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DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
MINISTRY OF PUBLIC WORKS
REPUBLIC OF INDONESIA

4/2

TUNTANG/JRAGUNG RIVERS BASINS INTEGRATED DEVELOPMENT PLAN

QUARTERLY PROGRESS REPORT

NO. 1

AUGUST 1979

SUBMITTED BY

**PRC ENGINEERING CONSULTANTS, INC.
ENGLEWOOD, COLORADO, U.S.A. SEMARANG, INDONESIA**

ECI ENGINEERING CONSULTANTS, INC.

CABLE ADDRESS: ECISEMARANG
SEMARANG, INDONESIA
TEL.: 315061/311740

REPLY TO:
TUNTANG DEVELOPMENT PROJECT
P.O. BOX 220--JL. GEDEH 7 A
SEMARANG
CENTRAL JAVA
INDONESIA

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

September 6, 1979

Attention: Ir. Mardjono Notodihardjo
Director Planning and
Programming

Our file: 1241/QPR/1
241/79

Subject: Tuntang River Basin
Development Plan -
Quarterly Progress
Report No. 1

Dear Sir:

We are pleased to submit herewith twenty (20) copies of the Quarterly Progress Report No. 1 for the Tuntang River Basin Development Plan. This report has been prepared in pursuance of Section 10.15 of the Contract No. HK.02 03 01/B.58/CES/79 which became effective May 16, 1979.

The draft of the progress report was shown to the management of the Iratunseluna Basin Project before it was printed.

Respectfully submitted.

- cc. - Deputy Director Planning and
Programming
Attn: Ir. Mashudi Dipl. H.E.
- Project Manager
Iratunseluna (5 copies)
 - U.S. AID Jakarta (8 copies)
Attn: Mr. Jack Lemaire
 - PRC ECI Denver (SD 173)
 - All Staff PRC ECI Semarang
 - Project Engineer Tuntang
 - File

Very truly yours,
PRC Engineering Consultants Inc.

Saeed A. Rana
Saeed A. Rana
Resident Manager.

SAR/ℓ

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SECTION I

GENERAL

This report has been prepared in pursuance of Section 10.15 of the Contract No. B.58/CES/79 between the Directorate General of Water Resources Development of the Ministry of Public Works and the PRC Engineering Consultants, Inc. which became effective on May 16, 1979 for consulting engineering services for the Tuntang River Basin Development Plan. The 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.

During the period under report, all the staff of the Consultant who had been assigned to work on the Tuntang River Development Plan arrived on schedule. The alternative schemes for the Development Plan were formulated and an interim report was prepared and submitted. Several meetings were held with the Ministry Officials both at Jakarta and at Semarang where the alternative schemes were reviewed and discussed. Also, the Consultants's V.P. Engineering, Chief Engineer, Chief Geologist and the Dam Design Specialist visited the project area, held discussions with the staff and advised on the analysis of various development schemes.

The events which took place, the actions that were initiated or completed and other points pertinent to the formulation of the Development Plan are described in the following.

1. The proposed study involves a substantial amount of data review and analyses for optimizing the water resources not only in the Tuntang River Basin but also to make an integrated use of the water resources of the Tuntang and the Jragung River Basins. The time

for the formulation of the Plan is short and limited. Keeping those facts in view, a work schedule was prepared for carrying out and completing the study. The work schedule was discussed with the local Proyek authorities who offered useful comments and suggestions which were incorporated therein and the same was submitted to DGWRD and U.S. AID.

The job has been proposed to be accomplished by taking the following steps in sequence, as noted.

<u>Phase</u>	<u>Period</u>
Data Collection and Start Review	May 16 - June 15
Analyze and Propose Alternate Schemes	June 16 - Jul 31
Prepare Interim Report	Aug 1 - Aug 15
Discussions and Decisions	Aug 16 - Sep 15
Finalize Tuntang Plan and Prepare Draft Report	Sep 16 - Oct 31
Discuss and Review	Nov 1 - Nov 15
Prepare Final Report	Nov 16 - Nov 30

The schedule of activities is listed and the order and proposed period for completing the activities are presented in a bar chart included at the end of this report.

It may be noted that in the original scope of work for the study, only the water resources of the Tuntang River Basin were required to be studied. However, due to the postponement of the implementation of the Jragung Dam Project, it was deemed necessary to investigate the development potential of the two sub Basins and to make a fresh evaluation of the development possibilities of the Tuntang River in conjunction with the Jragung River before proceeding with any new projects in the area.

Although the scope of work resulting from the need for additional study to include Jragung River in the Tuntang Basin Development increased considerably, yet the constraint on time for completing the study did not make it possible to extend its duration.

