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

MONTHLY PROGRESS REPORT
No. 18

AUGUST 1978

SUBMITTED BY :

ENGINEERING CONSULTANTS, INC.

Denver, Co., USA - Semarang, Indonesia

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

Attention: Ir. Oesman Djojoadinoto
Director Irrigation.

September 13, 1978

Our file: 1196/MR/18
328/78

Subject : Monthly Progress
Report No. 18.

Dear Sir:

We submit herewith fifteen (15) copies of the Monthly Progress Report No. 18 for the month of August, 1978. The report is prepared in pursuance of Section 10.15 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
(Attention: Mr. P. Thorn)
with eight (8) copies of
the report.

ECI Denver (SD 262)

Project Manager
Jratunseluna Basin Project

General Manager PROSIDA
Ten (10) copies

ECI Semarang

SAR/ m.

JRAGUNG DAM PROJECT

MONTHLY

PROGRESS REPORT

NO. 18

PERIOD

AUGUST 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 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 20, 1976 has been obtained by the Government of Indonesia.

It was reported in the progress report for the month of July that the review of design work done at Semarang had been initiated by the Consultant's Dam and Structural Design specialists. The said review was completed during the month of August. Necessary revisions and corrections to the designs suggested by the specialists are now being incorporated. As recommended by the Consultant, to counteract the effect of anticipated sedimentation in the reservoir on the storage capacity, the Ministry has agreed in principle to raise the normal maximum reservoir at Jragung from elevation 125.00 per feasibility report to about elevation 130.00. Reservoir operation studies are currently in progress to determine the optimum reservoir water surface elevation. The design of the dam progressed satisfactorily as additional test results of the embankment and foundation materials became available for determining the final design parameters. Work is now continuing on designing the dam to crest elevation ± 135.00 for the higher reservoir elevation. The effects on the economics of the Project of raising the dam and adjusting the appurtenant structures correspondingly, are presently being studied.

The events which took place, the actions that were initiated or completed and the abovementioned and other points pertinent to the Project

design are described in the following.

1. A meeting, presided by Ir. Oesman Djojoadinoto, Director of Irrigation was held at Jakarta on August 24, 1978 and was attended by Ir. Soewasono, General Manager PROSIDA, Mr. Paul Thorn, Project Officer U.S. AID, representatives of PLN, DPMA, Bina Program, Jratunseluna Project and the resident staff of ECI, the Project Consultant. The purpose of the meeting was to discuss the status of the final design of the Jragung Dam Project and also to discuss the Consultant's latest report on the reservoir sedimentation and its effects on the useful life of the Project. Relevant extracts from that report were given in the July monthly progress report. A Design Status Report dated July 1978 was prepared by the Consultant, copies of which were distributed to all the concerned agencies. This report contained exploration and recommendations by the Consultant of all the aspects of the Project design including the reservoir sedimentation problem. A summary of the discussions which took place during the meeting is recorded in a note prepared by the Consultant and submitted to the Directorate of Irrigation with letter 1196/G/33 - 308/78 dated August 26, 1978. Based on those discussions, the following decisions were made by the Director of Irrigation.

a. The height of the dam and the crest of the Spillway should be raised above those of the feasibility report to provide additional storage at Jragung. However, the exact height and the final elevations to which the raising should be done would be determined after the results of the ongoing studies being done by the Consultant were known. The revisions to designs necessary for raising the dam should be started.

b. The Jratunseluna Proyek authorities at Semarang will be responsible for coordinating and carrying out the review of design drawings, specifications, reports and other documents submitted by the Consultant. They will get help from PROSIDA, Irrigation Directorate and other concerned agencies including U.S. AID to accomplish this task.

c. The effect of raising the Jragung Dam on the Tuntang Diversion weir should be studied by the Consultant.

d. The hydropower potential of the Jragung Dam for the proposed raising of the reservoir water surface should be examined. Also, the cost component for hydropower facilities of the Project should be evaluated separately.

2. The mapping of the damsite and of all the appurtenant structures as originally contemplated has since been completed. However, need has arisen to map an additional area at the right abutment of the main dam for accomodating the raised section of the dam embankment. This work has been entrusted to and is being done by the Proyek surveyors. Also, the secondary mapping work and other miscellaneous surveys progressed on schedule.

3. The geological field investigation work is complete. Some of the laboratory test results related to the foundation materials are needed to complete the final report on geology. No problems or delays are expected in this regard.

4. A slight change in the alignment of the River Diversion Works, as stated in the preceding monthly report, was made to locate the conduit beneath the dam section on the revised alignment. The revisions to the drawings, thus necessitated, are presently being made. The final design and specification drawings will be ready for issuance within the month of September.

Work continued on the preparation of construction drawings of the River Diversion Works. This work was scheduled to be completed by the end of August, but has been delayed somewhat so that the revisions to the design drawings, mentioned above, could be made. However, all construction drawings for the River Diversion Works will be ready for drafting by the middle of September.

The design of the Tuntang Diversion Works done by Mr. Hoge at Semarang has been reviewed by Mr. Kuehl, Chief Engineer ECI. The implementation of the changes and revisions proposed by Mr. Kuehl is presently being done by Mr. Frey. After the construction drawings for the River Diversion Works have been completed, the finalization of the design and specification drawings and preparation of the construction drawings for the Tuntang Diversion Works will be entrusted to Mr. McLaughlin, the Structural Design Engineer. This work is expected to be completed by the end of October.

The model testing in the DPMA laboratories at Bandung of the Spillway stilling basin .ontinued during the month under report. The model was visited by Mr. Kuehl and many test runs were made in his presence. He was satisfied with the overall scheme of the structure, its intake, the flume and the general layout of the flipbucket. Certain changes to the flip and improvement of the outlet conditions of the model were recommended by him to increase the efficiency of the flip under low flow conditions and to get a more realistic picture of the downstream scour pattern.

In consequence of the proposed raising of the normal reservoir level, the crest of the Spillway will have to be raised accordingly. This may necessitate shifting of the alignment of the Spillway further to the left into the higher ground. The change in the alignment will be shown in revision to the design already completed. The design and specification drawings for this structure will be finalized after all model test results have become available. It is expected that the entire design of the Spillway will be completed by the end of October.

The basic concept of the design of the main dam remains the same as was explained in the meeting of April 7, 1978. When design stage investigations were started, many geological complexities and structural weaknesses were detected in the ridges. The presence of many faults and shear zones and the existence of weaker claystone interbeds within the strong claystone and the sandstone precluded the possibility of abutting

the dam at the locations proposed in the feasibility report. For the geological conditions, it was considered that the ridges were too narrow at these locations. Therefore, it was believed necessary that the ridges should not be exposed directly to water from the reservoir where they were narrow and the resulting seepage could lead to sliding failures.

The final design of the dam takes due cognizance of the above mentioned conditions. The axis of the dam has been located upstream of the original location so that the embankment guards the entry of water from the reservoir into the ridges and abuts the ridges at locations where they have substantial width and are thus structurally stable. The impervious core and filter and drainage zones of the embankment have been designed in such a manner that seepage from the reservoir is collected and drained out before it can enter the ridges. In addition, drainage galleries at appropriate elevations have been provided within the ridges to collect any water which seeps under the dam and thus bypasses the filter and drainage zones and infiltration from the surface.

The weakness of the dam foundation area requires weight berms at the toes of the embankment slopes. The strength of the foundation material is being determined by laboratory tests and stability analyses are being performed in order to arrive at the most economical yet safe section for the dam. The work presently being done at Semarang on the dam design relates primarily to aligning the dam for the raised crest elevation based on the stated design criteria.

It has been suggested by our Dam Design specialists that efforts should be made to exploit the Penawangan Borrow Area located about 5 kilometers in the north-western direction from the damsite. The soils in the prospective borrow area are volcanic in origin and are classified as Agglomerate. In situ, these are consolidated and held together by cohesion and interstitial fine materials. To exploit the borrow area, it is felt that it will be necessary to rip the material before its excavation and haulage

to the dam. The local representative of Caterpillar has been approached to conduct seismic refraction tests and determine the extent of ripping and the type of equipment needed. This job will be done next month. If exploitation of Penawangan area proves economically feasible, it can provide excellent material for the outer shells of the dam.

The final shipment of the foundation materials was sent to laboratories in North America for testing during the later part of the month of August. All the test results are expected to be available for the finalization of the dam section by the end of October. The slope stability analyses are being performed on the ECI computer at Denver where all the results of material testing are being collected.

Detailed reports of progress achieved in the design of various components of the Project are given in Sections IV-A and IV-B of this report.

5. As a part of the appraisal of data and study of sediment transport in the Jragung River at the damsite, the review of hydrologic data of the Jragung watershed was also done by Dr. M.A. Stevens, ECI's River Regime Specialist. Water yield from the Jragung watershed at the damsite has accordingly been updated and revised based on the streamflow measurement data of two more years. A copy of Dr. Stevens' report on this subject is appended to this section of the monthly progress report.

6. The preparation of technical specifications and the contract documents progressed on schedule except for the technical specifications for the Base Camp. The design of the Base Camp is being prepared by the University of Diponegoro for the Jratunseluna Project. The technical specifications will be completed by the Consultant after all the design drawings have been finalized.

