



MINISTRY OF PUBLIC WORKS AND ELECTRIC POWER
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
DIRECTORATE OF IRRIGATION

JRAGUNG DAM

MULTI - PURPOSE IRRIGATION FLOOD CONTROL
HYDROELECTRIC AND MUNICIPAL
AND INDUSTRIAL WATER SUPPLY PROJECT

QUARTERLY PROGRESS REPORT

No. 4

INCLUDES MONTHLY PROGRESS
REPORT No. 13

MARCH 1978

SUBMITTED BY :

ENGINEERING CONSULTANTS, INC.

Denver, Co., USA -- Surarany, Indonesia

2-Way Memo

Subject : Jragung Dam
AID Loan 497-T-040

INSTRUCTIONS

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Washington, D.C. 20523

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<i>Paul B. Thorn</i>	
TITLE OF ORIGINATOR	
Project Officer	

FOLD INITIAL MESSAGE FOLD

Transmitted herewith are two copies of Quarterly Progress Report No. 4, March 1978 for the final design phase of the Jragung Dam. Please see that one copy is forwarded to the AID/Library. A copy has also been sent to DS/SER.

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From : Paul B. Thorn
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HYDROELECTRIC AND MUNICIPAL
AND INDUSTRIAL WATER SUPPLY PROJECT

QUARTERLY PROGRESS REPORT

No. 4

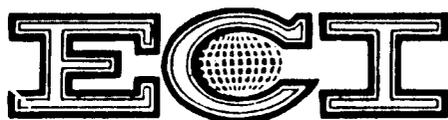
INCLUDES MONTHLY PROGRESS
REPORT No. 13

MARCH 1978

SUBMITTED BY :

ENGINEERING CONSULTANTS, INC.

Denver, Co., USA — Semarang, Indonesia



ENGINEERING CONSULTANTS, INC.

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Director General of
Water Resources Development
Ministry of Public Works and
Electric Power
Jalan Pattimura 20/7
Kebayoran Baru
Jakarta Selatan
Republic of Indonesia

April 17, 1978

Our file : 1196/MR/13
121/78

Subject : Quarterly Progress
Report No. 4

Attention : Ir. Cesman Djojoadinoto
Director Irrigation

Dear Sir:

We submit herewith twenty (20) copies of the Quarterly Progress Report No. 4 for the period January 1 to March 31, 1978. It may be noted that separate monthly report for the month of March, 1978 has not been prepared; the same is included in this Progress Report.

The report is prepared in pursuance of Section 10.15 B of Contract No. KAB. 9/3/72 between the Directorate General of Water Resources Development and the Engineering Consultants, Inc. for providing engineering services for the design of Jragung Dam Project. The draft of the report was shown to the Jragung Dam Project Management at Semarang before its printing.

Your comments, if any, on the contents of the report are respectfully requested.

cc. U.S. AID Jakarta
(Attention: Mr. Grayson)
with eight (8) copies of
the report
ECI Denver (E1119)
Project Manager
Brahmavijaya Biron Project
General Manager (RCSIPA)
ECI Semarang
SAR: n,

Very truly yours,
Engineering Consultants, Inc.

Saeed A. Rana

Saeed A. Rana
Resident Manager

JRAGUNG DAM PROJECT

QUARTERLY PROGRESS REPORT

NO. 4

INCLUDES MONTHLY PROGRESS REPORT

FOR MARCH, 1978

PERIOD

JANUARY 1, 1978 - MARCH 31, 1978

CONTRACT NO. KAB. 9/3/12

U.S. AID LOAN NO. 497 - T - 040

ENGINEERING CONSULTANTS, INC.

DENVER, COLORADO

SEMARANG

U.S.A.

INDONESIA

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SECTION I

GENERAL

This report has been prepared in pursuance of Section 10.15 of the Contract No. KAB. 9/3/12 dated March 15, 1977 between the Directorate General of Water Resources Development of the Ministry of Public Works and Electric Power, Republic of Indonesia, and the Engineering Consultants, Inc. for consulting services for the Jragung Dam Project. The design job is being financed by the United States of America acting through the Agency for International Development for which a loan No. 497-T-040 dated July 28, 1976 has been obtained by the Government of Indonesia.

The report covers the period January, 1978 through March, 1978. The monthly progress report for the month of March, 1978 is also included in this report.

During the period under report, the design stage investigations for the dam and structures foundations, embankment and other construction materials progressed satisfactorily and now are in the concluding stages. At the main damsite, the geological, foundations and materials investigations and the design work proceeded simultaneously to find out the best alignment and layout of the dam and the most suitable scheme for the River Diversion Works, Spillway and the Irrigation and Power Tunnel. In this area, the field investigations have mostly been completed and quite useful information has been obtained for the finalization of the design work of the said structures. The surveying and mapping of the structures locations and the damsite have substantially been completed.

The events which took place, the actions which were initiated or completed and other points pertinent to the Project design are described

in the following.

1. The Project was visited from January 26 to January 31 by Mr. C.M. Langford, Senior Vice President ECI and the Project Director of the Jragung Dam Project and in February, 1978 by the following members of the Consultant's design review team.

- | | |
|-------------------|-----------------------------------|
| 1. Mr. M.K. Kuehl | Chief Engineer and Vice President |
| 2. Dr. W.H. Burke | Geology Consultant |
| 3. Mr. P. Strauss | Chief Engineering Geologist |
| 4. Mr. S. Hillis | Chief Materials Engineer |

A thorough review of the geology, foundation conditions, exploration, data, test results and the designs accomplished by then, was done by this team of experts. Based on their field visits and data review, the alignments of the dam axis and the River Diversion Works have been finalized. Final decisions on the alignment of the Irrigation and Power Tunnel and the locations of the Powerhouse are now being made.

The report on the review of geology of the damsite by Dr. Burke is a useful and important document, on which the location of the dam and the appurtenant structures have been based. This report is being included as annexure to Section IV-A of this Quarterly Report.

2. The survey and mapping work envisaged in the original plan for the damsite and the appurtenant structures have already been completed. However, work on additional mapping required at the right abutment of the final alignment of the dam is in progress and is expected to be completed within first half of the next quarter. The remaining part of the miscellaneous surveys and other secondary mapping work are progressing on schedule.

3. The geological investigation work has so far progressed satisfactorily. The quantity of additional exploration work has further increased resulting from the geology review conducted by Dr. Burke. Most of this work is expected to be completed by the end of April, 1978 at which time the TDY assignment of the geologist on Jragung will conclude. However, the balance work will be done by Mr. Strauss, ECI's Chief Engineering Geologist. The remaining drilling at the damsite will be supervised by Mr. Borinelli.

The main activity of geological investigation was concentrated at the Power and Irrigation Tunnel locations, the Power House and the Dam foundation area. Some additional work was also done at the Spillway location.

The number of drilling rigs working at the damsite varied from 2 to 3, and the progress on drilling remained satisfactory. If two drilling rigs are continuously available during the next quarter period, the scheduled drilling work will be completed on time.

The progress on trenching remained slow which is attributed to fuel shortages and repeated mechanical problems of the bulldozers and the weather conditions. It is hoped that the two bulldozers presently available for the Jragung Dam exploration program will be more effectively employed on the trenching work during the month of April to enable the geologist to complete the geological investigation. This work will be adversely affected if the condition of the bulldozer work does not improve.

A detailed description of the progress in the geological exploration work is given in Section IV-A of the Report. The geology review report is also contained therein.

4. The final design of the River Diversion Works per the feasibility report scheme was completed and submitted to the Ministry and U.S. AID for

review and comments. Since the final alignment of the dam has now been decided, relocation of the diversion tunnel and addition of cut and cover section in part length of the conduit have become necessary. These changes are being incorporated as "revision" in the design of the River Diversion Works submitted earlier. It is expected that the revised drawings will be issued in the first week of May, 1978. Any further adjustment required to be made in the alignment of the diversion tunnel resulting from the finalization of the section of the main dam will also be included as "revision" at the appropriate time. However, the basic scheme of work, which has now been finalized, will not change.

The construction drawings for the relocated access roads and the bridge have been completed and submitted to the Ministry and U.S. AID. Also, the technical specifications and a set of design drawings, all in draft form, have been presented. After review of these designs and the documents has been completed, formal contract documents will be printed and submitted.

The proposed layout of the Government Camp at the Project site has been received from the Consultant's Denver office and has been given to the Proyek office for completing the designs of buildings and preparation of construction drawings by the Proyek engineers. The review by the Consultant of the standard building designs of the camps continued and is expected to be completed by the end of April.

The design of the Spillway structure at the new location is in progress and was in an advanced stage at the end of the period under report. The concrete outlines of all three schemes of the structure at new location have been finalized. The model testing, which was suspended after the first run for the scheme of structure provided in the feasibility report, has now been resumed at the Bandung Hydraulic Laboratories for the three schemes in general and for the most favored Alternative III in particular. Decision on the final scheme of structure will be taken

during the month of April and any change in the shape of the structure necessitated on the basis of model testing will be incorporated after the results are known.

