs and statistics.
System characteristics such as frequency, phase, voltages, power factor, diversity factors, load factors, plant factors, hours of service per day, seasonal variations, etc.

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Typical daily load patterns for annual peak and minimum demand periods as presently experienced when project goes into commercial operation and when project fully utilized.

Reference to power use or market surveys, studies or reports.

B. Present Power System

A brief description of the service area illustrated by maps and diagrams showing present and planned transmission and distribution systems and the location of each power source, major substation, switching point and interconnection with other systems.

A description of the existing facilities which now provide or are able to provide electric power supply, transmission and distribution services in the area, giving capacity, capability and reserves of each system. Include list of plants and major power lines and substations showing ownership, purpose served, condition and age.

Applicable laws, regulations, codes, licenses and franchises, the existence or lack of which may have tended to limit use of new, more efficient equipment or methods, and may affect designs and costs of the proposed project.

Operating problems such as low voltage, insufficient capacity, low reliability, excessive outages and other inadequacies of the present systems.

Current planning in support of or in conflict with the proposed system.

Valuation of facilities and how and when established.

Present indebtedness and losses carried forward.

Adequacy of present rate structures and methods of collection.

Compatibility of existing design, equipment and materials with present U.S. standard equipment and materials.

Description of major units of present systems including at least the following:

1. For each generating plant state its location, type (steam, diesel or hydro), KW rated capacity (nameplate and capability), type of fuel used, date each principal unit was installed, how the plant is normally used (base load, peaking or standby service), the KWH generated and peak KW demand for each year for five past years.

2. For each hydroelectric plant include also the firm or dependable KW and peaking KW capacity, and the annual KWH energy output broken down into dependable and secondary energy for normal, wet and dry years.

3. For each transmission system give a description covering design, operating voltage, points connected length of circuit, type of structures, type, size and spacing of conductors and date system was built.

4. For each substation give a description covering location, incoming and outgoing circuits, type of structure, number of power transformers, KVA rated capacity and voltages, and type of switching, metering, relaying, capacitors, synchronous condensers, communication facilities, etc.

5. For primary and secondary distribution systems give a description covering design, consumer densities, voltage levels and regulation, type of circuits (number of conductors, underground, overhead, etc.), materials used for conductors and poles, miles of system, sectionalizing, metering, and sizes and total capacity of distribution transformers.

6. For interconnections with other systems where power is purchased or sold give data on purpose, KW and KWH transferred, and rates and contract arrangements as applicable.

7. For general plant describe other facilities utilized by the power system. These would include warehouses, headquarters offices, laboratories, computers, dispatching facilities, communications and major construction and maintenance vehicles and equipment.

C. Plan for Meeting Future Requirements

Proposed long-range plan showing how the forecasted power requirement will be met and how the proposed project will fit into this plan and will be integrated with any existing systems. Annex G shows suggested form for tabulating the results of the load forecast and the plan to meet it. The following supporting detail should be included and/or described:

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1. Assignment of the demand (KW) and energy (KWH) requirements to the various power sources (present, proposed and future) so as to obtain the optimum use of all facilities for base load, peaking, off-peak and standby service; give attention to system power and energy losses including generating station service, transformation, transmission and distribution losses, and system reserve requirements.

2. Where hydro-generation is involved state the estimated output on an average annual water year basis; cover also the method of serving system requirements through a dry year and utilizing excess hydro-energy during periods of maximum flow.

3. The interim system requirements during construction of the proposed facilities.

4. Retirement and disposal of obsolete or obsolescent facilities not needed for standby or peaking service.

5. Provide an annual load duration curve of the system showing the output of each source of power for the year the proposed project goes into operation and for the last year (10th) of the system load projection. Where hydro power plants are involved show how the power sources will be utilized for normal, wet and dry years.

6. Discuss standards of service such as allowable voltage drop, reserves and planning to meet expected load growth.

7. Describe and evaluate previous related studies and reports such as market surveys, area economic studies, previous power studies and statistical detail utilized in support of the proposed project.

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Design

Description of the engineering features of the overall project and the bases on which the project location and design and the type and size of major elements were selected.

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Layout and preliminary engineering drawings (attach prints).

Extent to which the characteristics and capacities of existing facilities may be affected by the proposed project such as the interrupting capacities of circuit breakers, fuel storage and handling, transmission system, etc.; also retirement of facilities or changes in basic purpose or use of existing plant such as when an existing power plant used as a primary source of power is displaced to secondary use when a new plant goes into service.

Design and construction standards which will apply, including any local codes, regulations and ordinances which may be applicable.

Information about major project features as follows:

1. Generating Stations (all type

   Description of site.

   Means used to deliver plant output into the power system and to consumers.

   Reports on soil tests for foundations.

   Significant geological, meteorological, seismological and lightning data.

   Required site improvements and access to highways, railroads, waterways, etc.

2. Hydroelectric Projects

   Selection of proposed site in lieu of possible alternatives.

   Stream runoff records available, period covered, and location of gaging and meteorological stations.

   Water rights and present and planned upstream and downstream uses.

   Details of water availability and utilization, including storage, draw-down and estimated monthly KWH generation under various flow conditions.

   Dependable and secondary power output of the project, supported by appropriate analysis.

   Geological studies and site borings for dams, tunnels, canals and all major structures.

   Basis on which decisions were made as to type and height of dam, size of reservoir, number and size of generating units, capacity of spillway, diversion tunnels, penstocks, gates and other major features of the project.

   Capacity-area curve for the reservoir.

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The extent and results of studies of reservoir sedimentation and downstream channel effects resulting from project operation.

Required acquisition of land, reservoir clearing, and relocation of roads, railroads, etc.

Design allowances for flood, earthquake and special local conditions.

Availability of material for construction.

3. Thermal Plants (steam, diesel, gas turbine, etc.)

Description of the site with suitable drawings showing ground surface contours and location of principal structures.

Detailed information on fuel, including sources, availability, analyses, calorific value, means of delivery and delivered price.

Provisions for fuel storage and handling at the plant.

Estimated heat rate of the plant and the basis on which the estimate was made. (It should be the average that could reasonably be expected based on normal operation of the plant serving its share of the system load).

Heat balance studies.

The source, quality and availability of plant cooling water and boiler make-up water.

Solution of special problems, such as ash and effluent disposal, smoke and fly ash nuisance, and prevention of site flooding.

4. Transmission and Distribution Systems

Basis on which the design was made, considering power losses (I^2R, corona, etc.), voltage drop allowance, system stability, economic loading, etc., including scope and results of network studies made.

Describe the power sources if not part of the project. Elaborate on such items as experience, standards of operation, reliability, policy regarding reserves, planning to meet future needs, rate schedules and existing or proposed contractural arrangements.

The type of design and materials to be used for supporting structures, protective treatment of wood structures, average span lengths and conductor size, type and spacing.

One-line diagrams showing proposed system and its relation to the existing system.

Right-of-way requirements covering any problems such as conformance with laws governing condemnation of property, clearing, long overwater spans, etc.

Special measures to overcome effects of deposits on insulators.

Description of the method to be used for sectionalizing and communication.

5. Substations and Switching Stations

Location and purpose of each station, with KVA and voltages, type of structure (steel, aluminum or wood) and number of circuits.

Type of transformers (tap changing, cooling method, voltages, etc.)

Major circuit breakers and regulating equipment such as capacitors, synchronous condensers and voltage regulators.

Special relaying and metering equipment.

B. Specifications

Outline specifications for equipment and construction defining particularly those standards of quality which will have a significant effect on the cost of construction, with specific justification for any unusual standards adopted to conform with local conditions.

C. Construction Labor, Materials and Equipment

Manpower requirements.

Skilled and unskilled labor and technical and supervisory personnel available.

Local availability of cement, steel, aggregates, poles, cross-arms and other construction materials.

Types of construction equipment required for the work, indicating what is available locally and what must be imported.

D. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons, as they affect construction schedule and equipment use.

Geological conditions.

Necessity of keeping existing power facilities in service.

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Local transport of materials and equipment.
Time required to obtain delivery of imported materials and equipment.

E. Plan for Execution of Project

General construction plan.
Proposed methods of contracting for engineering, construction, and construction supervision (see Chapter I).
Tests to be performed on completed works.
Equipment guarantees to be required.
Engineering and construction schedules (attached).

F. Operating Organization and Quality of Management

Description of organization to be responsible for management, including an organization chart and names and qualifications of key officials.
Required number and qualifications of management and technical employees.
Number, qualifications and availability of required operating employees.
Plans for recruiting and training.
Availability of necessary office facilities and transportation equipment.
Provisions for competent management and maintenance throughout the life of the proposed loan.

G. Overall Technical Soundness

Proven reliability of proposed equipment.
Assurance that proposed system will produce and transmit power at rates stated on a continuing and dependable basis, with full consideration of load factors and plant factors.
Analysis of any adverse factors and measures to overcome them.
Steps being taken to secure additional studies or specialized advice if required for final design.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost of Project

Estimated cost of the project, broken down by major items in a manner similar to that suggested in Annex H showing

separately the dollar cost and local currency components tabulated under the various sources of financing. Owner-supplied material, equipment, supervision, engineering and force-account work should be included. Also amounts required for working capital required for start-up and for first, second and third years to cover initial fuel supply and repair parts. Amounts to provide for contingency should be shown separately.

Estimates should be in such detail that an independent reviewer would know the scope of each item and would be able to check and verify the estimate. The basis on which the estimates were made and can be supported should be provided.

B. Estimate A. I. D. Financed Items

Detailed breakdown which identifies and shows the estimated cost of the specific items to be procured or contracted for utilizing the requested A. I. D. financing. These will become the "eligible items" in the event a loan is made.

C. Annual Costs

Estimated cost of power and energy, broken down into production, transmission and distribution for significant years (see suggested form, Annex I), including the first full year's operation following completion and the year when the facility will first be fully utilized, including details of calculation for:

Operating and maintenance labor, materials and spare parts, supplies, water, lubricants, chemicals, etc.

Fuel.

Supervision and administration.

Taxes, insurance, etc.

Depreciation charges based on life of various elements.

Interest on estimated amount of loans.

Where necessary for evaluation purposes, give an additional breakdown to show production cost broken down into its KW capacity and KWH energy components so that cost may be compared with demand and energy components in rate schedules or to establish the KW capacity value to the system as would be necessary to evaluate the value of peaking capacity.

Portion of the annual cost covering the supplies, spare parts and technical supervision which must be imported together

with a statement as to source and availability of the foreign exchange required to cover such imports.

D. Annual Income

Applicable laws and regulations governing the fixing of rate schedules and allowable return on investment (attach copies).

Rate schedules to be adopted, applying to each major class of consumers, with explanation of basis for adoption, taking into account the financial ability of consumers to pay.

Average rate per unit of power and energy sold over the past several years and the estimated average rates for the next 10 years, with recent major changes explained.

Explanation of any anticipated changes in rate schedules.

Estimate of power to be sold during each year of next 10 years. (From Section II above).

Estimated annual gross revenue from power sales.

E. Economic Justification and Profitability of the Project

Proforma balance sheet showing the position of the owner upon completion of the project. (See Annex J).

Financial projection showing the profit and loss and cash flow for each year beginning with the present year and extending through a minimum of 10 years. (See Annex K for a suggested form).

Analysis and comparison of costs of production of power.

Analysis of financial statements to show that revenues will provide an adequate return on the investment and that sufficient funds will be generated to cover all operating costs including interest, taxes and depreciation or amortization of debt (whichever is larger); to make provisions for reserves for replacement and renewal; and to make it possible to finance the costs of expanding the facilities in the service area to meet the future demand.

Comparison of net profit of proposed project with estimated profit of one or more possible alternate plans for meeting power system requirements.

For hydroelectric projects, give a comparison of benefits and costs made in accordance with procedures set forth in the memorandum of the President dated May 15, 1962. (See Annex B). Where power produced by the project is the only benefit to be considered, the cost of power from the alternative source most likely to be used in the absence

of the project normally provides a measure of the power benefits. The ratio should be based on equivalent power and energy from the hydro and alternative source delivered to the same load centers by including transmission and transformation losses and costs. The annual costs should include operation, maintenance, interest and depreciation, with depreciation rates commensurate with the estimated economic life of the particular facility. (See Supplement No. 1 for details). It should be supplemented by detail as may be needed to support the information presented.

V. NATIONAL ECONOMIC BENEFITS

List of benefits which will accrue to the national economy, in addition to the profits earned by the project owners, such as:

- Taxes paid by the industry.
- More effective utilization of labor as compared with other available occupations.
- Provision of a market for local fuels and supplies.
- Benefits to consumers on account of lower prices or more dependable supply of power.
- Stimulation of other industrial efforts.
- Training of people in power operation and management.

Evaluation of above and other possible benefits in monetary terms where feasible and comparison with overall cost to the national economy.

CHAPTER IV

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS AGRICULTURE AND IRRIGATION PROJECTS

(Projects for the development or expansion of agricultural land, with or without irrigation).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, relation to other agricultural areas, and general plan of project, illustrated by an outline map.
Scope and magnitude of the project, area of new land served and total area benefited.
Major features of proposed development.
Principal crops grown and to be grown.
Estimates of benefits and costs.
Compliance with criteria of the memorandum of the President dated May 15, 1962. (Annex B; also see Supplement No. 1).
Reference to any applicable reports (attached or readily available elsewhere).

II. ECONOMIC ASPECTS AND BENEFITS

A. Present Agricultural Production

Crops and acreages by types.
Yields, per acre and total.
Prices received at the farm and total value.
Deductions for farm input costs.
Net agricultural yield.

B. Factors Expected to Increase Production

Changes in farm sizes, tenure status and method of land allocation.
Land and water available for new settlers and improved irrigation service to present farmers.
New crops and modified rotations and cropping patterns.

C. Markets for Additional Crops

Location and size of markets and present and anticipated prices.
Transportation facilities and costs.
Estimated prices obtainable at the farm.

D. Agricultural Production after Completion of Project

Crops and yield.
Value at anticipated prices.
Deductions for farm input costs.
Net agricultural yield.

E. Benefits to Landowners

Gain in total agricultural production.
Annual net benefits to landowners. (See Supplement No. 1 for suggested form for making calculations).

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Description of Project Area

Topography of area and description of physical features accompanied by a map showing project area in relation to mountains, rivers, population centers, utilities and transportation facilities.
Climatological data, including records of precipitation, temperature, humidity, evaporation, wind direction and velocities, sunlight hours per month and length of growing season.
Geology of region with particular reference to water bearing formations, movement of groundwater, presence of harmful minerals and salts, strength and porosity of foundations for proposed structures and location of suitable construction materials.
Hydrology, including rainfall rates and frequencies, infiltration, runoff, groundwater storage and depletion, and losses due to evaporation and transpiration.
Soil surveys, land classification and drainage condition of agricultural area.
Present land use in the project area, covering utilization for various crops, pasture and fallow, existing rotation systems and cropping patterns.

Water usage for various crops and for the area as a whole, quality of irrigation water, existing water rights and customs, laws and regulations concerning water usage.

Local communities and total rural population.

Farm sizes, land tenure systems, farm ownership and farm operating pattern.

Approximate portion of farm production retained on the farms for family subsistence.

Location, capacities and pertinent data on any agricultural processing plants such as sugar mills, natural fibre mills, packing plants, etc.

Availability and cost of agriculture credit both to landlords and tenants.

B. Engineering Surveys, Plans and Data

Preliminary studies made in sufficient detail to permit calculation of work quantities for all elements of project, including the following where applicable:

1. Dams. Most suitable type of dam for location selected, preliminary design, foundation exploration for dam and spillways, spillway size calculations, general features of outlet works, topography of damsite and reservoir basin, tailwater data, capacity-area curves for the reservoir, and location and description of available construction materials, such as earth, sand, gravel and rock.

2. Wells. Location, extent, depth, character and permeability of water-bearing formations, the velocity of underground flow, depth to the natural water surface, drawdown, circle of influence, the types, locations and capacities of wells to be used, and water quality determinations.

3. Canals and Laterals. Location, preliminary design, including transverse section with side slopes, longitudinal profile with slopes, velocity and capacity, calculation of quantities, estimates of water losses, need for lining, and plans for handling silt. If also used for water borne transportation describe any special features for traffic use.

4. Structures. Location and preliminary design of diversion structures, intakes, weirs, siphons, flumes, wasteways, drops, checks and chutes, highway and railroad crossings, headgates and water measuring devices, with estimates of types and quantities of materials needed.

5. Drainage. Location, design and calculation of quantities of project drains to receive all waste or surplus water from main canals and laterals and to collect and remove the surface and underground drainage water produced by seepage and deep percolation losses; typical soil profiles to show drainability of soils; and intended use of natural channels as part of drainage system.

6. Land Development. Preliminary estimates of land area to be irrigated, land leveling to be done, extent of farm irrigation and drainage systems required, types of irrigation to be used and auxiliary facilities needed such as housing, schools, hospitals, experiment stations, etc.

Estimated seasonal and total crop water needs for each crop to be grown and consequent irrigation delivery requirements, based on a knowledge of local climatic and soil conditions, production objectives, and irrigation water application techniques, taking into account irrigation efficiencies, peak demands, evaporation, effective precipitation and water needed to maintain a favorable salt balance.

C. Plans, Specifications, and Construction Schedule

Preliminary plans for the main elements of the project sufficient to permit a reasonably firm cost estimate to be made, including auxiliary features such as access roads and construction camps and roads. (Attach prints with all notes in English).

Outline specifications defining the proposed standards of quality of construction which will have a major effect on the cost of construction, with specific justification for any standards which are unusual in the local situation.

Construction schedule for the project separated into main elements of work.

D. Construction Labor, Materials and Equipment

Manpower requirements and availability of skilled and unskilled labor and technical and supervisory personnel.
Availability of cement, steel, aggregates, and other major construction materials, indicating what is available locally and what must be imported.
Type of work to be done by manual labor.
Types of construction equipment required for the work, indicating what is available locally and what must be imported.
Provisions for maintenance and spare parts for construction equipment.

E. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons, as they affect construction schedule and equipment use.
Necessity of keeping existing canals, highways and railroads in operation during the construction period.
Possible landslide problems.
Time required to obtain delivery of imports.

F. Management of Completed Project

Name of organization to be responsible for management.
Names and qualifications of key officials, accompanied by an organization chart showing functions performed.
Procedure to be adopted to assure expert management throughout the life of the proposed loan.
Proposed method of assessing and collecting taxes or charges for use of water or facilities.

G. Operation and Maintenance

Description of general method of operation.
Schedule showing progressive development of the project, covering land served and water used annually until project is fully developed.
Availability of necessary trained operating personnel and required facilities and equipment.
Ability to provide the necessary level of maintenance required for new system when completed.
Plan for personnel recruiting and training.

Source of funds to be used for meeting operation and maintenance costs prior to the time the project becomes self-supporting.

Availability of foreign exchange needed for the importation of any operating materials, supplies and spare parts not available locally.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering and construction, prepared in accordance with Annex A so far as applicable.

Total estimated capital cost in U.S. dollar and local currency:

To be financed by Applicant.

To be financed by loan/grant.

Estimated average cost per acre of land benefited.

B. Maintenance and Operating Cost

Annual cost of labor, supervision, equipment operation, operating supplies and repair parts, training expense, administration.

Breakdown to show dollar costs and local currency costs.

Annual cost per acre benefited.

C. Estimate of Overall Annual Costs

Annual depreciation and interest on total project investment based on estimated life of project and on the going interest rate for development projects in the country.

Annual operation and maintenance expense.

Total annual cost.

Average annual cost per acre benefited.

D. Estimated Revenues

Total annual benefit to landowners (see Section II above) and average benefit per acre.

Estimate of maximum amount which landowners would be able to pay annually in water charges or land taxes to meet annual cost of project and still retain reasonable profits on their operations.

Proposed schedule of taxes or water charges to be collected from landowners.

Estimated total revenue for each of first 10 years after completion of project.

E. Economic Soundness of Project

Benefit-cost ratio, determined in accordance with the memorandum of the President dated May 15, 1962 (Annex B; see also Supplement No. 1), taking into account:

Benefits measured by expected net farm income (Section II above).

Economic cost of the project including operation and maintenance, and replacement costs.

Ability of project to meet costs, demonstrated by proforma Profit and Loss Statements showing anticipated operating revenues as against maintenance and operating cost and interest.

V. NATIONAL ECONOMIC BENEFITS

Overall increase in land values within and surrounding the project.

General increase in business and industry caused by additional crop production.

Increase in general tax receipts.

Gains or savings in foreign exchange, where farm products are exported.

Raising of standard of living in project area.

Direct benefit to population through local expenditures of project funds for labor, materials, food, rent, etc. (temporary benefit).

CHAPTER V

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS MINING AND EXTRACTIVE PROJECTS

(Mines of all types and plants for primary extractive processes such as smelting, metal separating, ore up-grading and concentrating, and combinations thereof).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Type of mine or plant and proposed daily, monthly and yearly production of all intermediate and final products.
Quantity of indicated ore reserves.
Location of project illustrated by map showing surroundings, transportation facilities, and existing utilities.
Methods of transport and distances involved, from mine or plant to markets, between mine and extractive plants, and to sources of supplies for mining and plant use.
Relation of project to Applicant's present operations, if any, with statement as to Applicant's interest in land, mineral rights, and other natural resources, whether as owner, lessee, or other holder of title.
Benefits, costs and profitability of project.
Reference to any applicable reports (attached or readily available elsewhere).

II. COMMERCIAL ECONOMIC ASPECTS

A. Ore Reserves

Description of known and indicated reserves of the commodity to be exploited, giving measurements, quantities, grades, and sampling and testing methods used, supported by calculations, maps, cross sections, drill hole data, survey, test results and samples.
Statement as to percentage of recovery anticipated with the exploitation method planned.

If underground or open pit mining operations are contemplated, submit relatively complete information as to shape, attitude and grade of the ore body.

B. Market Situation

Local, regional and worldwide market trends during past five years, as applicable, for each major product and any competing products, illustrated by a tabulation showing:
Domestic production, quantity and value, f. o. b. mine or plant.
Imports and exports, quantity and value, c. i. f. or f. o. b.
Net local consumption, quantity and value.
Present consumption in country and comparison with other countries.
Any local laws, regulations or customs affecting marketing of proposed products, including import and export duties, tariffs, quotas, restrictions, price controls, subsidies and tax exemptions.

C. Market for Proposed Products

Future market trend for each product showing estimated quantity and value of imports, exports, domestic production, and domestic consumption for the next five years.
Trends in use of present or prospective competitive products.
Analysis of market for each product, including c. i. f. and domestic price studies, foreign markets, and distribution costs and methods.
Survey and analysis of all existing or potential users of the several products.
Evidence of salability of the product, in the form of sales contracts or intentions to purchase.
If part of proposed production is intended for export, show for each major product:
Number of units to be exported.
Proposed markets and cost of transport.

D. Applicant's Present Operations, If Any

Nature of present operations and results of operations to date, giving period, amount, quality and method of production.
Present production capacity for each product.

Description of existing buildings, equipment, operating organization stage of development, and general condition.

Statement as to whether or not products require further treatment, the nature of such treatment, and the place where such treatment is given.

Complete financial statement including balance sheets, profit and loss statements and dividends paid for past five years. (See Annexes C and D. Annual reports are usually acceptable in place of Annex C if reasonably equivalent information is given).

Sales volume and value of each product for past five years showing separate figures for domestic and export sales.

Domestic and export prices, f.o.b. mine or plant, for past five years.

Estimated production of each major product for next five years, with and without completion of project.

Estimated additional production required to meet overall country demand for next five years, including intended exports.

E. Competitors

Names, location, present and future output, production costs and selling prices of present local competitors in the same field of production.

Information as to any anticipated changes in competition, such as expansions, modernization, new plants, new competing products, etc.

Information as to foreign competition and any anticipated changes in laws or regulations which might affect volume of imports.

F. Competitive Position

Selling prices which must be met in domestic and export markets.

Estimated transportation costs and export expenses.

Maximum competitive selling prices f.o.b. mine or plant.

Competitive advantages of proposed project:

- Relative availability and cost of labor.
- Modern production equipment and processes.
- Transportation costs.
- Dependability of supply.

G. Summary of Commercial Prospects

Schedule showing forecast of sales volume for the domestic market and each export market, and the percentage of the total market claimed in each case, with full explanation and justification.

Justification of the proposed size and capacity of the project.

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Design

Description of the engineering features of the project as a whole.

Reasons for selection of mining method and the extractive or treatment process and comparison with possible alternatives. (Avoid both obsolescent and experimental technology).

Descriptions of particular elements of project as follows:

1. For all mining projects, submit a scale map of Applicant's property or concession, showing boundaries, topography, principal geological features, existing mine workings and structures, ore outcrops, exploratory openings, diamond drill holes, etc.; also submit geologic and engineering reports, assay maps, and other technologic information pertinent to the economic and technical feasibility of the project. (Geologic reports should cover not only the property in question but all aspects of regional geology developed through other investigations and mining operations which might furnish a clue to the origin, nature and extent of mineral deposits in the area).

2. For underground mining, describe the mining method, mine plant and equipment required, the general surface plant, plans for pre-production development, and the planned daily productive capacity.

3. For open pit operations, describe operating procedure and equipment requirements, illustrated by preliminary plans; also describe and justify the overall stripping ratio, the contemplated cut-off grade of the ore, and the planned productive capacity.

4. For ore treatment plant, to be built in conjunction with a mining operation or as an independent enterprise, describe the mill and process, the related facilities, the equipment and proposed daily capacity, illustrated by a plant layout plan and a process flow sheet.

5. For ore handling and transportation, give complete description of various types of transport (rail, truck, tramway, barge) to be used between mine and consumer or port, and a description of structures and equipment required at transfer points, including ports. Also give resume of alternate means considered, and reasons for rejection.

Description of any patents and licenses involved.
Planned arrangements for highway or railroad connections.
Estimated overall output of each product as percentage of design capacity for each of the first five years after completion of project.

B. Utilities Available or to be Provided

Requirements, source, availability, cost and reliability of all utilities, pertinent data on each system, and reasons for selection of source in each case, including comparison of advantage of purchasing against in-plant production.
Power requirement in peak KW demand and annual KWH consumption, initial and future.
Fuel for heat, steam and plant processes.
Water supply and disposal of effluents (liquid and gaseous), including any which may be noxious or dangerous.

C. Specifications

Outline specifications for equipment and construction defining particularly those standards of quality which will have a significant effect on the cost of construction, with a specific justification for any unusual standards adopted to conform with local conditions.

D. Construction Labor, Materials and Equipment

Manpower requirements and availability, including skilled and unskilled labor, and technical and supervisory personnel.

Local availability of cement, steel, aggregates, and other construction materials.

Types of construction equipment required for the work, indicating what is available locally and what must be imported.

E. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons, as they affect construction schedule and equipment use.

Necessity of keeping existing mine or treatment facilities in service.

Time required to obtain delivery of imported materials and equipment.

F. Plan for Execution of Project

General construction plan.

Proposed methods of contracting for engineering, construction and construction supervision (see Chapter I).

Proposed breakdown of work into separate contracts.

Tests to be performed on installed equipment.

Equipment guarantees to be required.

Phased engineering and construction schedule (attached).

G. Operating Organization and Quality of Management

Description of organization which will manage the business and supervise its operation illustrated by an organization chart present and projected.

Number, type and availability of labor for each major phase of operation.

Required qualifications of management and technical personnel.

Experience records of available key management and technical personnel.

Plans for recruiting and training.

Provisions for competent management and maintenance throughout the life of the proposed loan.

H. Overall Technical Soundness

Justification of location of project.

Proven reliability of plant processes and equipment.

Superiority of adopted processes.

Compatibility of adopted processes with potential capabilities of available management, operating and maintenance personnel.

Analysis of any adverse factors and measures to overcome them.

Assurance that plant described will produce the quantity and quality of products specified, on a continuing and dependable basis.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering and construction, prepared in accordance with Annex A so far as applicable.

Total estimated capital cost in U.S. dollars and local currency:
To be financed by Applicant.
To be financed by loan/grant.

B. Working Capital Requirements

Amount required at start-up and at the end of the first, second and third years of operation, to cover supplies, repair parts, auxiliary materials, products in process, finished products, accounts receivable and cash on hand.

Sources and availability of local and foreign currency funds required.

Anticipated occurrence of seasonal peaks in working capital requirements and method contemplated to meet such peak financial requirements.

C. Production Cost (broken down into local currency and dollar costs)

Production estimates showing tonnage and grade of run-of-mine ore produced and milled, tonnage and grade of mill products and percentage of mill recovery.

Estimate of the direct cost of producing each of the major products and any intermediate products for mining and milling operations separately, supported by detailed calculations and arranged as per Annex F if applicable.

Estimate of pre-operating cost prorated to production cost.

Adopted wage rates and production factors used in production cost analysis, taking into account legal wage and salary

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scales, including all fringe benefits such as social security, vacation pay, medical allowances, displacement allowances and travel pay.

Provisions included for personnel facilities such as transportation, housing, subsistence, recreation, medical care, etc.

Number of shifts and days of operation per year used in calculations, and basis for determination.

Government preferences or allowances taken into account such as 1. exemption from or deferment of any general or specific taxes on products, 2. exemption from or deferment of corporate or local taxation, and 3. any special depreciation allowances for tax purposes.

Estimated effect of possible wide fluctuation of any cost factors entering into computations.

Where applicant is producing the same or equivalent products in an existing plant, show present production cost in same general form.

Breakdown of production costs into local costs and dollar costs.

Availability of foreign exchange to permit necessary imports of materials and supplies.

D. Costs of Distributing and Selling

Description of methods of distributing and selling products and estimate of costs thereof.

Costs of advertising.

Administrative expense.

E. Selling Prices

Proposed selling prices in domestic and export markets and relationship to current prices.

Deduction for cost of selling, distributing and transportation.

Net selling prices at the plant and adjustments that might be made in case of wide fluctuation of any of the cost factors.

F. Profitability

Analysis of predicted Profit and Loss and Forecast of Earnings. Receipts and Expenditures, as per Annex E.

Estimated level of production and sales at break-even point.

Estimate of net annual foreign exchange earnings from exports, if any.

General conclusion as to commercial profitability of the enterprise, including percentage returns on total investment and on owner's equity.

V. NATIONAL ECONOMIC BENEFITS

List of benefits which will accrue to the national economy, in addition to the profits earned by the project owners, such as:

- Taxes paid by the industry and import tariffs included in proposed sale prices of products.
- More effective utilization of labor as compared with other available occupations.
- Provision of a market for local natural resources.
- Foreign exchange gain if products are exported, after taking into account any foreign exchange costs in the project operation.
- Benefits to consumers on account of lower prices or more dependable supply of goods.
- Stimulation of other industrial efforts.
- Training of people in factory operation and management.

Evaluation of above and other possible benefits in monetary terms where feasible.

Comparison of benefits with costs.

CHAPTER VI

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS PORT DEVELOPMENT OR STORAGE PROJECTS

(Construction, enlargement or improvement of a sea or inland port or any of the facilities built or operated in connection therewith; or any warehouse, tank or other facility for the storage of commodities; but limited to ports or facilities which offer services to the general public under defined rate schedules).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, nature and extent of proposed construction, enlargement or improvement.
Relation to other ports or storage facilities and to Applicant's present operations, if any.
Description of major features of design.
Proposed increase in port or storage capacities.
Estimates of benefits and costs.
Compliance with the memorandum of the President dated May 15, 1962 (Annex B).
Reference to any applicable reports (attached or readily available elsewhere).

II. ECONOMIC ASPECTS AND BENEFITS

A. Area Served

Description of area to be served, including pertinent information on population, agriculture, natural resources, industries, highways, railroads, and other factors affecting the occurrence or movement of commodities in the area.
Principal commodities produced within the area pertinent to the project.
Types of commodities imported.

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B. Present Port and Storage Facilities

Present ports and main storage facilities in the country.
Names of any organizations, agencies, or companies already providing shipping and storage service in the project area.
Description of existing port and storage facilities particularly as to capacity for handling and storing various types of commodities.
Present volume of commodity movements and storage within the project area.
Extent to which inadequacies of port or storage facilities are retarding economic growth.

C. Applicant's Present Operations, If Any

Nature of present operations.
Profit and Loss statements for past five years. (See Annex E).
If Applicant is a private corporation, give also financial position and financial information conforming with Annexes C and so far as applicable.
Present capacity for various services.
Estimated volume of Applicant's business in each type of service for next five years, without and with proposed project.

D. Forecast of Future Business

New commodities or new movement patterns expected to develop as a result of the project.
Estimate of volume of new business which would develop as a result of the project.
Forecast of future port and storage services for 10 years after beginning of operation of the project, supported by graphs and rates of increase in demand for such services.
Breakdown of the forecast to show services that would be drawn from existing facilities in the surrounding area and the new services which will be generated by this and any other projects which may be contemplated.
Extent to which forecast has been based on general economic factors other than those disclosed by historical records.

E. Additional Capacity Required

Additional port and storage capacities required to meet the

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forecast of future traffic by years, taking into account possible expanded services of existing facilities.

Desirable location of additional facilities to meet future requirements.

F. National Program

Description of any national program for development of ports and storage facilities and the specified priority of the project within this program.

G. Character of Anticipated Benefits

Increases in port and storage charges, local custom duties, etc.

Reduction in operating and maintenance costs of any existing facilities.

Increase in general tax receipts which will result from increased economic activity in the area.

Increased income to area served.

Faster and cheaper delivery of commodities.

General economic effect of additional service provided by the proposed project.

Direct benefit to local population through local expenditure of the project funds themselves for labor, materials, food, rent, etc. (temporary benefit).

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Description and Justification of Project

Basis for selection of the project location and comparison with other sites considered, with reference to both economic and physical aspects. (Where the project is to be located in an area having a history of active earthquakes, a detailed seismologic study will be required.)

Description of the engineering features of the project particularly as to type, initial and ultimate capacity, and operating features of any major equipment included.

Special provisions made for handling or storing large volumes of bulk commodities and the justification therefor.

Relationship of capacity of the proposed project to present services and forecasts of future services, taking into account services already being rendered.

B. Design Criteria and Construction Standards

Design objectives, quality and type of service to be rendered.
Standards for materials and equipment to be incorporated in the project.
Outline specifications defining the proposed standards of quality of construction which will have a major effect on the cost of construction, with specific justification for any unusual standards which are proposed to fit local conditions.
Impact and earthquake factors to be used in the design of structures.

C. Surveys and Preliminary Plans

Surveys and studies of project site with pertinent meteorological, oceanographical, hydrological, geological data and information as to salinity and presence of wood borers and earthquake history of the region.
Test borings and soundings.
Master plan of the development showing stage construction, if contemplated.
Preliminary plans for docks, piers, wharfs, buildings and machinery for handling cargo to, within, through, and from the facility (attach prints).
Preliminary design and layout of railways, roads and utilities serving the facility.
Sketches, diagrams or photographs of existing structures and equipment.
Description of plans for connecting new facilities with existing structures and for operating the combined facility.

D. Construction Labor, Materials and Equipment

Skilled and unskilled labor, including "trainability."
Technical and supervisory personnel.
Major construction materials: cement, aggregates, steel, electrical materials, etc.
Housing, food, fuel, lubricants, repair shops, etc.
Suitable site for construction camp.
Construction equipment.
Local subcontractors.

E. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons, currents, tides, typhoons, etc., as they affect construction schedule and equipment use and labor force.
Handling of existing port or storage operations during construction.
Limitations on construction schedule due to long lead-time equipment and materials.
Evaluation of possible major causes of delay: floods, labor troubles, political disturbances, etc.

F. Plan for Execution of Project

General sequence of construction operations, including identification of major elements which control time and cost.
Construction methods, particularly as to the use of manual labor vs. equipment.
Proposed methods of contracting for engineering, construction, and construction supervision (see Chapter I).
Phased engineering and construction schedule (attached).

G. Operating Organization

Description of organization which will manage the business or operation, accompanied by an organization chart, present and projected.
Required qualifications of management and technical personnel.
Experience records of available key management and technical personnel.
Plans for recruiting and training.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering and construction, prepared in accordance with Annex A so far as applicable.
Total estimated capital cost in U.S. dollars and local currency:
To be financed by Applicant.
To be financed by loan/grant.

B. Working Capital Requirements

Amount required at start-up and at the end of the first, second and third years of operation, to cover operating supplies, maintenance materials, accounts receivable and cash on hand.

Anticipated occurrence of seasonal peaks in working capital requirements and method contemplated to meet such peaks.

C. Total Initial Capital Requirements

Initial capital cost.

Working capital at start-up of operation.

Total capital requirement by time periods, and type of currency.

D. Maintenance and Operation Cost

Estimate of annual cost of maintenance and operation including labor, supplies, power, fuels, repair parts, supervision and administration, broken down between local currency and foreign currency costs.

Comparison with the maintenance and operation costs of present facilities at the project site or other facilities in the country.

E. Total Annual Cost

Estimates of annual costs, including:

- Maintenance and operation.
- Depreciation on structures and equipment.
- Interest on loans.
- Taxes (property, income, etc.).
- Total by time periods and type of currency.

Extent to which above estimates have taken into account any governmental preferences, tax remissions, tax deferments or subsidies.

F. Annual Revenues

Estimated annual income from port and dockage fees, handling charges, storage charges, etc., projected for the first five years after project completion.

Comparison with present annual revenues of the existing port or storage facility, if any, showing the increase brought about by completion of the project.

G. Profitability

Estimate of profit and loss for five years after completion of project, conforming generally with Annex E.

Estimated return by years on total capital cost and on owner's investment.

General conclusion as to profitability of the enterprise.

V. COMPARISON OF BENEFITS AND COSTS

Summary of tangible and intangible benefits as described in Section II above, with estimate of monetary value so far as practicable.

Comparison of benefits with costs. (For harbor development portion of project, analysis is to be based on procedures outlined in the memorandum of the President dated May 15, 1962; Annex B; see also Supplement No. 1).

CHAPTER VII

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS AVIATION GROUND FACILITY PROJECTS

(Construction, enlargement, conversion or improvement of an airport and airway facilities).

(All topics in this outline should be considered in the Analysis insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

(Considerations should include airports, airport facilities (such as buildings, utilities, fueling systems, and other technical requirements), airways facilities (such as communications, navigational aids and meteorological stations), airport and air route traffic control, search and rescue facilities, and associated training in all aviation categories).

I. SUMMARY

Location, nature and extent of proposed construction, enlargement, conversion or improvement.

Relation to other airports and other airway facilities, national and international.

Description of major features of design.

Reference to any applicable reports or long range development plans (attached or readily available elsewhere).

Brief statement of conclusions as to relative benefits and cost, taking into consideration the advantages in safety, regularity and efficiency of operations, increase in volume of aircraft traffic that can be handled, larger aircraft that can be accommodated, increase in aircraft utilization; direct and indirect contributions to economic infrastructure, nation building and social and economic development, as a result of the proposed project.

II. ECONOMIC ASPECTS AND BENEFITS

A. Position of Project in Overall Program

Brief description of present airway system in the country.

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Present transport systems other than air (rail, highway, water, pipelines, etc.)

Extent to which development of air transport will stimulate economic growth.

Value of aviation facilities in times of national emergency.

Relationship between civil and military aviation infrastructure.

National program for airport development, and priority of project within this program.

Extent to which project will facilitate national and international movement of people and commodities, and promote international commerce and understanding.

B. Relation to Other Transport Systems

Present distribution of traffic in the project area among the various types of transport.

Anticipated effect of project on such distribution and on economics of other transport systems.

Relative availability of vehicles, operating personnel, fuel servicing, etc.

Estimated or actual comparable transportation costs for the various transportation systems.

Capital and operating costs of the surface transport system that would be the most likely alternative system.

C. Effect on Development in Project Area

General description of area served (physical and economic geography, including agriculture, processing, manufacturing, centers of population, and climate as related to air traffic generating activity).

Estimate of volume of passenger and air freight business which would develop over next five years as a result of completion of the project, and improvements in social, cultural, government and trade sectors which will be achieved.

D. Anticipated Revenue and Economic Benefits

Operating revenues of existing airport for the past five years and forecast of operating revenues for the next five years after completion of project.

Increase in general tax receipts which will result from increased economic activity.

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Increased foreign exchange earnings through tourism, commercial travel and freight handling.

Increased business income to area served by project airport (if any).

Reduction in airline operating and maintenance costs.

Social, political and other indirect economic benefits. (Examples of such economies would include shorter, direct routes to be flown resulting from installation of an efficient system of navigation aids; decrease in aircraft maintenance problems and costs resulting from paving a landing area, increase in utilization by the installation of instrument landing facilities or night lighting).

Faster and cheaper delivery of perishable or emergency commodities.

Direct benefit to local population through local expenditure of the project funds themselves for labor, materials, food, rent, etc. (temporary benefit).

E. Safety Benefits and Protection of U.S. Lives and Property

Extent to which project will result in added safety and security to U.S. nationals flying on foreign air carriers.

Extent to which project will result in added safety, regularity and security to U.S. air carriers operating abroad.

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Present and Future Air Traffic

Size, distribution, and economic activities of the area as affecting air traffic.

Population trends.

Type and volume of air passengers and freight arriving at and departing from present airport.

Type and volume of air traffic utilizing present airway system.

New types and/or increase in air passenger and freight traffic expected to develop as a result of the project.

Summary of present traffic including average and maximum density of landings and take-offs, broken down between military, commercial and general aviation, and maximum size and weight of planes accommodated.

Anticipated traffic for next five years, with same breakdown as above, with and without the project improvements.

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B. Traffic Capacity of Airport

Theoretical capacity of present airport as to number of plane movements, number of passengers, and maximum loads on pavements.

Capacity required for runways and airport facilities to accommodate anticipated plane movements and pavement loadings.

Relation of capacity of proposed facilities to future theoretical requirements.

C. Justification of Proposed Scope of Improvements

Basis for selection of airport site including relation to sources of traffic, suitability of access, and existence of required utilities. Show a comparison with any possible alternatives.

Justification of runway and taxiway extensions or improvements based on number of plane movements and size and weight of planes to be accommodated.

Necessity for improved airport and/or air route facilities to accommodate anticipated additional passengers and freight traffic.

Necessity for navigational aids, meteorological and air traffic service facilities, communications, and lighting.

Justification for project on the basis of safety, efficiency and regularity of operations.

D. Design Criteria

Criteria selected for the improved airport, or other aeronautical facilities, based on those established by the International Civil Aviation Organization (ICAO), or the U. S. Federal Aviation Agency (FAA), including particularly the following:

ICAO runway code letter, and/or other authoritative classification.

Runway dimensions, elevation and effective gradient.

Whether or not instrument landing system, or other navigational or approach aids (including lighting) are contemplated, and ICAO or FAA criteria on which this is based.

Pavement type and the loadings used in design.

Required dimensions of taxiways, holding areas, warm up and terminal aprons, clear zones, end zones, etc.

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Criteria for determining whether obstructions should be removed, marked or lighted.

Criteria used for design of required drainage facilities.

Characteristics of fuel storage and refueling system.

E. Surveys and Preliminary Plans

General description of extent of surveys and preliminary plans and studies used to determine the location of proposed work.

A master plan showing the general layout of the contemplated ultimate development of the airport and indicating various stages, if stage development is contemplated.

A map showing all existing facilities and all work included in the project, including landing strips, runways, taxiways, aprons, buildings, utility services, parking areas, access roads, off-site communications, meteorological facilities and a wind rose, and/or other facilities as applicable.

Map showing nature and location of obstructions in the approach zones or any penetrations of the horizontal or conical surfaces together with a description of their nature and any work contemplated in removing or marking such obstructions; also a description of the limitations on flight paths imposed by the surroundings; also the drainage pattern for the surrounding area as affecting limitations on future expansion.

Preliminary plans and profiles of new work on runways, taxiways and aprons, showing established grades, typical cross-sections, shoulders and drainage system, in sufficient detail to permit reasonably firm estimates of earthwork and pavement quantities.

Sketches, diagrams, or photographs of typical existing structures, including those for storage and delivery of fuels, and planned modifications or additions in sufficient detail to permit reasonably accurate estimate of their cost.

Sketches or descriptions showing any immediate installation contemplated for instrument landing system or other facilities provided to accommodate additional installation in a later stage of construction.

Details of stabilized or bound shoulders and special treatment of runway ends and parking areas to resist solvents or jet blasts.

Results of soils and subsurface investigations to determine strength and compaction characteristics of subgrades, position of the ground water level, and foundation requirements for major structures.

Quality and location of available earth, gravel, stone or other local materials, suitable or contemplated for use in the runway, taxiway, service or access roads, structure and other elements of the facility.

F. Construction Standards

Outline specifications defining the proposed standards of quality of construction and/or other installations which will have a major effect on the cost of construction with specific justification for any unusual standards which are proposed to fit local conditions.

G. Availability of Local Resources and Equipment

Skilled and unskilled labor, including "trainability."
Technical and supervisory personnel available.
Training requirements for development, operation and maintenance.
Major construction materials: cement, asphalt, aggregates, water, base course materials, steel, pipe, lumber, plumbing, hardware, etc.
Housing, food, fuel and lubricants, repair shops.
Suitable site for construction camp.
Construction equipment.
Local subcontractors.
Local government budgetary and other arrangements for continued maintenance and operation of facilities to be provided. Capability of responsible agency to finance and administer new systems or facilities. Need for legislative, organizational or budgetary changes to accomplish continued supervision and operation of facilities.

H. Special Construction or Installation Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons, and periods of daylight, as they affect construction or installation schedule, equipment use and labor force.
Handling of air traffic (if any) during construction.
Limitations on construction schedule due to long lead-time equipment and materials.

Steps which must be taken to provide specialized tools, test equipment, fitted maintenance or crash/rescue vehicles, runway sweepers, together with associated spare parts for a continuing satisfactory operation.

Evaluation of potential major causes of delay such as slides, earthquakes, floods, labor troubles, political disturbances, delay in providing access to land, local currency contributions, or local trained or trainable personnel.

I. Plan for Execution of Project

General sequence of construction operations, including identification of major elements which control time and cost.

General plan for grading operations as related to equipment requirements, haul distances, requirements for haul and access roads, for quarries and borrow pits, etc.

Construction methods, particularly as to the use of manual labor vs. equipment.

Engineering, construction or installation contracting and construction supervision (see Chapter I).

Phased engineering and construction schedule (attached).

J. Operation and Maintenance Organization

Description of Applicant's present and proposed operations and maintenance organization.

Applicant's ability to provide personnel and finances for the necessary level of maintenance for the airport or other aviation facilities when completed.

Availability of equipment and trained operation and maintenance personnel.

Plan for recruiting and training of all required personnel.

Applicant's ability to finance additional operations and maintenance work, and plans for providing funds at proper time.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering, construction, installation, equipment of all types including the cost of delivery

to site, prepared in accordance with Annex A insofar as applicable. (This shall be done separately for each phase of the project if phased construction is contemplated.)

Total estimated capital cost in U.S. dollars and local currency:

To be financed by Applicant.

To be financed by loan/grant.

B. Maintenance and Operation Cost

Annual cost of labor, supervision, equipment operation, supplies and spare parts, and administration.

Breakdown to show dollar costs and local currency costs.

A plan must be outlined in detail showing the training of personnel or purchase of additional maintenance equipment for spare parts regardless of whether funds are required as a loan/grant or are supplied by the Applicant.

V. COMPARISON OF BENEFITS AND COST

Summary of tangible and intangible benefits as described in Section II above, with estimate of monetary value so far as practicable.

Annual cost, including interest and amortization of investment and operating and maintenance charges.

Comparison of benefits and costs.

CHAPTER VIII

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS TELECOMMUNICATIONS PROJECTS

(Installation, extension or improvement of a system providing message and other services over wire lines, cable, microwave, or radio transmission as normally provided by communications common carriers under defined rate schedules).

(All topics in this outline should be considered in the Analysis insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, nature and extent of proposed installation or improvement.
Relation to existing telecommunications systems.
Relation of proposed project to fundamental long-range telecommunications plans.
Description of major features of design.
Reference to any applicable reports (attached or available elsewhere).
Brief statement of conclusions as to relative benefits and cost.

II. ECONOMIC ASPECTS AND BENEFITS

A. Position of Project in Overall Program

Present telecommunications systems and identities of owners or operators.
Extent to which inadequacies of communications are retarding economic growth.
National program for telecommunications development, and priority of project within the program.
Responsibilities of telecommunications organization in related communications activities such as broadcasting, monitoring frequency assignments, etc.
Coordination with other users such as police, transportation agencies and other utilities.

B. Effect on Development in Project Area

General description of area served (physical and economic geography, including agriculture, processing, manufacturing, centers of population, topography and climate as related to generation of communications traffic).
Estimate of volume of additional communications business which would develop as a result of completion of the project.
General economic effect of improved communications which will result from completion of the project.

C. Applicant's Present Operations, If Any

Nature of present operations.
Profit and loss statements for last five years (see Annex E).
If Applicant is a private corporation, give also financial position and financial information conforming with Annexes C and D insofar as applicable. (Annual reports are usually acceptable in place of Annex C if reasonably equivalent information is given).
Present capacity for various services.
Estimated volume of business in each type of service for next five years, without and with proposed project.

D. Anticipated Revenue and Economic Benefits

Increase in tolls and service charges.
Increase in general tax receipts which will result from increased economic activity.
Increased business income in area served.
Advantages to other planned development projects due to improved communication service.
Direct benefit to local population through local expenditures of the project funds themselves for labor, materials, food, rent, etc. (temporary benefit).

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Long-range Plans for Telecommunications Development (15 - 20 years)

Scope of existing fundamental plans.
Backbone toll and trunk routes.

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Toll switching centers.
Numbering plan.
International circuits.

B. Estimated Market

Size, distribution, and economic activities of the population.
Population trends.
Nature and relative number of various types of communications.
New types of communications expected to develop as a result of project.
Types of surveys conducted in the service area.
Forecast of market by category of user and type of service for each communications center or other defined area, and for each inter-area connection for a 10 year period supported by graphs and statistics as to rate of growth of demand.
Relationship of forecast to historical use in the area and known new demands.
Comparisons with usage in similar areas elsewhere.
Consideration given to large users and special service installations.
Extent to which forecast has been based on general economic factors not disclosed by historical data.

C. Existing Telecommunications in the Area

Description of present organizations rendering telecommunications service.
Map showing system boundaries, license or franchise limitations, major communications centers and connections between them.
Description of existing facilities including types of switching, wire line, radio and terminal equipment for the various services provided, points between which such services are provided, and age, condition and adequacy of the facilities.
Tabulation showing pattern of development for the past five years by type of service, category of user, residential industrial, commercial, governmental, institutional, and annual usage in each case.

D. Justification of Proposed Scope of Improvements

Description of the major elements of the project as to type, initial and ultimate capacity, and operating features of major equipment.
Basis for selection of the particular layout and proposed equipment.
Relationship of capacities of the proposed or enlarged system with present usage and forecast of future usage.
Necessity of the new or additional facilities.

E. Design Criteria and Standards

Design objectives for quality and grade of service including transmission objectives.
Standards for materials and equipment to be incorporated in the project.
Technical limitations on location.
Applicable laws and regulations governing frequencies.
Operating and maintenance practices and standards.
Types of construction, etc.
Special characteristics and availability of power required.

F. Surveys and Preliminary Plans

Map of the system layout showing connections with existing systems owned by the Applicant or others.
Schematic drawings showing number and types of circuits (open wire, cable, carrier, radio) and switching arrangements.
Comparison of project with alternate methods of providing the proposed service.
Field investigations such as path surveys, loss calculations, and field intensity measurements for radio equipment.
Compatibility of proposed equipment with existing equipment to be retained.
Diagrams showing frequency allocation and channeling for radio and carrier equipment and coordination with other similar equipment in operation or planned in the area.
Summary of arrangements made for circuits terminating outside the project area such as international circuits.
Description of method of operating present and proposed facilities within the area in such manner as to meet system requirements determined by the market forecast.

G. Construction Labor, Materials and Equipment

Skilled and unskilled labor, including "trainability."
Technical and supervisory personnel.
Major construction materials: cement, aggregates, steel, poles, wire, electrical materials, etc.
Housing, food, fuel and lubricants, repair shops.
Suitable sites for construction camps.
Construction equipment.
Local subcontractors.

H. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons, as they affect construction schedule and equipment use and labor force.
Handling of existing communications operations during construction of new facilities.
Limitations on construction schedule due to long-lead-time equipment and materials.
Evaluation of possible major causes of delay: floods, labor troubles, political disturbances, etc.

I. Plan for Execution of Project

General sequence of construction operations, including identification of major elements which control time and cost.
Plan for receiving, storing and distributing materials and equipment to points of use.
Construction methods, particularly as to the use of manual labor vs. equipment.
Proposed method of contracting for engineering, construction and construction supervision (see Chapter I).
Requirements for equipment and system tests.
Phased engineering and construction schedule (attached).

J. Maintenance Organization

Description of Applicant's present and proposed maintenance organization.
Applicant's ability to provide the necessary level of maintenance for communications system when completed.