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

7. The participants of Part II of Ministry Personnel Training Program, namely, Ir. Mohammad Ali, Ir. Triwasono, Mr. Sihombing and Ir. Sudaryanto returned to Indonesia after completing their scheduled trainings overseas. The remaining two gentlemen, namely Ir. Gayo and Drs. Sugianto are scheduled to return to Indonesia at the end of August. On their return, both parts of the Ministry Personnel Training Program would conclude.

8. With the need now established to raise the normal maximum reservoir level and the crest of the dam to elevations higher than those which were given in the feasibility report and according to which the dam and the appurtenant structures have already been designed, it is obvious that additional effort will be needed to carry out the related changes and revisions to those designs. Furthermore, additional reservoir operation studies are being done by the Consultant to determine the revised allocation of reservoir capacities and their usages for various purposes. A detailed economic analysis will also be needed to evaluate the project economics. All these jobs will require more manpower than was originally provided in the Contract. Although the Consultant is trying to finish the entire job within the manpower and the time schedule given in the Contract, yet the possibility of the total estimated contract dollar costs being exceeded cannot be ruled out. This subject is being taken up separately with the Ministry and U.S. AID.

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

9. The reimbursable Dollar expenditure up to the end of July amounted to $ 1,065,982.13. As of the end of August, the reimbursable Rupiah expenditure amounted to Rp. 30,079,984.-

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

Report on Revised Hydrology

Jragung Dam Project

by

Dr. M.A. Stevens

Introduction

In December 1976, Engineering Consultants, Inc., submitted an upgraded feasibility report[1/] on the Jragung Dam Project to the Ministry of Public Works and Electric Power of the Government of the Republic of Indonesia. The objectives of that report were to upgrade the previous studies for the Jragung Dam to full feasibility level and to consolidate and evaluate previous studies under one general report.

Since that time, Engineering Consultants, Inc., and the Jragung Dam Project personnel have continued to collect and analyze hydrologic data taken in the watershed upstream from the Jragung Dam. The hydrologic data include measurements of rainfall, runoff and sediment yield. These data collected up to and including May, 1978, are presented herein.

Analyses of the hydrologic data indicate that our previous estimates of watershed evapotranspiration, runoff and sediment yield should be revised. These revisions and a mathematical model of the reservoir sedimentation process are given in this summary report.

1/ Engineering Consultants, Inc. "Jragung Dam Multipurpose Irrigation, Flood Control, Hydroelectric and Municipal and Industrial Water Supply Project, Upgraded Feasibility Report", prepared for the Ministry of Public Works and Electric Power, Directorate General of Water Resources Development, Directorate of Irrigation, Semarang, Indonesia, December 1976.

Rainfall

The rainfall over the Jragung Watershed is primarily characterized by high intensity convective storms of short duration and limited areal extent. These storms usually occur as the result of warm air rising off the land mass in the late afternoon.

Although convective storms are the most common, large amounts of rain come from larger weather disturbances with lower rainfall intensities but much longer durations. Such synoptic storms can last 2 or 3 days. On the average, 80 percent of the annual rainfall occurs during the northwest monsoon, November to May.

Daily Basin Rainfall: The basin rainfall for the years 1976, 1977 and 1978 was obtained by using the data from 5 raingages within the basin. The largest recorded daily rainfall on the Jragung Watershed in the period of record was 180 millimeters. The average annual maximum daily rainfall on the watershed is 75 millimeters.

Monthly Rainfall: The values of the basin-averaged monthly rainfall on the Jragung Watershed above the damsite for the period of record are shown below. The values for the individual months are listed in Table 1. On the average, January is the wettest month with 424 millimeters of rain (13.7 millimeters per day) and August is the driest month with only 59 millimeters (1.9 millimeters per day). The largest monthly rainfall was 950 millimeters which occured in January 1965. Many dry season months have had zero rainfall.

Monthly Rainfall

(mm/%)

Wet Season	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
	252	321	424	355	363	254	200	2,169
	9.5	12.1	16.0	13.4	13.7	9.6	7.6	81.9

Dry Season	Jun	Jul	Aug	Sep	Oct	Total	Annual Total
	105	83	59	72	159	478	2,647
	4.0	3.2	2.2	2.7	6.0	18.1	100.0

Annual Rainfall: The mean annual rainfall on the Jragung Watershed above the damsite is 2,647 millimeters. The southwest boundary of the watershed receives the largest amount of rainfall; the lower portion of the watershed receives a lesser amount.

The wettest water year (October through September) in the record was 1957-1958 with 3,653 millimeters of rainfall and the driest was 1976-1977 with only 1,918 millimeters.

Effective Rainfall

For the purpose of this watershed analysis, effective rainfall, R_e, is defined as the difference between the catchment rainfall, R_t, and runoff, Q, or

$$R_e = R_t - Q$$

Thus, R_e is the sum of the volume of water used for evapotranspiration, the change in the volume storage in the groundwater table and the change in volume of water stored in the soil.

If changes in the groundwater level and in the amount of water in the soil are small, then the effective rainfall is limited to the value

of potential evapotranspiration, E_{tp}, or

$$R_e \leq E_{tp}$$

The monthly values of effective rainfall on the Jragung watershed upstream from the damsite for the period of runoff records are given in Table 2. The monthly values were computed from the measurements of basin rainfall and runoff.

The values of average monthly potential evapotranspiration for the Jragung service area are given below.

Monthly Potential Evapotranspiration

(mm/%)

Jan	Feb	Mar	Apr	May	Jun	
159	146	162	165	150	147	
8.1	7.5	8.3	8.4	7.6	7.5	
Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
167	174	169	195	173	154	1,961
8.5	8.9	8.6	9.9	8.8	7.9	100.0

By comparing the potential evapotranspiration with catchment rainfall we find that, in the period of record, in the months of June, July and August, rainfall was nearly always less than potential evapotranspiration. In most other months rainfall was greater than potential evapotranspiration. In general, the soil moisture depletions occur during June, July and August, soil moisture replenishment occurs in September and October, and soil moisture conditions remain fairly constant (on a monthly basis) in the rest of the year.

In the period of record the effective rainfall was less than the potential evapotranspiration except for 11 months. In 7 of these 11 months the difference between effective rainfall and potential evapotranspiration

was only approximately 5 percent of the total rainfall. This difference is less than the measurement errors in rainfall alone, and are not considered significant.

The conclusion is that most of the time the effective rainfall is considerably less than the potential evapotranspiration, and the amount of the difference is seasonal. The seasonal variation was determined by correlation. The results of the correlation are given in Figure 1. On an annual basis, the effective rainfall varies with basin rainfall as shown in Figure 2.

Streamflow Simulation Model

The long-term monthly streamflows for the Jragung River at the damsite were simulated using effective precipitation basin rainfall model shown in Figure 1 and the monthly rainfall in Table 1. The runoff was computed by the computation:

$$Q = R_t - (1 + E) R'_e$$

in which Q is the runoff in millimeters, R_t is the basin rainfall in millimeters, R'_e is the first estimate of the effective rainfall in millimeter (obtained from Figure 1) and E is a coefficient depending on the month (also obtained from Figure 1).

Fifty-two years of monthly effective runoff values were produced by this simulation. The average annual runoff was 133×10^6 m^3 which converts to 1,421 millimeters. That corresponds to an average annual effective precipitation of 1,226 millimeters. As indicated by the curve in Figure 2, this value of effective rainfall is too low.

The runoff was then recomputed using the equation:

$$Q = 0.91 [R_t - (1 + E) R'_e]$$

The new value of average annual runoff was 121 x 10^6 m^3 which corresponds to an average annual effective rainfall of 1,364 millimeters. This second simulation was judged satisfactorily for use in the reservoir operation studies.

Runoff

Since May 1973, monthly runoff at the Jragung Damsite (Table 3) has been determined by prorating the measured discharge at the Borangan Bridge (Table 4) according to drainage area. The drainage areas at the damsite are 94 and 101 square kilometers, respectively.

The long-term monthly simulated streamflows for the Jragung River at the damsite and those measured since May 1973, are given in Table 5.

The long-term (51.5 years) annual runoff at the Jragung Damsite is 121 x 10^6 cubic meters. August and September are the driest, 0.9 x 10^6 cubic meters. The largest monthly runoff was 77.3 x 10^6 cubic meters in January 1965.