With the finalization of the location of the main dam axis, the major design activity is now concentrated on determining the required section of the dam. For this purpose, the strength parameters of the foundation and embankment materials based on testing being done at Semarang and in North America are being determined. The final design section is scheduled to be completed by the middle of September.

The design of the Power and Irrigation tunnel and the Power House was started in the Consultant's Denver office in the month of February and is progressing on schedule. The Indonesian counterparts are participating in these design as part of the Ministry Personnel Training Program.

The design of the powerplant and the power distribution system are continuing. Many field visits were made and office discussions were held with the authorities of the PLN by the Consultant's electrical and mechanical engineers during their first part of the TDY assignments on Jragung. Further work is now being done at Denver which will be finalized during the second phase of the TDY assignments of the electrical and mechanical engineers.

A scheme of power distribution system has been prepared by the Consultant and submitted to the Ministry to obtain views and comments of the PLN. The Consultant requests an early response.

Detailed reports on progress achieved in design work and material investigation are given in Sections IV-B and IV-C.

5. The material investigation for the dam in the borrow areas has been completed. Laboratory testing of available materials is in progress both

at Semarang and in North America. The second shipment of soil samples containing embankment and foundation materials is expected to leave for the United States in the first week of April. The third and the last shipment will leave by about the end of May. The results of testing being done overseas are expected to start arriving soon.

6. The status of rock and concrete aggregate for the dam and its appurtenant structures remained the same as stated in the Quarterly Progress Report No. 3. The available sources of sand are Kali Putih and Kali Krasak and those for good quality rock (basalt) are at Pudak Payung and Gunung Tjantung. It appears that andesite boulders in the borrow areas are of acceptable quality for the dam riprap. Investigations to determine the quantities and characteristics of rock that would thus be available have been started.

7. In a coordination meeting held in the PROSIDA office at Jakarta on March 7, 1978, the designs of the Jragung Dam Project were presented by ECI and were discussed by the Directors of the Directorate General of Water Resources Development and the representative of the Cipta Karya and the Semarang Water Supply Board. The order of priority for the use of Jragung water and the Muncul Springs for the Semarang municipal and industrial requirements was discussed and debated. The Water Supply authorities favored using Muncul Springs first because of lower cost involved in their exploitation. The Irrigation authorities contend that Muncul water cannot be diverted for use in Urban area of Semarang, because presently it is being used for irrigation and drinking purposes by a large rural population. The use of Jragung reservoir water for the municipal and industrial requirements of Semarang, as provided in the Jragung Project, should therefore receive first priority.

The DGWRD authorities undertook to examine the possibilities of getting finances for providing treatment plant and water supply mains to deliver Jragung water to Semarang as a part of the implementation of the Jragung

Dam Project. The Consultant informed that they could provide consulting engineering services to Cipta Karya for this additional part of the design work, if requested to do so. Additional time and the number of manmonths for the water supply design job could be negotiated at the appropriate time.

8. The special sediment measurement program which was initiated by Dr. Stevens, the Consultant's River Regime Specialist in October, 1977 continued unabated through the first quarter of 1978. Till the end of March, a total number of 355 samples of sediment, during high flows at the Jragung damsite, had been collected and sent for testing to the DPMA laboratory at Bandung. The results of 255 samples have already been received and Dr. Stevens is currently at Semarang reviewing the sediment measurement program and making an appraisal of the anticipated reservoir sedimentation.

9. The preparation of technical specifications and the contract documents is proceeding on schedule. The drafts of contract documents for the preliminary works has already been submitted by the Consultant. A detailed report on this activity is given in Section IV-D.

10. Four Indonesian Engineers, namely, Mr. Maryono Bony, Mr. Wisnu Suharto, Mr. Sudarno and Mr. Harris left on February 6 for the United States as part of the Ministry Personnel Training Program. During their four month stay overseas, they will not only be visiting various civil engineering projects and the universities but will also be participating as counterparts in the design of Irrigation and Power Tunnel and the Power House currently in progress at the Consultant's Denver office.

The second batch of the trainees under the same program will start leaving in May to enable one of them (Ir. Gayo) to attend the summer quarter of course work at Colorado State University at Fort Collins.

11. Two of the Consultant's principal design engineers, namely Mr. Glen Trowbridge and Mr. J. Hoge arrived in Semarang on TDY assignments.

They will be working on and completing the designs of the Spillway and the Tuntang Diversion, respectively. The Consultant's watershed management specialist, Dr. Fletcher also arrived at the end of the quarter under report. Dr. Fletcher will study the watershed of the Jragung Dam and suggest ways and means to reduce erosion. He is expected to stay on the Project up to June, 1978.

12. The third installment of Rupiah payment of Rp. 12,000,000.- due consultant was paid by the Proyek on February 1, 1978. The Rupiah and Dollar expenses are being reported in the monthly progress reports. As of the end of March, 1978, the reimbursable Rupiah expenditure amounted to Rp. 17,581,561.-. The reimbursable Dollar expenditure up to the end of February, 1978 amounted to \$ 582,458.80.

A detailed description of Rupiah and Dollar expenditures is given in Section VII of the Report.

SECTION II

PERSONNEL

A. EXPATRIATE

1. At Semarang on December 31, 1978

Saeed A. Rana	Resident Manager
Carlos Borinelli	Materials and Dam Engineer
Robert McLaughlin	Structural Engineer
Warren Stevens	Surveyor
James E. Pyne	Resident Geologist
Jeffery P. Frey	Specification Engineer

2. Arrived in Semarang during January 1 - March 31, 1978

C.M. Langford	Senior Vice President and Project Director
Ralph Goodrich	Electrical Engineer
John Ismert	Chief Mechanical Engineer
Glenn Trowbridge	Design Engineer
Max K. Kuehl	Chief Engineer and Vice President
Sidney F. Hillis	Chief Materials Engineer
Dr. H. Burke	Consultant Geologist
Peter L. Strauss	Chief Engineering Geologist
Dr. M.A. Stevens	River Regime and Sediment Specialist
Mr. James Hoge	Design Engineer
Dr. H. Fletcher	Watershed Management Specialist
Paul Otter	Chief Planning Engineer

3. Departed from Semarang during January 1 - March 31, 1978

Warren Stevens	Surveyor
Cecil M. Langford	Senior Vice President and Project Director
Ralph Goodrich	Electrical Engineer
John Ismert	Chief Mechanical Engineer
Max K. Kuehl	Chief Engineer and Vice President
Sidney F. Hillis	Chief Materials Engineer
Dr. H. Burke	Consultant Geologist
Peter L. Strauss	Chief Engineering Geologist
Paul Otter	Chief Planning Engineer

4. At Semarang on March 31, 1978

Saeed A. Rana	Resident Manager
Carlos Borinelli	Materials and Dam Engineer
Robert McLaughlin	Structural Engineer
James E. Pyne	Resident Geologist
Jeffery P. Frey	Specification Engineer
Glenn Trowbridge	Design Engineer
James Hoge	Design Engineer
Dr. H. Fletcher	Watershed Management Specialist
Dr. M.A. Stevens	River Regime and Sediment Specialist

B. COUNTERPART

1. Assigned Full Time as of December 31, 1977

Mr. Maryono Bony M.E.	
Ir. Wisnu Suharto	
Ir. Sudaryanto HS.	
Drs. Redjiono	
Triyono B.E.	(Assistant Counterpart)
Sutardjo B.E.	(Assistant Counterpart)

Ir. Haryono Wardi
Ir. Sudarno
Ir. Supriyo
Ir. Rustiyanti (Assistant Counterpart)
Eddy Arifin (Assistant Counterpart)
Buang Soekardjono (Assistant Counterpart)
Ir. Muhammad Ali
Ir. Tri Hardono (Assistant Counterpart)

2. Assigned Full Time During January - March, 1978

Ir. Yusuf Gayo
Djasriansyah Aht.
Ir. Diah Kusumawati
Harris BME
Ir. Bambang Sujono

C. TECHNICAL

During the period under report, the following technical personnel provided by the Proyek worked with the Consultant:

Mr. Mukiyat	Draftsman
Mr. Barleyanto	Draftsman
Mr. Bambang Prayitno	Draftsman
Mr. Aris Mudjianto	Draftsman
Mr. Baryono	Geology Field Supervision

D. ADMINISTRATIVE

On-Hand as of March, 1978

Mrs. Tan Ik Goen	Interpreter I
Miss Dra. Djoa Sioe Lan	Interpreter II
Mrs. Sri Moenasih Sutikno	Secretary
Miss Dra. L. Murtianingsih	Secretary
Miss Sri Anon	Clerk/Typist
Mr. Suhandi	Messenger

Dates of arrival and departure of the Consultant's resident staff, TDY staff, the ministry personnel and the direct hire administrative personnel are given in Annexures I, II and III, respectively.