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Availability of equipment and trained maintenance personnel.
Plan for recruiting and training.
Applicant's ability to finance additional maintenance work, and plans for providing funds at proper time.
If funds for training of personnel or purchase of additional maintenance equipment or spare parts are included in the requested loan amount, explain plan in detail.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering and construction, prepared in accordance with Annex A so far as applicable.
Total estimated capital cost in U.S. dollars and local currency:
To be financed by Applicant.
To be financed by loan/grant.

B. Working Capital Requirements

Amount required at end of construction period and at the end of the first, second and third years of operation, to cover operating supplies, maintenance materials, accounts receivable and cash on hand.
Anticipated occurrence of peaks in working capital requirements and method contemplated to meet such peaks.

C. Maintenance and Operation Cost

Annual cost of labor, supervision, equipment operation, operating supplies and repair parts, and administration.
Breakdown to show dollar costs and local currency costs.
If funds for training of personnel or purchase of additional maintenance equipment or repair parts are included in the requested loan/grant amount, explain plan in detail.

D. Annual Income

Schedule of rates adopted for various types of communications services and basis for determination.
Explanation of any changes in rates from present schedule and any prospective future changes.
Income based on forecast of market for each year of next 10 year period (Section III above).

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E. Profitability

Analysis of predicted Profit and Loss and Forecast of Earnings Receipts and Expenditures, prepared as per Annex E.

General conclusion as to commercial profitability of the enterprise, including percentage of return on total investment and on owner's equity.

V. NATIONAL ECONOMIC BENEFITS

Net annual profit of the enterprise.

Other tangible and intangible benefits to the economy (Chapter II), evaluated in monetary terms so far as practicable.

Overall value of project benefits.

Comparison with costs of the project, including any costs or losses on the part of the government.

CHAPTER IX

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS HIGHWAY PROJECTS

(Construction, reconstruction, widening or improvement of a highway or any of its component parts such as bridges, tunnels, culverts, pavements and miscellaneous structures and facilities).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, nature and extent of proposed construction or improvement.
Relation to other highways and other transportation facilities.
Description of major features of design.
Reference to any applicable reports or long range development plans (attached or readily available elsewhere).
Brief statement of conclusions as to relative benefits and costs.

II. ECONOMIC ASPECTS AND BENEFITS

A. Position of Project in Overall Program

Present highway system.
Present transport systems other than highway (rail, air, water, pipelines, etc.).
Extent to which inadequacies of transport are retarding economic growth.
National program for highway development and priority of project within the program.

B. Relation to Other Transport Systems

Present distribution of traffic among the various types of transport in the project area.
Anticipated effect of project on such distribution and on economics of other transport systems.

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Relative availability of vehicles, operating personnel, fuel, servicing, etc.

Estimated or actual comparable transportation costs for the various systems.

C. Effect on Development in Project Area

General description of area served (physical and economic geography, including agriculture, processing, manufacturing, centers of population, topography, geology, vegetative cover, and climate as related to traffic generating economic activity).

Estimate of volume of exportable surpluses of commodities available in the area and requiring transport to outside markets.

Estimate of volume of exportable surpluses of commodities that will be made available because of the completed facilities in the area and will require transport to outside markets.

General economic effect of additional commerce anticipated as a result of proposed project.

D. Anticipated Revenue and Economic Benefits

Increase in special tax receipts (gasoline, road and bridge tolls, local custom duties, etc.).

Increase in general tax receipts which will result from increased economic activity.

Reduction in transportation costs, including vehicle operating and maintenance costs.

Increased income to area served.

Lower costs of other planned development projects which will be served by this project.

Gains by opening new land for settlement by outside population presently unemployed or under-employed.

Direct benefit to local population through local expenditure of the project funds themselves for labor, materials, food, rent, etc. (temporary benefit)

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Present and Future Traffic Generating Activities

Size, distribution, and economic activities of the population.

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Nature and tonnages of cargo imported into, exported from and passing through the area.
Schools.
Population trends.
New types and amounts of traffic expected to develop as a result of project.
Projections of present traffic with and without proposed project.

B. Traffic Capacities

Theoretical capacity of present highway (number of vehicles, tonnage and maximum loads).
Present use of highway (based on traffic counts or other means of estimating).
Estimated future use projected to end of proposed loan period.
Relation of present and estimated future use to present and future theoretical capabilities.

C. Justification of the Scope of Improvement

On basis of maximum load and traffic volume requirements.
On basis of general development of the country.
On basis of savings to traffic.

D. Design Criteria

Average daily traffic (ADT), pavement and bridge loadings, and design speed.
Maximum grade, minimum radius of curvature, minimum sight distance and minimum length of vertical curve.
Number of traffic lanes, and by-passes and turn-outs, if any.
Width of lanes, shoulders and right-of-way.
Maximum height of embankments (to limit length of culverts and width of clearing).
Criteria used to determine types of stream crossings (pipe culverts, box culverts, masonry arch bridges, steel bridges, etc.).
Minimum and maximum side slopes for cuts and fills.
Unit stresses for structural design.

E. Surveys and Preliminary Plans

Description of extent of preliminary studies and surveys used to arrive at proposed location.

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Preliminary alignment map of proposed location based on ground surveys, aerial surveys, topographic maps and other sources.

Preliminary plan-profile drawings with established grades and general drainage schemes, sufficient to permit reasonably firm estimates of earth work quantities. (Only in exceptional cases is detailed cross-sectioning considered necessary for this purpose).

Rainfall and runoff data and calculations of streamflow estimates, sufficient to permit rational design of drainage structures.

Sketches, diagrams or photographs of typical existing drainage works, tunnels, bridges, retaining walls and other significant structures.

Location sketches for major new structures.

Preliminary plans for modification of existing structures and for construction of typical new structures, culverts, drainage ditches, etc., in sufficient detail to permit reasonably close estimate of materials and work quantities.

Preliminary schedule of drainage structures by type, giving approximate numbers and total length of each type and size.

Preliminary plans of any major safety features, such as median dividers, grade separations, interchanges, etc.

Results of soils and subsurface investigations for determination of quality of foundations for fills and major structures and for location of quarries and borrow pits.

Sufficient soil sampling along proposed alignment for determination of soil types and quantities of various types of excavation material.

F. Construction Standards

Outline specifications defining the proposed standards of quality of construction, which will have a major effect on the cost of construction (specific justification for any unusual standards which are adopted to fit the local situation and conform with local standards).

G. Availability of Local Resources and Equipment

Skilled and unskilled labor, including "trainability."

Technical and supervisory personnel.

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Training requirements for development maintenance.
Major construction materials: cement, aggregates, water, base course materials, steel, pipe.
Housing, food, fuel and lubricants, repair shops, etc.
Suitable sites for construction yards or camps.
Construction equipment.
Local subcontractors.
Local government budgetary and other arrangements for continued maintenance of facilities to be provided. Capability of responsible agency to finance and administer new systems or facilities. Need for legislative, organizational or budgetary changes to accomplish continued supervision and operation of facilities.

H. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons and periods of daylight, as they affect construction schedule and equipment use and labor force.
Rerouting of traffic during construction.
Limitations on construction schedule due to long lead-time equipment and materials.
Evaluation of possible major causes of delay: slides, earthquakes, floods, labor troubles, political disturbances, etc.
Steps which will be taken in providing specialized tools, test equipment and/or service vehicles together with associated spare parts for a continuing satisfactory operation.

I. Plan for Execution of Project

General sequence of construction operations, including identification of major elements which control time and cost.
General plans for grading operations as related to equipment requirements, haul distances, requirements for haul roads and access roads to quarries and borrow pits, etc.
Description of base course and paving operations.
Construction methods, particularly as to the use of manual labor vs. equipment.
Proposed methods of contracting for engineering, construction and construction supervision (see Chapter I).
Phased engineering and construction schedule (attached).

CHAPTER X

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS MUNICIPAL STREET AND STORM SEWER PROJECTS

(Construction or improvement of public streets within a city, town or village with or without concurrent installation of gutters, catch basins, storm water inlets, and storm sewers).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, nature and extent of proposed construction or improvement.
Relation to work previously done.
Description of major features of work.
Reference to any applicable reports (attached or readily available elsewhere).
Brief statement of conclusions as to relative benefits and cost.

II. ECONOMIC ASPECTS AND BENEFITS

A. Position of Project in Overall Program

Present extent and condition of street system, including percentage paved, and extent of storm sewer system.
Extent to which inadequacies of streets and storm sewers are retarding economic growth of the community.
Adopted program for development of a municipal street and drainage system and priority of project within this program.

B. Present Storm Sewer System

Extent of storm sewer system.
Area served and present capacity and adequacy.
Types of pipe and present condition.
Existence and adequacy of any pumping plants.
Conditions at present outfall.

Extent to which storm sewers are used for sanitary sewage.
Complaints received about flooding.

C. Effect of Improvement on Development in Project Area

General description of area including occupations, industries, processing and manufacturing plants, topography, and climate as related to traffic generating activity.
Estimate of volume of new local business or residential housing which would develop as a result of completion of the project.
General economic effect of improved traffic circulation provided by the proposed project.

D. Evaluation of Anticipated Benefits

Increase in general tax receipts which will result from increased property values and general economic activity in the community.
Reduction in street maintenance and flood control cost.
Saving in cost of vehicle operation.
More efficient movement of people and commodities.
Direct benefit to local population through local expenditures of the project funds themselves for labor, materials, food, rent, etc. (temporary benefit).

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Present and Future Traffic Generating Factors

Forecast of population growth and basis of prediction.
Contemplated changes in zoning or land use.
Anticipated industrial, commercial and residential growth.

B. Traffic Capacities

Theoretical capacity of present streets (number of lanes and maximum loads).
Present use of streets (based on traffic counts or other means of estimating) and estimated future use.

C. Justification of Scope of Proposed Project

Need of project in relation to traffic requirements and prevention of flooding.

Relation to development of the community.

D. Design Criteria

Maximum grade, and minimum radius of curvature.
Number of traffic lanes and maximum loads.
Widths of roadways and walkways.
Criteria used to determine flow capacities of gutters, culverts, storm sewers and bridges.

E. Construction Standards

Outline specifications defining the proposed standards of quality of construction which will have a major effect on the cost of construction (specific justification to be given for any unusual standards which are adopted to fit the local situation or to conform with present standards).

F. Surveys and Preliminary Plans Furnished

General location map and master plan for street development.
Preliminary street plan showing proposed work.
Land and easement acquisition.
Plan for clearing right-of-way and removing existing buildings.
Preliminary plan-profile drawings with established grades, typical cross-sections, location of present and proposed sewers and utility lines in sufficient detail to permit reasonably firm estimates of earth work and pavement and storm sewer work quantities.
Rainfall and runoff data and calculation of flows sufficient to permit rational design of storm sewer and drainage facilities.
Sketches, diagrams or photographs of typical existing storm sewers, culverts, bridges, retaining walls and other significant structures.
Location sketches for major new structures.
Preliminary plans for modification of existing structures and for construction of typical new structures, storm sewers, culverts, drainage ditches, pumping plants, etc., in sufficient detail to permit a reasonably close estimate of materials and work quantities.
Preliminary schedule of sewer pipe and sewer and drainage structures, giving approximate numbers and lengths by type and size.

Results of soils and subsurface investigations for determination of quality of foundations for pavements and major structures and character of material in pipe trenches.
Description of conditions at outfall and any measures required to prevent backwater, and downstream damage.

G. Construction Labor, Materials and Equipment

Skilled and unskilled labor, including "trainability."
Technical and supervisory personnel.
Major construction materials: cement, asphalt, aggregates, water, base course material, structural and reinforcing steel, culvert pipe, sewer pipe, castings, etc.
Housing, food, fuel and lubricants, repair shops.
Suitable sites for construction yard.
Construction equipment.
Local subcontractors.

H. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons and prevalence of rain, snow and ice as they affect construction schedule and equipment use and labor force.
Rerouting of traffic during construction.
Limitations on construction schedule due to long lead-time equipment and materials.
Evaluation of possible major causes of delay: floods, labor troubles, political disturbances, lack of right-of-way, delay in installation of utilities by others, etc.

I. Plan for Execution of Project

General sequence of construction operations, including identification of major elements which control time and cost.
General nature of grading and trenching operations as related to equipment requirements and haul distances.
Construction methods, particularly as to the use of manual labor vs. equipment.
Proposed methods of contracting for engineering, construction, and construction supervision (see Chapter I).
Phased engineering and construction schedule showing timing and duration of major work items.

J. Maintenance Organization

Description of Applicant's present and proposed maintenance organization.
Applicant's ability to provide the necessary level of maintenance for new streets and sewers when completed.
Availability of equipment and trained maintenance personnel.
Plan for recruiting and training.
Applicant's ability to finance additional maintenance work, and plans for providing funds at proper time.
If funds for training of personnel or purchase of additional maintenance equipment or spare parts are included in the requested loan/grant amount, explain plan in detail.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimate of cost of land, engineering and construction, prepared in accordance with Annex A so far as applicable.
Total estimated capital cost in U.S. dollars and local currency:
To be financed by Applicant.
To be financed by loan/grant.

B. Annual Maintenance Cost

Annual cost of labor, supervision, equipment operation, supplies and spare parts, and administration.
Breakdown to show dollar costs and local currency costs.
If funds for training of personnel or purchase of additional maintenance equipment or spare parts are included in the requested loan/grant amount, explain plan in detail.

V. COMPARISON OF BENEFITS AND COSTS

Summary of tangible and intangible benefits as described in Section II above, with estimate of monetary value so far as practicable.
Annual cost including interest and amortization of investment and operating and maintenance charges.
Comparison of benefits with costs.

CHAPTER XI

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS MUNICIPAL WATER AND SEWERAGE PROJECTS

(Construction, extension or improvement of water supply and distribution systems, sanitary sewer systems, water treatment plants, sewage treatment plants and any combination thereof).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, nature and extent of proposed construction or improvement.
Relation to existing water and sewer systems in the community.
Description of major features of design.
Estimates of benefits and costs.
Compliance with criteria of the memorandum of the President dated May 15, 1962. (Annex B; also see Supplement No. 1).
Reference to any applicable reports (attached or readily available elsewhere).

II. ECONOMIC ASPECTS AND BENEFITS

A. Description of the Community

Geography, topography, type of soil, seismic activity and climate.
Population and principal occupations.
Number of industries by type.
Prevalence of water-borne diseases.

B. Present Water System

Extent of water system and area and population served.
If more than one, give area served by each and type of water delivered (potable, industrial, fire-fighting, etc.)
Sources of supply and description of existing wells, dams, pumps and conduits.

Quality of water and amount of dependable supply.
Description and condition of any treatment facilities.
Main features of distribution system including tanks, reservoirs, pumping plants and types of pipe.
Adequacy of service within area supplied.
Application or demand for increased or improved service.

C. Present Sanitary Sewer System

Extent of sewer system and area and population served.
Local customs and usage, as they affect amount and nature of sewage.
Number of house connections and relation to the number of water services.
Types of pipe and present condition.
Extent to which parts of the sanitary system are used also to carry storm drainage.
Description of any sewage treatment facilities.
Location and adequacy of effluent disposal areas.
Methods used to dispose of sewage in areas not served by the sewer system.
Complaints about sanitary sewage overflow.

D. Position of Project in Overall Program

Extent to which inadequacies of the water and sewer systems constitute a health menace and tend to retard the economic growth of the community.
National or regional program for development of water and sewer systems and priority of project within this program.

E. Anticipated Benefits

Increase in revenues from water and sewer charges.
Reduction or elimination of present costs of obtaining water and sewage service.
Estimate of volume of new local business and new residential construction which would develop as a result of completion of the project.
General economic effect of improved water supply and sewerage.
Increase in general tax receipts which will result from increased property values and increase in general economic activity in the community.

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Lower insurance rates resulting from improved facilities for fire suppression.
Removal of health hazards and saving in cost of health services.
Direct benefit to local population through local expenditures of the project funds themselves for labor, materials, food, rent, etc. (temporary benefit).

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Factors Affecting Water Supply and Sewerage Requirements

Size, distribution and economic activities of the population.
Forecast of population growth, giving basis of prediction.
Contemplated changes in zoning or land use.
Demand for additional home building.
Anticipated industrial or commercial development.

B. Capacities of Water and Sewer Systems

Present and anticipated water consumption per capita and comparisons with other similar communities.
Total water supply and number of water services required to serve the community.
Total volume of sanitary sewage to be disposed of and comparison with supply of water.

C. Justification of Scope of Project

Desirability of construction by stages.
Areas to be served by initial stage.
Capacities to be provided in relation to theoretical or ultimate requirements.
Scope of project in relation to development of the community.

D. Design Criteria

Reliability of water supply.
Initial capacity of water mains in relation to estimated future requirements.
Maximum and minimum water pressures at service connections.
Degree of water purification required for a potable supply or an industrial supply.

Minimum velocity in sanitary sewers.
Minimum size of sewers.
Permissibility of using sanitary sewers for storm flow.
Degree of sewage treatment required.

E. Construction Standards

Outline specifications defining the proposed standards of quality of construction which will have a major effect on the cost of construction (specific justification to be given for any unusual standards which are adopted to fit the local situation or to conform with present standards).

F. Preliminary Studies and Plans

Location map showing contours, sources of water supply, main conduits, boundaries of the community, service areas in first stage of development, location of water and sewage treatment plants, and outfall for sewage effluent.
Rainfall and runoff data and calculation of flows sufficient to demonstrate sufficiency of water supply.
Results of soils and subsurface investigations for determination of quality of foundations for major structures and character of material in pipe trenches.
Information about major elements of the project as follows:

1. Water supply and treatment
   Sources of supply (lake, river, fresh or brackish wells, reclaimed water).
   Preliminary plans of dams, intakes, pumping plants, well fields and conduits (attach prints).
   Preliminary layout of water treatment or desalinization plant, flow diagram and preliminary plans of major features (attach prints).

