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

JRAGUNG DAM

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

QUARTERLY PROGRESS REPORT
No. 7

INCLUDES MONTHLY PROGRESS
REPORT No. 22

DECEMBER 1978

SUBMITTED BY :

ENGINEERING CONSULTANTS, INC.

Denver, Co., USA — Semarang, Indonesia

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ECI ENGINEERING CONSULTANTS, INC.

CABLE ADDRESS :
ECISEMARANG
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INDONESIA
Tel. : 315061
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JRAGUNG DAM PROJECT
P.O. BOX 220
SEMARANG
CENTRAL JAVA
INDONESIA

Director General of
Water Resources Development
Ministry of Public Works
Jalan Pattimura 20/7
Kebayoran Baru
Jakarta Selatan

February 1, 1979

Our file: 1196/MR/22
16/79 SD 13

Attention: Ir. Oesman Djojoadinoto
Director Irrigation.

Subject : Quarterly Progress Report No. 7.

Dear Sir:

We submit herewith fifteen (15) copies of the Quarterly Progress Report No. 7 for the period October 1 to December 31, 1978. It may be noted that a separate monthly report for the month of December 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. 9/3/12 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.

Very truly yours,
Engineering Consultants, Inc.

Saeed A. Rana

Saeed A. Rana
Resident Manager

cc. U.S. AID Jakarta
(Attn: Mr. P. Thorn)
with eight (8) copies
of the report.

General Manager PROSIDA

Project Manager
Jratunseluna Basin Project

ECI Denver (SD 13)

ECI Semarang

SAR/ m.

JRAGUNG DAM PROJECT

QUARTERLY PROGRESS REPORT

NO. 7

INCLUDES MONTHLY PROGRESS REPORT

FOR DECEMBER 1978

PERIOD

OCTOBER 1, 1978 - DECEMBER 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 10.1 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 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 October 1978 through December 1978. The monthly progress report for the month of December 1978 is also included in this report.

During the period under report, the alignment and layout of the main dam and the dikes were finalized. The crest of the Jragung Dam has been fixed at elevation 135.3 with corresponding normal maximum water surface level of the reservoir at elevation 131.0. The final water surface elevation is based on an analysis of the Jragung Reservoir operation studies and project economics for various reservoir levels to arrive at the most economical and best technical solution. A report on the reservoir operation studies and project economic analysis was compiled and submitted. Adjustments to the design of the appurtenant structures to bring them into conformity with the final dam layout and reservoir level progressed satisfactorily.

Work was also initiated to study effects on the economics of implementation of the project in stages.

The events which took place, the actions that were initiated or completed and the points pertinent to the project design including those mentioned above are described in the following.

1. Mr. Fred Trylston of U.S. AID Washington DC accompanied by Messrs. Walter McAleer and Paul Thorn of U.S. AID Jakarta visited the Consultant's office at Semarang on October 13. They were given a briefing on the Project design work and other related matters. A field visit to the damsite was made by Messrs. Trylston and Thorn accompanied by Mr. Rana of ECI and Mr. Maryono Bony of the Jratunseluna Basin Project.

The Project was visited on October 29-30 by Mr. R.E. Mathe, the President of ECI. In addition to discussions on the Project matters held with the Ministry authorities and U.S. AID during his stay at Jakarta, a meeting was held with the authorities of the Jratunseluna Basin Development Project at Semarang on October 30. In that meeting all aspects of the Consultant's job on the design of the Jragung Dam were discussed.

On October 31, Governor Soepardjo of Central Java visited the damsite and the project field office. Various aspects of the Project in general, and the problem of reservoir sedimentation in particular, were explained to him. He agreed that actions should be taken to improve the existing water and land management practices in the upper watershed of Jragung so that excessive erosion in the watershed leading to sedimentation in the Jragung reservoir would be controlled. In that connection he decided that the matter would be given priority and would be discussed at the provincial governmental level during the next meeting concerning the implementation of the greening program in the province.

Mr. Guy Le Moigne, a consultant to the World Bank arrived in Semarang on December 15, 1978 to carry out a review of the design work accomplished thusfar for the Jragung Dam Project. He was accompanied by two senior members of PROSIDA from Jakarta, Ir. David Suleiman, Chief of Design Section, and Ir. A.E. Nobel, Chief of Planning Section. During discussions with the ECI staff they were briefed on the design concepts of the Jragung Dam and appurtenant structures. Mr. Le Moigne visited the damsite on December 16, with Messrs. Rana and Borinelli of ECI, then returned to Jakarta on December 17, 1978.

2. The finalization of the dam and dikes alignment and layout were directed by Mr. S.F. Hillis, the Consultant's dam design and materials specialist, during his stay at the Semarang office from November 20 to December 6, 1978. After review of the latest alternative alignments, the most economical and technically feasible design solution was developed. The main features of the final dam design are the following:

1. The downstream part of the dam overflows most of the right ridge which results in reducing fill quantities.
2. A downstream berm was provided in most of the right ridge and on part of the left ridge to ensure the downstream stability of the ridge and/or downstream slope of the dam.
3. An upstream berm with the top at elevation 100.0 in the maximum section and with variable elevations towards both right and left ridges was provided to ensure foundation stability. A downstream berm with the top at elevation 85 was provided in the maximum section.
4. The dam is a zoned earth embankment in the main section connected to homogeneous weather gravel blankets along the ridges both on the left and the right sides. The upstream blanket has a minimum thickness of 10 meters.
5. Although the dam overflows the ridge, its axis has been located sufficiently upstream so that the back of the dam is not broken and a stable support for the core is maintained all along.
6. In the area where the dam overflows the ridge, a line projected from the downstream contact of the core with the dam crest, at an angle of 45 degrees to the normal, intercepts the upstream slope of the ridge and contains a wedge of supporting material downstream of the core. In most of the sections a downstream berm was provided to ensure stability of the ridge and the downstream slope of the dam.

Complete sets of cross sections for the main dam and dikes have been prepared as final design drawings. The availability and the quantities of different materials from the two borrow areas, No. VII and Penawangan, were reviewed and the various zones of the proposed dam sections were sized accordingly. A report prepared by Caterpillar, at the Consultant's request, on the suitability of the material in Penawangan borrow area shows that the material can be used in the main dam embankment. That material is now being considered in the final design section of the dam.

3. The mapping of the damsite and of all the appurtenant structures is complete. Mapping of the quarry area at Gunung Mergi has been initiated. The secondary mapping work and other miscellaneous surveys progressed on schedule.

4. The geological field investigation work is complete. More results of the foundation material testing currently being done in North America have been received. Those results are being incorporated in the final report on the project geology. The slope stability analyses for several sections of the final dam design using the material testing results have been completed.

5. The design and specification drawings of the Tuntang Diversion Works have been completed and are ready for review. The drafting of the "Good for Construction" drawings of the River Diversion Works was completed. Work continued on the drafting of the design and specification drawings for the inlet and the chute of the Spillway structure. The designs for all of the structures were reviewed by Mr. Kuehl, Chief Engineer ECI during his visit to the Project the first week of December.