SECTION III
MEETINGS CONFERENCES AND MAJOR EVENTS

<u>Date</u>	<u>Place</u>	<u>Event</u>	<u>Participation</u>	<u>Organization</u>
January 4, 1978	Semarang	Discussion Project Matters	Ir. Bambang, Mr. Maryono Rana	Proyek ECI
January 9, 1978	Damsite	Discussion Drilling Work	Rana Pyne	ECI
January 12, 1978	Semarang	Proyek - ECI Meeting No. 13	Ir. Bambang Ir. Gayo Mr. Maryono All counterparts Rana, McLaughlin Borinelli, Pyne, Frey Paul Thron	Proyek ECI U.S. AID
January 13, 1978	Semarang	Discussion Spillway Model	N. Ahmed Ir. Haryono Rana	UNDP DPMA ECI
January 18, 1978	Semarang	Discussion Drilling and Damsite Investigation Program	Mr. Maryono Rana Borinelli Pyne	Proyek ECI
January 20, 1978	Jakarta	Discussion Project Matters	Mr. Nur Rana	DGWRD ECI
January 20, 1978	Jakarta	Discussion Project Matters	Mr. A. Grayson Rana	U.S. AID ECI
January 21, 1978	Jakarta	Discussion Project Matters	Drs. Attamini Rana	DGWRD ECI
January 21, 1978	Jakarta	Discussion Diversion Works Construction Supervision	Ir. David Rana	PROSIDA ECI

<u>Date</u>	<u>Place</u>	<u>Event</u>	<u>Participation</u>	<u>Organization</u>
January 30, 1978	Semarang	Discussion Project Design and General Matters	Ir. Bambang Mr. Langford Rana	Proyek ECI
February 1, 1978	Semarang	Discussion Jragung Power House and Transmission Lines Designs	Engineers Mowo Prabowo, Djoko Sri Winarno, Rambang Sirait, Slameto, Hartopo and Djasriansjah Mr. Maryono Rana, Goodrich and Ismert	PLN Proyek ECI
February 5, 1978	Semarang	Briefing Session for the Design Review Team	Resident Staff, Mr. Kuehl, Dr. Burke, Mr. Hillis, Mr. Staruss	ECI
February 6-7, 1978	Damsite and Project Area	Field visits	Rana, Borinelli, Pyne, Kuehl, Burke, Hillis, and Strauss	ECI
February 8, 1978	Semarang	Discussion Project Matters	Ir. Gatot Rana	DGWRD ECI
February 9, 1978	Semarang	Discussion Project Designs	Ir. Suwandi Sanoesi and his staff Ir. Bambang Rana, Ismert and Goodrich	Cipta Karya Proyek ECI
February 14, 1978	Jakarta	Discussion Project Matters	Ir. Soewarsono Langford, Rana Ir. Bambang	PROSIDA ECI Project
February 15, 1978	Bandung	Discussion Spillway Model Testing	Rana Ir. Haryono	ECI DPMA

<u>Date</u>	<u>Place</u>	<u>Event</u>	<u>Participation</u>	<u>Organization</u>
February 16, 1978	Jakarta	Discussion Project Matters	Messrs. Grayson and Thorn Rana	U.S. AID ECI
February 18, 1978	Semarang	Discussion Project Matters	Ir. Bambang Ir. Gayo Mr. Toto Rana	Proyek ECI
February 22, 1978	Jakarta	Discussion Project Matters	Drs. Attamimi Rana	DGWRD ECI
February 27, 1978	Jakarta	Discussion Jragung Construction Work and Schedule	Ir. Soewasono Ir. Habibbudin Ir. David Suleiman Ir. Gayo Rana	PROSIDA Proyek ECI
March 2, 1978	Semarang	Visit to Consultant Office	Ir. Suyono Sosro-darsono and Staff	DGWRD
March 7, 1978	Jakarta	Coordination Meeting Jragung Dam Project	Ir. Soewasono Ir. Oesman Djojoadinoto, Ir. Mardjono Ir. Bambang Ir. Gayo Ir. Suwandi Sanoesi and his staff Saeed A. Rana	DGWRD Proyek Cipta Karya ECI
March 8-9, 1978	Jakarta	Discussion Construction Program and Engineering Services	Ir. Soewasono and staff Saeed A. Rana	PROSIDA ECI
March 10, 1978	Jakarta	Discussion Draft Prequalification Instructions River Diversion Works	Ir. Soewasono and staff Saeed A. Rana	PROSIDA ECI
March 14-16, 1978	Jakarta	Discussion Construction Program and Engineering Services	Ir. Soewasono and staff Saeed A. Rana	PROSIDA ECI

<u>Date</u>	<u>Place</u>	<u>Event</u>	<u>Participation</u>	<u>Organization</u>
March 20- 21, 1978	Jakarta	Discussion Draft Construct- ion Contract	Ir. Habibuddin Saeed A. Rana	PROSIDA ECI
March 28, 1978	Semarang	Discussion Project Matters	Ir. Bambang Ir. Jayo Saeed A. Rana	Proyek ECI
		Discussion Model Testing	Ir. Gayo Ir. Memed Dr. M.A. Stevens Saeed A. Rana	Proyek DPMA ECI

In addition to the above reported events, regular field visits were made by the Consultant's resident and TDY staff to the damsite and Project area.

SECTION IV

PROGRESS REPORT BY ACTIVITIES

A brief description of work being done in the major fields of activity on the Project was given in Section I. A detailed description of the work involved and the progress achieved during the period under report are given in the following:

A. Geology

During the period covered by this report, geologic investigations throughout the site area have continued by means of surface mapping, aerial photo interpretation, core drilling, bulldozer trenching, and backhoe test pit excavation. The subsurface geologic conditions are more complex than initially interpreted; however, the essential geologic features such as major faults, bedding attitude and strike, and distribution of the major sandstone units are now fairly well defined.

Mapping

Early in January, topographic maps of the site area at 1 : 1,000 scale and 1 meter contour interval were provided by the surveyors. Utilizing these accurate topographic maps as a base, geologic maps have been produced that show locations of borings, test pits, trenches, adits, faults, major sandstone units, and bedding dip and strike. These maps are constantly being updated as additional data are obtained.

Dam Foundation

The test pit program, which was initiated in November (see Quarterly Progress Report No. 3), was completed on January 24 with a total of 46 test pits. All of the test pits have been surveyed to obtain locations and

elevations. The logs have been edited and are ready for final drafting. Nine cross sections have been prepared through selected test pits to show the thickness and character of soil overburden, the ground water level, and the type and condition of the in-situ dam foundation material.

On February 21, angle drilling was initiated in the river valley upstream from the proposed dam axis to investigate the condition of in-situ materials below the level that could be reached by the test pit equipment. This drilling, which will continue into the next quarterly report period, will provide samples for testing and important data with regard to dam design.

Site Review

From February 5 through 11, an intensive review of the site geology was conducted by Messrs. Kuehl, Strauss, Burke, and Hillis. Dr. Burke, a consultant to ECI, was primarily responsible for the geological review. His findings and recommendations are presented in a report dated February 13, 1978. Because of adjacent faulting, Dr. Burke suggested that the proposed alignments of the diversion and power tunnels be modified if possible. Also, some additional drilling and test pit exploration was recommended. Additional geological efforts have been required in order to comply with the recommended exploration program and to study various alternate tunnel alignments.

Spillway

Geologic investigations by means of borings and surface mapping have continued in the preferred spillway area. A site review of the spillway geology was conducted with Mr. Trowbridge, ECI design engineer, on February 17.

Diversion Tunnel

A revised diversion tunnel alignment has been proposed by ECI in Denver, Colorado. The new alignment is presently under study in cooperation with Mr. J. Hoge, ECI design engineer. A geologic cross section and report will be completed in early April.

Power and Irrigation Tunnel

Alternate alignments for the power and irrigation tunnel are currently being considered because of known or suspected faults that cross and closely parallel the initial proposed location. New cross section and geologic data will be prepared along the preferred alignment in the near future.

Tuntang Diversion Tunnel

Geologic mapping along the Tuntang tunnel alignment from the top of the ridge to the Tuntang River was completed on February 16. The remainder of the alignment from the top of the ridge of the Jragung (Klampok) River has not been adequately mapped due to poor condition of the trenching in that area. New trenching is planned.