Long-Term Monthly Streamflow
(10^6 m^3/%)

Wet Season	Nov	Dec	Jan	Feb	Mar	Apr	May
	8.2	13.9	24.4	19.5	20.9	13.6	9.3
	6.8	11.5	20.2	16.2	17.3	11.3	7.7

Dry Season	Jun	Jul	Aug	Sep	Oct	Annual
	3.5	2.1	0.9	0.9	3.4	120.6
	2.9	1.7	0.8	0.8	2.8	100.0

MONTHLY BASIN RAINFALL ABOVE JRAGUNG DAMSITE

ear	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
916-1917	269	262	326	537	457	195	330	187	174	48	117	276	3178
917-1918	331	293	300	377	499	194	110	76	49	40	21	44	2334
918-1919	69	148	302	356	315	328	339	305	68	15	83	15	2343
19-1920	15	326	568	314	306	355	277	61	96	18	299	211	2846
20-1921	330	206	272	324	344	399	183	34	96	100	19	153	2460
21-1922	186	311	444	278	327	406	213	300	245	67	29	32	2838
22-1923	202	192	410	397	291	323	124	213	154	341	0	0	2647
23-1924	42	231	277	229	360	314	356	156	97	138	51	68	2319
24-1925	342	498	135	393	312	379	121	99	0	11	0	8	2298
25-1926	47	186	270	388	193	500	182	403	14	6	33	36	2258
26-1927	126	224	494	507	239	294	400	443	172	33	8	118	3058
27-1928	115	231	373	320	489	463	233	71	91	3	165	35	2589
28-1929	191	335	461	184	239	403	134	35	80	0	7	49	2118
9-1930	117	191	362	378	480	336	289	241	36	102	10	17	2559
0-1931	156	215	276	698	237	433	257	172	65	34	53	9	2605
1-1932	373	202	227	339	419	491	293	128	212	0	0	100	2784
2-1933	178	234	284	398	435	695	115	263	163	373	149	157	3444
933-1934	178	278	358	649	324	320	281	81	61	51	14	13	2608
934-1935	163	398	153	440	207	414	346	88	73	0	1	0	2283
935-1936	283	187	232	388	346	446	447	231	81	58	22	68	2789
936-1937	106	221	168	503	195	423	387	260	164	8	6	124	2565
937-1938	71	137	365	493	517	288	119	358	197	134	32	83	2794
938-1939	167	413	411	347	406	419	296	51	416	289	81	65	3361
939-1940	105	224	179	311	392	339	309	387	88	7	7	4	2352
940-1941	42	171	483	405	424	426	412	359	124	74	16	42	2978
951-1952	47	105	470	618	377	466	188	138	53	33	119	83	2697
952-1953	170	231	264	260	197	328	255	267	23	83	16	4	2098
953-1954	46	290	220	274	413	262	159	247	66	72	132	235	2416
954-1955	199	559	264	272	531	242	299	301	112	259	163	147	3348
955-1956	255	359	348	829	397	296	98	237	170	71	188	30	3278
956-1957	108	158	397	335	282	363	149	120	124	181	114	13	2344
957-1958	141	249	585	325	549	359	324	229	150	334	319	89	3653
958-1959	178	186	380	443	247	204	304	302	89	170	7	132	2642
959-1960	125	131	403	394	451	155	200	217	58	62	13	51	2260
960-1961	84	472	232	904	195	395	102	285	14	35	0	0	2718
961-1962	24	194	290	643	525	563	451	95	96	156	151	12	3200
962-1963	244	158	323	738	269	419	217	48	6	0	0	0	2422
963-1964	52	124	355	303	331	202	349	200	125	71	93	222	2427
964-1965	274	441	276	950	354	333	205	111	43	43	0	3	3033
965-1966	21	169	337	397	521	501	129	121	116	0	1	22	2335
966-1967	342	187	311	418	498	327	346	32	0	0	12	3	2476
967-1968	76	245	328	380	516	219	248	350	350	257	183	103	3255
968-1969	134	292	542	192	218	220	495	35	46	32	4	9	2219
969-1970	10[illegible]	238	178	294	274	505	254	319	91	131	8	45	2437
970 - 1971	154	297	459	560	584	375	231	171	170	72	3	30	3106
971 - 1972	252	279	205	643	230	614	169	181	4	0	2	0	2279
972 - 1973	13	178	270	490	367	331	417	375	114	121	44	177	2905
973 - 1974	138	269	276	211	264	407	175	191	60	62	99	200	2352
974 - 1975	314	302	227	377	215	338	374	334	72	23	68	292	2936
975 - 1976	294	279	265	310	249	374	162	42	13	8	28	12	2035
976 - 1977	249	249	74	188	250	311	180	243	160	6	0	8	1918
977 - 1978	27	168	302	367	392	194	164						
an	159	252	321	424	355	363	254	200	105	83	59	72	2647

TABLE 2

Effective Rainfall
Watershed Upstream from the Jragung Damsite

Year	Month	Basin Rainfall (mm)	Runoff (mm)	Effective Rainfall (mm)
1973	May	375	238	137
	Jun	114	63	51
	Jul	121	43	78
	Aug	44	3	41
	Sep	177	60	117
	Oct	138	36	102
	Nov	269	113	156
	Dec	276	181	95
1974	Jan	211	135	76
	Feb	264	178	86
	Mar	407	320	87
	Apr	175	135	40
		2,571	1,505	1,066
	May	191	79	112
	Jun	60	24	36
	Jul	62	13	49
	Aug	99	14	85
	Sep	200	37	163
	Oct	314	106	208
	Nov	302	119	183
	Dec	227	82	145
1975	Jan	377	202	175
	Feb	215	98	117
	Mar	338	164	174
	Apr	374	231	143
		2,759	1,169	1,590
	May	334	168	166
	Jun	72	3	69
	Jul	23	0	23
	Aug	68	1	67
	Sep	292	37	255
	Oct	294	76	218
	Nov	279	118	161
	Dec	265	121	144

TABLE 2
(Continued)

Effective Rainfall
Watershed Upstream from the Jragung Damsite

Year	Month	Basin Rainfall (mm)	Runoff (mm)	Effective Rainfall (mm)
1976	Jan	310	251	59
	Feb	249	149	100
	Mar	374	287	87
	Apr	162	131	31
		2,722	1,342	1,380
	May	42	44	-2
	Jun	13	21	-8
	Jul	8	19	-11
	Aug	28	5	23
	Sep	12	11	1
	Oct	249	38	211
	Nov	249	98	151
	Dec	74	29	45
1977	Jan	188	51	137
	Feb	250	117	133
	Mar	311	194	117
	Apr	180	91	89
		1,604	718	886
	May	243	105	138
	Jun	160	95	65
	Jul	6	7	- 1
	Aug	0	4	- 4
	Sep	8	2	6
	Oct	27	2	25
	Nov	168	13	155
	Dec	302	94	208
1978	Jan	367	154	213
	Feb	392	211	181
	Mar	194	98	96
	Apr	164	57	107
		2,031	842	1,189

TABLE 3

Monthly Runoff

Jragung River at the Damsite

(10^6 m^3)

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1972-73								22.4	5.9	4.0	0.3	5.6	-
1973-74	3.4	10.6	17.0	12.7	16.7	30.1	12.7	7.4	2.3	1.2	1.3	3.5	118.9
1974-75	10.0	11.2	7.7	19.0	9.2	15.4	21.7	15.8	0.3	0.0	0.1	3.5	114.0
1975-76	7.1	11.1	11.4	23.6	14.0	27.0	12.3	4.1	2.0	1.8	0.5	1.0	115.9
1976-77	3.6	9.2	2.7	4.8	11.0	18.2	8.6	9.9	8.9	0.7	0.4	0.2	78.2
1977-78	0.2	1.2	8.8	14.5	19.8	9.2	5.4						
Long-term average	3.6	9.6	16.4	27.2	23.1	25.7	15.8	10.4	4.0	2.6	1.1	0.9	140.4

TABLE 4

Monthly Runoff

Jragung River at the Borangan Bridge

(10^6 m^3)

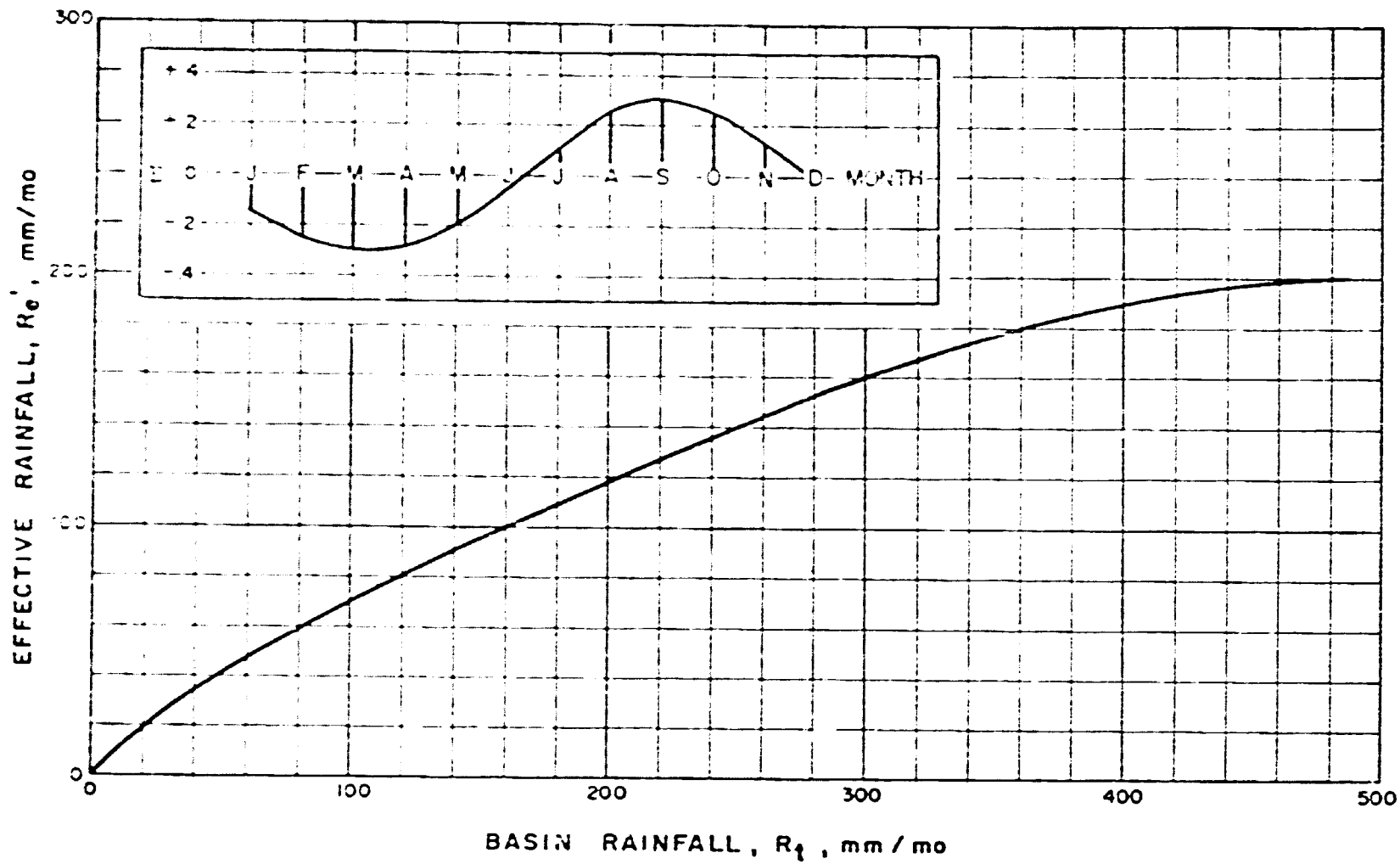
Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
1972-73								23.9	6.3	4.3	0.3	6.0	-
1973-74	3.7	11.4	18.3	13.6	17.9	32.3	13.6	8.1	2.5	1.1	1.4	3.8	127.7
1974-75	10.6	12.0	8.3	20.4	9.9	16.6	23.3	17.0	0.3	0.0	0.1	3.8	122.5
1975-76	7.6	11.9	12.2	25.3	15.6	29.0	13.2	4.4	2.1	1.9	0.5	1.1	124.8
1976-77	3.9	9.9	2.9	5.1	11.8	19.6	9.2	10.6	9.6	0.8	0.4	0.2	84.0
1977-78	0.2	1.3	9.4	15.6	21.3	9.9	5.8						