The hydraulic model of the Jragung Spillway in the DPMA laboratory at Bandung was tested continuously for a period of about one week in the presence of the ECI design engineers. Different schemes for the flip bucket and the downstream conditions were tested and the final arrangement

of the flip bucket and the position of the downstream plunge pool was decided. Further testing continued to determine pressures at different points along the structure. By the end of the report period, the testing needed for the Spillway was complete.

6. There is a possibility that the renovation of the Borobudur Temple in Central Java may be given priority to use rock from the two quarries at Pudak Payung and Gunung Tjentung which were being considered to supply rock and concrete aggregates for the Jragung Project. A search has, therefore, to be made to explore other possible quarries to supplement rock supply to Jragung. In this connection, exploratory work was started and a potential quarry site at Gunung Mergi was investigated. In this area quarrying of andesite rock is already in progress on a small scale. The site is nearer to the Project area compared to the abovementioned two quarries. If the rock is found to be of acceptable quality, exploiting of this source will be more economical. Necessary recommendations are being made to the Proyek authorities to start drilling work in that area.

7. As requested by the Proyek, another draft of contract documents in the form following that which was prepared by PROSIDA and approved by IBRD has been submitted by the Consultant. This draft supersedes the draft of the documents submitted in February 1978. The drafts of the technical specifications and other contract documents for two main electrical contracts have also been submitted to the concerned agencies. The PLN authorities have been requested by the Proyek to review those documents.

A detailed report on the preparation of contract documents is given in Section IV-C of this report.

8. Preparation of the initial draft of the Final Design Report has been undertaken by all members of the ECI Semarang staff during the

month of December. Draft copies of the sections on Materials and Design of Dam and Dikes were sent to ECI Denver and Mr. S.F. Hillis for final review. The Project economics and cost estimate are as yet not final. The initial draft of the Final Design Report is to be submitted to PROSIDA, Director of Irrigation, U.S. AID and the Proyek for their comments and suggestions prior to preparation of the report in its final form. The initial draft will be submitted by January 10, 1979.

9. The operation studies for the Jragung reservoir have been completed. The results of optimization suggest that the maximum operating level of the reservoir should be at elevation 131. The maximum surcharge elevation under PMP flood conditions, for spillway crest at elevation 131.00, will be 134.4. Accordingly, it has been decided to keep the crest of the dam at elevation 135.30.

The results of the reservoir operation and the economic analysis were compiled in a special report which was issued on November 6, 1978 entitled "Jragung Dam Project-Reservoir Operation Studies and Project Economic Analysis". The Project estimate is further being reviewed by considering the final design quantities and the unit costs which are being established in consultation with other agencies involved in similar jobs. The project economics will be finally reviewed and the analysis will be revised during the month of February 1979, when all the needed information will be available.

It has been suggested that to improve the economics of the project, consideration should be given to build the dam and/or the Project in stages. This would necessitate studying operation of the reservoir at different maximum pool elevations with varying transbasin diversions from Tuntang and without such diversions. The Ministry directed the Consultant to carry out such additional reservoir operation studies and evaluate project economics for all possible alternatives. These studies were initiated in the Consultants' Denver office and will continue through the month of February. Mr. Saeed A. Rana, the Project Resident Manager is presently

participating in those studies at Denver. He will bring back the results of the operation studies with him by the third week of January 1979. A specialist cost consultant and an economist will be assigned to the Project by February 1, 1979 to evaluate costs, benefits and the economics of all the alternatives for review by the IBRD.

10. It was stated in the preceeding quarterly progress report that although the Consultant had been making every effort to finish the entire design job within the manpower and the time schedule given in the Contract, yet, due to additional work which the Consultant had to perform, it appeared that the total estimated contract dollar costs might be exceeded and extension of contract period might become necessary. A request has already been made to the Ministry for extending the time limit in the contract for submitting the estimates of additional costs and the needed extension of time.

11. ECI's engineering economist, Mr. Berger, was at Semarang on two, one-week TDY assignments during October and November to update the economic analysis and to do cost allocation based on the present Project estimate.

Mr. Saeed A. Rana left for USA on December 20 partly for vacation and partly to work in the Consultants' Denver office on Jragung operation studies and Project economics. He is expected to return to Indonesia by January 22. During his absence, Mr. J.P. Frey is acting as Resident Manager.

Mr. C.A. Borinelli the dam design and material engineer left Semarang on December 29, after completing his term of employment on the Jragung Dam Contract.

The schedules of the expatriate personnel of the Consultant are given in Section II of the Report.

12. The reimbursable U.S. Dollar expenditure up to the end of November 1978 amounted to $ 1,252,157.16.-. As of the end of December 1978, the reimbursable Rupiah expenditure amounted to Rp. 35,825,878.-.

The detailed description of Rupiah and Dollar expenditure is given in Section VII of this Report.

SECTION II

PERSONNEL

A. EXPATRIATE

1. At Semarang on September 30, 1978

Saeed A. Rana	Resident Manager
Carlos A. Borinelli	Materials and Dam Engineer
Robert G. McLaughlin	Structural Engineer
Jeffery P. Frey	Specification Engineer

2. Arrived in Semarang during October 1 - December 31, 1978

M.K. Kuehl	Chief Engineer and Vice President
S.F. Hillis	Materials and Dam Design Engineer

3. Departed from Semarang during October 1 - December 31, 1978

M.K. Kuehl	Chief Engineer and Vice President
S.F. Hillis	Materials and Dam Design Engineer
Saeed A. Rana	Project Resident Manager
Carlos A. Borinelli	Materials and Dam Engineer

4. At Semarang on January 1, 1979

Robert G. McLaughlin	Structural Engineer
Jeffery P. Frey	Specification Engineer

B. COUNTERPART

1. Assigned Full-Time as of December 31, 1978

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. Rustiyanti	(Assistant Counterpart)
Edy Arifin	(Assistant Counterpart)
Buang Sukardjono	(Assistant Counterpart)
Ir. Muhammad Ali	
Ir. Tri Hardono	
Djasriansyah Aht	
Harris BME	
Ir. Bambang Sujono	
Nursalim B.Sc	

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 December 31, 1978

Mrs. Tan Ik Goen	Interpreter I
Miss Drs. Djoa Siok Lan	Interpreter II
Miss Drs. 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

Date	Place	Event	Participation	Organization
October 4-5, 1978	Bandung	Spillway Model Testing	Mr. F. Trylston Mr. W. McAleer Mr. P. Thorn	U.S. AID
			Mr. Rana	ECI
			Mr. Maryono	Jratunseluna
			Mr. Memed Ir. Erman	DPMA
October 13, 1978	Semarang	Discussion Project Design and Progress. Inspection damsite.	Mr. F. Trylston Mr. W. McAleer Mr. P. Thorn	U.S. AID
			Resident Staff at Semarang	ECI
October 14, 1978	Semarang	Discussion Project Matters	Ir. Bambang	Jratunseluna
			Mr. Rana	ECI
October 16, 1978	Semarang	Discussion Assignments Counterparts	Ir. Gayo Mr. Maryono	Jratunseluna
			Mr. Rana	ECI
October 20, 1978	Jragung	Reconnaissance Tuntang Diversion Intake Area	Rana and Frey	ECI
October 26, 1978	Jakarta	Discussion Project Matters	Ir. Soewasono	PROSIDA
			Mr. A. Grayson Mr. P. Thorn	U.S. AID
			Mr. R.E. Mathe Mr. G.E. Rogers Mr. Rana	ECI
October 27, 1978	Jakarta	Discussion Project Matters and Finances	Mr. Grayson Mr. P. Thorn	U.S. AID
			Mr. Rana	ECI
October 30, 1978	Semarang	Discussion Project	Ir. Martopo Ir. Bambang Mr. Maryono	Jratunseluna
			Mr. R.E. Mathe Mr. G.E. Rogers Mr. Rana	ECI