2. Water distribution system
   Street plan showing location and sizes of water mains and laterals, and location and capacity of reservoirs, storage tanks and booster pumping stations.
   Determination as to separate systems for potable and nonpotable water or a single system for all uses.
   Basis for determination of capacities.
   Calculations of pressures at faucets, hydrants, etc.

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Explanation of provisions for expansion or extension of the system in later stages of development.
Inclusion of water meters in project.
Schedule of pipe sizes and quantities.
Preliminary typical plans for structures.

3. Sewage collection and treatment

Street plan showing location and sizes of collection, intercepting and main sewers and location of sewage treatment plant.
Type of system (separate or combined sanitary and storm).
Basis for determination of sewer sizes.
Explanation of provisions for future expansion and extension.
Schedule of sewer pipe sizes and quantities and number of manholes.
Preliminary typical plans for structures in collection system.
Basis for selection of treatment plant site.
Preliminary layout of sewage treatment plant, flow diagram and preliminary plans of major features.
Description of stream or body of water which will receive effluent and its capability of accepting the quantity and quality of flow to be discharged.

G. Construction Labor, Materials and Equipment

Skilled and unskilled labor, including "trainability."
Technical and supervisory personnel.
Major construction materials: water and sewer pipe, cement, aggregates, water for concrete, structural and reinforcing steel, castings, etc.
Housing, food, fuel and lubricants, repair shops.
Suitable sites for construction yards or camps.
Construction equipment.
Local subcontractors.

H. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons, floods, and temperatures as they affect construction schedule and equipment use and labor force.
Soil conditions and groundwater.

Rerouting of street traffic during construction.
Limitations on construction schedule due to long lead-time equipment and materials.
Evaluation of possible major causes of delay: floods, labor troubles, lack of right-of-way, etc.

I. Plan for Execution of Project

General sequence of construction operations, including identification of major elements which control time and cost.
Construction methods, particularly as to the use of manual labor vs. equipment.
Proposed methods of contracting for engineering, construction, and construction supervision. (See Chapter I).
Phased engineering and construction schedule (attached).

J. Maintenance and Operating Organization

Description of Applicant's present and proposed maintenance and operating organization.
Applicant's ability to provide the necessary level of maintenance for new water and sewer systems when completed.
Availability of trained maintenance and operating personnel and equipment.
Applicant's ability to finance additional maintenance and operation work, and plans for providing funds at proper time.
If funds for training of personnel or purchase of additional maintenance equipment or spare parts are included in the requested loan/grant amount, explain plan in detail.

IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering and construction, prepared in accordance with Annex A so far as applicable.
Total estimated capital cost in U.S. dollars and local currency:
To be financed by Applicant.
To be financed by loan/grant.

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B. Maintenance and Operation Cost

Estimate of annual cost of maintenance and operation including labor, supplies, power, spare parts, replacements, supervision and administration, broken down between local currency and foreign currency costs.

Comparison with the maintenance and operation costs of present community facilities or similar facilities elsewhere.

C. Estimated Revenues

Proposed schedule of water rates for domestic and industrial use or special taxes on land served.

Proposed schedule of charges for sewage disposal service based on water use or quantity of effluent.

Estimates of annual income for first 10 years based on forecast of water consumption at proposed rates and charges.

V. COMPARISON OF BENEFITS AND COST

Tangible and intangible benefits as described in Section II above, with estimate of monetary value so far as practicable, compared with annual cost, including interest and amortization of investment and operating and maintenance charges.

Ability of project to meet costs, demonstrated by proforma Profit and Loss statements showing anticipated revenues as against maintenance and operating cost, interest, and depreciation or amortization of debts for 10 years after completion of project.

For water supply systems, compute benefit-cost ratio determined in accordance with the memorandum of the President dated May 15, 1962 (see Supplement No. 1), taking into account:

Benefits measured by the cost of achieving the same results by the most likely alternative means that would be utilized in the absence of the project. Where such an alternative source is not available or would not be economically feasible, the benefits may be valued on such basis as the value of water to users or the average cost of raw water (for comparable units of dependable yield) from municipal or industrial water

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supply projects planned or recently constructed in the general region.

Benefits resulting from betterment of water quality control.

Economic costs of the project including induced costs, amortization of investment including interest, operation and maintenance, and equipment replacement charges.

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CHAPTER XII

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS RAILROAD PROJECTS

(Construction, reconstruction, rehabilitation or extension of a railroad or of track, structures, buildings or other elements of a railroad; also the furnishing of rails, rolling stock, or signal and communications or other equipment for use on a railroad).

(All topics in this outline should be considered in the Analysis, insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, nature and extent of proposed project.
Relation to Applicant's present business and to other railroads and other transportation facilities.
Description of major features of design.
Reference to any applicable reports (attached or readily available).
Brief statement of conclusions as to benefits and costs.

II. ECONOMIC ASPECTS AND BENEFITS

A. Area Served

Description of area to be served, including pertinent information on population, agriculture, natural resources, industries, towns and cities, and other factors affecting the occurrence or movement of commodities and the movement of people in the area.
Principal commodities produced within the area for distribution or export.
Types of commodities imported and distributed.

B. Position of Project in Overall Program

Present railway system.
Present transport systems other than rail (highway, air, water, pipelines, etc.).

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Extent to which inadequacies of transport are retarding economic growth.

National or regional program for railway development and priority of project within the program.

C. Relation to Other Transport Systems

Present distribution of traffic among the various types of transport in the project area.

Anticipated effect of project on such distribution and on economics of other transport systems.

Relative availability of vehicles, operating personnel, fuel, servicing, etc.

Estimated or actual comparable transportation costs for the various systems.

D. Applicant's Present Operations, If Any

Nature and extent of present operations.

Description of existing facilities.

Profit and Loss statements for past five years. (See Annex C).

If Applicant is a private corporation, give also financial position and financial information conforming with Annexes C and D so far as applicable. (Annual reports are usually acceptable in place of Annex C if reasonably equivalent information is given).

E. Forecast of Future Business

New commodities or new movement patterns expected to develop as a result of the project or as a result of other developments in the country.

Forecast of future freight and passenger business for at least 10 years after completion of the project, supported by graphs and statistics and giving justification for the assumptions made as to rates of increase in growth.

Breakdown of the forecast to show business that would be drawn from highways or other railways in the surrounding area and the new business which will be generated by this and any other projects which may be contemplated.

Extent to which forecast has been based on general economic factors other than those disclosed by historical records.

F. Character of Anticipated Benefits

Reduction in operating and maintenance costs of existing railway.
Faster and cheaper delivery of commodities.
Reduction in transportation costs to users.
General economic effect of improved service provided by the proposed project.
Increased income to area served.
Increase in general tax receipts which will result from increased economic activity in the area.
Lower costs of other planned development projects which will be served by this project.
Gains by opening new land for settlement by outside population presently unemployed or underemployed.
Direct benefit to local population through local expenditure of the project funds themselves for labor, materials, food, rent, etc. (temporary benefit).
Collateral benefits should be considered and qualified to the extent possible.

III. ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Description and Justification of Project Location

Description of the engineering features of the project.
Basis for selection of the project location and comparison with other locations considered, with reference to both economic and physical aspects.

B. Traffic Capacities

Factors limiting capacity of present railway (rolling stock, ruling grades, curves, tunnels, repair facilities, etc.).
Additional railway capacity required to meet the forecast of future traffic by years, taking into account possible expanded services of existing railways and airlines and possible construction of highways, waterways and pipe lines.
Capacity of railway after completion of proposed project.

C. Justification of the Scope of Project

On basis of relation to estimated future requirements.
On basis of general development of the country.

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D. Design Criteria

Maximum train loads, maximum and average speeds.
Ruling grades and curvature.
Number of tracks, frequency of passing tracks, turnaround time.
Weight of rail, bolted or welded.
Type of ties and quality and size of ballast.
Criteria used to determine types of stream crossings (pipe or box culverts, masonry arch or steel bridges, etc.).
Servicing facilities.
Signal requirements.
Housing for operating personnel.

E. Surveys and Preliminary Plans

Description of extent of preliminary studies and surveys used to arrive at proposed location.
Preliminary alignment map of proposed location based on ground surveys, aerial surveys, topographic maps and other sources.
Preliminary profile drawings with established grades, location of principal bridges, typical roadbed sections and general drainage schemes, sufficient to permit reasonably firm estimates of earthwork quantities and haul distances.
Rainfall and runoff data and estimates of streamflow sufficient to permit a reasonable estimate of bridge and culvert quantities.
Sketches, diagrams or photographs of typical existing passenger and freight stations, water and fueling facilities, shops, tunnels, bridges, retaining walls, drainage works and other significant structures.
Location sketches for major new buildings, structures and yards.
Preliminary plans for modification of existing structures and for construction of typical new stations, yards, signal systems, servicing facilities, structures, culverts, drainage ditches, etc., in sufficient detail to permit reasonably close estimate of materials and work quantities.
Preliminary schedule of drainage structures by type, giving numbers and total length of each type and size.
Results of soils and subsurface investigations for determination of quality of foundations for fills and major structures and for location of quarries and borrow pits.

Where motive power equipment is to be procured a motive power survey should be made covering operating characteristics of the line, present level of motive power, additional motive power required, maintenance facilities, investment required, unit operating costs with present equipment, and an estimate of the economies that will result from the use of the motive power proposed.

Where rolling stock is to be procured the survey should show an inventory of present car strength, condition, and capacity, the magnitude of freight and/or passenger backlog in appropriate units, percentage distribution of cars per section of line, car turnaround time on each section, number of additional cars needed on a daily basis for each section, and a summary of the effect of introducing the proposed new rolling stock.

F. Construction Standards

Outline specifications defining the proposed standards of quality of construction, which will have a major effect on the cost of construction, with specific justification for any unusual standards which are adopted to fit the local situation and conform with local standards. (Where motive power or rolling stock is to be procured, an outline performance specification is required).

G. Availability of Local Resources and Equipment

Skilled and unskilled labor, including "trainability."

Technical and supervisory personnel.

Major construction materials: lumber, ties, ballast rock, building stone, cement, aggregates, water, metal pipe, etc.

Housing, food, fuel and lubricants, repair shops, etc.

Suitable sites for construction yards and construction camps.

Construction equipment.

Local subcontractors.

Where motive power or rolling stock is to be procured, the local availability of components and erection facilities should be described.

H. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons as they affect the construction schedule.

Rerouting of traffic during construction.

Limitations on construction schedule due to long lead-time equipment and materials.

Evaluation of possible major causes of delay : slides, earthquakes, floods, labor troubles, political disturbances, etc.

I. Plan for Execution of Project

General sequence of construction operations, including identification of major elements which control time and cost.

General plans for grading operations as related to equipment requirements, haul distances, requirements for haul roads and access roads to quarries and borrow pits, etc.

Plan for production of ballast and aggregate.

Description of track laying and ballasting operations.

Construction methods, particularly as to the use of manual labor vs. equipment.

Proposed methods of contracting for engineering, construction, and construction supervision (see Chapter I).

Phased engineering and construction schedule showing timing and duration of major work items.

Where motive power or rolling stock is to be procured the method of inspection during manufacture, the delivery method and schedule, and the plan for erection should be specified.

J. Maintenance Organization

Description of Applicant's present and proposed maintenance and operating organization.

Applicant's ability to provide the necessary level of maintenance and operation for new railway facilities when completed.

Availability of equipment and trained personnel required for operation and maintenance.

Plan for recruiting and training.

Applicant's ability to finance the additional maintenance and operating costs and plans for providing funds at proper time.

Where motive power is to be procured it is expected that provisions will be made for training of maintenance and operating personnel at the supplier's facilities in the U.S.

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IV. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, engineering, construction, rolling stock and equipment, prepared in accordance with Annex A for construction portion of project.

Total estimated capital cost in U.S. dollars and local currency:

To be financed by Applicant.

To be financed by loan/grant.

B. Working Capital Requirements

Amount required at start-up and at the end of the first, second and third years of operation, to cover fuel stocks, operating supplies, maintenance materials, accounts receivable and cash on hand.

Anticipated occurrence of peaks in working capital requirements and method contemplated to meet such peaks.

C. Total Initial Capital Requirement

Initial capital cost.

Working capital at start-up of operation.

Total capital requirement.

D. Maintenance and Operation Cost

Estimate of annual cost of operation and maintenance including labor, fuel, supplies, power, repair parts, supervision and administration, broken down into local currency and foreign currency costs.

Comparison with the maintenance and operation costs of the present railway or other railways in the country or elsewhere.

E. Annual Operating Cost

Estimates of annual operating costs, projected through the proposed amortization period, including:

Maintenance and operation.

Depreciation on structures and equipment.

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Interest on loans.
Taxes (property, income, etc.).
Total.

Extent to which above estimates have taken into account any governmental preferences, tax remissions, tax deferments or subsidies.

F. Annual Revenues

Proposed fares and freight rates and comparison with existing rail, airline and highway transport rates.

Estimated annual income from fares, freight charges and other sources, projected through the proposed period for amortization.

Comparison with present annual revenues of the existing railway, showing the increase brought about by completion of the project.

G. Profitability

Estimate of profit and loss, conforming generally with Annex E.

Estimated return by years on total capital cost and on owner's investment.

General conclusion as to profitability of the enterprise.

V. COMPARISON OF BENEFITS AND COSTS

Summary of tangible and intangible benefits as described in Section II above, with estimate of monetary value so far as practicable.

Comparison of benefits with costs.

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CHAPTER XIII

ECONOMIC AND TECHNICAL SOUNDNESS ANALYSIS SCHOOL OR HOSPITAL PROJECTS

(Construction, reconstruction or enlargement of a school, college, university, hospital or medical center, and auxiliary buildings and facilities in connection therewith).

(All topics in this outline should be considered in the Analysis insofar as they are applicable to the project. Others should be included as necessary to complete the demonstration of the economic and technical soundness of the particular undertaking).

I. SUMMARY

Location, nature and size of proposed school or hospital project.
Relation to the existing school system or present medical facilities in the community.
Description of major features of design.
Estimates of benefits and costs.
Reference to any applicable reports, particularly reports on community school programs and requirements, and reports on existing medical facilities and general hospital planning (attached or readily available elsewhere).

II. ECONOMIC ASPECTS AND BENEFITS

A. Description of the Community

Description of climate, average rainfall and temperature and elevation above sea level.
Population and principal occupations.
School enrollment in relation to total population and general level of literacy.
General level of health and sanitation.

B. Present School System

Types of schools in the community (primary, elementary, secondary, etc.).
Number of pupils in each grade.
Type and age of building in each case, and capacity, safety and present condition.

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Location of schools with reference to centers of residential areas, accessibility and environment.
Availability of recreation areas.
Availability of land for construction of new buildings or additions to existing buildings.

C. Present Hospital Facilities

Existing public hospitals and medical, nursing and treatment facilities.
Total number of beds in relation to community population.
Existing private facilities for diagnosis, hospitalization and treatment.
Availability of land for construction of new buildings or additions to existing buildings.
Adequacy of present staff and additions to staff.

D. Position of Project in Overall Program

Extent to which inadequacies of community schools and hospitals are retarding economic growth of the community.
National, regional or community program for development of schools and hospitals and priority of the project within this program.
Demand for graduates from this type curriculum.

E. Anticipated Benefits

Increase in the education and health of the local population.
General economic effect of improved or expanded school and hospital facilities.
Direct benefit to local population through local expenditures of the project funds themselves for labor, materials, food, rents, etc. (temporary benefit).

III. REQUIREMENTS ANALYSIS

A. Factors Creating Demand for Schools and Hospitals

Size, description and economic activities of the population.
Forecast of population growth, giving basis of prediction.

B. Basic Data for School Project

Results of any surveys that have been made to determine

program needs, school enrollments, and needed additional school plant.

Coverage of the surveys and by whom made.

School age population data, past trends and future forecast, by age levels and by percentage of adults of child bearing age.

School enrollments in past years in public and nonpublic schools, trends by grade levels, effects of community industrial activity, influence of transportation facilities and traffic barriers, and effects of new housing developments.

Forecast of future enrollments by areas and by grade levels.

Requirements of new school or school addition:

- Grade levels covered and size of classes.
- Special facilities for vocational training or teaching of handicapped children.

List of classrooms and special rooms.

List of other spaces and services.

Facilities for community use for summer classes or recreation, adult classes, adult recreation, community meetings and community libraries.

Special plant facilities for lunchroom service, health clinic services, libraries, etc.

Types of equipment and furnishings to be provided.

C. Basic Data for Hospital Project

Need for additional hospital facilities.

Number of beds to be provided.

Types of services to be offered.

Extent of out-patient service.

Community welfare activities to be accommodated.

Special requirements as to power, lighting, heating and air conditioning.

Site to have suitable surroundings.

Building to be oriented to take best advantage of sunlight and prevailing wind.

Types of equipment and furnishings to be provided.

D. Design Criteria

Space requirements per pupil or per hospital bed.

Degree of lighting, heating and ventilation required.

Reliability of water and power supplies.

Noise limitations.
Structural safety.
Total number of pupils or patients.
Type of school (academic level, trade school, etc.).
Type of hospital (general purpose or teaching hospital).
Minimum areas for which heat or air conditioning must be provided.
Extent of food service to be provided.
Requirements for athletic facilities.
Requirement for laboratories.
Requirement for auditorium.
Requirement for dormitory.
Requirement for library.
Requirement for administrative rooms.