2. The work on the hydrological analysis of the Tuntang River Basin has been completed. This is essentially the review of work done earlier by others and updating of the data based on additional information since then. However, a fresh basin flood frequency analysis was done and the P.M.P. (Probable Maximum Precipitation) flood for the Tuntang River at Gunung Wulan was estimated. The results of the hydrological analysis done by ECI are shown in Table 1 attached to this section of the report.

As in the case of the Jragung Dam Project study done by ECI, the sediment data is also not available for the Tuntang River. No measurement of sediment of the high stage of the Tuntang River has reportedly been made in the past. Therefore, the estimation of sediment transport in the system has to be made by judgement only. It is important that for proper optimization of the sizes of the dams and of the storage reservoirs, a realistic estimate of the reservoir sedimentation should be made.

The Consultant in an attempt to gather some sediment data for the Tuntang studies has temporarily moved the sediment measuring equipment from Jragung to the Tuntang River for sampling of sediment of occasional high flows during the current dry season. The equipment should be returned to Jragung before the advent of the next flood season so the program of measurement of sediment on that basin will not be disrupted. However, the Consultant strongly recommends that the equipment needed for starting measurement of sediment on the Tuntang River should be immediately arranged and installed on the Railroad bridge at Kedungjati to continue the program of measurement on that river as well.

3. Two damsites on the Tuntang River at Glapan and at Gunung Wulan were previously proposed by others. A search was made to locate

additional potential sites on the Tuntang River where dams could be built for storage. Two such sites, one at Tempuran and the other at Sambirejo were identified. The geological conditions at these sites were evaluated by the geologist who found that it would not be technically feasible to build the dams at those locations. The reasons are: poorly oriented beds in the foundation area for the first site and the weakness of bed rock at the second site.

The geological conditions at all other locations where structures have been proposed in the various alternatives for the Development Plan, namely Glapan damsite, Gunung Wulan damsite, site for the Sambirejo power plant and the Rawa Pening have been reviewed. A report of review and evaluation of geology has already been prepared. A summary of the report has been presented in the Interim Report. The main report will be appended to the final report for the Tuntang Development Plan.

4. The economist has already completed the evaluation of unit benefits for various products to be derived from the river basin development. These are: irrigated agriculture for both rice and upland crops, electric power, municipal and industrial water supply and flood control. These unit benefits are now being applied in the preliminary economic analysis of various alternative schemes for the Development Plan.

The economist left at the middle of July after completing his first tour of duty of one month on the Tuntang Project. He will return to Semarang in September to complete the economic analysis of the finally selected Plan.

5. The Interim Report for the Tuntang/Jragung Rivers Basin Integrated Development Plan was submitted on August 14, 1979. Various elements of the schemes which comprised the alternative schemes are described in the following.

(i) Rawa Pening as existing and then the storage capacity increased from 48 MCM as of now to a maximum of 110 MCM.

(ii) Building a dam on the Jragung River. Different heights of the dam and the storage capacities of the reservoirs are being considered. The Project is being called High Jragung, Medium Jragung or Low Jragung with gross storage capacities varying from 177 MCM to 100 MCM.

(iii) Building a dam on the Tuntang River at Gunung Wulan. In this case also, the levels of the Project called High Gunung Wulan, Medium Gunung Wulan and Low Gunung Wulan are being considered. The corresponding gross capacities of the proposed reservoirs would vary between 340 MCM and 115 MCM (the size originally proposed by NEDECO).

(iv) Providing a cross connection to effect transbasin diversion from the Tuntang River to the Jragung Reservoir. The capacity of the diversion conduit has to be optimized based on the reservoir operation studies.

(v) Possibility of providing up to 2,000 l/s of potable water for the City of Semarang either from the Muncul Spring or from the Jragung Reservoir.

(vi) Building an additional hydropower plant on the Tuntang River at Sambirejo. The water emerging from the Timo power plant will be led to the third power plant located upstream of the cross connecting structure for the transbasin diversion to exploit the power potential between the two sites.

Preliminary designs for the above listed schemes of works are being prepared and these have been grouped together to provide a total gross storage capacity of about 450 MCM for irrigating 35,000 ha of rice land in the Tuntang and the Jragung service area and for the municipal and industrial water supply for the city of Semarang.

The operation studies for optimization based on simulation technique are presently being conducted on the computer of the DPU at Jakarta. Based on the initial runs, the choice of the schemes has narrowed down to four different alternatives which have been presented in the Interim Report submitted on August 14. Refinement of these alternatives is being done and will continue after these have been discussed in meetings with all the concerned agencies.