Drilling

During all of the last quarterly report period, only one drill rig was at the damsite. A second drill rig arrived on January 9. A third rig was brought to the damsite from the borrow area on February 18. This rig, however, was returned to the borrow area after completion of one 40-meter deep boring on March 11. The following tabulation summarizes

the drilling that has been accomplished during this quarterly report period :

<u>Boring No.</u>	<u>Location</u>	<u>Date</u>		<u>Total Depth</u>
		<u>Begin</u>	<u>End</u>	
EC-26D	Alternate A Spillway	27-12-77	9-1-78	25.00 m
EC-27D	Power House	9-1-78	22-1-78	32.00 m
EC-28Da	Right Abutment	24-1-78	25-1-78	4.72 m
EC-28Db	Right Abutment	12-1-78	23-1-78	25.05 m
EC-29D	Right Abutment	27-1-78	4-2-78	25.00 m
EC-30D	River Valley-Damsite	20-3-78	Drilling	
EC-31D	Upper Spillway Still- ing Basin	4-2-78	3-3-78	30.00 m
EC-32D	River Valley-Damsite	28-2-78	11-3-78	40.00 m
EC-33D	River Valley-Damsite	21-3-78	18-3-78	55.00 m
EC-34D	Upper Spillway Ogee	7-3-78	20-3-78	24.85 m
EC-35D	Right Abutment	6-2-78	18-2-78	25.50 m
EC-36D	River Valley Damsite	27-3-78	Drilling	

It is felt that the two drill rigs at the site are providing adequate data and are progressing at a rate that is satisfactory for the present drilling program.

Trenching

At the close of the last quarterly report period, a total of 7,685 meters of trenching had been excavated throughout the site area. During January, 150 meters of new trenching was completed in the extreme right abutment area. Early in February, this new trenching was extended an additional 100 meters. During March, approximately 100 meters of new trenching has been completed along the upstream side of the left abutment ridge, making a total of 350 meters of new trenching for this quarterly period and 8,035 meters of trenching to date.

Trenching that is planned for completion early in the next quarterly period includes approximately 200 meters along the upstream side of the left abutment ridge to define the thickness of surficial slump debris and to locate faulting. An additional 270 meters of new trenching is needed along the proposed Tuntang diversion tunnel alignment from the top of the ridge to the Jragung (Klampok) River. Finally, as a result of adjustments in the proposed dam alignment, an estimated 600 meters of new trenching may be required in the extreme right abutment area to define the geologic conditions.

The main problem during this quarterly report period has been with the bulldozers. Fuel shortages, repeated mechanical problems, and wet weather conditions have combined to slow the trenching progress considerably. Approximately 470 meters of new trenching is planned for completion during the month of April. At the present rate of progress, the new trenches may not be finished before the ECI project geologist is scheduled to depart.

Future Work

The ECI project geologist, is scheduled to depart after completion of his assignment on Jragung at the end of April. At this time the site geologic map and selected cross sections will be prepared and the final geological report written. All of the data obtained to date will be thoroughly reviewed with the counterpart geologist who will continue the site investigation under the direction of Mr. Strauss from Denver, and Mr. Borinelli, the Materials and Dam Design Engineer.

(Appendix to Section IV-A)

REVIEW OF GEOLOGY OF JRAGUNG DAM PROJECT, JAVA

Period February 4-13, 1978

Harold W. Burke, PhD
Geologist and Registered
Civil Engineer (Calif.)

Summary

Considerable geologic exploration has been done since my last visit and larger scale aerial photos have been made available, a map based on photogeologic interpretation accompanies this report. The present picture is basically the same as originally drawn but is considerably more complex.

The main problem of the site remains the stability of the ridge and foundation. An upstream buttress and ridge dewatering are almost certainly required to stabilize the upstream slope of the ridge during reservoir operation. The weakness of the foundation along the upstream toe of the dam may control the dam slopes or require weight berms.

The present alignments of the diversion and the power tunnels are along major faults and should be modified if possible.

No significant foundation problems are expected for any of the spillway alternatives although faults cross the foundation of each.

The Tuntang diversion tunnel will be through mudstones of reasonable quality. The apparent slumping occurs in the soils overlying the bedrock.

Some additional exploration is needed to evaluate the depth of slump material on the upstream slope of the left abutment, the conditions along the upstream toe of the dam, and conditions for specific structures.

An analysis should be made of all information available on the stiff blue clays which probably originated by pulverization of claystone along faults.

Geology

The damsite ridge is formed by a sequence of alternating layers of well to poorly cemented tuffaceous sandstones and uncemented siltstones and claystones which strike normal to the river at the gorge and which dip almost vertically. The ridge is almost certainly supported throughout its length by the same sequence which stands out sharply from the mudstone sequences upstream and down. However, the sandstone sequence is somewhat wider than the ridge proper, and the crest is not necessarily formed by the same sandstone layer, at least there is no known marker bed whose recognition would permit this to be established one way or the other. The horizontal component of fault displacement, therefore, may be significantly greater than the horizontal offset of the crest line along the same fault.

Faults are very common and fall into three main sets; one strikes parallel to bedding; one is normal to bedding; the third strikes N20E. All are nearly vertical. In the claystones the gouge is a stiff blue clay. In the sandstones and siltstones the angular breccia is common with local clayey gouge. Jointing is more closely spaced in the mudstones than the sandstones where the spacing averages a meter or so. Very low angle joints are common as are similar surfaces with slight displacement and thin gouge.

Although the topographic features along the ridge suggest regular bedding, outcrops of bedrock along the ridge have widely divergent strikes and dips. Much of this is due to gravity folding the viscoelastic beds close to the surface where lateral support is reduced. Tectonic forces have also played a role, however, especially within a wide zone cutting across the left abutment. This zone includes a number of large faults which can be traced for kilometers beyond the ridge. The trenches of the

left abutment show that the claystone there are highly contorted and sheared while the sandstones are somewhat less contorted but heavily sheared into blocks. This is probably due to movement along parallel minor step faults within the zone. The horizontal displacement of the crest line across this zone is about a hundred meters, and this may represent only one component of a largely vertical movement of much greater magnitude.

Jointing

Jointing is generally well developed. It is more closely spaced in the mudstone layers, commonly on the order of centimeters apart, while the spacing in the sandstones may be a meter or so. Joints of most any attitude can be found. A common, widespread set is almost horizontal. Generally, there is a local preferred orientation of the dips. Some joints have an individual extent of ten or more meters. Probably these individually extensive joints are more common in the sandstones. In the mudstones the joints have less individual extent but collectively they also extend with overlap through wide areas. I include with these joints the many discontinuous surfaces along which small movement has occurred and on which thin gouge occurs.

Gravity Creep and Slump

The viscoelastic threshold of the claystone, siltstone, sandstone sequence is quite low, and, therefore, the zone of gravity distortion and creep is well developed and thick locally. This gradual distortion of the beds is not necessarily destabilizing but it commonly is, especially where beds of significantly different characteristics are interlayered. Certainly at least locally the viscoelastic rotation of beds has led into blocks slumping along joint and bedding surfaces. An especially thick section of creep and slump occurs along the upstream face of the ridge in the area where the distorted fault zone crosses the left abutment.

Springs

A number of springs occur in and around the ridge. Some are merely the percolation from recent rains passing down through the soil and talus and running over the rock surface to a convenient outlet. Others, however, are groundwater within the rock mass. From the location of springs on the rail level in the gorge it is apparent that the sandstones, at least, are quite pervious. The presence of springs high on the ridge demonstrate that some of the mudstones, at least, are quite impervious and dam the underground flow. Faults, at least locally, act as barriers; others, as channel.

The cave-in of the right abutment adit demonstrates that a saturated mass of broken mudstone can act as a mudflow.

Weathering

Weathering effects in the sandstone and siltstones are intense and occur to considerable depth, partly due to the opening of joints due to gravity sag and creep. Weathering of the claystone is more a matter of moisture and volume change mechanical fragmenting, and pulverization due to grinding during rock movement.

Blue Clay

A number of zones of stiff clay have been found. Those found in adits and on the surface occur as fault gouge where the claystone has been pulverized. Such material could also originate by original deposition or by weathering but neither process seems likely here. The claystone itself has little if any cement and owes its extra compactness and strength to consolidation by pressure; there seems no way by which one mass of clay be subject to such pressure and an adjacent mass not. The clay mineralogy may be different but it seems the same. If different it would have to be

an original depositional difference since the claystones have been little affected by weathering, especially in depth.

ENGINEERING GEOLOGY

Ridge Stability

Though portions of the ridge are relatively narrow I believe its stability against downstream sliding will be adequate, especially if properly blanketed and drained. Although some of the low angle joints are quite continuous, and failure can echelon from one to another, I believe that there will be enough divergence in attitude of the joints through the ridge to require riding up of five or six degrees. Effectively increasing the friction angle of the surfaces by that amount. This will probably be the controlling strength rather than the residual strength of some average figure such as the siltstones.

For more local failure, however, such an increment would not be applicable since it is more likely that the joint attitudes would be the same. Failure during sudden draw-down or during seismic shock with normal uplift could occur of wedges bounded by bedding faults and low angle joints. An upstream buttress should be sized to prevent such failure.