TABLE 5

JRAGUNG RIVER AT THE DAMSITE

MONTHLY RUNOFF
(MCM)

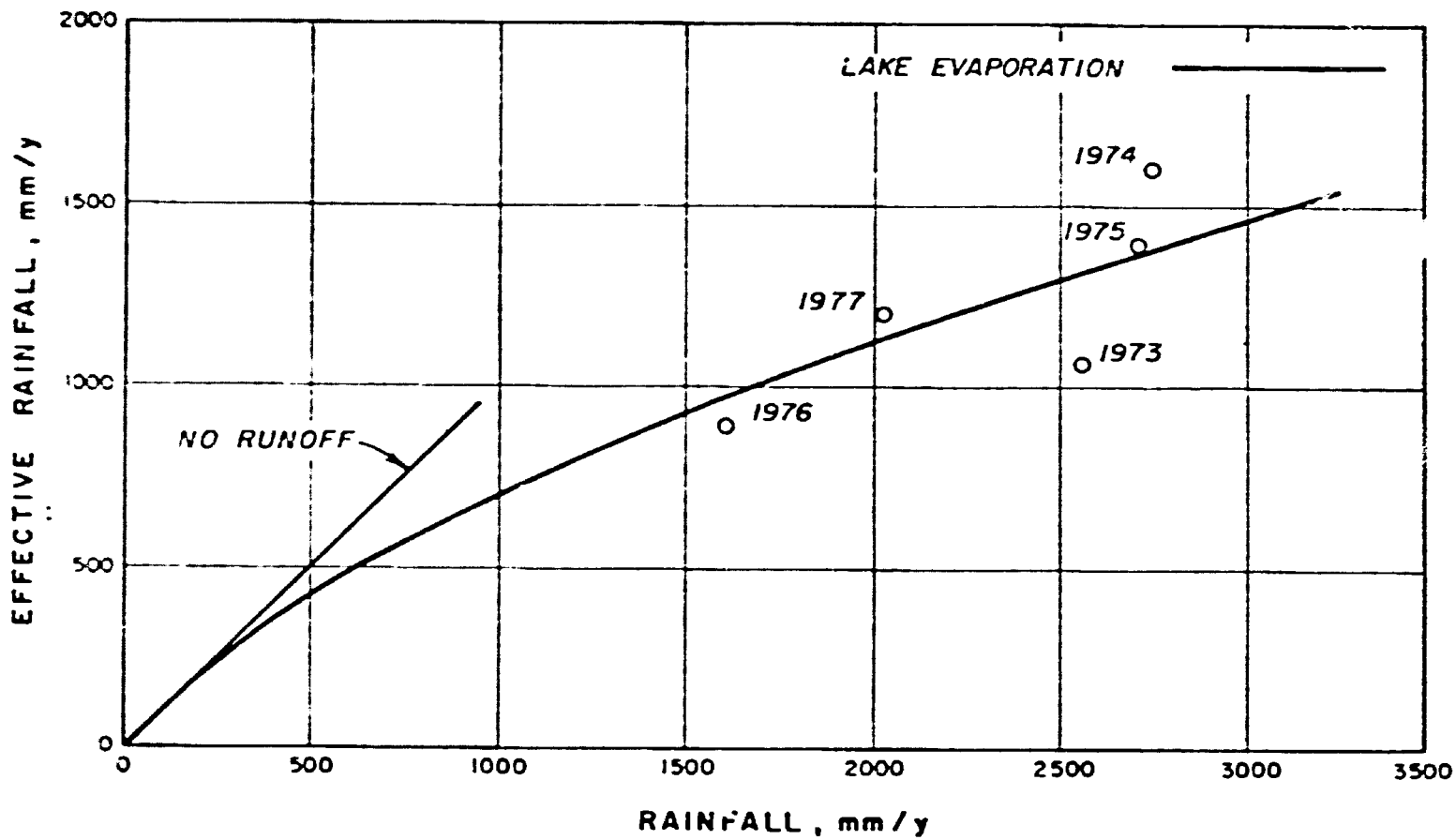
WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1916 1917	7.2	8.1	13.4	31.3	26.4	9.7	18.0	8.3	6.3	0.4	1.5	6.8	137.4
1917 1918	10.0	9.5	11.9	18.8	29.8	9.7	4.8	2.5	0.9	0.2	0.0	0.0	98.1
1918 1919	0.2	3.4	12.0	17.4	16.3	17.8	18.6	15.0	1.5	0.0	0.4	0.0	102.6
1919 1920	0.0	11.2	31.4	14.8	15.7	19.6	14.7	1.9	2.6	0.0	8.5	4.5	124.6
1920 1921	9.9	5.7	10.5	15.4	18.1	22.8	9.3	0.8	2.6	1.8	0.0	2.4	99.1
1921 1922	4.0	10.4	21.1	12.7	17.1	23.3	10.7	14.7	9.7	0.8	0.0	0.0	124.5
1922 1923	4.5	5.2	18.7	20.2	14.8	17.5	5.6	9.7	5.8	12.7	0.0	0.0	114.2
1923 1924	0.0	6.7	10.7	10.0	19.2	16.9	19.7	6.6	2.6	3.4	0.0	0.0	95.8
1924 1925	16.5	22.9	4.0	19.9	16.1	21.3	5.4	3.6	0.0	0.0	0.0	0.0	103.7
1925 1926	0.0	5.0	10.4	19.6	9.1	30.7	9.0	21.4	0.0	0.0	0.0	0.0	105.2
1926 1927	1.8	6.4	25.1	28.8	11.7	15.7	22.8	24.4	6.2	0.0	0.0	1.1	144.0
1927 1928	1.4	6.7	16.2	15.2	29.0	27.7	11.9	2.3	2.3	0.0	3.2	0.0	115.9
1928 1929	4.2	11.7	22.4	7.7	11.7	23.1	6.2	0.8	1.9	0.0	0.0	0.0	89.7
1929 1930	1.5	5.1	15.5	18.9	28.2	18.4	19.4	11.2	0.5	1.9	0.0	0.0	116.6
1930 1931	2.4	6.1	10.7	45.1	11.6	25.6	16.4	7.5	1.4	0.0	0.0	0.0	124.0
1931 1932	12.3	5.5	8.2	16.3	23.4	30.0	15.6	5.1	8.0	0.0	0.0	0.6	125.0
1932 1933	3.7	4.9	11.1	20.3	24.6	47.4	5.1	12.5	5.7	14.6	2.6	2.5	157.0
1933 1934	3.7	8.9	15.2	40.9	16.9	17.3	14.9	2.7	1.3	0.4	0.0	0.0	122.2
1934 1935	3.2	15.4	4.8	23.3	9.9	23.9	19.0	3.1	1.7	0.0	0.0	0.0	104.3
1935 1936	7.8	5.0	8.5	19.6	10.3	26.3	26.4	10.7	2.0	0.6	0.0	0.0	125.2
1936 1937	1.1	6.3	5.5	28.4	9.2	24.5	21.9	12.3	5.8	0.0	0.0	1.3	116.3
1937 1938	0.2	2.9	15.7	27.6	31.3	15.3	5.3	18.3	7.3	3.2	0.0	0.2	127.3
1938 1939	3.3	16.4	18.8	16.8	22.5	24.2	15.8	1.5	19.9	10.0	0.4	0.0	149.6
1939 1940	1.1	6.4	6.1	14.6	21.5	18.6	16.6	20.3	2.2	0.0	0.0	0.0	107.4
1940 1941	0.0	4.4	24.2	20.8	23.8	24.8	23.7	18.4	3.8	1.0	0.0	0.0	144.9
1941 1942	0.0	1.7	23.2	38.3	20.4	27.9	9.3	5.7	1.0	0.0	1.5	0.2	129.2
1942 1943	3.4	6.7	10.1	11.7	9.3	17.8	13.3	12.7	0.1	1.2	0.0	0.0	86.5
1943 1944	0.0	9.4	7.9	12.5	23.0	13.7	7.6	11.6	1.5	1.0	2.0	5.2	95.4
1944 1945	4.4	28.1	10.1	12.4	32.5	12.5	16.0	14.7	3.3	8.6	3.2	2.2	148.0
1945 1946	6.6	13.0	14.6	70.9	21.8	15.8	4.1	11.0	6.1	0.9	4.1	0.0	168.9
1946 1947	1.2	3.8	17.8	16.1	14.3	20.2	7.1	4.7	3.8	5.2	1.4	0.0	95.6
1947 1948	2.3	7.5	32.9	15.5	34.1	19.9	17.6	10.4	5.1	12.3	9.4	0.3	167.5
1948 1949	3.7	5.0	16.6	23.6	12.2	18.2	16.3	14.8	2.3	4.8	0.0	1.6	111.1
1949 1950	1.7	2.7	18.2	20.0	25.9	7.4	10.0	9.9	1.2	0.7	0.0	0.0	97.7
1950 1951	0.5	20.8	8.5	77.3	9.2	22.5	4.4	13.8	0.0	0.0	0.0	0.0	157.0
1951 1952	0.0	5.2	11.4	40.4	32.0	36.1	26.7	3.4	2.6	4.1	2.7	0.0	164.6
1952 1953	6.1	3.8	13.2	63.7	13.5	24.2	11.0	1.4	0.0	0.0	0.0	0.0	136.9
1953 1954	0.0	2.4	15.0	14.2	17.3	10.1	19.2	9.0	3.9	0.9	0.7	4.7	97.4
1954 1955	7.4	18.4	10.7	73.9	18.8	18.2	10.3	4.2	0.7	0.2	0.0	0.0	162.8
1955 1956	0.0	4.3	14.0	20.2	31.7	30.8	5.9	4.7	3.4	0.0	0.0	0.0	115.0
1956 1957	10.0	5.0	12.5	21.7	29.7	17.8	19.0	0.7	0.0	0.0	0.0	0.0	116.4
1957 1958	0.3	7.3	13.5	19.0	31.3	11.1	12.8	17.8	15.5	8.5	3.9	0.7	141.7
1958 1959	2.1	9.5	29.2	8.1	10.5	11.2	30.3	0.8	0.8	0.0	0.0	0.0	102.5
1959 1960	0.9	7.0	6.0	13.6	13.8	31.2	13.2	15.8	2.3	3.1	0.0	0.0	106.9
70 1971	2.8	9.7	22.3	33.3	37.1	21.0	11.8	7.5	6.1	1.0	0.0	0.0	152.4
71 1972	6.4	8.9	7.2	40.4	11.2	40.5	8.2	8.0	0.0	0.0	0.0	0.0	130.8
1972 1973	0.0	4.6	10.8	27.4	19.7	18.0	24.1	22.4	5.9	4.0	0.3	5.6	142.8
1973 1974	3.4	10.6	17.0	12.7	16.7	30.[illegible]	12.7	7.4	2.3	1.2	1.3	3.5	118.4
1974 1975	10.0	11.2	7.7	19.0	9.2	15.4	21.7	15.8	0.3	0.0	0.1	3.5	113.4
75 1976	7.1	11.1	11.4	23.6	14.0	27.0	12.3	4.1	2.0	1.8	0.5	1.0	115.4
76 1977	3.1	9.2	2.7	4.8	11.0	18.2	8.6	9.9	0.4	0.7	0.4	0.2	78.2
1977 1978	0.2	1.2	8.8	14.5	19.8	9.2	5.4						
TOTAL	172.1	430.3	725.4	1273.2	1016.2	1089.8	708.4	478.0	180.6	111.2	48.1	47.9	
AVERAGE	3.4	8.2	13.9	24.4	19.5	20.9	13.6	9.3	3.5	2.1	0.9	0.9	120.6