The results of the multi-reservoir operation studies completed to date are given in Table 2.

Another alternative which deserves merit and will be considered is to formulate the plan by changing the mode of operation of the power plants on the Tuntang River from base load as at present to the peaking power, which is the recommended practice for hydropower plants. This aspect needs serious consideration especially in view of the additional steam turbogenerator units with installed capacity of 100 MW which have started functioning at Semarang.

The conclusions of the study which were given in the Interim Report are recorded in the following.

CONCLUSIONS

1. In order to meet irrigation demands for a service area of 35,000 hectares, more than one storage site is required. This is due to the fact that no one site has been identified which can store the total required amount.
2. Sediment load of both the Tuntang and Jragung Rivers is very high. Reservoir storage to accommodate sediment will be a significant portion of the gross storage. A reservoir operation scheme which passes a portion of the wet season flows will also pass the sediment load carried by the river during that time period with a resulting decrease in reservoir capacity required to accommodate sediment. Preliminary studies indicate that the river flows from December 1 through February 15 can be passed each year and the reservoir filled after February 15 each year with 100 percent firmness to provide stored water for irrigation

needs. It is estimated that this mode of reservoir operation will result in reducing the reservoir volume required to store sediment by about 40 percent.

3. Three potential storage sites have been identified and studied. The sites and their characteristics are given as follows:

	Rawa Pening Raise	Gunung Wulan	Jragung
Gross Storage Capacity	110 MCM	340 MCM	177 MCM
Net Storage Capacity (assuming all sediment stored)	100 MCM [*]	200 MCM	100 MCM
Dam Height	≈3.5 m Levee	45 m	73 m
Dam Volume	1.8 MCM	8.5 MCM	15 MCM
Estimated Construction Cost	\$ 10,600,000	\$ 92,600,000	\$91,500,000
Ratio of Cost/Net Storage	0,184 ^{**}	0,421	0,915

4. Increasing the existing Rawa Pening storage volume will be beneficial for irrigation needs only if the release pattern is revised. Such a revision will decrease annual firm power generation but will increase the annual production of secondary energy.
5. If municipal and industrial (M & I) water is taken from the system, storage required to meet irrigation needs must be increased. The increase is not equal to the total amount withdrawn; it is approximately 60 percent of the total amount withdrawn.
6. If M & I water is taken from Muncul Springs, the total power potential of the system will be reduced. If the existing Jelok and Timo plants are upgraded, if a new plant is constructed at Sambirejo, and if new plants are constructed at both the Jragung and Gunung Wulan damsites; then it is estimated that the power potential will be decreased by about 6.6 MW due to the loss of the constant flow of 2 cubic meters per second.
7. If M & I water is taken from Jragung, the construction cost and the operation and maintenance cost of developing the water will be substantially higher than if Muncul Springs were the source.

* Existing lake presently has live storage of 42.5 MCM.

** Based on increase of live storage of 57.5 MCM.

8. The Tuntang/Jragung transbasin diversion feature is necessary if the irrigation needs of the entire 35,000 hectares service area are to be met.
9. In order to best serve the needs of the region, the project development should be optimized to serve the needs of all water users. This may require some compromise among the three water uses of irrigation, power and M & I. Full agreement to such compromise by the involved water users will be very beneficial in obtaining central government approval for the project and will speed up project implementation.
10. The multiple structure development plan necessary to provide the required storage lends itself to staged development.
11. Based on the conclusions listed above, the plan of work to be carried out by the Consultant during the remaining part of the present contract is given hereunder.
 - a. Continue reservoir operation studies to optimize the alternative packages of works described in this Interim Report. The results of the continuing optimization studies will be available at the time of the meetings to be held to discuss the proposed alternative schemes.
 - b. After the Consultant receives the directive from the DGWRD as to which development package should be studied, the Consultant will further refine the selected scheme. This will include determining the optimized sizes of the reservoirs, dams and the appurtenant structures related to that particular scheme, carrying out of the economic analyses of the individual elements and of the collective proposed plan and preparation of a final report on the study.
 - c. In the final report, a plan of actions will be proposed which should follow the present study. These proposed actions could be to implement those elements of the Development Plan for which detailed designs have already been prepared, to revise the designs and drawings of such components of the Plan were designed in the past but their sizes must be changed, and to carry out detailed feasibility study for those works for which investigations to that level have not been done in the past.

The various alternative schemes are presented in a chart attached as Figure 1 with this section of the report.

5. The review of the demand projections of potable water for the city of Semarang has been completed. This is given in Table 3. Furthermore, the status of investigations for the groundwater source to supplement the municipal water supply and the results achieved so far have been given in a separate report which will be appended to the Final Report on the Development Plan.