Another mode of failure could involve the masses of slumped rock and talus. Commonly such masses have formed a gouge zone along the contact with the bedrock, especially if claystone. A particularly thick mass of such material may occur around trench T1 on the upstream slope of the left abutment. It should be explored to evaluate its dimension, nature, stability, and possible methods of treatment if necessary. A similar zone may also occur on the downstream slope near the powerhouse. In addition to sliding failure, these masses, if open, may collapse into themselves during seismic shock.

Toe Stability

The upstream toe of the dam lies on a sequence of claystone and siltstone beds with but few sandstone stiffeners. Bedding faults may well have resulted in extensive development of stiff clay from the claystone. Even without these gouge zones the foundation may be weak enough to control the dam slope design. If present, the gouge may require use of special berms.

Seepage

There are a number of relatively permeable routes for flow at least partially through the ridge. Some channels have undoubtedly been formed by piping and erosion. It would seem wise to blanket the upstream face of the ridge and then to grout where such routes and channels are known or suspected.

Drainage

A large drainage network is needed downstream of the waterstop to insure low uplift pressures and to control erosion and piping.

Tunnels

Although all tunnels considered are relatively small, saturated fracture zones, especially in the claystones, will be subject to collapse and flow with little stand up time. Possibly several drainage holes should be maintained ahead of the working face to drain such zones before they are intercepted. Shotcreting should be applied immediately both to hold the rock and to prevent slaking. The present alignments of the diversion tunnel and the power tunnel are along shear zones. Tunneling conditions would improve significantly if they were moved to less fractured areas.

Spillway

Although the geology of the spillway area is cut by a number of faults and fold axes, there seems to be no significant foundation problems there for the structures planned.

Tuntang Diversion

Probably a considerable cut and cover section will be needed at both the intake and especially at outlet portal of the planned tunnel, because of thick soil cover. The bedrock is in beds striking parallel to the tunnel with a variety of dips due to small shear zones and folds. It will be soft ground tunneling as described above but no other special problems are expected. Slumping seems to be restricted to the rather thick overlying soils.

EXPLORATION

I recommend that the thickness and the nature of the slump zone on the upstream slope of the left abutment be investigated with three test pits through it spaced along the 115 contour.

More study is also required of the foundation for the upstream toe of the dam with three holes angled downstream at 45° spaced along high section of the dam. One of these should be set for correlation of the core with the outcrops of mudstone sequence in the bank of the river.

A boring or two should be drilled on the terrace to the right end of the right abutment for foundation conditions there in a possible fault.

A boring should be drilled into the possible slump mass on the downstream side of the left abutment to determine general conditions and depth.

End of Dr. Burke's Report

B. Dam Design

During the first part of February, a review of the Geology of the Damsite was conducted by a team of experts from ECI Denver Office. As a result, the dam layout has been modified and moved upstream to provide better foundation conditions for the embankment and the abutments.

Geotechnical Damsite Subsurface Exploration

Two 45 degree angle borings have already being drilled in the upstream area of the dam, under the proposed embankment, to determine if there is any soft, sheared and/or weathered material, etc. Additional holes will be drilled in the upstream area; a maximum of three will be required on the left area and up to four could be drilled on the right area. In addition, one 45 degree angle hole is being drilled at the present. This borings and additional trenching to be performed on the right abutment will provide a complete picture of the foundation condition of the embankment.

The downstream foundation study will be completed using, as maximum, two 45 degree angle holes. Representative samples for shear strength testing will be selected and sent overseas.

Determination of quantities of Borrow Area Material

The determination of quantities of Borrow Area VII considering the subsurface information provided by test pits and trenches, was finished on January.

Embankment Materials Exploration and Testing

Eleven samples were obtained from the same number of different locations of Penawangan Village Borrow Pit. All basic testing of the material was performed.

A bulldozer trench was dug in Penawangan Borrow Pit and large representative samples were obtained for triaxial test purposes.

Three samples of Penawangan material are being sent overseas, one with high content of fine grain size, and the others two with average and low contents of fines, respectively.

Large samples for shearing strength testing overseas were selected from Sambiroto and Larangan borrow pits. Shell material was sampled in Sambiroto and Larangan, in addition, core type material was sampled in Larangan Borrow Pit.

All the samples were processed, prepared, basic testing performed, and the selected material was ready to be sent overseas at the end of March.

Foundations Material Sampling

Slickenside sheared clays from two locations of the left adit were sampled for repeated direct shear testing. Also, materials from fault gouge, 6 in total, were sampled. Basic testing was performed and two of them were selected for repeated direct shear testing to be done overseas.

All the material was ready to be sent at the end of March.

Borrow Area Drilling Subsurface Exploration Program

A Proyek rig - Long Year 34 - started to drill in Borrow Area VII (Pondok Sempu Borrow Pit). However, as the material of the borrow area is mainly of volcanic origin, considerable problems are encountered to carry out a proper subsurface investigation. The previous test pits and trenches already dug, detected in general in the borrow area, halloysite, weathered gravel with a halloysite matrix, agglomerate, strata of cobbles and boulders

of different type, etc.

C. Structural Design

The work progress for this quarter will be reported from the previous quarter and cover the various structural design areas as follows:

Infrastructure

The "relocated access road" (1) final drawings have been completed. These involved detail plan and profile drawings for about 2.6 kilometers of roadway including designs for culverts where needed. The pavement is 6.0 meters wide and crosses the Klampok River at a point just about 0.5 kilometer upstream from the edge of the reservoir.

Drawings have also been completed for the "proposed main access road". These included detailed plan and profile drawings for about 2.8 kilometers of roadway, however, no culverts were needed for this section. This pavement is 7.0 meters wide and completes the continuity of access around the reservoir. It is a portion of the "proposed main access road" to the damsite now under design by the Project. *)

During this quarter the alternative II bridge drawings were completed. This consisted of a three-span reinforced concrete structure, simply supported. The spans were 15.0 meters each and the footings rest upon spread footings, similar to Alternative I footings. Construction drawings with bending diagrams and reinforcement lists were included. A third alternative of prestressed girders was proposed but is not seriously being considered at this time.

*) See Monthly Progress Report No. 11, page 13, for description of the road terminology.

Government Base Camp community layout configuration has been completed by the Denver Office planning staff and was sent to Semarang in the beginning of March. The Project staff in Denver (Maryono Bony et al) have assisted and approved of the configuration and this was then sent by ECI Semarang to the Jratunseluna Project Manager's office for their review and comment. The proposed building plans for the base camp have been reviewed and comments on these will shortly be submitted to Project.

Spillway

During this past quarter the changes which were made in the location of the dam embankment caused reconsideration of the spillway location. There are now being considered three alternatives which are not the ones that were mentioned in the previous quarterly report; however, the location is still within the same general area. All three alternatives have upper and lower crests and could be described as follows.

All of the alternatives of course have an upper crest elevation of 125.0. Alternative I has an upper crest length of 66.0 meters and an upper stage chute converging to 56.0 meters at the stilling basin elevation of 95.0 meters. The lower crest is at elevation 96.0 and the lower chute is then 20.0 meters wide. This is the only alternative with a curved alignment wherein the second stage curves around and is routed through the gorge area mentioned in the first alternative of the previous quarterly report. Alternative II has a curved upper crest length of about 74.0 meters, which wraps around in bathtub fashion, and a 30.0 meters wide chute to a stilling basin at 102 elevation. The lower crest is at elevation 104.5. This is on a straight alignment which actually cuts through the right abutment just to the right of the above mentioned gorge area. Alternative III is along the same alignment as Alternative II, but has Alternative I characteristics except for the stilling basin elevation of 105.0 and the lower crest elevation of 108.0. All three alternatives have a 20.0 meters

wide lower chute ending in a stilling basin and a negative slope which acts a flip bucket for high flows. These alternatives have been submitted for model testing.

Diversion Tunnel

During the past quarter the changes in dam alignment also caused some revisions of the diversion tunnel location. It was moved to the north or towards the river more or less parallel to the previous location. The design drawings for the diversion tunnel which were submitted during this last quarter, will have to be adapted to the new location. The alignment is now set and the information has been sent to Denver to allow them to design the approximately 260 meters of cut and cover section. That should be finished early next quarter. The revisions to the plans for the tunnel portion (the length of which is now reduced from 420 meters to 168 meters) will be done in this office during the next quarter.

Power and Irrigation

Work on the power house is presently being done in Denver with assistance from counterpart staff from proyek engineers. Locations for the power house and tunnel have been fixed and these remain essentially the same as was in the feasibility study.

Tuntang Diversion Works

Much design work will be accomplished in this area during the next quarter. Some preliminary design work has been done recently but the bulk of the design work is scheduled for next quarter.