IV. ARCHITECTURAL-ENGINEERING ASPECTS AND TECHNICAL SOUNDNESS

A. Preliminary Studies and Plans

Location map showing boundaries of the community and location of existing and proposed schools and hospital facilities.
Project site studies, including:
  Topography and present use.
  Access roads or streets.
Results of soils and subsurface investigations for determination of character of foundations.
Location of all existing utilities.
Availability of potable water and water for fire suppression and other uses.
Suitability from standpoint of accessibility, noise, smoke, odors and proximity of breeding grounds for flies and mosquitoes.
Comparison with possible alternate sites.
Preliminary plans for buildings and structures in sufficient detail to permit a reasonable estimate of quantities of materials and work.
Schedules showing space provided for various types of rooms (classrooms, laboratories, libraries, wards, surgeries, nurses accommodations, administrative offices, etc.) and comparison of such quantities with corresponding quantities provided in similar installations elsewhere.
Plans for site grading, access and interior roads, landscaping and vehicle parking.

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Preliminary plans for all utilities, including sewers and sewage disposal facilities.

List and location of all major built-in equipment, including water treatment, heating and ventilating, electrical transformers, kitchen, toilet and washroom, lighting fixtures, etc.

List of movable furniture and equipment, including essential hospital equipment.

Approximate list of supplies needed for initial operation.

Anticipated use of consultants on specialized phases of final design.

B. Construction Standards

Outline specifications for equipment and construction defining particularly those standards of quality which will have a significant effect on the cost of construction, with specific justification for any unusual standards adopted to conform with local conditions.

C. Construction Labor, Materials and Equipment

Manpower requirements and availability, including skilled and unskilled labor, and technical and supervisory personnel.

Local availability of cement, steel, aggregates, water for concrete, building stone, lumber and other construction materials.

Types of construction equipment required for the work, indicating what is available locally and what must be imported.

D. Special Construction Problems Foreseen

Climatic conditions, especially time and length of wet and dry seasons as they affect construction schedule and equipment use.

Necessity of keeping an existing school or hospital in service during construction.

Time required to obtain delivery of imported materials and equipment.

E. Plan for Execution of Project

General construction plan.

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Proposed methods of contracting for engineering, construction and construction supervision (see Chapter I).
Tests to be performed on installed equipment.
Equipment guarantees to be required.
Engineering and construction schedule (attached).

F. Maintenance and Operating Organization

Applicant's present and proposed teaching and hospital staffs and ability to finance additional personnel needed.
Applicant's present and proposed maintenance organization.
Applicant's ability to provide and finance the necessary level of maintenance of the new facilities when completed.
Availability of trained teaching, hospital and administrative personnel.
Plans for recruiting and training.

V. FINANCIAL ASPECTS

A. Estimated Capital Cost

Estimates of cost of land, architecture, engineering and construction, prepared in accordance with Annex A so far as applicable.
Total estimated capital cost in U.S. dollars and local currency:
To be financed by Applicant.
To be financed by loan/grant.

B. Maintenance and Operation Cost

Estimate of annual cost of maintenance including labor, supplies, power, spare parts and supervision, broken down between local currency and foreign currency costs.
Comparison with the maintenance and operation costs of present community facilities or similar facilities elsewhere.

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ANNEXES

Annex	Subject
A	Cost Estimate, All Types of Project
B	The Memorandum of the President dated May 15, 1962
C	Balance Sheet, Industrial or Commercial Project
D	Financial Information, Industrial or Commercial Project
E	Forecast of Earnings, Receipts and Expenditures, Industrial or Commercial Project
F	Production Cost, Industrial Project
G	System Requirements, Power and Energy Sources, Electric Power Project
H	Capital Cost and Investment, Electric Power Project
I	Annual Production Costs, Electric Power Project
J	Balance Sheet, Electric Power Project
K	Financial Projection, Electric Power Project

ANNEX A
ALL TYPES OF PROJECT

COST ESTIMATE

A. Land and Right-of-Way

Cost in local currency (paid or to be paid by Applicant).

B. Engineering Costs - broken down into local currency and U.S. dollars.

Preliminary engineering up to time of application.

Additional surveying and test borings.

Final design, preparation of contract documents, construction contract supervision and inspection.

C. Construction Costs - broken down into local currency and U.S. dollars.

1. The basis for estimating unit prices in construction costs must be specified. This may be current unit prices for similar work in the same location or if no such basis exists, unit costs may be derived by the following tabulation:

   a. Work item units and quantities.
   b. Material requirements and prices at job site.
   c. Phased manpower requirement.
   d. Wage and salary scales (local and U.S.) plus social security, vacation pay, medical, family, and displacement allowances, etc.
   e. Phased equipment requirements.
   f. Construction equipment costs prorated to each item.
   g. Derived direct unit costs of each work item.
   h. Indirect costs (mobilization, construction camps, access roads, contingencies, U.S. and local overhead, and profit) all prorated to each work item.
   i. Derived total unit cost of each item.

2. Summation of i above will yield the total estimated cost of the construction contract.

D. Summary of Estimated Project Cost

Item	Funds Requirements		Total, Expressed In	
	Local Currency	U. S. Dollars	Local Currency	U. S. Dollars
Land and Right-of-Way				
Construction Cost				
Engineering Costs (Design)				
Engineering Costs (Supervision)				
Contingencies	_____	_____	_____	_____
Totals				
Portion to be Financed by Applicant	_____	_____	_____	_____
Remaining Cost to be Covered by Loan/Grant				

Percentage Local Cost _____ Foreign Cost _____

LETTER OF PRESIDENT JOHN F. KENNEDY TO THE SECRETARY OF THE INTERIOR; THE SECRETARY OF AGRICULTURE; THE SECRETARY OF HEALTH, EDUCATION, AND WELFARE; AND THE SECRETARY OF THE ARMY

THE WHITE HOUSE,
May 15, 1962

Your joint response to my memorandum of October 6, 1961, requesting you to review existing standards for the formulation and evaluation of water resources projects and to recommend any necessary changes constitutes a major improvement. You have done a difficult task well.

The statement of "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources" enclosed with your memorandum of today is approved for application by each of your Departments and by the Bureau of the Budget in its review of your proposed programs and projects.

There is need, as you indicate, for up-to-date policies, standards, and procedures relating to cost allocation, reimbursement, and cost sharing, and no doubt other water and related land resource subjects of mutual concern to your four Departments upon which uniformity and consistency would be in the public interest. Consideration of subjects such as these and establishment, with my approval, of necessary policies, standards, and procedures will be the responsibility of the Water Resources Council when it is created. In the meantime, I agree that you should move ahead now to a consideration of those subjects you have indicated need immediate attention.

JOHN F. KENNEDY.

POLICIES, STANDARDS, AND PROCEDURES IN THE FORMULATION, EVALUATION, AND REVIEW OF PLANS FOR USE AND DEVELOPMENT OF WATER AND RELATED LAND RESOURCES

I. PURPOSE AND SCOPE

The purpose of this statement is to establish Executive policies, standards, and procedures for uniform application in the formulation, evaluation, and review of comprehensive river basin plans and individual project plans for use and development of water and related land resources. Problems of cost allocation and of reimbursement or cost sharing between the Federal Government and non-Federal bodies will be covered subsequently.

These provisions shall govern, insofar as they are consistent with law and other applicable regulations, all formulation, evaluation, and review of water and related land resources plans. Any proposed variation from these policies and standards shall be specified in planning reports and the reasons therefor indicated.

II. OBJECTIVES OF PLANNING

The basic objective in the formulation of plans is to provide the best use, or combination of uses, of water and related land resources to meet all foreseeable short- and long-term needs. In pursuit of this basic conservation objective, full consideration shall be given to each of the following objectives and reasoned choices made between them when they conflict:

A. Development

National economic development, and development of each region within the country, is essential to the maintenance of national strength and the achievement of satisfactory levels of living. Water and related land resources development and management are essential to economic development and growth, through concurrent provision for—

Adequate supplies of surface and ground waters of suitable quality for domestic, municipal, agricultural, and industrial uses—including grazing, forestry, and mineral development uses.

Water quality facilities and controls to assure water of suitable quality for all purposes.

Water navigation facilities which provide a needed transportation service with advantage to the Nation's transportation system.

Hydroelectric power where its provision can contribute advantageously to a needed increase in power supply.

Flood control or prevention measures to protect people, property, and productive lands from flood losses where such measures are justified and are the best means of avoiding flood damage.

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Land stabilization measures where feasible to protect land and beaches for beneficial purposes.

Drainage measures, including salinity control where best use of land would be justifiably obtained.

Watershed protection and management measures where they will conserve and enhance resource use opportunities.

Outdoor recreational and fish and wildlife opportunities where these can be provided or enhanced by development works.

Any other means by which development of water and related land resources can contribute to economic growth and development.

B. Preservation

Proper stewardship in the long-term interest of the Nation's natural bounty requires in particular instances that—

There be protection and rehabilitation of resources to insure availability for their best use when needed.

Open space, green space, and wild areas of rivers, lakes, beaches, mountains, and related land areas be maintained and used for recreational purposes; and

Areas of unique natural beauty, historical and scientific interest be preserved and managed primarily for the inspiration, enjoyment and education of the people.

C. Well-being of people

Well-being of all of the people shall be the overriding determinant in considering the best use of water and related land resources. Hardship and basic needs of particular groups within the general public shall be of concern, but care shall be taken to avoid resource use and development for the benefit of a few or the disadvantage of many. In particular, policy requirements and guides established by the Congress and aimed at assuring that the use of natural resources, including water resources, safeguard the interests of all of our people shall be observed.

III. PLANNING POLICIES AND PROCEDURES

A. National, regional, State, and local viewpoints

1. All viewpoints—national, regional, State, and local—shall be fully considered and taken into account in planning resource use and development. Regional, State, and local objectives shall be considered and evaluated within a framework of national public objectives and available projections of future national conditions and needs. Similarly, available projections of future conditions and needs of regions, States, and localities shall be considered in plan formulation.

2. Significant departures from a national viewpoint required to accomplish regional, State, or local objectives shall be set forth in planning reports by those charged with their preparation. Such reports shall also describe the present economy of the locality, State, and region, changes which can be expected on the basis of current trends, specific economic problems of the area, and the manner in which the project is expected to contribute to the sound economic growth and well-being of the locality, State, and region.

3. Comprehensive plan and project formulation shall be based upon an analysis of the relationship of goods and services to be provided

by a proposed resource use or development to available projections of national, regional, State, and local requirements and objectives. From a national point of view, the analysis shall include, within practical limits, a comparison of the proposed resource use and development with alternative means available for providing similar goods and services to the area and other areas and an indication of its relationship, if any, to specific considerations of national security.

B. Multiple-purpose planning

Planning for the use and development of water and related land resources shall be on a fully comprehensive basis so as to consider—

(1) The needs and possibilities for all significant resource uses and purposes of development, including, but not limited to domestic, municipal, agricultural, and industrial uses of water; water quality control; navigation in relation to the Nation's transportation system; hydroelectric power; flood protection control or prevention; land and beach stabilization; drainage, including salinity control; watershed protection and management; forest and mineral production; grazing and cropland improvement; outdoor recreation, as well as sport and commercial fish and wildlife protection and enhancement; preservation of unique areas of natural beauty, historical and scientific interest; and

(2) All relevant means (including nonstructural as well as structural measures) singly, in combination, or in alternative combinations reflecting different basic choice patterns for providing such uses and purposes.

C. River basin planning

River basins are usually the most appropriate geographical units for planning the use and development of water and related land resources in a way that will realize fully the advantage of multiple use, reconcile competitive uses through choice of the best combination of uses, coordinate mutual responsibilities of different agencies and levels of government and other interests concerned with resource use. Planning use of water and related land resources, therefore, shall be undertaken by river basins, groups of closely related river basins, or other regions, and shall take full cognizance of the relationships of all resources, including the interrelationship between surface and ground water resources. Despite this primary confinement to an area, the fact should be recognized that such planning also requires consideration of pertinent physical, economic, and social factors beyond the area.

D. Individual project planning

To the extent feasible, programs and projects shall be formulated as part of a comprehensive plan for a river basin or other area, and the report proposing development shall indicate the relationship to the comprehensive plan. When a program or project has been formulated independently and not as part of a comprehensive plan, the report shall indicate, to the extent practicable, the relationship of the program or project to the probable later developments needed or to be undertaken in the basin and the reasons for proposing to proceed with the proposed program or project independently.

E. Coordination within the Federal Government and with non-Federal interests

1. Federal planning shall be carried out on a coordinated basis from the earliest steps of investigation, survey, and planning through the entire planning and review process. When any Federal agency initiates an investigation or survey, it shall arrange for appropriate coordination and consideration of problems of mutual concern with other Federal agencies and with interested regional, State, and local public agencies and interests. When warranted, joint consideration of such problems shall be arranged. Full advantage is to be taken of all existing organizations and arrangements for coordination, such as river basin commissions, interagency committees, interstate bodies, and State and local agencies.

2. When plans for resource use or development affect the interests and responsibilities of other Federal agencies, the sponsoring agency shall, to the maximum extent practicable, consult with such agency or agencies in the field and at headquarters in conducting its investigation and preparing its report. When specific project proposals are contemplated, each affected agency shall be afforded an opportunity to participate in the investigations and surveys in an effort to develop fully coordinated proposals. Project reports shall include a statement of the extent of coordination achieved.

3. Before a report is submitted to the President and the Congress, each department or independent agency interested in the project and the concerned States shall be provided with copies of the proposed report, and given an opportunity to furnish a statement concerning the project proposal from the viewpoint of its interest and responsibility. Such statements shall be included in the reports submitted by a sponsoring agency. If such statements propose variations from the policies and standards specified herein, the reasons for each variation shall be stated. A sponsoring agency may submit a report without the views of any agency or State when a statement from that agency or State has not been received within 90 days after receipt of the project report or within such other period specified by law.

4. Planning by Federal agencies shall also be carried out in close cooperation with appropriate regional, State, or local planning and development and conservation agencies, to the end that regional, State, and local objectives may be accomplished to the greatest extent consistent with national objectives. When a proposed resource use or development affects the interest and responsibility of non-Federal public bodies, those bodies shall be furnished information necessary to permit them to evaluate the physical, economic, and social effects. Their views shall be sought, considered in preparation of reports and included in the final reports submitted to the President and the Congress or other approving authority.

F. Relation to existing law and executive orders

The policies, standards, and procedures set forth herein shall not be regarded as authorizing any deviation from general or specific requirements of law or Executive order. Whenever a plan or proposal varies from such policies, standards or procedures because of a requirement of existing law or Executive order, the variation shall be indicated, and reference made to the section of law or Executive order imposing such requirements.

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IV. REVIEW OF COMPREHENSIVE PLANS AND PROJECT PROPOSALS

With a view to arriving at general and specific independent judgments upon comprehensive plans, programs and project proposals, and parts thereof, as well as recommendations concerning such plans and proposals, review at all appropriate levels shall be based upon a thorough appraisal of planning reports and upon the following criteria:

(*a*) Compliance with the statement of purpose and scope, objectives of planning, and planning policies and procedures set forth herein.

(*b*) Compliance with law, legislative intent, and Executive policies and orders.

(*c*) Compliance with recognized technical standards.

(*d*) Compliance with standards for the formulation of plans and evaluation of tangible and intangible effects as set forth herein.

V. STANDARDS FOR FORMULATION AND EVALUATION OF PLANS

A. General setting, viewpoint, and procedures

1. Formulation of comprehensive and project plans, and evaluation of tangible and intangible effects shall reflect full consideration of, and adherence to the purpose and scope, objectives of planning, planning policies and procedures and criteria for review, as set forth herein.

2. Formulation and evaluation shall normally be based on the expectation of an expanding national economy in which increasing amounts of goods and services are likely to be required to meet the needs of a growing population, higher levels of living, international commitments, and continuing economic growth. Such an environment will necessitate relatively high and efficient levels of resource employment and a pattern of production in balance with the anticipated demand for goods and services.

3. Formulation and evaluation of plans or alternative plans shall be accomplished in such a way as to permit timely application of standards appropriate to conditions of: (*a*) Less than "full employment" nationally, and (*b*) chronic and persistent unemployment or underemployment in designated areas. Standards appropriate to (*a*) shall be those adopted at the time of existence of such condition and authorized by the President. Standards appropriate to condition (*b*) shall be used where an area has been so designated under the Area Redevelopment Act of 1961 (75 Stat. 47) or other authorized procedures relating to resource underemployment. In condition (*b*) project benefits shall be considered as increased by the value of the labor and other resources required for project construction, and expected to be used in project operation, project maintenance, and added area employment during the life of the project, to the extent that such labor and other resources would—in the absence of the project—be unutilized or underutilized. Such benefits should be clearly identified as redevelopment benefits for the purposes of cost allocation, cost-sharing procedures, and to indicate their significance for project justification.

4. A comprehensive public viewpoint shall be applied in the evaluation of project effects. Such a viewpoint includes consideration of all effects, beneficial and adverse, short range and long range, tangible

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and intangible, that may be expected to accrue to all persons and groups within the zone of influence of the proposed resource use or development. The adequacy of the coverage depends on how completely all effects can be traced and evaluated in comparable terms.

5. Full consideration shall be given to the opportunity and need for outdoor recreational and fish and wildlife enhancement in comprehensive planning for water and related land use and development, and project formulation and evaluation. Project plans shall include provision for public acquisition of lands and rights-of-way adjacent to proposed Federal or Federal-assisted water resource projects (additional to those needed for other uses and for public access) for administration by Federal, State, or local public bodies, as appropriate, to insure full ultimate realization of the outdoor recreational, fish and wildlife, and related resource enhancement opportunities of the project area. Plans shall indicate, in appropriate detail, all facilities needed for full development of the recreation and fish and wildlife potential, as well as specific indication of basic facilities required initially for access, health, safety, fire prevention, and use of the area.