Date	Place	Event	Participation	Organization
October 31, 1978	Jragung Damsite	Inspection Jragung	Mr. Soepardjo and staff	Governor of Central Java
			Mr. Martopo Mr. Takrim Mr. Maryono	Jratunseluna
			Mr. Rana	ECI
November 1, 1978	Jakarta	Discussion Contract Matters	Ir. Habibuddin	PROSIDA
			Rana	ECI
November 8, 1978	Semarang	Present and Explained Updated Report on Jragung Project	Ir. Martopo, Ir. Bambang, Mr. Takrim	Jratunseluna
			Rana	ECI
November 10, 1978	Jakarta	Presented and Explained Updated Report on Jragung Project	Ir. Soewasono	PROSIDA
			Rana	ECI
November 20-21, 1978	Bandung	Finalization Spillway Model Testing	Ir. Memed Drs. Erman	DPMA
			Rana, Frey, McLaughlin	
			Ir. Suharto	Jratunseluna
November 23, 1978	Jakarta	Discussion Finalization of Dam Design	S.F. Hillis, Rana, Borinelli	ECI
December 6, 1978	Semarang	Discussion Unit Rates Estimating	Kuehl, Frey	ECI
December 8, 1978	Quarry at Gunung Mergi	Inspection of quarry Site	Ir. Tri Hardono	Jratunseluna
			Kuehl, Rana	ECI
December 15, 1978	Semarang	Discussion of Design Concepts of Jragung Project	Mr. Le Moigne	World Bank
			Ir. D. Suleiman Ir. A.E. Nobel	PROSIDA
			Mr. Maryono Mr. Cayo	Jratunseluna
			Mr. Rana, Mr. Borinelli Mr. McLaughlin Mr. Frey	ECI

Date	Place	Event	Participation	Organization
December 16, 1978	Jragung Damsite	Inspection Jragung	Mr. Le Moigne	World Bank
			Mr. Maryono Mr. Gayo	Jratunseluna
			Mr. Rana Mr. Borinelli	ECI
			Ir. D. Suleiman	PROSIDA
December 17, 1978	Semarang	Discussion Project Designs and Economics	Mr. Le Moigne Rana	World Bank ECI
December 19 - 20, 1978	Jakarta	Discussion Project Designs and Further studies	Ir. Triwasono	PROSIDA
			Rana	ECI
December 19 - 20, 1978	Jakarta	Discussion Project Designs and further studies	Mr. Grayson Mr. D. Thorn	U.S. AID
			Rana	ECI

In addition to the above mentioned events, regular field trips were made to the Project area and the damsite by the Consultant's resident staff at Semarang.

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. Structural Design

Progress in the design of appurtenant structures is hereunder described as follows.

Tuntang Diversion

During the past quarter, the contract document drawings have been completed as earlier designed. The comments from the ECI Denver Chief Engineer's review will be incorporated as part of the final checking phase of the contract document drawings. However, a decision has now been made to raise the crest of the weir from elevation 128.5 to elevation 130.0. The raising of the weir crest elevation has been under consideration for some time and recent reservoir operation studies and field surveys have indicated that an elevation of 130 meters above M.S.L. is the most appropriate. This work has also been started, and will be incorporated into the final checking phase of these contract document drawings.

Spillway

Since the last quarterly reported progress on this structure, the model testing has been completed and the results incorporated into the design. The problem connected with the outlet conditions reported in the last quarterly report have been solved. It was found to be uneconomical to design the outlet portion of the structure as a conventional stilling basin for the P.M.P. flood condition; it was therefore designed for a lower

discharge yet allowing passage of the P.M.F. flood without damage to the main structure and with minimum damage to the downstream flexible apron. This design concept resulted in dissipating the energy of the flow with a hydraulic jump type of stilling basin, in which the downstream sill would act in the manner of a flip bucket for higher discharges, throwing the jet a safe distance away from the stucture into a pre-excavated plunge pool. By comparing the several schemes for this portion of the spillway structure, it was found that a considerable savings in cost could be achieved through flipping out the flows above approximately 125 cubic meters per second and forming a hydraulic jump for flows less than this. A concrete apron plus a riprap flexible apron were attached to the end sill of the flip bucket for protection under low flow conditions. The final model tests were based on a spillway crest elevation of 131.0. With the completion of the design as described above, the entire spillway structure design is finalized.

Also in the quarter past, the specification drawings have been done and checked by the ECI Chief Engineer. His comments plus other areas which have been checked are presently being incorporated into the drawings. This checking process should be finished in the next period.

The spillway portion of the Final Design Report has also been completed in draft form. The first draft of the Design Report is to be completed next period.

Diversion Tunnel

There have been no revisions to this structure during the past quarter and the contract document drawings and the construction drawings are finished; however any shift of the dam axis in the course of design will also affect this structure and may require revision of the drawings as the designs are finalized.

The Design Report portion for the Diversion Tunnel has been written and completed for the Design Report draft.

Power and Irrigation

Revisions in the intake tower elevation, from intake crest at 85.0 to 90.0, were completed on the plans and the Design Report was written for this structure in the past quarter. The construction drawings will be done following completion of the Tuntang and Spillway drawings.

B. Materials and Dam Design

The design of the dam was reviewed during the month of December by Mr. Guy Le Moigne, representative of the World Bank, who was satisfied with the design of the dam and the appurtenant structures.

Following is the work accomplished in the fourth quarter of 1978:

1. Materials:
   a. Preparation of all final boring logs for all the five borrow pits' deep borings.
   b. Preparation of final fifty (50) geological cross sections for the five borrow pits.
   c. Preparation of all the soil testing data for the embankment materials section of the Final Design Report.
   d. Final determination of the borrow pits embankment materials quantities for all the five borrow pit studies.
   e. In addition, Caterpillar provided their final report concerning their study of the Penawangan Borrow Pit. According to the seismic refraction study done by Caterpillar, the Penawangan Agglomerate is rippable. The use of a D8K Caterpillar bulldozer would be required to rip the Penawangan Agglomerate.

The section of the Final Design Report entitled"Chapter II.2.2.

Materials", concerning all of the materials for the embankment construction, filters, drains, riprap, and concrete aggregate, was written by the Materials and Dam Design Engineer and sent to the the ECI Denver office for its final review. In addition, Appendix III, Geotechnical Data of the Final Design Report, was prepared.

2. Dam Design: a. Preparation of the final borrow logs for all of the 49 deep borings accomplished in the damsite area during the final design stage.
   b. Computation and tabulation of foundation permeability values from water pressure tests.
   c. Evaluation and tabulation of piezometer data.
   d. Design of the left dike.