D. Specifications

During the first quarter of 1978, specifications' work has been concentrated on the preparation of contract documents for the River Diversion Works and Access Roads contracts. A draft of the prequalification documents for River Diversion Works was submitted to the Ministry late in January. The documents include "Advance Notice of Intent to Invite Bids" and "Pre-qualification Instructions". Changes and additions requested by the PROSIDA were incorporated and the revised prequalification documents were resubmitted in mid-March. A sample advertisement giving notice for prequalification of contractors for the River Diversion Works, to be published in local newspapers, was included.

In late February, general and technical provisions of the specifications, including the drawings, for the River Diversion Works were submitted for review and comment to the Ministry and U.S. AID. The specifications were presented in two volumes: "Volume I, Invitation for Bids, Instructions to Bidders, Proposal-Bill of Quantities, Contract Conditions and Technical Specifications", and "Volume II, Drawings".

A similar set of contract documents was prepared for the Access Roads Contract. This contract includes construction of the 2.6 kilometers long relocated access road and bridge and the 2.8 kilometers length of main access road which connects the relocated access road to the existing access route. A draft form of "Volume II, Technical Specifications", "Volume III, Drawings" and the "Proposal-Bill of Quantities" for the Access Roads was submitted to the Ministry and U.S. AID early in March. "Volume I, Invitation for Bids, Instructions to Bidders, Proposal-Bill of Quantities, Contract and Conditions" will require only slight modification of that proposed for the River Diversion Works Contract.

SECTION V
PREPARATION OF REPORTS

The schedule of submittals and the current status of all the reports required to be prepared by the Consultant is stated in the following:

<u>Name of Report</u>	<u>Date due</u>	<u>Status</u>	<u>Date Submitted</u>
1. Inception Report (draft)	May 15, 1977	Completed	May 12, 1977
2. Final Design Report (draft)	November 15, 1978		
3. Final Completion and Engineering Report on Construction Contracts	March 15, 1979		
4. Monthly Progress Reports	10th Day of the following month	Schedule being met	
5. Quarterly Progress Reports	20th Day of the following month	Schedule being met	
6. General Design Criteria Civil Works			July 8, 1977
7. Appendix I to (6) Dam and Dikes Design Criteria			August 1, 1977
8. Advance Notice of Intent to Invite Bids and Pre- qualification Instructions Submitted Revised Draft		Draft	January 25, 1978 March 15, 1978
9. Contract Documents River Diversion Works		Draft	February 23, 1978
10. Technical Specifications and Drawings Access Roads and Bridge		Draft	March 13, 1978

SECTION VI

PROBLEM AREAS

The survey and mapping work, which passed through certain critical stages, as described in the previous quarterly progress report, has now substantially been completed. At present, there is no problem in this area.

With the arrival of an additional rig at the damsite, the situation of geological investigation has considerably been improved. The Proyek owned rig is drilling in the borrow areas. There has been problem in recovering proper samples with this rig in certain types of materials, especially the conglomerate. The Proyek has been requested to provide adequate equipment for the rig to enable recovering the required samples.

In general there is no major problem in the geological investigation work. However, it is important that the Proyek should ensure proper maintenance of the drilling rigs and other machines (especially the bulldozers as pointed out in Section IV-A of this report) presently engaged at the damsite and borrow area investigation so that maximum efficiency of these machines can be achieved and the schedules can be met.

SECTION VII

FINANCIAL

Dollar Accounts

Up to the end of the month of February, a total amount of U.S. \$ 582,458.80 was spent. This represents 42.48 percent of total Dollar reimbursable costs provided in the Contract. The corresponding percentage of the contract period elapsed is 47.9. The expenditure to that date as well as the budget amounts are shown in Annexure IV included in the report.

Rupiah Accounts

Up to the end of the period under report, a total amount of Rp. 17,581,561.- was spent. This represents 24.84 percent of the total Rupiah reimbursable costs provided in the Contract. The corresponding percentage of the contract period elapsed is 52.0.

The summary of the Rupiah budget and costs is given in Annexure No. V.

Engineering Consultants, Inc.

JRAGUNG DAM PROJECTQuarterly Progress Report No. 4
Period : Ending March, 1978Assignment of Resident and TDY Staff

<u>NAME</u>	<u>NATIONALITY</u>	<u>JOB TITLE</u>	<u>PROJECT ASSIGNMENT</u>		<u>MANMONTHS IN INDONESIA</u>	
			<u>ARRIVAL</u>	<u>DEPARTURE</u>	<u>SCHEDULED</u>	<u>ACTUAL</u>
1. Ceceid A. Rana	Permanent Resident U.S.A.	Resident Manager	March 16, 1977		24	12.5
2. James Rollins	U.S.A.	Geologist	March 16, 1977	June 30, 1977	3.5	3.5
3. Robert McLaughlin	U.S.A.	Structural Design Engineer	April 5, 1977		23	11.9
4. Carlos Borinelli	Permanent Resident U.S.A.	Materials Dam Engineer	June 4, 1977		18	9.9
5. James E. Tyra	U.S.A.	Resident Geologist	September 1, 1977		8	7.0
6. Jeffery F. Frey	U.S.A.	Specifications Engineer	December 18, 1978		12	3.45
7. Glen Trowbridge	U.S.A.	Design Engineer	February 7, 1978		18	1.75
8. Cecil M. Langford	U.S.A.	Project Director	August 6, 1977 January 23, 1978	August 12, 1977 January 31, 1978	1.5	0.52
9. M.K. Kuehl	U.S.A.	Chief Engineer	June 27, 1977 February 4, 1978	July 2, 1977 February 12, 1978	1.5	0.50

Engineering Consultants, Inc.

JRAGUNG DAM PROJECTQuarterly Progress Report No. 4
Period : Ending March, 1978Assignment of Resident and TDY Staff

<u>NAME</u>	<u>NATIONALITY</u>	<u>JOB TITLE</u>	<u>PROJECT ASSIGNMENT</u>		<u>MANMONTHS IN INDONESIA</u>	
			<u>ARRIVAL</u>	<u>DEPARTURE</u>	<u>SCHEDULED</u>	<u>ACTUAL</u>
10. Paul Otter	U.S.A.	Project Engineer	March 16, 1977 March 1, 1978	March 18, 1977 March 4, 1978	1.5	0.23
11. Peter Strauss	U.S.A.	Chief Geologist	March 16, 1977 June 13, 1977 February 4, 1978	March 18, 1977 July 1, 1977 February 7, 1978	4	0.93
12. William Wenger	U.S.A.	Electrical Engineer	March 16, 1977	March 21 1977		0.50
13. Ralph Goodrich	U.S.A.	Electrical Engineer	January 20, 1978	February 15, 1978	4	0.90
14. M.A. Stevens	Canada	River Regime Sedi- ment Specialist	March 20, 1977 October 21, 1977 March 27, 1978	March 23, 1977 December 15, 1977	3	2.13
15. W. Stevens	U.S.A.	Surveyor	April 4, 1977 August 1, 1977	May 31, 1977 January 15, 1978	7.5	7.25

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 4

Period : Ending March, 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			ARRIVAL	DEPARTURE	SCHEDULED	ACTUAL
16. E.B. Bartel	U.S.A.	Design Engineer	November 12, 1977	December 20, 1977		1.30
17. S.F. Hillis	Canada	Chief Materials	June 26, 1977	July 18, 1977	3	1.15
OR 18. Robert Campbell	U.S.A.	Assistant Chief	February 2, 1978	February 12, 1978		
			November 7, 1977	November 10, 1977		
			November 28, 1977	December 12, 1977		0.63
19. John Inert	U.S.A.	Chief Mechanical Engineer	January 27, 1978	February 12, 1978	4	0.77
20. Dr. W. Burke	U.S.A.	Geologist Consultant	February 4, 1978	February 12, 1978		0.30
21. James Hoge	U.S.A.	Design Engineer	March 23, 1978			0.30
22. Dr. H. Fletcher	U.S.A.	Watershed Management	March 31, 1978		3	

JRAGUNG DAM PROJECT

Engineering Consultants, Inc.

Quarterly Progress Report No. 4
Period : Ending March, 1978Assignment of Counterparts and Technical Personnel

<u>NAME</u>	<u>EXPERTISE</u>	<u>WORK ASSIGNMENT</u>	<u>PROJECT ASSIGNMENT DATES</u>		<u>MAN MONTHS WORKED</u>
			<u>STARTING</u>	<u>ENDING</u>	
<u>Counterparts</u>					
1. Ir. Martopo	1. Project Management 2. Project Planning	November 1, 1975	March 16, 1977		12.5
2. Ir. Bambang Soedjono	1. Project Management 2. Project Planning	November 1, 1975	March 16, 1977		12.5
3. Maryono Bony M.E.	1. Project Planning 2. Dam Design Engineer	November 1, 1975	March 16, 1977		12.5
4. Ir. Wisnu Scharito	Hydraulic Structures	November 1, 1975	March 16, 1977		12.5
5. Ir. Soedaryanto Ms.	Geologist	January 1, 1977	March 16, 1977		12.5
6. Drs. Redjiono	Hydrologist	January 1, 1977	March 16, 1977		12.5
7. Susanto B.Sc	Geologist	November 1, 1975	March 16, 1977	March 31, 1977	0.5
8. Ir. Sudarno	Civil Structures Engineer	March 16, 1977	March 16, 1977		12.5
9. Ir. Muhammad Ali	1. Dam Design Engineer 2. Soil Mechanics/Material	January 1, 1976	March 16, 1977		12.5

Engineering Consultants, Inc.