JRAGUNG DAM PROJECT

SEASONAL VARIATION OF EFFECTIVE RAINFALL ON THE JRAGUNG WATERSHED

FIGURE 1



JRAGUNG DAM PROJECT

ANNUAL EFFECTIVE RAINFALL FOR THE WATERSHED UPSTREAM FROM THE JRAGUNG DAMSITE

FIGURE 2

SECTION II
PERSONNEL

A. EXPATRIATE

1. At Semarang on July 31, 1978

Saeed A. Rana	Resident Manager
Carlos A. Borinelli	Materials and Dam Engineer
Robert G. McLaughlin	Structural Engineer
Jeffery P. Frey	Specification Engineer
M.K. Kuehl	Chief Engineer and Vice President
S.F. Hillis	Materials and Dam Design Engineer

2. Arrived in Semarang during August, 1978

None

3. Departed from Semarang during August, 1978

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

4. At Semarang on September 1, 1978

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

B. COUNTERPART

1. Assigned Full Time as of August 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. Supriyo	
Ir. Rustiyanti	(Assistant Counterpart)
Eddy Arifin	(Assistant Counterpart)
Buang Sukardjono	(Assistant Counterpart)
Ir. Muhammad Ali	
Ir. Tri Hardono	
Djasriansyah Aht	
Ir. Diah Kusumawati	
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 August, 1978

Mrs. Tan Ik Goen	Interpreter I
Miss Dra Djoa Sioe Lan	Interpreter II
Mrs. Sri Moenasih Soetikno	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

Date	Place	Event	Participation	Organization
August 5, 1978	Semarang	Dam Design Meeting	Ir. Bambang, Mr. Bony, Mr. Takrim and staff	Jratunseluna Project
			Messrs. Rana, Kuehl, Borinelli and Frey.	ECI
August 8, 1978	Jakarta	Discussions Project Matters	Drs. M. Nur	DGWRD
			Rana	ECI
August 14, 15, 1978	Bandung	Discussions Spillway Model Testing	Staff	DPMA
			Kuehl, Rana	ECI
August 16, 1978	Jakarta	Discussions Project Designs and Related Matters	Ir. Oesman Djojoadinoto	DGWRD
			Ir. Bambang	Jratunseluna Project
			Messrs. Grayson Thorn	U.S. AID
			Messrs. Kuehl, Rana	ECI
August 24, 1978	Jakarta	Meeting Project Designs and Reservoir Sedimentation Problem	Ir. Oesman Djojoadinoto	DGWRD
			Ir. Soewasono	PROSIDA
			Ir. Bambang Ir. Bony	Jratunseluna Project
			Ir. Moh. Memed	DPMA
			Messrs. Moh. Jiddin and Koesaeni	PLN
			Staff	DGWRD
			All Staff	ECI

Date	Place	Event	Participation	Organization
August 29, 1978	Semarang	Discussion Project Matters	Messrs. Thorn and Eddy	U.S. AID
			Rana	ECI
August 30, 1978	Semarang	Discussion Project Matters	Ir. Bambang	Jratunseluna Project
			Rana	ECI

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

Design work progress achieved during the past period concerning the structures appurtenant to the dam is detailed below. Most effort was directed towards one structure.

Diversion Tunnel

Design work on this structure was concentrated on the construction drawings as per last month's report. The excavation layout drawings have been completed by the engineers and are ready for the draftsmen. This work included excavation details for construction work on the inlet structure, the cut and cover, and tunnel alignment, the upstream portal area, and the downstream portal and outlet areas. Four drawings are involved. Corrections due to the recent dam alignment revision were included. All of the concrete layout drawings have also been prepared for this and any corrections required by the above mentioned alignment change have been included. These drawings give concrete details for form work required in the construction of the inlet transition structure (including the wingwalls), the cut and cover and tunnel sections, the upstream and downstream portal structures, the outlet area, and the tunnel plug and keyways structure. There are eight drawings involved, three of which have been completed by draftsmen. Reinforcement layout drawings have also been partially worked out, however are not as yet

ready for drafting. These drawings define the bar placement within the forms and are somewhat more time-consuming than other types of drawings due to the bar lists which must accompany each drawing. For the above mentioned structures, six drawings are being developed; two of these are being worked on by draftsmen. Approximately 80 percent of this work has been completed. The completion of the remaining 20 percent is expected early next month, at which time construction drawing work for other structure will begin. Also during this period time was spent in both Semarang and Jakarta discussing with U.S. AID personnel, points raised in their "Review of the Bridge Structural Calculations and Road Drawings for Relocated Access Road/ Jragung Dam Project" from Mr. Eddie Kristiawan to Mr. Paul B. Thorn, dated July 26, 1978. The meetings between ECI and U.S. AID were fruitful and informative for both as many points were thoroughly discussed and many questions answered. The content and results of these conversations is presently being prepared by ECI in the form of a memo and will be sent to U.S. AID during the next period.

B. Dam Design

Borrow Areas Drilling Subsurface Exploration Program

Sixteen deep boring were drilled in Borrow Area VII, (Larangan Borrow Pit), during this month. A total of 43 deep boring were drilled recently for the embankment materials exploration program. The exploration program is now completed.