6. Full consideration shall also be given in survey, investigation, and planning to the need for acquisition of lands necessary for all purposes of water resource development in advance of construction, so as to preserve these areas from encroachment by residential, commercial, industrial, and other development. Proposals to this end shall be set forth in special reports, or included in regular planning reports, when deemed necessary. Measures proposed should represent the minimum necessary action consistent with the objective of site preservation. Reliance should be placed, where feasible, on zoning and other measures by non-Federal authorities to keep lands on local tax rolls and control development until sites are needed for project purposes. Such measures should also include provisions for advance participation in construction or reconstruction of transportation facilities, when necessary, to avoid increased costs for relocation.

7. When there are major differences among technically possible plans conceived as desirable on the basis of consideration of intangible benefits and costs, in comparison with optimum plans based on tangible benefits and costs, alternative combinations of projects within a river basin or alternative projects, giving expression to these major differences, shall be planned. Comparison of their economic and financial costs shall be set forth in reports to provide a basis for selection among the alternatives by reviewing authorities in the executive branch and by the Congress. Minor differences, with regard to intangible considerations, shall be handled, to the extent practicable and economically feasible, by adjustments in plans. Planning reports shall clearly indicate alternatives, their consequences, and adjustments made to take account of these minor differences.

8. When secondary benefits are included in formulation and evaluation of a project proposal, planning reports shall indicate—

(*a*) The amount of secondary benefits considered attributable to the project from a national viewpoint. Such benefits, combined with primary benefits, shall be included in the computation of a benefit-cost ratio.

(*b*) Secondary benefits attributable to the project from a regional, State, or local viewpoint. Such benefits shall also be evaluated, when this procedure is considered pertinent, and an additional benefit-cost ratio computed.

(*c*) Presentations in planning reports shall include an explanation of the nature of each type of secondary benefit taken into account from either viewpoint and the methods used in the computation of each of their values. The implications, from the national viewpoint, of considering secondary benefits of the project from a regional, State, or local viewpoint shall be set forth.

B. Specific setting for area under consideration

1. Reports on proposed plans shall include an analysis of present and projected future economic conditions in the project area and the contribution that comprehensive or project development may be expected to make toward the alleviation of problems and the promotion of economic growth and well-being within the zone of influence. Economic projections will be made to provide a basis for appraisal of conditions to be expected with and without the plans under consideration, and an estimate of the contribution that comprehensive development may make to increased national income and welfare, and regional growth and stability. Such analyses will frequently require a general economic study of the area, a study of all of its resources, an assessment of their functional relationships, their development potentials, possible adverse effects, and the locational situation with reference to resources, markets, transportation, climate, and social factors. Analyses should indicate the significance of the locality and the region in producing increased goods and services to meet foreseeable needs.

2. These analyses should be as extensive and intensive as is appropriate to the scope of the project being planned. They should provide essential information for identifying both immediate and long-range needs in economic and social terms and these needs should be expressed in a form useful for program formulation. Presentations in reports should identify—

(*a*) The relationship between economic development needs and opportunities and potential water and related land resource use and development;

(*b*) The economic and social consequences of complete or partial failure to satisfy these needs; and

(*c*) The possible improvements in economic efficiency, alleviation of unemployment, stabilization of production and income, community well-being, and the quality of goods and services that will be forthcoming.

C. Standards for formulation of plans

1. All plans shall be formulated with due regard to all pertinent benefits and costs, both tangible and intangible. Benefits and costs shall be expressed in comparable quantitative economic terms to the fullest extent possible.

2. Comprehensive plans shall be formulated initially to include all units and purposes which satisfy these criteria in quantitative economic terms:

(*a*) Tangible benefits exceed project economic costs.

(*b*) Each separable unit or purpose provides benefits at least equal to its costs.

(*c*) The scope of development is such as to provide the maximum net benefits.

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(*d*) There is no more economical means, evaluated on a comparable basis, of accomplishing the same purpose or purposes which would be precluded from development if the plan were undertaken. This limitation refers only to those alternative possibilities that would be physically displaced or economically precluded from development if the project is undertaken.

3. Net benefits are maximized when the scope of development is extended to the point where the benefits added by the last increment of scale (i.e., an increment of size of a unit, an individual purpose in a multiple-purpose plan or a unit in a comprehensive plan) are equal to the costs of adding that increment of scale. The increments to be considered in this way are the smallest increments on which there is a practical choice of omission from the plan.

4. Reports or plans shall indicate the scale of development that would result from application of the foregoing criteria considering tangible benefits and project economic costs expressed in comparable terms. This will provide a baseline from which the effect of considering intangibles can be judged.

5. Reports and plans shall also indicate the extent to which departures from that scale of development are proposed in order to take into account intangibles or other considerations warranting a modification in scale not reflected in the tangible benefits and project economic costs. For example, a higher degree of flood protection, particularly in urban areas, than is feasible on the basis of tangible benefits alone may be justified in consideration of the threat to lives, health, and general security posed by larger floods. Also, when long-range water needs are foreseeable only in general terms and where alternative means of meeting the needs are not available and inclusion of additional capacity initially can be accomplished at a significant savings over subsequent enlargement, such considerations may justify the additional cost required. Similarly, long-range power needs, in the light of generally expected economic growth of an area, may justify measures initially to insure later availability of the full power potential.

D. Definitions of benefits

1. Benefits: Increases or gains, net of associated or induced costs, in the value of goods and services which result from conditions with the project, as compared with conditions without the project. Benefits include tangibles and intangibles and may be classed as primary or secondary.

2. Tangible benefits: Those benefits that can be expressed in monetary terms based on or derived from actual or simulated market prices for the products or services, or, in the absence of such measures of benefits, the cost of the alternative means that would most likely be utilized to provide equivalent products or services. This latter standard affords a measure of the minimum value of such benefits or services to the users. When costs of alternatives are used as a measure of benefits, the costs should include the interest, taxes, insurance, and other cost elements that would actually be incurred by such alternative means rather than including only costs on a comparable basis to project costs as is required when applying the project formulation criteria under paragraph V–C–2(*d*).

3. Intangible benefits: Those benefits which, although recognized as having real value in satisfying human needs or desires, are not

fully measurable in monetary terms, or are incapable of such expression in formal analysis. Each type of benefit usually has a part which is readily measurable and may have a part which is not measurable or not readily measurable. The significance of this latter part shall be based upon informed judgment.

4. Primary benefits: The value of goods or services directly resulting from the project, less associated costs incurred in realization of the benefits and any induced costs not included in project costs.

5. Secondary benefits: The increase in the value of goods and services which indirectly result from the project under conditions expected with the project as compared to those without the project. Such increase shall be net of any economic nonproject costs that need be incurred to realize these secondary benefits.

E. Types of primary benefits and standards for their measurement

1. Domestic, municipal, and industrial water supply benefits: Improvements in quantity, dependability, quality, and physical convenience of water use. The amount water users should be willing to pay for such improvements in lieu of foregoing them affords an appropriate measure of this value. In practice, however, the measure of the benefit will be approximated by the cost of achieving the same results by the most likely alternative means that would be utilized in the absence of the project. Where such an alternative source is not available or would not be economically feasible, the benefits may be valued on such basis as the value of water to users or the average cost of raw water (for comparable units of dependable yield) from municipal or industrial water supply projects planned or recently constructed in the general region.

2. Irrigation benefits: The increase in the net income of agricultural production resulting from an increase in the moisture content of the soil through the application of water or reduction in damages from drought:

3. Water quality control benefits: The net contribution to public health, safety, economy, and effectiveness in use and enjoyment of water for all purposes which are subject to detriment or betterment by virtue of change in water quality. The net contribution may be evaluated in terms of avoidance of adverse effects which would accrue in the absence of water quality control, including such damages and restrictions as preclusion of economic activities, corrosion of fixed and floating plant, loss or downgrading of recreational opportunities, increased municipal and industrial water treatment costs, loss of industrial and agricultural production, impairment of health and welfare, damage to fish and wildlife, siltation, salinity intrusion, and degradation of the esthetics of enjoyment of unpolluted surface waters, or, conversely, in terms of the advantageous effects of water quality control with respect to such items. Effects such as these may be composited roughly into tangible and intangible categories, and used to evaluate water quality control activities. In situations where no adequate means can be devised to evaluate directly the economic effects of water quality improvement, the cost of achieving the same results by the most likely alternative may be used as an approximation of value.

4. Navigation benefits: The value of the services provided after allowance for the cost of the associated resources required to make the service available. For commodities that would move in the

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absence of the project, the benefit is measured by the saving as a result of the project in the cost of providing the transportation service. For commodities that will move over the improved waterway but would not move by alternative means, the measure of the benefit is the value of the service to shippers; that is, the maximum cost they should be willing to incur for moving the various units of traffic involved. Navigation improvements may also provide benefits in other forms, such as reduction in losses due to hazardous or inadequate operating conditions and enhancement in land values from the placement of dredged spoil.

5. Electric power benefits: The value of power to the users is measured by the amount that they should be willing to pay for such power. The usual practice is to measure the benefit in terms of the cost of achieving the same result by the most likely alternative means that would exist in the absence of the project. In the absence of economically feasible alternative means, the value of the power to users may be measured by any savings in production costs, increase in value of product that would result from its use, or its net value to consumers.

6. Flood control and prevention benefits: Reduction in all forms of damage from inundation (including sedimentation) of property, disruption of business and other activity, hazards to health and security, and loss of life; and increase in the net return from higher use of property made possible as a result of lowering the flood hazard.

7. Land stabilization benefits: Benefits accruing to landowners and operators and the public resulting from the reduction in the loss of net income, or loss in value of land and improvements, through the prevention of loss or damage by all forms of soil erosion including sheet erosion, gullying, flood plain scouring, streambank cutting, and shore or beach erosion, or, conversely in terms of advantageous effects of land stabilization.

8. Drainage benefits: The increase in the net income from agricultural lands or increase in land values resulting from higher yields or lower production costs through reduction in the moisture content of the soil (exclusive of excessive moisture due to flooding), and the increase in the value of urban and industrial lands due to improvement in drainage conditions.

9. Recreation benefits: The value as a result of the project of net increases in the quantity and quality of boating, swimming, camping, picnicking, winter sports, hiking, horseback riding, sightseeing, and similar outdoor activities. (Fishing, hunting, and appreciation and preservation of fish and wildlife are included under par. V–E–10.) In the general absence of market prices, values for specific recreational activities may be derived or estimated on the basis of a simulated market giving weight to all pertinent considerations, including charges that recreationists should be willing to pay and to any actual charges being paid by users for comparable opportunities at other installations or on the basis of justifiable alternative costs. Benefits also include the intangible values of preserving areas of unique natural beauty and scenic, historical, and scientific interest.

10. Fish and wildlife benefits: The value as a result of the project of net increases in recreational, resource preservation, and commercial aspects of fish and wildlife. In the absence of market prices, the value of sport fishing, hunting, and other specific recreational forms of fish

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and wildlife may be derived or established in the same manner as prescribed in paragraph V–E–9. Resource preservation includes the intangible value of improvement of habitat and environment for wildlife and the preservation of rare species. Benefits also result from the increase in market value of commercial fish and wildlife less the associated costs.

11. Other benefits: Justification of the recognition of any other benefits and of the standard used in their measurement shall be set forth in reports. Unless included under one or more of the above categories, reports should show the net economic effects of changes in transportation capability, or changes in productivity of forest, range, mineral, or other resources. A project's contribution toward meeting specific needs for servicing international treaties or for national defense may also be included.

F. Definition of costs

1. Project economic costs: The value of all goods and services (land, labor, and materials) used in constructing, operating, and maintaining a project or program, interest during construction, and all other identifiable expenses, losses, liabilities, and induced adverse effects connected therewith, whether in goods or services, whether tangible or intangible and whether or not compensation is involved. Project economic costs are the sum of installation costs; operation, maintenance, and replacement costs; and induced costs as defined below.

2. Installation costs: The value of goods and services necessary for the establishment of the project, including initial project construction; land, easements, rights-of-way, and water rights; capital outlays to relocate facilities or prevent damages; and all other expenditures for investigations and surveys, and designing, planning, and constructing a project after its authorization.

3. Operation, maintenance, and replacement costs: The value of goods and services needed to operate a constructed project and make repairs and replacements necessary to maintain the project in sound operating condition during its economic life.

4. Induced costs: All uncompensated adverse effects caused by the construction and operation of a program or project, whether tangible or intangible. These include estimated net increases, if any, in the cost of Government services directly resulting from the project and net adverse effects on the economy such as increased transportation costs. Induced costs may be accounted for either by addition to project economic costs or deduction from primary benefits.

5. Associated costs: The value of goods and services over and above those included in project costs needed to make the immediate products or services of the project available for use or sale. Associated costs are deducted from the value of goods and services resulting from a project to obtain primary benefits.

6. Taxes: Allowances in lieu of taxes or taxes foregone will not be included in project economic costs, except as required by law.

G. Time considerations

1. *Period of analysis.*—The economic evaluation of a project shall encompass the period of time over which the project will serve a useful purpose. Thus, the period of analysis should be the shorter of either the physical life or the economic life of the structure, facility, or im-

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provement. However, because of the difficulty in defining the more remote future conditions and the discount of long-deferred values, 100 years will normally be considered the upper limit of the period of analysis.

2. *Discount rate.*—The interest rate to be used in plan formulation and evaluation for discounting future benefits and computing costs, or otherwise converting benefits and costs to a common time basis shall be based upon the average rate of interest payable by the Treasury on interest-bearing marketable securities of the United States outstanding at the end of the fiscal year preceding such computation which, upon original issue, had terms to maturity of 15 years or more. Where the average rate so calculated is not a multiple of one-eighth of 1 percent, the rate of interest shall be the multiple of one-eighth of 1 percent next lower than such average rate.

This procedure shall be subject to adjustment when and if this is found desirable as a result of continuing analysis of all factors pertinent to selection of a discount rate for these purposes.

3. *Price levels.*—The prices used for project evaluation should reflect the exchange values expected to prevail at the time costs are incurred and benefits accrued. Estimates of initial project costs should be based on price relationships prevailing at the time of the analysis. Estimates of benefits and deferred costs should be made on the basis of projected normal price relationships expected with a stabilized general price level and under relatively full employment conditions for the economy. Pending development of mutually acceptable long-term price projections of this type, normalized current price relationships may be used in estimating deferred project effects. When benefits are measured in terms of the cost of an alternative, the prices should be those expected to prevail at the time such costs would have been incurred. Whenever project production is expected to influence prices significantly, the use of a price about midway between those expected with and without the project may be justified to reflect the public values involved. Appropriate price adjustments should be made where there is a limited foreseeable need or demand for the products or services to be provided by the project.

VI. RELATION TO COST ALLOCATION, REIMBURSEMENT AND COST-SHARING POLICIES, STANDARDS, AND PROCEDURES

Cost allocation, reimbursement and cost-sharing policies, standards, and procedures, as indicated in the section on "Purpose and Scope," above, are not generally included herein. Nevertheless, certain such matters of special importance in relation to the foregoing are included, as follows:

(*a*) All project purposes shall be treated comparably in cost allocation and each is entitled to its fair share of the advantages resulting from the multiple-purpose project or program. Project purposes to which costs may be allocated on a par with all other purposes, without restrictions regarding reimbursement or cost-sharing policies, shall include (but not be limited to) the following:

Domestic, municipal, or industrial water supply.
Irrigation.
Water quality control.
Navigation.

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Hydroelectric power.
Flood control and prevention.
Land and beach stabilization.
Drainage, including salinity control.
Outdoor recreation development.
Fish and wildlife development.
Other purposes, such as area redevelopment and the servicing of international treaties and national defense when specific, quantifiable benefits are provided for such purposes by a project or program.

(*b*) Allocated costs, determined in accordance with principles and procedures to be established subsequently, shall provide a basis for consideration of reimbursement and cost-sharing arrangements.

(*c*) The period of analysis and discount rate established herein for purposes of formulation and evaluation of comprehensive plans and project plans (sec. V–G–1 and 2) shall not be construed as establishing the payout period or rate of interest to be used in reimbursement and cost-sharing arrangements.

(*d*) Planning reports of each department shall include appropriate recommendations covering reimbursement and cost-sharing arrangements and provide a detailed explanation of the basis used in arriving at the recommendations in consideration of the laws and administrative provisions in effect at the time.

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ANNEX C
INDUSTRIAL OR COMMERCIAL
PROJECT

BALANCE SHEET

Attach comparative balance sheets for the past five years, according to the following breakdown:

Assets

1. Current Assets:

    a. Cash
    b. Marketable securities
    c. Notes Receivable (show separately amounts owed by subsidiaries; directors, shareholders, their families and agents; all other amounts other than normal commercial debts.)
    d. Accounts Receivable from customers
    e. Inventories
    f. Other Assets (describe)

2. Investments:

    a. In subsidiaries
    b. Other Investments (describe)

3. Capital Assets:

    a. Land
    b. Buildings and Site Facilities
    c. Machinery and Equipment
    d. Construction in Progress
    e. Other Capital Assets (describe)

4. Gross Assets: (1 thru 3)

5. Depreciation Reserves (state method of amortization)

6. Net Capital Assets (3 - 5)

7. Intangibles (patents, licenses, good will, trademarks, formulas, franchises, etc.)

8. Other Assets: (specify)

9. Total Assets (6 thru 8)

Liabilities

10. Current Liabilities (due within one year)

    a. Notes Payable
       - to banks or other short-term lending agencies
       - to holders of long-term debt maturing within one year
       - to directors, shareholders, their families, and agents
    b. Accounts payable to commercial creditors
    c. Contractors' bid and performance bonds
    d. Royalties
    e. Other Current Liabilities (describe)

11. Long-term Debt (over one year) (indicate terms)

12. Construction Costs Payable

Capital and Surplus

13. Capital (authorized, issued and paid-in)

14. Reserves: (describe)

15. Surplus:

    a. Revaluation Surplus
    b. Earned Surplus (or Deficit)
    c. Net Surplus or Deficit)

16. Total Liabilities and Capital

    (10 thru 14 minus or plus 15)

ANNEX D
INDUSTRIAL OR COMMERCIAL
PROJECT

FINANCIAL INFORMATION

1. Capital Structure (present and planned)
   Authorized Capital
   Issued Capital
   Subscribed Capital
   Paid-up Capital
   Capital Surplus (if any) arising from asset revaluation

2. Distribution of Shares

	No. Issued	Total Nominal Amount	Total Paid-up Amount	No. of Votes per Share
Ordinary				
Preference				
Deferred				

3. Indicate number and type of shares held by any individuals and/or group controlling more than one-fifth of the votes. Indicate relationship of such individuals and/or group to the company. If held by a holding company or other industrial enterprise, provide balance sheets, profit and loss statements, and capital structure information on such enterprises. If held by individuals, provide general and financial information on such individuals.