JRAGUNG DAM PROJECTQuarterly Progress Report No. 4
Period : Ending March, 1978Assignment of Counterparts and Technical Personnel

<u>NAME</u>	<u>EXPERTISE</u>	<u>WORK ASSIGNMENT</u>	<u>PROJECT ASSIGNMENT DATES</u>		<u>MAN MONTHS WORK'D</u>
			<u>STARTING</u>	<u>ENDING</u>	
10. I. Soedjono BEE	Electrical Engineer	March 16, 1977	March 16, 1977		12 .5
11. Djasriansyah Aht	Electrical Engineer	March 16, 1977	March 16, 1977		12.5
12. Ir. Hartopo	Hydro Power Engineer	March 16, 1977	March 16, 1977		12.5
13. Harris BME	Mechanical Engineer	March 16, 1977	March 16, 1977		12.5
14. Ir. Supriyo	Specification Engineer	September 16, 1977	September 16, 1977		6 .5
<u>Assistant Counterpart</u>					
1. Triyono BE	Geologist	June 1, 1976	March 16, 1977		12 .5
2. Sutardjo BE	Geologist	December 1, 1976	March 16, 1977		12 .5
3. Bambang Gunadi B.Sc	Hydrologist	January 1, 1976	March 16, 1977	November 1, 1977	7 .5

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT
Quarterly Progress Report No. 4
Period : Ending March, 1978

Assignment of Counterparts and Technical Personnel

<u>NAME</u>	<u>EXPERTISE</u>	<u>WORK ASSIGNMENT</u>	<u>PROJECT ASSIGNMENT DATE</u>		<u>MAN MONTHS WORKED</u>
			<u>STARTING</u>	<u>ENDING</u>	
4. Ir. Tri Hardono	Dam Design Engineer	March 16, 1977	March 16, 1977		12.5
5. Ir. Rustiyanti	Hydraulics Structures	March 16, 1977	March 16, 1977		12.5
6. Buang Sukardjono	Hydrologist	January 1, 1977	March 16, 1977		12.5
7. Edy Arifin Aht	Civil Structures	April 1, 1976	March 16, 1977		12.5
8. Ir. Diah Kusumawati	Hydro Power Engineer	December 1, 1976	February 15, 1978		1.5
<u>Draftsmen</u>					
1. Mukiyat	Draftsman	March 1, 1976	March 16, 1977		12.5
2. S.V. Barleyanto	Draftsman	November 1, 1975	March 16, 1977		12.5
3. Bambang Prayitno	Draftsman	February 1, 1976	March 16, 1977		12.5
4. Aris Madjianto	Draftsman	December 16, 1977	December 16, 1977		3.5

Engineering Consultants, Inc.

JHAGUNG DAM PROJECTQuarterly Progress Report No. 4
Period : Ending March, 1978Direct-hire Indonesian Personnel

<u>NAME</u>	<u>POSITION</u>	<u>PERIOD OF SERVICE</u>		<u>MAN/WOMAN MONTHS</u>	
		<u>DATE STARTED</u>	<u>DATE ENDED</u>	<u>PROVIDED</u>	<u>SPENT</u>
1. Mrs. Tan Ik Goen	Interpreter/Translator I	March 16, 1977		24	12.5
2. Miss Dra. Djoa Sioe Lan	Interpreter/Translator II	May 16, 1977		24	10.5
3. Mrs. Ariati Haryono	Secretary I	March 16, 1977	July 31, 1977	24	4.5
4. Miss Dra. L. Murtianingsih	Clerk/Typist	March 16, 1977	April 30, 1977	24	1.5
	Secretary	May 1, 1977			11.0
5. Mrs. Sri Moenasih Soetikno	Clerk/Typist	March 16, 1977	July 31, 1977	24	4.5
	Secretary	August 1,		19.5	8.0
6. Miss Sri Anon	Clerk/Typist	March 16, 1977		24	12.5
7. Mr. Suhandi	Messenger	March 16,		24	12.5

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 4
 Period : Ending February, 1978.

Summary of U.S. Dollar Expenditures

<u>COST ITEMS</u>	<u>AMOUNT AVAILABLE</u> US \$	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		<u>PRIOR</u>	<u>DURING PERIOD</u> <u>REPORTED</u>	<u>UP TO DATE</u>	<u>EXPENDITURE</u>	<u>TIME</u> <u>ELAPSED</u>
1. Resident Staff Base Salaries	181,360.00	53,831.06	25,938.40	79,769.46	43.98	47.9
2. Overseas Differential	53,890.00	13,426.10	6,484.60	19,910.70	36.95	
3. Overhead Resident Staff (75% base salaries)	136,020.00	40,373.30	19,562.19	59,935.49	44.06	
4. TDY & Denver Staff Salaries	206,700.00	58,137.09	60,445.02	118,582.11	57.37	
5. Overhead TDY & Denver (95% base salaries)	196,365.00	55,230.22	57,422.75	112,652.97	57.37	
6. Fixed Fee	138,000.00	46,000.-	17,250.-	63,250.-	45.83	
7. Travel and Per Diem	73,120.00	22,366.90	10,190.26	32,557.16	44.53	
8. Transportation (Relocation)	12,000.00	10,250.-	900.-	11,150.-	92.92	
9. Other Direct Costs & Miscellaneous Expenses	53,800.00	16,855.20	10,343.33	27,198.53	50.55	

Annexure IV

Continued

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 4

Period : Ending February, 1978

<u>COST ITEMS</u>	<u>AMOUNT AVAILABLE</u> US \$	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		<u>PRIOR</u>	<u>DURING PERIOD</u> <u>REPORTED</u>	<u>UP TO DATE</u>	<u>EXPENDITURE</u>	<u>TIME</u> <u>ELAPSED</u>
10. Ministry Personnel	60,000.00		6,091.22	6,091.22	10.15	
11. Special Purchases	190,000.00	18,972.73	32,388.43	51,361.16	27.03	
12. Contingencies	70,000.00					
 Total Dollar Costs	 1,371,255.00	 335,442.60	 247,016.20	 582,458.80	 42.48	 47.9

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JRAGUNG DAM PROJECT

Quarterly Progress Report No. 4
 Period : Ending March, 1978

Summary of Rupiah Expenses

<u>COST ITEMS</u>	<u>BUDGET ALLOCATION</u> (Rp.)	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		<u>PRIOR</u>	<u>PERIOD REPORTED</u>	<u>TO DATE</u>	<u>EXPENDITURE</u>	<u>TIME ELAPSED</u>
<u>I. PER DIEM</u>						
Jakarta	3,300,000.-	965,500	486,750	1,452,250	44.00	
Bandung & Semarang	18,000,000.-	1,680,000	1,210,000	2,890,000	16.06	
Other	1,800,000.-	579,650	12,000	591,650	32.87	
47 Family	200,000.-	80,000		80,000	34.78	
Sub Total	23,330,000.-	3,305,150	1,708,750	5,013,900	21.49	52.0
<u>II. OTHER DIRECT COSTS</u>						
Cable & Telephone	2,000,000.-	504,124	238,995	743,119	37.16	
Postage	2,000,000.-	237,775	68,650	306,425	15.32	
Reproduction & Printing	15,000,000.-	2,175,198	800,770	2,975,968	19.84	
In Country Transportation	2,000,000.-	830,501	466,950	1,297,451	64.87	
Supplies & Materials	6,000,000.-	641,300	236,585	877,885	14.63	
Miscellaneous	7,000,000.-	1,095,144	381,595	1,476,739	21.10	
Sub Total	34,000,000.-	5,484,042	2,193,545	7,677,587	22.58	52.0

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 4
Period : Ending March, 1978

Summary of Rupiah Expenses

<u>COST ITEMS</u>	<u>BUDGET ALLOCATION</u> (Rp.)	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		<u>PRIOR</u>	<u>PERIOD REPORTED</u>	<u>TO DATE</u>	<u>EXPENDITURE</u>	<u>TIME ELAPSED</u>
<u>III. ADMINISTRATIVE PERSONNEL</u>						
Secretaries	3,610,500.-	1,181,091	390,850	1,571,941	43.54	
Interpreters	6,017,500.-	1,545,057	532,725	2,077,782	34.52	
Clerks/Typists	2,402,000.-	914,481	197,270	1,111,751	46.28	
Messenger	373,500.-	95,400	33,200	128,600	34.43	
Severance Pay	1,037,500.-					
Sub Total	13,446,000.-	3,736,029	1,154,045	4,890,074	36.37	
Grand Total	70,776,000.-	12,525,221	5,066,340	17,581,561	24.84	52.0