A considerable amount of work was carried out in completing the design of the main dam, dike and reservoir rim saddle dike. Two slightly different alternative alignments and layouts were studied for the main dam. Subsequently, a third alignment and layout was selected and studied, and was adopted as final for the dam. The design as finalized presents the most economical and the best technical solution. The main features of the dam design are the following:

1. The downstream part of the dam overflows most of the right ridge which results in reduced fill quantities.
2. A downstream berm is provided across most of the right ridge and on part of the left ridge to ensure the downstream stability of the ridge and/or downstream slope of the dam.
3. An upstream berm with the top at elevation 100.0 in the maximum section and with variable elevations towards both right and left ridges is provided to ensure foundation stability. A downstream berm with the top at elevation 85 is provided in the maximum section.

4. The dam is zoned earth embankment in the main section connected to homogeneous weathered gravel blankets along the ridges, upstream on the left and the right sides. The upstream blanket has a minimum thickness of 10 meters.

5. Although the dam overflows the ridge, its axis has been located sufficiently upstream so that the "back" of the dam is not broken and stable support for the core is maintained all along.

6. In the area where the dam overflows the ridge, a line projected from the downstream contact of the core with the dam crest, at an angle of 45 degrees to the normal, intercepts the upstream slope of the ridge and contains a wedge of supporting material downstream of the core. In most of the sections a downstream berm is provided to ensure stability of the ridge and the downstream slope of the dam.

The design of the dike, which was completed earlier, was reviewed. The slopes on the dike will be 1V to 3H upstream and 1V to 4H downstream. Berms have been provided both at the upstream and the downstream toes of the dike. The dike connects the left end of the dam to the Spillway crest.

Weathered gravel will be used for the upstream shell and Penawangan agglomerate will be used for the downstream shell of the embankments. A drainage gallery and drainage holes were designed for the area along the ridges under the embankment and under the dike.

The reservoir rim was also completely checked using actual field topographic data. Only one low saddle,located about 300 meters west of the Spillway, was detected where raising must be done. A 70-meter long and 5-meter high dike will be built at that location. The loose and weathered surface under the embankment will be completely stripped. The stripped material will be used to backfill low areas upstream and downstream of the rim. The dike will be constructed of material from the Spillway excavation and from stipping material removed beneath the dam embankment.

The embankment foundation and abutments instrumentation have been designed for the dam and dike. In addition, Chapter III, "Design Description Dam and Dike" of the Final Design Report was prepared by the Dam Design Engineer and sent to Denver office and Mr. Sidney Hillis for final review.

The Materials and Dam Design Engineer has accomplished all the work assigned to him in Jragung Dam Project and his assignment was completed. He will return to Denver on January 1, 1979.

C. Specifications

During the final quarter of 1978, specifications work concentrated on the revision of contract document drawings for the various structures in order to bring them into conformity with the final dam embankment layout with crest at elevation 135.3 and increased normal water surface elevation of 131.0. In addition, quantity take-offs from the revised designs have been made and new bills of quantities for the dam and appurtenant structures have been prepared. An update of unit rates for some of the work items was also performed for the preparation of the final Engineer's Cost Estimate for the Project.

In mid-October 1978, the final draft of the general conditions portion of the contract documents for the River Diversion Works Contract was completed and submitted to PROSIDA, Director of Irrigation, U.S. AID and the Proyek for approval. The documents are based on those prepared for the Rentang Barrage and Appurtenant Works Contract, which have been accepted by PROSIDA and the World Bank.

Also in October, a draft submittal of the technical specifications volumes and full-size blueprints of the drawings for the following two electrical contracts was made: "Furnish, Deliver and Install Power Plant Electrical Equipment" and "Furnish, Deliver and Install Switchyard and 20 kV Distribution Line". The specifications and drawings were furnished to U.S. AID, PLN and the Proyek for review and comment.

During November, revisions of the Spillway and Power and Outlet Facilities drawings were carried out. The Spillway crest elevation was raised to the corresponding normal maximum water surface elevation of 131.0. For the Power and Outlet Facilities, the intake crest elevation was raised from elevation 85.0 to elevation 90.0. Complete sets of the revised Power and Outlet Facilities and River Diversion Works drawings were submitted to the Proyek for their review.

In addition to the preparation of contract document drawings, work on the specifications for the Main Civil Works contract of the Project has been underway. Draft copies of the technical specifications sections prepared in Denver by the civil, mechanical and electrical departments have been forwarded to the Semarang office for review and compilation. All of the various sections for the technical specifications are on hand, except the "Excavation and Earthwork" and "Instrumentation" sections which are being prepared by the Consultant's dam design and materials specialist, Mr. S.F. Hillis, and are expected to be completed in February.

"Chapter V, Cost Estimate," for the initial draft of the Final Design Report to be submitted in mid-January, was completed in December. The quantities involved for each of the work items presented in the bills of quantities were computed from the latest revised design drawings of each of the structures and dam. The unit rates employed have been updated and also reviewed by Mr. Kuehl, ECI's Chief Engineer, during his visit.

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:

Name of Report	Date Due	Status	Date Submitted
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 of 6 (above) Dam and Dikes Design Criteria			August 1, 1977
8. Advance Notice of Intent to Invite Bids and Pre-qualification Instructions		Draft	January 25, 1978
Submitted Revised Draft			March 15, 1978
Submitted 130 copies		Final	June 1, 1978
9. Contract Documents River Diversion Works		Draft	February 23, 1978
Revised Bill of Quantities and Drawings			June 8, 1978
Revised Contract Documents as per PROSIDA-Advance Draft Copy			September 22, 1978

Name of Report	Date Due	Status	Date Submitted
Revised Contract Documents as per PROSIDA		Draft	October 19, 1978
Revised Drawings		Draft	October 3, 1978
10. Technical Specifications and Drawings Access Roads and Bridge		Draft	March 13, 1978
11. Drawings Irrigation and Power Tunnel and Powerhouse			June 14, 1978
12. Electrical Design Criteria and Specifications of Electrical Equipment		Draft	July 10, 1978
Technical Specifications and Drawings for Power Plant Electrical Equipment and Switchyard and 20 KV Transmission Line Contracts		Draft	October 13, 1978
13. Jragung Dam Project - Design Status Report			August 9, 1978
14. Jragung Dam Project - Upper Watershed Management Report		Draft	August 7, 1978
15. Jragung Dam Project - Reservoir Operation Studies and Project Economic Analysis.		Final	November 6, 1978

SECTION VI

PROBLEM AREAS

None.

SECTION VII

FINANCIAL

Dollar Accounts

Due to the reasons explained in monthly progress report No. 2, the Dollar accounts are being reported for the period up to the end of the month of November 1978. The expenditure to that date as well as the budget amounts are shown in Annexure IV. The percentage expenditure of the budget is 91.31 .

Rupiah Accounts

Up to the end of the month under report, a total amount of Rp. 35,825,878.- was expended. This represents 50.62 percent of the total Rupiah reimbursable costs provided in the Contract. The corresponding percentage of the contract period elapsed is 89.58.

The summary of the Rupiah budget and costs is given in Annexure V.