Embankment Material Testing

All the boring logs materials drilled are being checked in the Jragung Proyek soils laboratory by the Materials and Dam Engineer. Samples are being selected for testing to be accomplished in the mentioned laboratory and in DPMJ Bandung Soils Laboratory. Final boring logs will in that way be prepared.

Foundation Material Testing

Most of the basic foundation materials laboratory testing has been finished. This testing was performed in Bandung (DPMA and DPMJ Laboratories) and in the Jragung Project Laboratory. A complete summary of all the foundations testing performed, locally and overseas, during the final design stage has been prepared.

Twenty one undisturbed foundations Pitcher samples have been selected from the foundations samples obtained during the damsite drilling program. Each sample material was carefully classifed and all the disturbed samples were eliminated. The selected samples were sent overseas for special testing.

Concrete Material Testing and Concrete Mix Design

The concrete testing program to be performed in Bandung DPMJ Construction Laboratory was prepared. It is estimated that all the concrete testing will be finished for about the end of September.

Design

Pore Water Pressure Ratios

The calculation of Pore Water Pressures Ratios for the "After Construction" stability analysis case was done using Prof. Skempton and Brahtz-Hilf criteria.

Jragung Dam Project Camber Criteria

The calculation of settlement of the embankment due to its own weight was performed. Camber criteria was recommended.

Dam Alignment

The alignment of the dam is being studied to consider that the new design embankment crest elevation is now 135 and also that according to the last soil laboratory testing performed the residual and peak foundations material shearing strength are very low.

Preparation of Report

The Materials, Soil Mechanic and Dam Design report is being prepared. The final boring logs are being prepared and typed. All the testing data is being analyzed for its use in the report. Standard testing forms for presenting the soils testing data of the different laboratories in a uniform manner have been prepared.

C. Specifications

During the month of August, specifications' work concentrated on the revision of contract document drawings for the River Diversion Works contract. The alignment of the diversion works scheme has been modified to straighten the line of the cut and cover conduit beneath the dam embankment. Also, the inlet structure of the diversion works has been moved farther upstream to accomodate the extended dam embankment toe for the raised dam crest elevation of 135.0 meters.

The revisions to the contract document drawings necessitated by these changes in the diversion works scheme included redrawing of the "General Layout - Plan and Profile", "Geologic Section" and the topography associated with the tunnel inlet and outlet portals, outlet portal structure and outlet channel views. Revisions of all stationing and location coordinates on the remaining drawings was also required. Further it was decided to incorporate two additional geologic drawings in the contract document set. A site geologic map and boring logs of drill holes in the vicinity of the River

Diversion Works have now been included. The revised "Contract Documents, Volume II of II, Drawings" for the River Diversion Works contract will be submitted for approval to the Proyek in September and shortly thereafter should be printed and available for publication.

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 1 to (6) 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 River Diversion Works			June 8, 1978

Name of Report	Date due	Status	Date Submitted
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
13. Jragung Dam Project - Design Status Report			August 9, 1978
14. Jragung Dam Project - Upper Watershed Management Report		Draft	August 7, 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 July, 1978. 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 month under report, a total amount of Rp. 30,079,964.- was expended. This represents 42.50 percent of the total Rupiah reimbursable costs provided in the Contract. The corresponding percentage of the contract elapsed is 72.92.

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

Annexure I

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 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	17.5
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,		23	16.9
4. Carlos Borinelli	Permanent Resident U.S.A.	Materials Dam Engineer	June 4, 1977		18	14.9
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	8.45
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

Monthly Progress Report No. 18
Period: Ending August, 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT ARRIVAL	PROJECT ASSIGNMENT DEPARTURE	MANMONTHS IN INDONESIA SCHEDULED	MANMONTHS IN INDONESIA ACTUAL
9. E.B. Bartel	U.S.A.	Design Engineer	November 12, 1977	December 20, 1977		
			May 4, 1978	May 13, 1978		1.83
10. Cecil M. Langford	U.S.A.	Project Director	July 8, 1978	July 14, 1978		
			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		1.25
12. Paul Otter	U.S.A.	Project Engineer	July 25, 1978	August 16, 1978		
			March 16, 1977	March 18, 1977	1.5	
			March 1, 1978	March 4, 1978		0.23
13. Peter Strauss	U.S.A.	Chief Geologist	March 16, 1977	March 18, 1977	4	
			June 13, 1977	July 1, 1977		
			February 4, 1978	February 7, 1978		
			May 21, 1978	June 4, 1978		1.5

Annexure I
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			APRIVAL	DEPARTURE	SCHEDULED	ACTUAL
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 13, 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
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		1.55
			July 23, 1978	August 3, 1978		

Annexure I
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 1978

Assignment of Resident and TDY Staff

NAME	NATIONALITY	JOB TITLE	PROJECT ASSIGNMENT		MANMONTHS IN INDONESIA	
			ARRIVAL	DEPARTURE	SCHEDULED	ACTUAL
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 Engineer	January 27, 1978	February 12, 1978	4	0.77
22. Dr. W. Burke	U.S.A.	Geologist Consultant	February 4, 1978	February 12, 1978		0.30
23. Mr. H. Fletcher	U.S.A.	Watershed Management	March 31, 1978	June 1, 1978	3	2.1

Annexure II

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 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		17.5
2. Ir. Bambang Soedjono	1. Project Management 2. Project Planning	November 1, 1975	March 16, 1977		17.5
3. Maryono Bony M.E.	1. Project Planning 2. Dam Design Engineer	November 1, 1975	March 16, 1977		17.5
4. Ir. Wisnu Suharto	Hydraulic Structures	November 1, 1975	March 16, 1977		17.5
5. Ir. Soedaryanto Hs.	Geologist	January 1, 1977	March 16, 1977		17.5
6. Drs. Pedjiono	Hydrologist	January 1, 1977	March 16, 1977		17.5
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		17.5
9. Ir. Muhammad Ali	1. Dam Design Engineer 2. Soil Mechanics/Material	January 1, 1976	March 16, 1977		17.5

Annexure II
(Continued)

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 1978

Assignment of Counterparts and Technical Personnel

NAME	EXPERTISE	WORK ASSIGNMENT	PROJECT ASSIGNMENT DATES STARTING	ENDING	MAN MONTHS WORKED
10. I. Soedjono BEE	Electrical Engineer	March 16, 1977	March 16, 1977		17.5
11. Djasriansyah Aht	Electrical Engineer	March 16, 1977	March 16, 1977		17.5
12. Ir. Hartopo	Hydro Power Engineer	March 16, 1977	March 16, 1977		17.5
13. Harris BME	Mechanical Engineer	March 16, 1977	March 16, 1977		17.5
14. Ir. Supriyo	Specification Engineer	September 16, 1977	September 16, 1977		11.5
Assistant Counterpart					
1. Triyono BE	Geologist	June 1, 1976	March 16, 1977		17.5
2. Sutardjo BE	Geologist	December 1, 1976	March 16, 1977		17.5
3. Bambang Gunadi B.Sc	Hydrologist	January 1, 1976	March 16, 1977	November 1, 1977	7.5

Annexure II
(Continued)

Engineering Consultants, Inc.

JR.GUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 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		17.5
5. Ir. Rustiyanti	Hydraulics Structures	March 16, 1977	March 16, 1977		17.5
6. Buang Sukardjono	Hydrologist	January 1, 1977	March 16, 1977		17.5
7. Edy Arifin Aht	Civil Structures	April 1, 1976	March 16, 1977		17.5
8. Ir. Diah Kusumawati	Hydro Power Engineer	December 1, 1976	June 30, 1977		4.5
Draftsman					
1. Mukiyat	Draftsman	March 1, 1976	March 16, 1977		17.5
2. S.V. Barleyanto	Draftsman	November 1, 1975	March 16, 1977		17.5
3. Bambang Prayitno	Draftsman	February 1, 1976	March 16, 1977		17.5
4. Aris Mudjianto	Draftsman	December 16, 1977	December 16, 1977		17.5

Annexure III

Engineering Consultants, Inc.