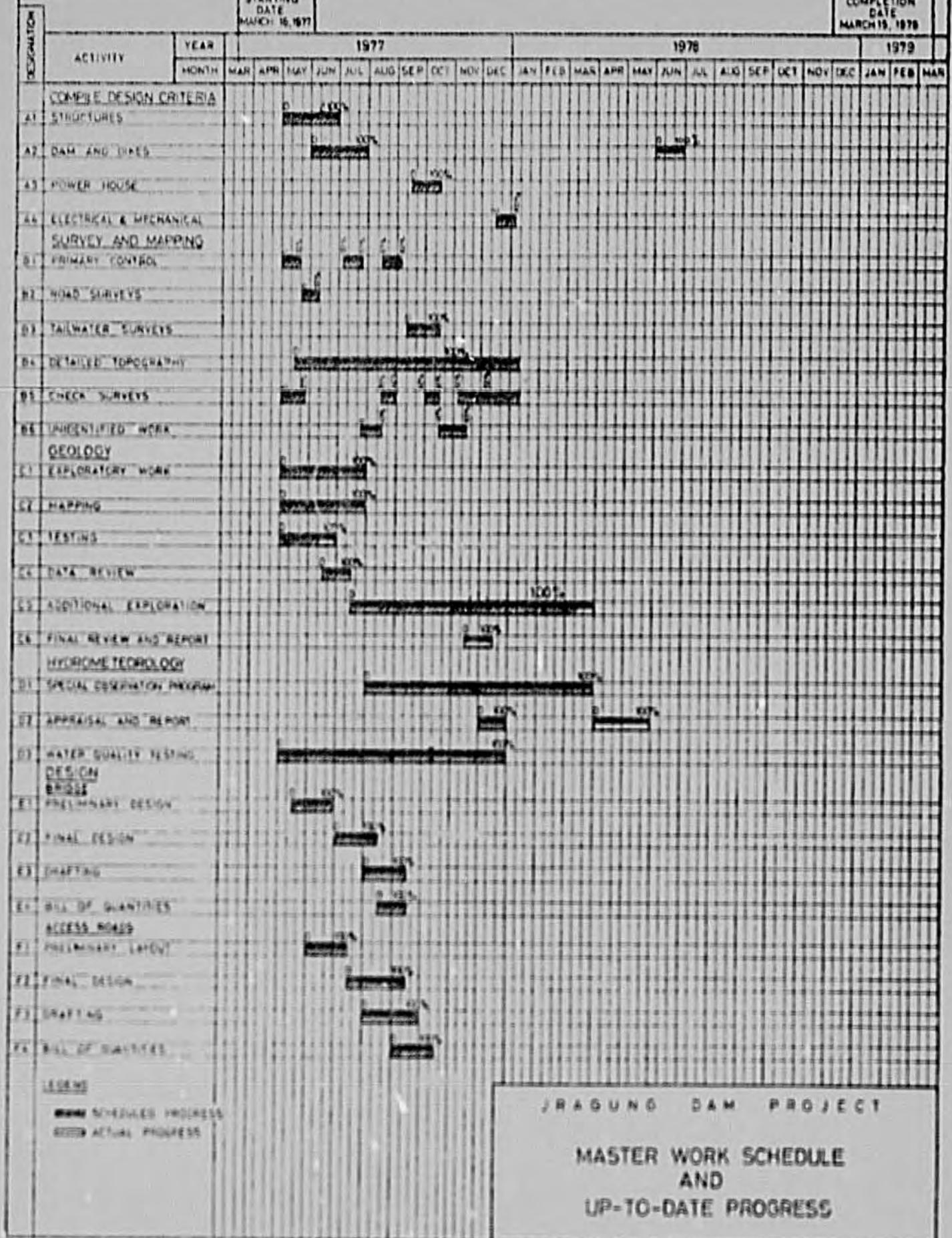
SUMMARY OF REIMBURSEMENT

Rupiah Payments Received by Consultant from Ministry up to the end of Report Period	=	31,685,381.-
Rupiah Expenditure by Consultant Approved for Reimbursement	=	17,581,561.-
Received from DPMA Bandung	+ =	1,000,000.-
Balance	=	15,103,820.-

JRAGUNG DAM PROJECT PROGRESS REPORT

STARTING DATE
MARCH 15, 1977

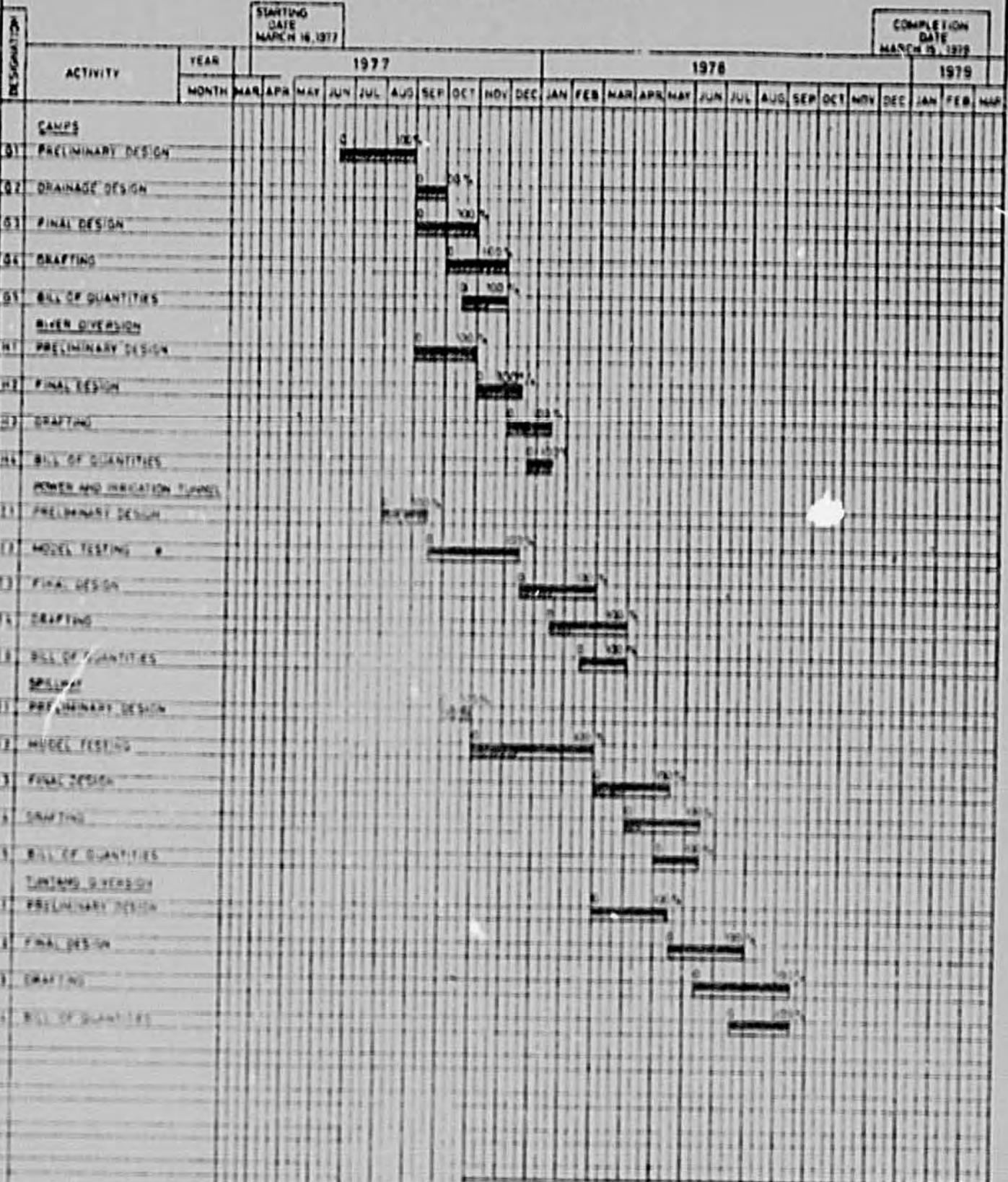
COMPLETION DATE
MARCH 15, 1978



JRAGUNG DAM PROJECT PROGRESS REPORT

STARTING DATE
MARCH 16, 1977

COMPLETION DATE
MARCH 15, 1979



LEGEND

- ▬ SCHEDULED PROGRESS
- ▬ ACTUAL PROGRESS
- * NEED NOT YET ESTABLISHED

JRAGUNG DAM PROJECT
MASTER WORK SCHEDULE
AND
UP-TO-DATE PROGRESS