Annexure I

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			ARRIVAL	DEPARTURE	SCHEDULED	ACTUAL
1. Saeed A. Rana	Permanent Resident U.S.A.	Resident Manager	March 16, 1977		24	21.5
2. James E. Rollins	U.S.A.	Geologist	March 16, 1977	June 30, 1977	3.5	3.5
3. Robert McLaughlin	U.S.A.	Structural Design	April 5, 1977		23	20.9
4. Carlos Borinelli	Permanent Resident U.S.A.	Materials and Dam Design Engineer	June 4, 1977	December 29, 1978	18	18.8
5. James E. Pyne	U.S.A.	Resident Geologist	September 1, 1977	May 1, 1978	8.5	
			May 21, 1978	June 4, 1978		8.5
6. Jeffery P. Frey	U.S.A.	Specifications Engineer	December 18, 1978		12	12.45
7. Glen Trowbridge	U.S.A.	Design Engineer	February 7, 1978	July 20, 1978	18	5.40
8. James Hoge	U.S.A.	Design Engineer	March 23, 1978	June 20, 1978		3.00

Annexure I
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			ARRIVAL	DEPARTURE	SCHEDULED	ACTUAL
9. E.B. Bartel	U.S.A.	Design Engineer	November 12, 1977	December 20, 1977		
			May 4, 1978	May 13, 1978		
			July 8, 1978	July 14, 1978		1.83
10. Cecil M. Langford	U.S.A.	Project Sponsor	August 6, 1977	August 12, 1977	1.5	
			January 23, 1978	January 31, 1978		0.52
11. M.K. Kuehl	U.S.A.	Chief Engineer	June 27, 1977	July 2, 1977	1.5	
			February 4, 1978	February 12, 1978		
			July 25, 1978	August 16, 1978		
			December 4, 1978	December 9, 1978		1.41
12. Paul Otter	U.S.A.	Project Engineer	March 16, 1977	March 18, 1977	1.5	
			March 1, 1978	March 4, 1978		0.23

Annexure I
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			ARRIVAL	DEPARTURE	SCHEDULED	ACTUAL
13. Peter Strauss	U.S.A.	Chief Geologist	March 16, 1977	March 18, 1977	4	
			June 13, 1977	July 1, 1977		
			February 4, 1978	Februray 7, 1978		
			May 21, 1978	June 4, 1978		
			September 25, 1978	September 28, 1978		1.63
14. William Wenger	U.S.A.	Electrical Engineer	March 16, 1977	March 21, 1977	4	0.50
15. Ralph Goodrich	U.S.A.	Electrical Engineer	January 20, 1978	February 15, 1978		0.90
16. Lawrence Boval	U.S.A.	Electrical Engineer	June 15, 1978	June 25, 1978		0.37
17. M.A. Stevens	Canada	River Regime Sediment Specialist	March 20, 1977	March 23, 1977	3	
			October 21, 1977	December 15, 1977		
			March 20, 1978	May 20, 1978		3.30

Annexure I
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			ARRIVAL	DEPARTURE	SCHEDULED	ACTUAL
18. W. Stevens	U.S.A.	Surveyor	April 4, 1977	May 31, 1977	7.5	
			August 1, 1977	January 15, 1978		7.25
19. S.F. Hillis	Canada	Chief Materials	June 26, 1977	July 18, 1977	3	
			February 2, 1978	February 12, 1978		
			July 23, 1978	August 3, 1978		
			November 20, 1978	December 6, 1978		2.41
20. Robert Campbell	U.S.A.	Assistant Chief Engineer	November 7, 1977	November 10, 1977		
			November 28, 1977	December 12, 1977		0.63
21. John Ismert	U.S.A.	Chief Mechanical	January 27, 1978	February 12, 1978	4	0.77
22. Dr. H.W. Burke	U.S.A.	Geologist Consultant	February 4, 1978	February 12, 1978		
			September 25, 1978	September 28, 1978		0.43
23. Mr. H.C. Fletcher	U.S.A.	Watershed Management	March 31, 1978	June 1, 1978	3	2.1

Annexure I
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			ARRIVAL	DEPARTURE	SCHEDULED	ACTUAL
24. Mr. R.L. Berger	U.S.A.	Economist	October 18, 1978	October 23, 1978		0.4
			November 13, 1978	November 19, 1978		

Annexure II

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Counterparts and Technical Personnel

NAME	EXPERTISE	WORK ASSIGNMENT	PROJECT ASSIGNMENT DATES STARTING	ENDING	MAN MONTHS WORKED
Counterparts					
1. Ir. Martopo	1. Project Management 2. Project Planning	November 1, 1975	March 16, 1977		21.5
2. Ir. Bambang Soedjono	1. Project Management 2. Project Planning	November 1, 1975	March 16, 1977		21.5
3. Maryono Bony M.E.	1. Project Planning 2. Dam Design Engineer	November 1, 1975	March 16, 1977		21.5
4. Ir. Wisnu Suharto	Hydraulic Structures	November 1, 1975	March 16, 1977		21.5
5. Ir. Soedaryanto Hs.	Geologist	January 1, 1977	March 16, 1977		21.5
6. Drs. Redjiono	Hydrologist	January 1, 1977	March 16, 1977		21.5
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		21.5
9. Ir. Muhammad Ali	1. Dam Design Engineer 2. Soil Mechanics/Material	January 1, 1976	March 16, 1977		21.5

Annexure II
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Counterparts and Technical Personnel

NAME	EXPERTISE	WORK ASSIGNMENT	PROJECT ASSIGNMENT DATES STARTING	PROJECT ASSIGNMENT DATES ENDING	MAN MONTHS WORKED
10. Djasriansyah Aht	Electrical Engineer	March 16, 1977	March 16, 1977		21.5 (Part Time)
11. Ir. Hartopo	Hydro Power Engineer	March 16, 1977	March 16, 1977		21.5 (Part Time)
12. Harris BME	Mechanical Engineer	March 16, 1977	March 16, 1977		21.5 (Part Time)
13. Ir. Supriyo	Specification Engineer	September 16, 1977	September 16, 1977	October 18, 1978	13.0
Assistant Counterpart					
1. Triyono BE	Geologist	June 1, 1976	March 16, 1977		21.5
2. Sutardjo BE	Geologist	December 1, 1976	March 16, 1977		21.5
3. Bambang Gunadi B.Sc	Hydrologist	January 1, 1976	March 16, 1977	November 1, 1977	7.5

Annexure II
(Continued)

JRAGUNG DAM PROJECT

Engineering Consultants, Inc.