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 1978

Direct-hire Indonesian Personnel

NAME	POSITION	PERIOD OF SERVICE		MAN/WOMAN MONTHS	
		DATE STARTED	DATE ENDED	PROVIDED	SPENT
1. Mrs. Tan Ik Goem	Interpreter/Translator I	March 16, 1977		24	17.5
2. Miss Dra. Djoa Sioe Lan	Interpreter/Translator II	May 16, 1977		24	15.5
3. Mrs. Ariati Haryono	Secretary I	March 16, 1977	July 31, 1977	24	4.5
4. Miss Dra. L. Murtiamingsih	Clerk/Typist	March 16, 1977	April 30, 1977	24	1.5
	Secretary	May 1, 1977			16.0
5. Mrs. Sri Moenasih Soetikno	Clerk/Typist	March 16, 1977	July 31, 1977	24	4.5
	Secretary	August 1,		19.5	13.0
6. Miss Sri Anon	Clerk/Typist	March 16, 1977		24	17.5
7. Mr. Suhandi	Messenger	March 16, 1977		24	17.5

Annexure IV

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18

Period: Ending July, 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	)				
2. Overseas Differential	45,340.00	)				
3. Overhead Resident Staff (75% base salaries)	136,020.00	)				
4. TDY & Denver Staff Salaries Including Overseas Differential	215,250.00	)				
5. Overhead TDY & Denver (95% base salaries)	196,365.00	624,814.08)	38,343.78	663,157.86	85.64	68.8
6. Fixed Fee	138,000.00	85,675.-	5,175.-	90,850.-	65.83	
7. Travel and Per Diem	73,120.00	)				
8. Transportation (Relocation)	12,000.00	)				
9. Other Direct Costs & Miscellaneous Expenses	53,800.00	)				

Annexure IV

Continued

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18

Period: Ending July, 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	)				
11. Special Purchases	190,000.00	282,407.40)	2,180.25	284,587.65	73.17	68.8
12. Contingencies	70,000.00	15,969.75	11,416.87	27,386.62	39.12	
Total Dollar Costs	1,371,255.00	1,008,866.23	57,115.90	1,065,982.13	77.74	68.8

Annexure V

JRATUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 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.-	1,815,250	214,500	2,029,750	61.51	72.92
Bandung & Semarang	18,000,000.-	5,545,000	70,000	5,615,000	31.19	
Other	1,800,000,-	627,650	3,000	630,650	35.04	
Family	230,000.-	80,000	-	80,000	34.78	
Sub Total	23,330,000.-	8,067,900	287,500	8,355,400	35.81	
II. OTHER DIRECT COSTS						
Cable & Telephone	2,000,000.-	1,055,809	62,934	1,118,743	55.94	
Postage	2,000,000.-	420,665	21,595	442,260	22.11	
Reproduction & Printing	15,000,000.-	4,673,234	221,152	4,894,386	32.63	
In Country Transportation	2,000,000.-	1,714,576	271,550	1,986,126	99.31	
Supplies & Materials	6,000,000.-	1,200,605	59,975	1,260,580	21.01	
Miscellaneous	7,000,000.-	4,866,004	90,462	4,956,466	70.81	
Sub Total	34,000,000.-	13,930,893	727,668	14,658,561	43.11	72.92

Annexure V

Continued

JRAGUNG DAM PROJECT

Monthly Progress Report No. 18
Period: Ending August, 1978

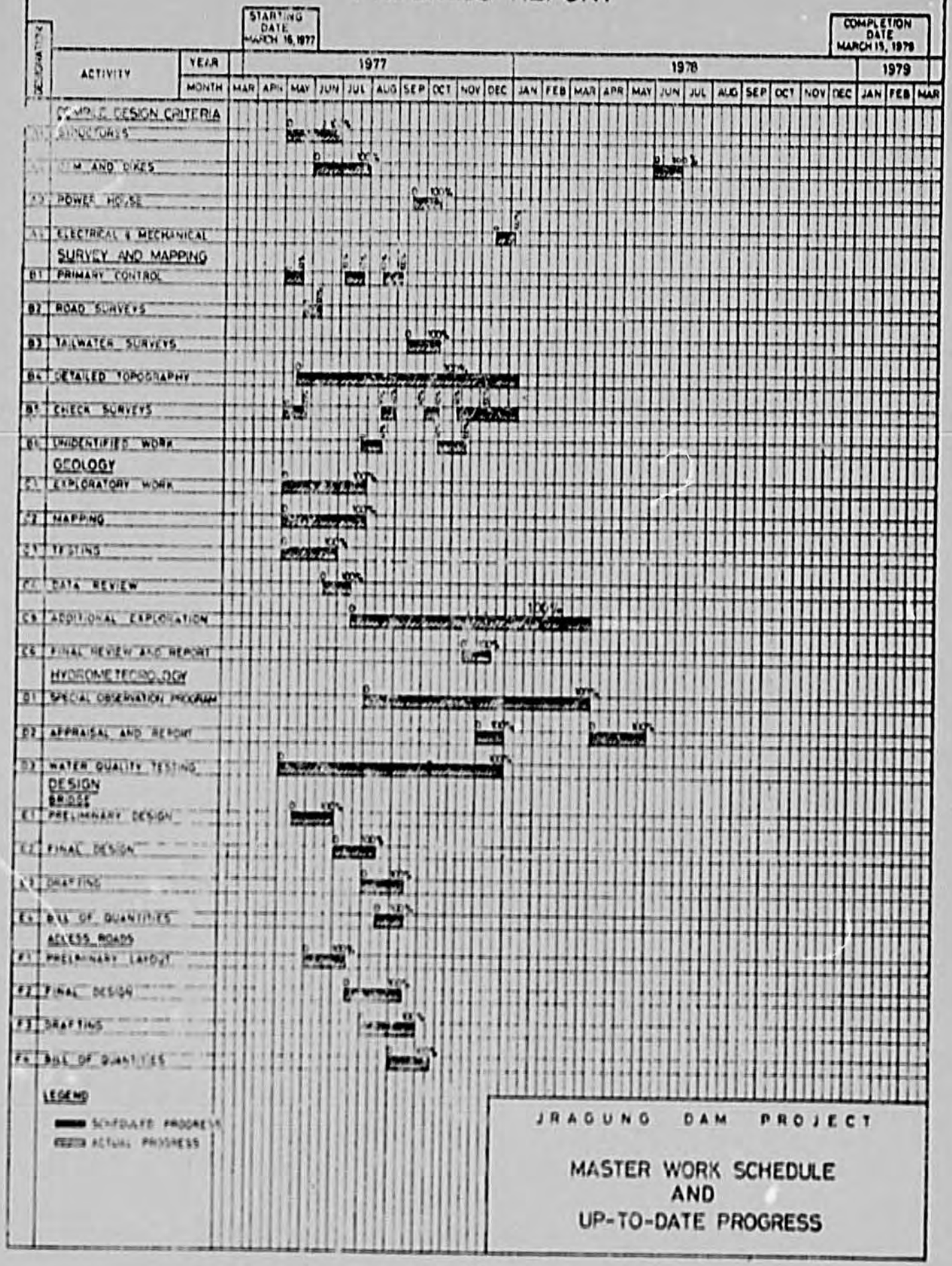
Summary of Rupiah Expenses

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.-	2,176,996	152,517	2,329,513	64.52	72.92
Interpreters	6,017,500.-	2,862,436	201,500	3,063,936	50.92	
Clerks/Typists	2,402,000.-	1,401,692	71,600	1,473,292	61.34	
Messenger	373,500.-	186,062	13,200	199,262	53.75	
Severance Pay	1,037,500.-	-	-	-		
Sub Total	13,446,000.-	6,627,186	438,817	7,066,003	52.55	
Grand Total	70,776,000.-	28,625,979	1,453,985	30,079,964	42.50	72.92

SUMMARY OF REIMBURSEMENT

Rupiah Payments Received by Consultant from Ministry up to the end of Report Period	=	35,685,381
Rupiah Expenditure by Consultant Approved for Reinbursement	=	30,079,364
Balance	=	5,605,417