4. Outstanding debentures (term of issue and redemption, interest rate, etc.)

5. Outstanding mortgages and other long-term debt (terms of of issue and repayment, interest rate, etc.)

6. Bank borrowings. Give details of amounts owed, interest rates, terms, renewal arrangements and unused credit limits.

7. Pending litigation either by or against the company.

8. Contingent liabilities, guarantees or endorsements.

9. Method of valuation of inventories. Note any departure from stated procedure affecting past profits as shown in in attached statements.

10. Book value and estimated current market value of inventories for the past four years, adjusted to a comparable basis.

11. Give the book value of fixed assets for the past four years according to the following breakdown:

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Book value of fixed assets at beginning of year (describe basis of valuation)

plus acquisitions during the year, at cost
minus retirements during the year, at book value
minus normal depreciation (state normal depreciation method and rates used by major categories of assets)
minus extraordinary depreciation or write-offs (or plus any shortfall below normal depreciation)
plus revaluation of fixed assets

Book value of fixed assets at end of year.

12. (a) Give the average annual amount written off on bad debts during the past four years;
(b) Give the total amount of claims overdue as of the date of the latest balance sheet and percentage of nominal value at which claims are recorded in the balance sheet.

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ANNEX E
INDUSTRIAL OR COMMERCIAL PROJECT

FORECAST OF EARNINGS, RECEIPTS AND EXPENDITURES

	Present Operation			Construction Years			Operative Years					
	1959	1960	etc.	1962	1963	etc.	1964	1965	1966	1967	1968	etc.
A. EARNINGS FROM OPERATIONS												
Revenue (Separately for each major product or category of sales)												
1. Annual Sales (Units per year)												
2. Unit Sales Price												
3. Gross Revenue from Sales (1 x 2)												
4. Other Income (describe)												
5. Total Income (3 + 4)												
Cost of Operation, Net Income & Profit												
6. Operating Expenses:												
a. Manufacturing												
b. Maintenance												
c. General Administration												
d. Distribution & Marketing												
e. Short-term Interest												
7. Depreciation Allowances (Show basis)												
8. Taxes (describe)												
9. Total Cost of Operation before interest on Long-term Debt (6 thru 8)												
10. Net Income before Interest on Long-term Debt (5 - 9)												
11. Interest on Long-term Debt												
12. Net Profit (or Loss) (10 - 11)												
B. SOURCES OF FUNDS												
13. Net Income before Interest (Item 10)												
14. Depreciation Allowance (Item 7)												
15. Increase in Paid-in Share Capital												
16. Borrowings:												
a. Existing DLF or A. I. D. Loans)												
b. A. I. D. Loan proposed herein)												
c. Other Long-term borrowings) (show terms)												
(Each loan separately))												
d. Anticipated short-term loans)												
17. Other receipts (describe)												
18. Total Receipts (13 thru 17)												

ANNEX E

	Present Operation			Construction Years			Operative Years					
	1959	1960	etc.	1962	1963	etc.	1964	1965	1966	1967	1968	etc
C. USE OF FUNDS												
19. Construction Expenditures:												
a. This A. I. D. Project												
Foreign currency												
Local currency												
Total A. I. D. Project												
b. Other Construction												
c. Total construction expenditures												
20. Current Assets (minimum expected) (See Annex C)												
21. Fixed, Intangible & other Assets (See Annex C)												
22. Debt Service:												
a. Amortization of Principal												
(1) Existing DLF or A. I. D. Loans												
(2) A. I. D. Loan proposed herein												
(3) Other borrowings												
b. Interest												
(1) Existing DLF or A. I. D. Loans												
(2) A. I. D. Loan proposed herein												
(3) Other borrowings												
23. Other expenditures (describe)												
24. Total Expenditures (19 thru 23)												
D. CASH FLOW												
25. Annual Cash Surplus (or Deficit) (Item 12)												
26. Cash to Reserves												
27 Cash to Dividends												
28. Cash Balance, End of Period (25 - 26 & 27)												
E. BALANCE SHEET, END OF PERIOD												
Assets												
29. Current Assets (See Annex C)												
30. Investments												
31. Capital Assets (See Annex C)												
32. Gross Assets (29 thru 31)												
33. Accumulated Depreciation												
34. Net Fixed Assets (32 - 33)												
35 Intangible Assets (See Annex C)												
36. Total Assets, end of period (34 + 35)												
Liabilities												
37. Current Liabilities (due within 1 year)												
38. Share Capital (authorized, issued, paid-in)												
39. Reserves (describe)												
40. Surplus: a. Re-evaluation surplus												
b. Earned Surplus or deficit												
41. Total Liabilities (37 thru 39 + or - 40)												

ANNEX E (Cont'd)

PRODUCTION COST

Cost per unit of output (pound, ton, thousand, etc.

based on ___ units per day or ___ units per year)

Item	Quantity Required per Unit	Price	Cost per Unit of Product
Labor (classes and rates)			
Raw materials (list)			
Power			
Fuel			
Utilities			
Supplies			
Supervisory and technical salaries (classes and rates)			
Other direct costs			
Total Direct Plant Cost			

SYSTEM REQUIREMENTS-POWER & ENERGY SOURCES

Calendar Years	Last Year of Record	For Minimum of 10 years by Year
A. SYSTEM DEMAND MW		
By substations, Areas or load centers		
TOTAL DEMAND, MW		
Demand Diversity Factor - %		
Coincidental Demand MW		
System Losses MW		
Net System Demand MW		
B. SYSTEM ENERGY, MWH		
By substations, Areas or load centers		
TOTAL MWH SALES		
Transmission & Distribution Losses, MWH		
Net MWH Supplied		
System Load factor %		
C. POWER SOURCES		
Show installed KW for each plant or other power source, to provide requirements (including reserves)		
Less Total Reserves, MW		
NET SYSTEM DEMAND, MW		
D. ENERGY SOURCES		
Show MWH supplied from each of above sources accounting for base load, peaking and standby requirements to equal requirements supplied		
NET MWH SUPPLIED		

ANNEX H
ELECTRIC POWER PROJECT

CAPITAL COST AND INVESTMENT

(Provide Separate Tabulation for Each Source of Financing)

Item	Local Currency	U. S. Dollars	Total
1. Generating Plant - Thermal			
a. Land and Land Rights			
b. Structures and Improvements			
c. Fuel Storage and Handling			
d. Cooling Water Supply			
e. Boiler Plant Equipment			
f. Turbine-generator Plant Equipment			
g. Engine-generator Plant Equipment			
h. Plant Step-up Substation			
i. Misc. Power Plant Equipment			
j. Other (explain)			
Sub-total, Generation (thermal)			
1a. Generating Plant - Hydro			
a. Land and Land Rights			
b. Structures and Improvements			
c. Reservoirs, Dams and Waterways			
d. Turbines and Generators			
e. Accessory Electric Equipment			
f. Plant Step-up Substation			
g. Accessory Mechanical Equipment			
h. Roads, Railroads and Bridges			
i. Other (explain)			
Sub-total, Generation (hydro)			

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(Provide Separate Tabulation for Each Source of Financing)

Item	Local Currency	U.S. Dollars	Total
2. Transmission (show each voltage class and circuit separately)			
a. Right-of-Way Procurement and Clearing			
b. Poles, Towers and Fixtures			
c. Overhead Conductors			
d. Underground Cable & Conduit			
e. Insulation and Hardware			
f. Other (explain)			
Sub-total, Transmission			
3. Substations (show each substation separately)			
a. Land and Land Rights			
b. Structures			
c. Conduit, Wiring & Busses			
d. Protective & Auxiliary Equipment			
e. Switchgear			
f. Transformers			
g. Other (explain)			
Sub-total, Substation			
4. Distribution (show each area separately)			
a. Right-of-Way Procurement & Clearing			
b. Poles, Towers and Fixtures			
c. Overhead Conductors			
d. Underground Conductors, Conduit and Devices			
e. Line Transformers			
f. Services			
g. Meters			
h. Other (explain)			
Sub-total, Distribution			

(Provide Separate Tabulation for Each Source of Financing)

Item	Local Currency	U. S. Dollars	Total
5. General			
a. Land and Land Rights			
b. Office Buildings, Warehouses, Garages and other Misc. Structures			
c. Office Furniture and Equipment			
d. Transportation Equipment			
e. Shop			
f. Laboratory Equipment			
g. Tools and Work Equipment			
h. Communication and Dispatching Equipment			
i. Computers			
j. Other (explain)			
Sub-total, General			
6. Improvements & Replacements (explain and itemize)			
Total Direct Cost			
7. Engineering			
8. Administration			
9. Contingency			
10. Other (explain)			
Total Construction Cost			
11. Interest during Construction			
12. Working Capital			
13. Overhead and Indirect Costs			
Total Investment			

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ANNUAL PRODUCTION COSTS
(Proposed Facilities)

	First Year's Operation	Year Facility Fully Utilized
Plant Capability, MW		
Station Usage %		
Net Station Heat Rate, BTU/KWH		
Gross Generation MWH		
Net Generation MWH		
Production Expenses		
Direct Production Expense		
Operating Labor and Supervision		
Operating Supplies & Equipment		
Maintenance Labor & Expenses		
Maintenance Material		
Fuel		
Other, explain		
Sub-total		
Indirect Production Expenses		
Replacement (not included in maintenance)		
Depreciation		
Interest		
Taxes		
Insurance		
Other, explain		
Sub-total		
Total Production Expense		

	First Year's Operation	Year Facility Fully Utilized
Transmission Expenses		
O&M (by voltage class and circuit)		
O&M, Step down substations		
Taxes		
Insurance		
Depreciation		
Interest		
Replacement (not included in O&M)		
Other, explain	_____	_____
Sub-total		
Distribution Expenses (same breakdown as Transmission)		
	_____	_____
Sub-total		
General Plant Expenses		
Depreciation		
Interest		
Inventories and Spare Parts		
Replacement		
Administrative & General		
Taxes		
Insurance		
Other, explain	_____	_____
Sub-total	_____	_____
Total Cost		
Unit Cost/KWH		

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BALANCE SHEET

(Show Comparative Balance Sheet for Past Five Years)

Assets and Other Debits

1. Electric Utility Plant:
   a. Production Plant
   b. Transmission Plant
   c. Substations
   d. Distribution Plant
   e. General Plant
   f. Construction in Progress
   g. Other Utility Property (describe)
   h. Intangible Plant _____
      Total, Utility Plant
   i. Accumulated Provision for Depreciation and Amortization _____
      Net, Utility Plant
2. Non-utility Property Less Accumulated Provision for Depreciation and Amortization
3. Investment in Associated Companies
4. Other Investments
5. Special Funds _____
   Total, Other Property and Investments
6. Cash
7. Special Deposits
8. Temporary Cash Investments and Marketable Securities
9. Accounts Receivable - Customers
10. Other Receivables (show separately, amounts owned by subsidiaries, directors, shareholders, their families or agents; all other amounts other than normal commercial debts).
11. Inventories : supplies, materials and fuels
12. Prepayments
13. Other Current and Accrued Assets _____
    Total, Current and Accrued Assets
14. Unamortized Debt Discount and Expense
15. Extraordinary Property Losses
16. Preliminary Survey and Investigation Charges
17. Clearing Accounts
18. Other Deferred Debits _____
    Total, Deferred Debits
19. Other Assets (specify) _____
    Total, Assets and Other Debits

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Liabilities and Other Credits

20. Capital Stock, Authorized, issued and paid in
21. Other Capital Stock Items (specify)
22. Surplus:
    a. Earned surplus or deficit
    b. Revaluation surplus
    c. Other surplus (specify)
    Total , Surplus _____
    Total , Proprietary Capital
23. Bonds
24. Advances from Subsidiaries
25. Other Long-term Debts (specify terms) _____
    Total , Long-term Debt
26. Current Liabilities (due within one year):
    Rates payable:
    a. To banks or other short-term lending agencies
    b. To holders of long-term debt maturing within one year
    c. To directors, shareholders, their families and agents
27. Accounts Payable to Commercial Creditors
28. Contractor's Bid and Performance Bonds
29. Dividends Declared
30. Other Current and Accrued Liabilities _____
    Total , Current and Accrued Liabilities
31. Deferred Credits (specify)
32. Operating Resources (specify)
33. Other Liabilities and Credits (specify) _____
    Total , Liabilities and Other Credits

ANNEX K
ELECTRIC POWER PROJECT

FINANCIAL PROJECTION

	Current	Projection by Years, Minimum 10 Years
I. STATEMENT OF OPERATIONS		
A. Revenue (Provide detailed calculations from each category of sales for a sample year)		
1. Annual Sales (KWH per year)		
2. Unit Sales Price		
3. Gross Revenue from Sales(1x2)		
4. Other Income (describe)	_____	_____
5. Total Income (3+4)		
B. Cost of Operations		
1. Production Expenses (show each plant separately)		
a. Steam Plants (Name)		
(1) Net generation (KWH per year)		
(2) Operation and maintenance		
(3) Fuel		
(4) Other	_____	_____
Sub-total, steam plants		
b. Hydro Plants (Name)		
(1) Net generation (KWH per year)		
(2) Operation and maintenance		
(3) Other	_____	_____
Sub-total, hydro plants		
c. Other Power Plants (Name)		
(1) Net generation (KWH per year)		
(2) Operation and maintenance		
(3) Fuel		
(4) Other	_____	_____
Sub-total, other power plant		
d. Purchase Power (show each major source)		
(1) Net energy purchased (KWH per year)		
(2) Unit cost of purchase power	_____	_____
Cost of purchase power		

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	Current	Projection by Years, Minimum 10 Years
e. System Control & Dispatching		
f. Other Power Supply Expenses (explain)	_____	_____
2. Total Production Expense		
3. Transmission Expenses		
a. Operation and Maintenance		
b. Other	_____	_____
Sub-total, Transmission		
4. Distribution Expense		
a. Operation and Maintenance		
b. Other	_____	_____
Sub-total, Distribution		
5. Other Expenses (explain)		
6. Total Operating Expenses		
C. Fixed Charges		
1. Depreciation		
2. Taxes		
3. Insurance		
4. Administrative and General		
5. Consumer Accounts and Sales		
6. Other Charges (explain)	_____	_____
7. Total Fixed Charges (before interest)		
D. Total Production Cost (B6 + C7)		
E. Net Profit or Loss (before interest) (A5-D)		
F. Interest		
G. Net Profit or Loss (E-F)		

	Current	Projection by Years, Minimum 10 Years

II. CASH FLOW

A. Cash Receipts

1. Net Profit Before Interest (Item I E)

2. Depreciation Taken (Item I C 1)

3. Other (explain)

4. Increase in Paid-in Share Capital

5. Borrowings:
   a. Existing A. I. D. or DLF Loans
   b. A. I. D. Loan Requested
   c. Other Long-term Borrowing (give terms)
   d. Finance Future Additions Required to Provide for Long Range Plan (See Chapter III, Section II C)

6. Sale of Assets (explain)

7. Decrease in Accounts Receivable

8. Decrease in Inventories

9. Decrease in Other Assets (explain)

10. Increase in Accounts Payable

11. Increase in Other Liabilities

12. Other Receipts (explain) _____ _____

13. Total Receipts

B. Cash Disbursements

1. Net Loss Before Interest (Item I E)

2. Construction Expenditures:
   a. This A. I. D. Project
   b. Other Construction
   c. Future Additions (See A 5 d above)

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	Current	Projection by Years, Minimum 10 Years
3. Current Assets (Minimum Expected) (See Annex J)		
4. Fixed, Intangible and Other Assets (See Annex J)		
5. Debt Service:		
a. Amortization of Principal		
(1) Existing A.I.D. and D.L.F. loans		
(2) A.I.D. loan requested		
(3) Other long-term borrowing		
(4) Borrowing for future additions		
b. Payment of Interest		
(1) Existing A.I.D. and D.L.F. loans		
(2) A.I.D. loan requested		
(3) Other long-term borrowing		
(4) Borrowing for future additions		
6. Other Expenditures (describe)		
7. Increase in Accounts Receivable		
8. Increase in Inventories		
9. Increase in Other Assets (explain)		
10. Decrease in Accounts Payable		
11. Decrease in Other Liabilities (Exclude Borrowing)		
12. Other Disbursements (explain)	_____	_____
13. Total Disbursements		
14. Increase (Decrease) in Cash		
15. Cash Balance Beginning of Year		
16. Cash Balance End of Year		

III. BALANCE SHEET, END OF PERIOD

A. Assets

1. Current Assets (see Annex J)

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	Current	Projection by Years, Minimum 10 Years
2. Investments		
3. Capital Assets (see Annex J)	_____	_____
4. Gross Assets (add 1, 2 and 3)		
5. Accumulated Provision for Depreciation	_____	_____
6. Net Fixed Assets (4 + 5)		
7. Intangible Assets (see Annex J)	_____	_____
8. Total Assets End of Period		

B. Liabilities

1. Current Liabilities (due within one year)		
2. Long-term Debt (due more than one year)		
3. Share Capital (authorized, issued and paid-in)		
4. Reserves (describe)		
5. Surplus:		
a. Revaluation Surplus		
b. Earned Surplus or Deficits	_____	_____
6. Total Liabilities and Capital		