Quarterly Progress Report No. 7
Period: Ending December 1978

Assignment of Counterparts and Technical Personnel

NAME	EXPERTISE	WORK ASSIGNMENT	PROJECT ASSIGNMENT DATES STARTING	ENDING	MAN MONTHS WORKED
4. Ir. Tri Hardono	Dam Design Engineer	March 16, 1977	March 16, 1977		21.5
5. Ir. Rustiyanti	Hydraulics Structures	March 16, 1977	March 16, 1977		21.5
6. Buang Sukardjono	Hydrologist	January 1, 1977	March 16, 1977		21.5
7. Edy Arifin Aht	Civil Structures	April 1, 1976	March 16, 1977		21.5
8. Ir. Diah Kusumawati	Hydro Power Engineer	December 1, 1976	June 30, 1978	September 30, 1978	3.0
Draftsmen					
1. Mukiyat	Draftsman	March 1, 1976	March 16, 1977		21.5
2. S.V. Barleyanto	Draftsman	November 1, 1975	March 16, 1977		21.5
3. Bambang Prayitno	Draftsman	February 1, 1976	March 16, 1977		21.5
4. Aris Mudjianto	Draftsman	December 16, 1977	December 16, 1977		12.5

Annexure III

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Direct-hire Indonesian Personnel

NAME	POSITION	PERIOD OF SERVICE		MAN/WOMAN MONTHS	
		DATE STARTED	DATE ENDED	PROVIDED	SPENT
1. Mrs. Tan Ik Goen	Interpreter/Translator I	March 16, 1977		24	21.5
2. Miss Dra. Djoa Sioe Lan	Interpreter/Translator II	May 16, 1977		24	19.5
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			20.0
5. Mrs. Sri Moenasih Soetikno	Clerk/Typist	March 16, 1977	July 31, 1977	24	4.5
	Secretary	August 1, 1977	September 20, 1978	19.5	14.0
6. Miss Sri Anon	Clerk/Typist	March 16, 1977		24	21.5
7. Mr. Suhandi	Messenger	March 16, 1977		24	21.5

Annexure IV

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending November 1978

Summary of U.S. Dollar Expenditures

COST ITEMS	AMOUNT AVAILABLE US $	EXPENDITURE PRIOR	EXPENDITURE DURING PERIOD	EXPENDITURE UP TO DATE	PERCENTAGE EXPENDITURE	PERCENTAGE TIME ELAPSED
1. Resident Staff Base Salaries	181,360.00	127,948.98	23,965.28	151,914.26	83.76	85.4[illegible]
2. Overseas Differential	45,340.00	34,935.80	5,516.32	40,452.12	75.06	
3. Overhead Resident Staff (75% base salaries)	136,020.00	96,070.12	17,973.96	114,044.09	83.84	
4. TDY & Denver Staff Salaries Including Overseas Differential	215,250.00	222,609.88	18,379.86	240,989.74	116.59	
5. Overhead TDY & Denver (95% base salaries)	196,365.00	211,479.35	17,460.86	228,940.21	116.59	
6. Fixed Fee	138,000.00	96,025.-	15,525.-	111,550.-	80.83	
7. Travel and Per Diem	73,120.00	43,010.20	6,550.28	49,560.48	67.78	
8. Transportation (Relocation)	12,000.00	11,150.-	-	11,150.-	92.92	
9. Other Direct Costs & Miscellaneous Expenses	53,800.00	59,780.84	852.29	60,633.13	112.70	

Annexure IV

Continued

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending November 1978

COST ITEMS	AMOUNT AVAILABLE US $	EXPENDITURE PRIOR	EXPENDITURE DURING PERIOD REPORTED	EXPENDITURE UP TO DATE	PERCENTAGE EXPENDITURE	PERCENTAGE TIME ELAPSED
10. Ministry Personnel	60,000.00	53,837.25	2,795.21	56,632.46	94.39	
11. Special Purchases	190,000.00	143,314.49	10,855.66	154.170.15	81.14	
12. Contingencies	70,000.00	22,932.32	9,188.20	32,120.52	45.89	
Total Dollar Costs	1,371,255.00	1,123,094.24	129,062.92	1,252,157.16	91.31	85.42

Annexure V

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

Summary of Rupiah Expenses

COST ITEMS	BUDGET ALLOCATION (Rp.)	EXPENDITURE PRIOR	EXPENDITURE PERIOD REPORTED	EXPENDITURE TO DATE	PERCENTAGE EXPENDITURE	PERCENTAGE TIME ELAPSED
I. PER DIEM						
Jakarta	3,300,000.-	2,062,750	280,500	2,343,250	71.01	89.58
Bandung & Semarang	18,000,000.-	5,675,000	390,000	6,065,000	33.69	
Other	1,800,000.-	630,650	3,000	633,650	35.20	
Family	230,000.-	80,000	20,000	100,000	43.48	
Sub Total	23,330,000.-	8,448,400	693,500	9,141,900	39.19	
II. OTHER DIRECT COSTS						
Cable & Telephone	2,000,000.-	1,176,883	234,710	1,411,593	70.58	
Postage	1,500,000.-	476,530	134,275	610,805	40.72	
Reproduction & Printing	15,000,000.-	5,120,292	1,036,327	6,156,619	41.04	
In Country Transportation	2,700,000.-	1,993,026	478,620	2,471,646	91.54	
Supplies & Materials	6,000,000.-	1,439,005	346,975	1,785,980	29.77	
Miscellaneous	6,800,000.-	5,224,450	254,457	5,478,907	80.57	
Sub Total	34,000,000.-	15,430,186	2,485,364	17,915,550	52.69	