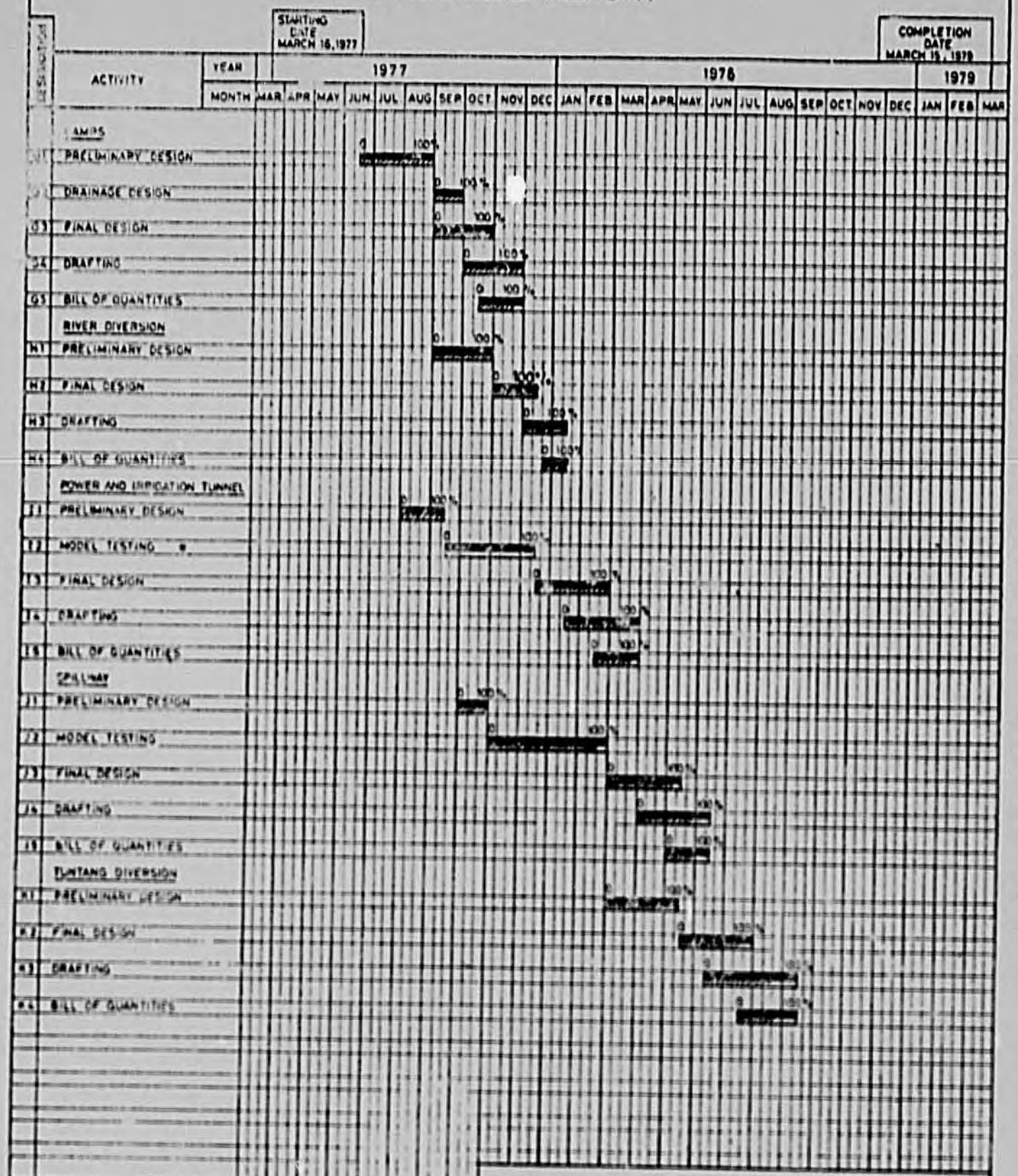
JRAGUNG DAM PROJECT
PROGRESS REPORT



JRAGUNG DAM PROJECT

MASTER WORK SCHEDULE
AND
UP-TO-DATE PROGRESS

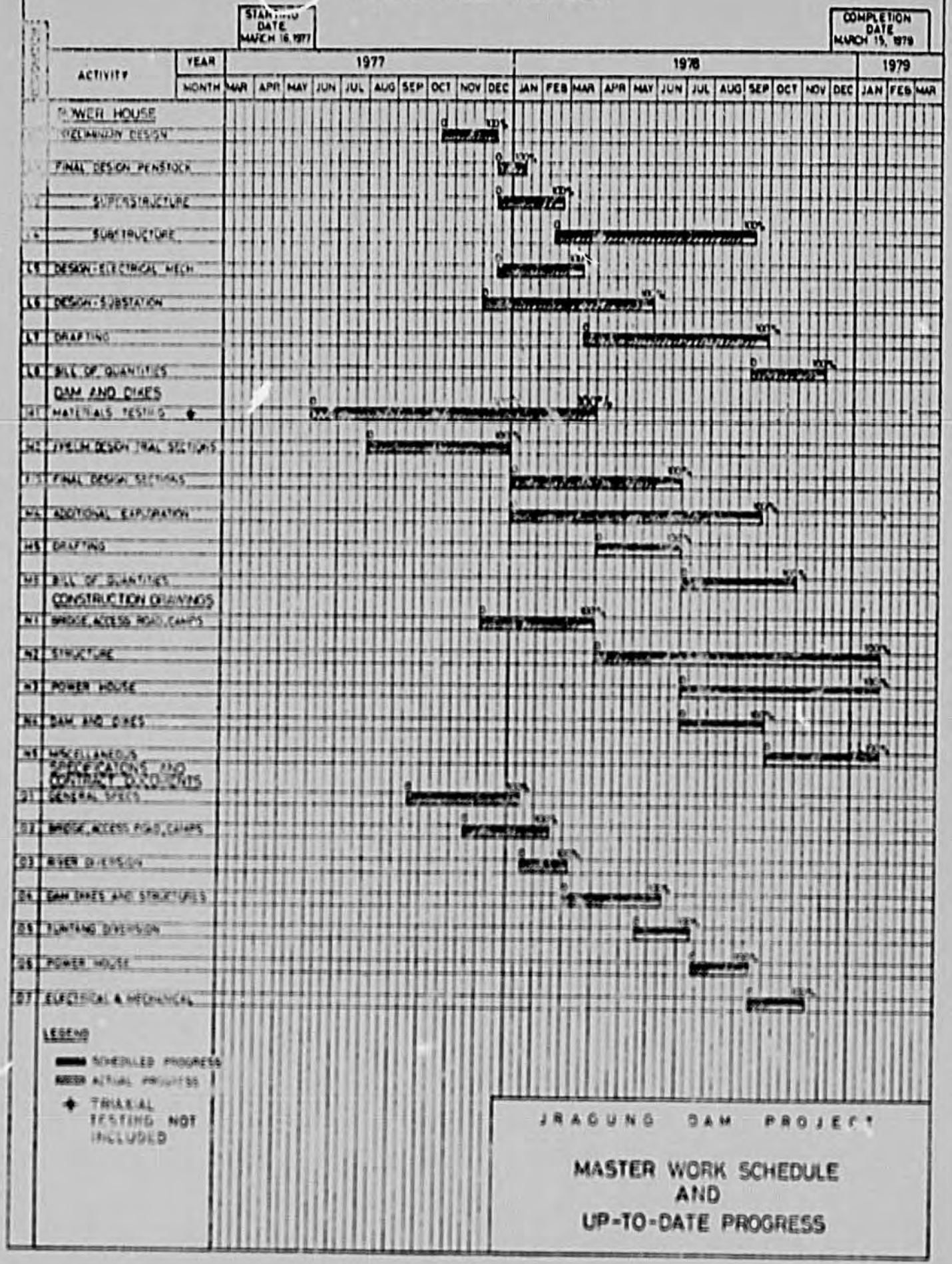
JRAGUNG DAM PROJECT
PROGRESS REPORT



JRAGUNG DAM PROJECT

MASTER WORK SCHEDULE
AND
UP-TO-DATE PROGRESS

JRAGUNG DAM PROJECT
PROGRESS REPORT



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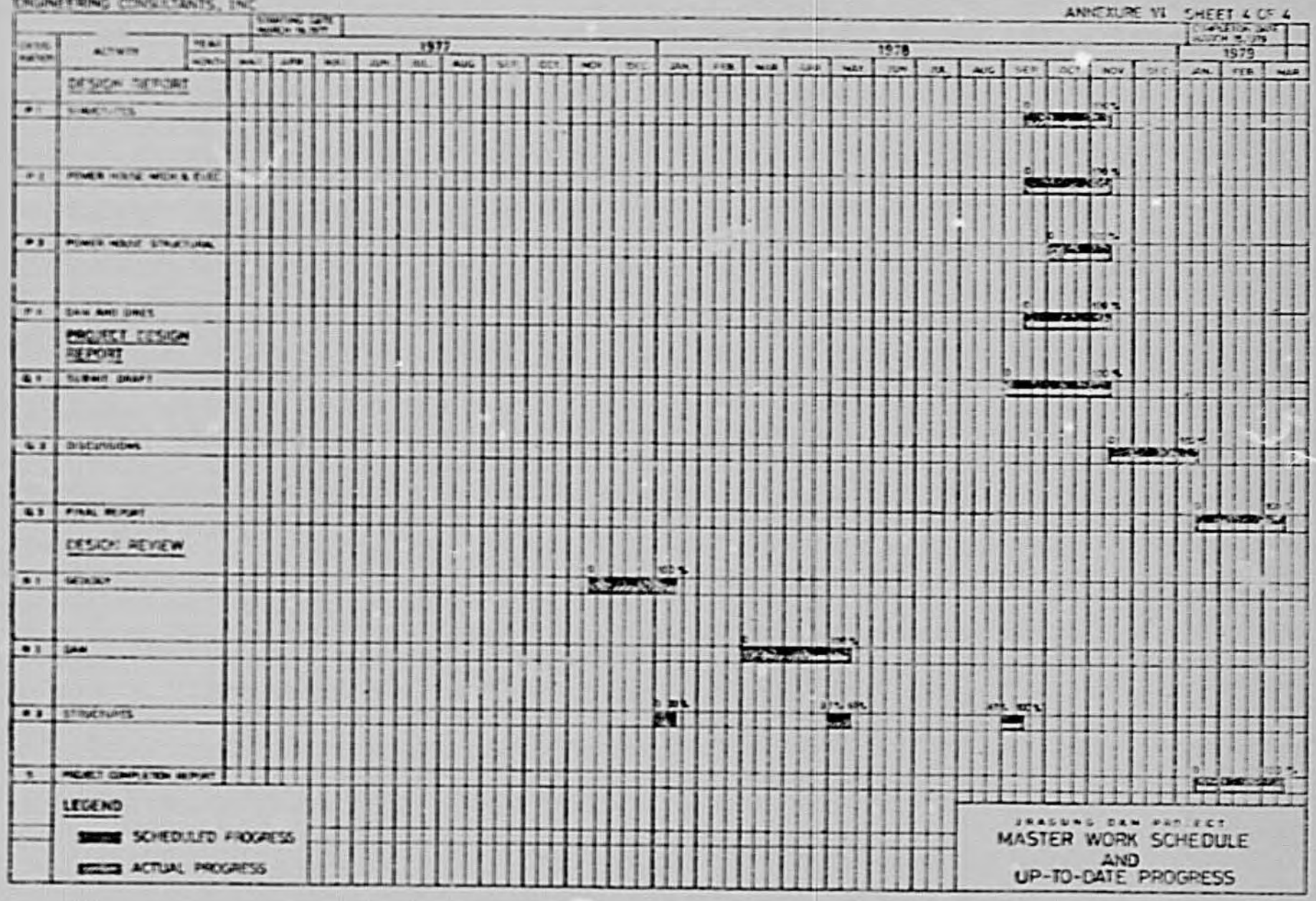
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