Annexure V

Continued

JRAGUNG DAM PROJECT

Quarterly Progress Report No. 7
Period: Ending December 1978

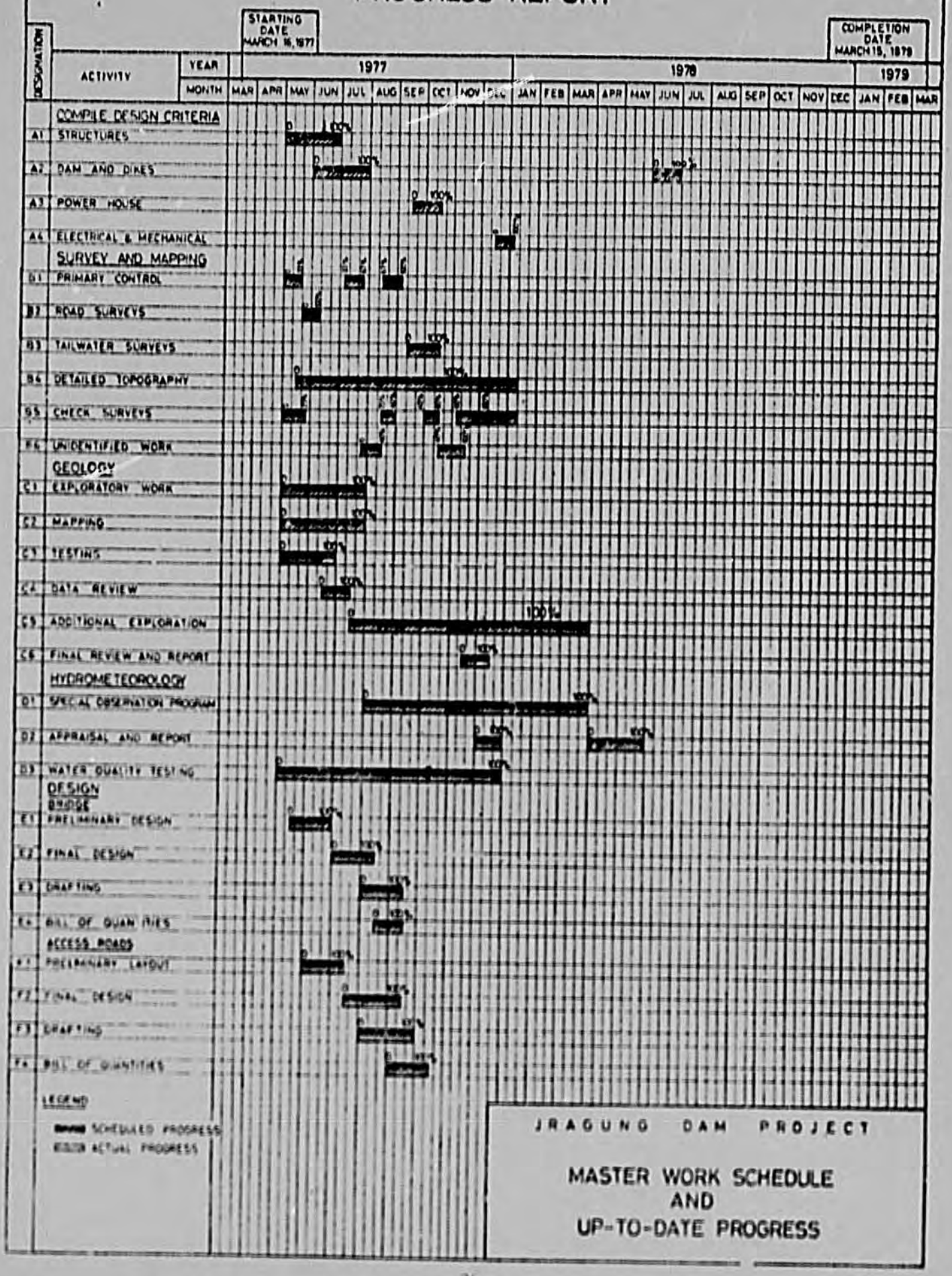
Summary of Rupiah Expenses

COST ITEMS	BUDGET ALLOCATION (Rp.)	EXPENDITURE PRIOR	EXPENDITURE PERIOD REPORTED	EXPENDITURE TO DATE	PERCENTAGE EXPENDITURE	PERCENTAGE TIME ELAPSED
III. ADMINISTRATIVE PERSONNEL						
Secretaries	3,610,500.-	2,479,164	297,728	2,776,892	76.91	
Interpreters	6,017,500.-	3,271,712	627,128	3,898,840	64.79	
Clerks/Typists	2,402,000.-	1,551,519	232,340	1,783,859	74.27	
Messenger	373,500.-	214,752	44,085	258,837	69.30	
Severance Pay	1,037,500.-	50,000	-	50,000	4.82	89.58
Sub Total	13,446,000.-	7,567,147	1,201,281	8,768,428	65.21	
Grand Total	70,776,000.-	31,445,733	4,380,145	35,825,878	50.62	

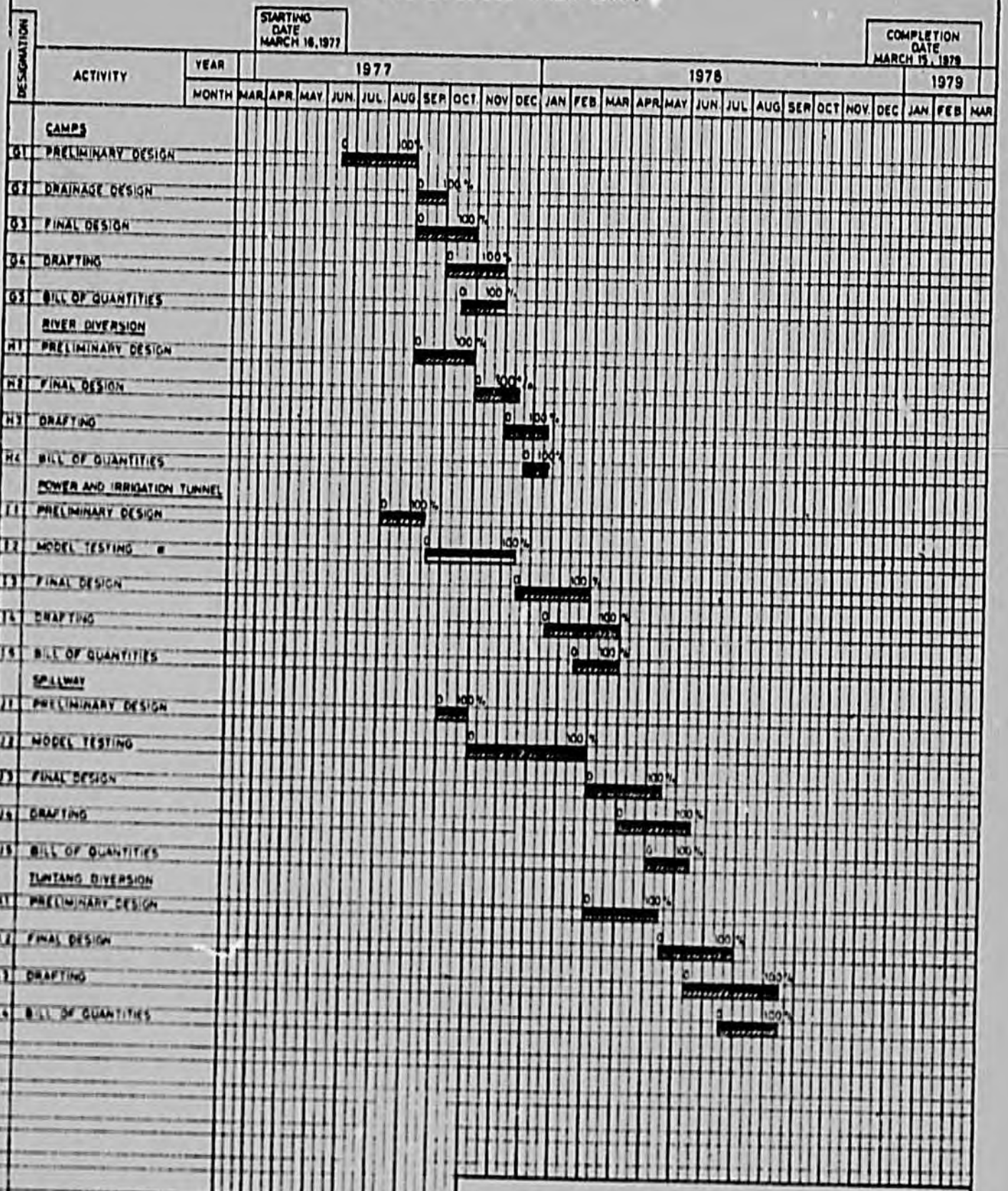
SUMMARY OF REIMBURSEMENT

Rupiah Payments Received by Consultant from Ministry up to the end of Report Period	=	43,685,381.-
Rupiah Expenditure by Consultant Approved for Reimbursement	=	35,825,878.-
Balance	=	7,859,503.-

JRAGUNG DAM PROJECT
PROGRESS REPORT



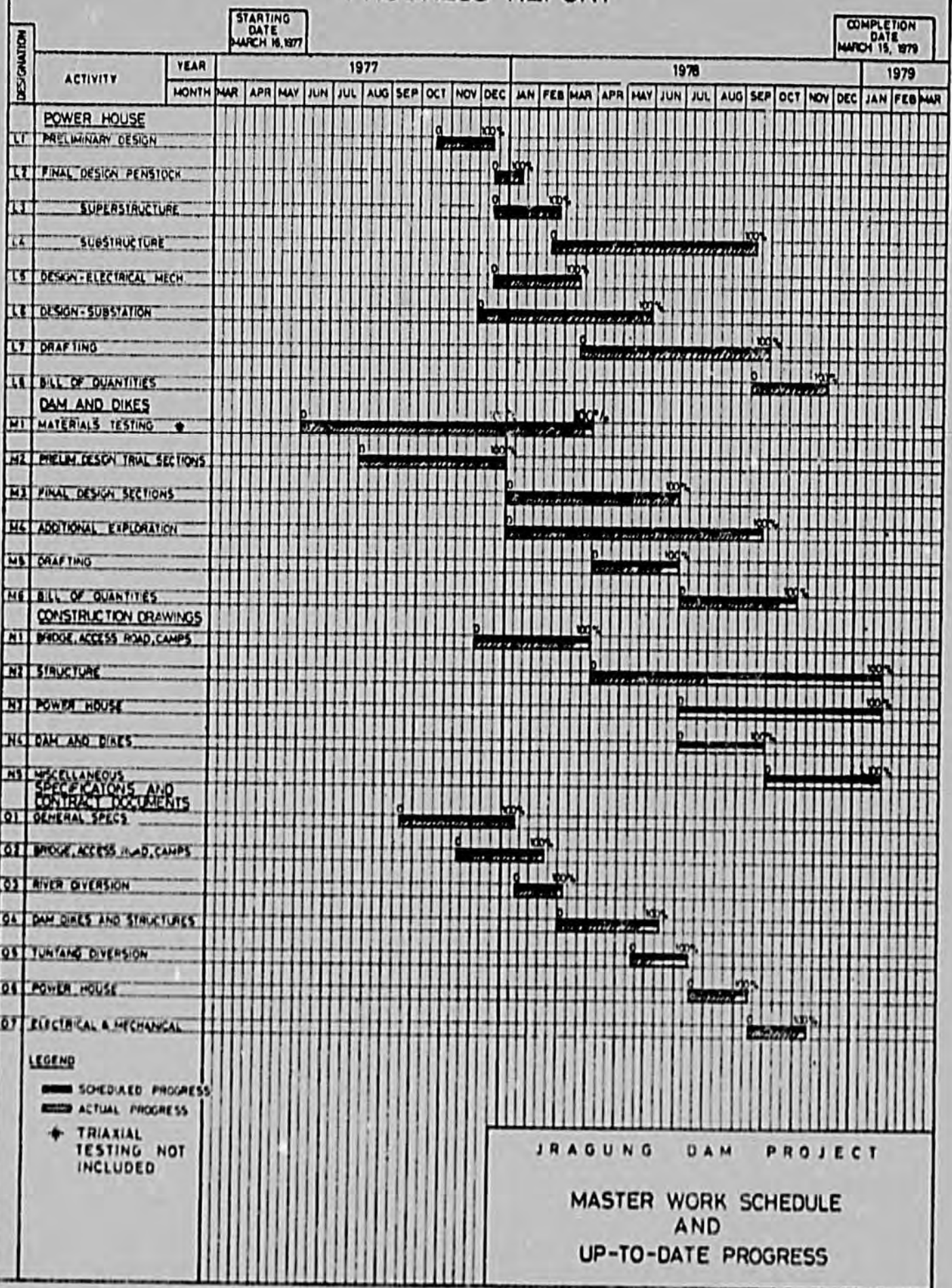
JRAGUNG DAM PROJECT
PROGRESS REPORT



JRAGUNG DAM PROJECT

MASTER WORK SCHEDULE
AND
UP-TO-DATE PROGRESS

JRAGUNG DAM PROJECT
PROGRESS REPORT



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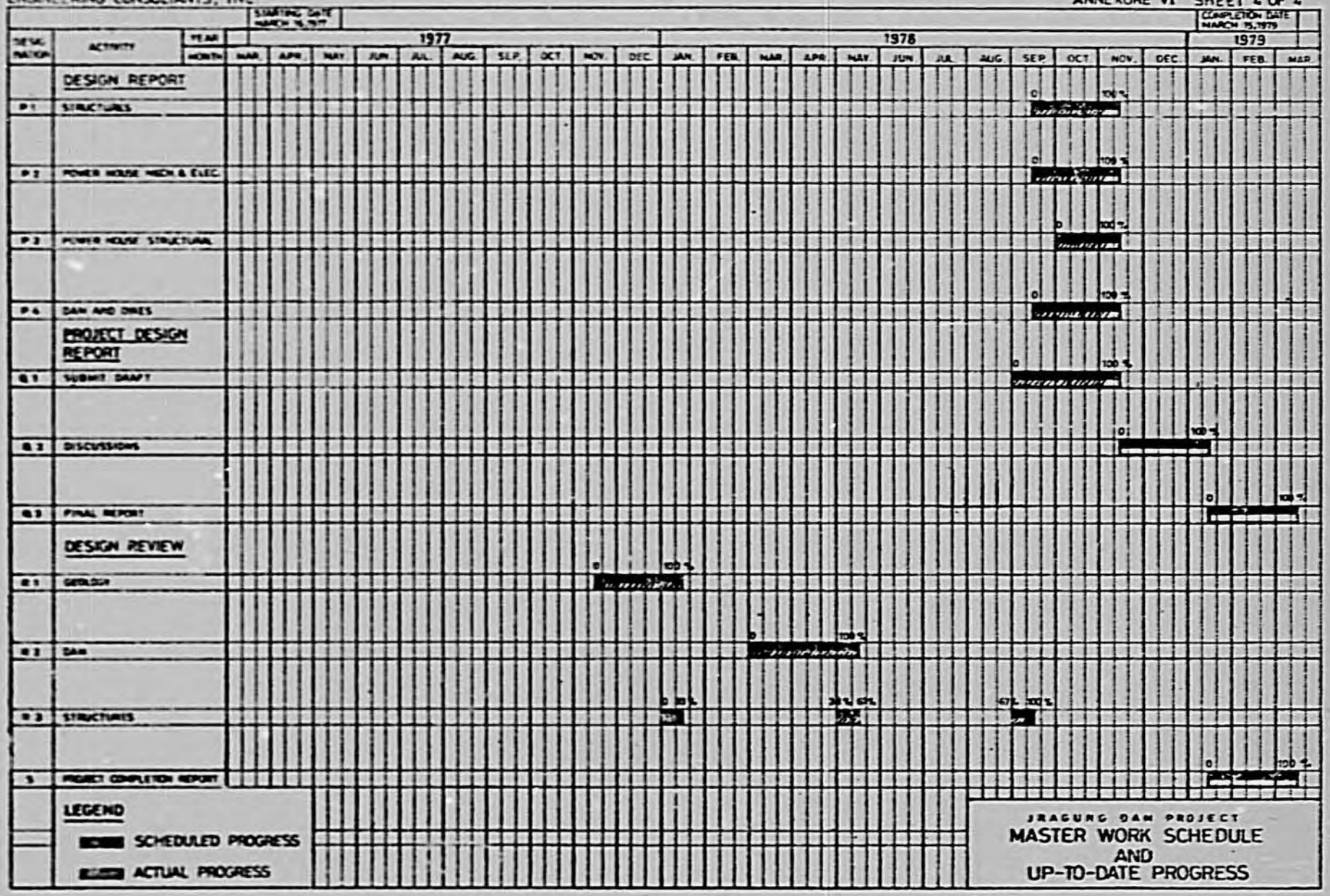
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