The cropping pattern and the cropping calendars presently being used in the irrigation service areas have been reviewed and projections have been made for the future possible cropping pattern with recommendation for a cropping calendar starting in November every year. The proposed cropping pattern and the cropping calendar for the Jragung/Tuntang service areas are shown in Figure 2.

The existing flooding problems in the service area and the needs for drainage and for flood mitigation have been investigated. The conditions which would be generated after the proposed dams would be built on the rivers and the storage reservoirs would attenuate the flood peaks have been studied and reported.

The environmental impacts of the proposed works in the alternative schemes for the Development Plan has been studied. The major problem is the population displacement and the need for resettlement. Also the effects of raising the water surface in the Rawa Pening and of reducing sediment flow to the estuaries of the rivers by trapping the sediment in the reservoirs have been investigated.

A summarized report on all the abovesaid aspects of the Development Plan has been presented in the Interim Report.

6. In brief, it is reported that the study for the Tuntang/Jragung Integrated Development Plan has so far progressed on schedule. The interim report on the study which was to be prepared at the end of the twelfth week of the study has been submitted.

In accordance with the work schedule, the discussions on the interim report should be completed and the consultant must receive a directive from the Ministry by September 15 which will provide the guidelines for the finalization of the Plan. A request has been made by the Consultant to hold the review meetings before the abovegiven date.

The names and the dates of arrivals and departures of the Consultant's staff are reported in Chapter II. The details of meetings, conferences and other major events are given in Section III of the report.

The details of local currency expenditure and the dollar costs are given in Section VI of the report. Up to the end of the first quarter, an amount of Rp. 9,000,000.- had been received as advance from the Ministry.

TABLE 1
SUMMARY OF HYDROLOGY
TUNTANG AND JRAGUNG CATCHMENT

	Unit	Tuntang River at Glapan Weir	Tuntang River at Gunung Wulan Damsite	Tuntang River at Jelok River	Jragung River at Jragung Damsite
<u>Area</u>					
Catchment Area	km ²	796	669	282	94
<u>Rainfall</u>					
Mean Annual Rainfall	mm	2,630	2,650	2,720	2,650
Maximum monthly rainfall	mm	600	608	612	950
Minimum monthly rainfall	mm	0	0	0	0
Maximum daily station rainfall	mm	400	400	400	306
Probable maximum 24-hr rainfall over the catchment	mm	577	598	612	680
<u>Runoff</u>					
Mean annual runoff	mm	1,120	1,150	1,420	1,280
Mean annual volume of runoff	10 ⁶ m ³	890	770	400	121
Mean annual discharge	m ³ /s	28.3	24.4	12.6	3.82
<u>Floods</u>					
Mean annual flood peak	m ³ /s	540 ¹ 360 ²	450	360 ³	280
Diversion design flood peak	m ³ /s	940	800	640 ³ 386 ⁴	470
Diversion design flood volume	10 ⁶ m ³	37 ¹ 31 ²	25	15	12
Probable maximum flood peak	m ³ /s	-	6,700	5,600 ³ 775 ⁴	3,000
Probable maximum flood volume	10 ⁶ m ³	-	282 ⁵	174 ⁵	43

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1. From the regional flood analysis
 4. Outflow peak at Jelok Weir

2. From NEDECO (12)

3. Inflow peak to Rawa Pening catchment

5. Includes 100-year flood preceding probable maximum flood by 24 hours.

TABLE 2

TUNTANG/JRAGUNG RIVERS DEVELOPMENT PLAN

RESERVOIR OPERATION STUDY

Irrigation Areas

Jragung 14,000 ha +

Gunung Wulan 21,000 ha +

RUN NO.	TUNTANG DIVERSION CAPACITY m ³ /s	STORAGE CAPACITIES (MCM)			PERCENT SHORTAGE		M & I WATER m ³ /s		POWER GENERATED Year 1			SEDIMENT MODE
		Rawa Fening	Gunung Wulan	Jragung	Gunung Wulan	Jragung	Jragung	Muncul	Upper Tuntang	Gunung Wulan	Jragung	
26	10.0	43.0	200.0	75.0	10.7	4.4	-	-	259.4	26.6	28.0	Stored in reservoir
27	10.0	43.0	240.0	75.0	8.7	7.1	-	2.000	236.5	29.4	27.5	"
28	10.0	43.0	240.0	75.0	7.9	7.1	2.000	-	259.4	29.5	31.7	"
29	12.0	43.0	240.0	75.0	9.3	6.7	2.000	-	259.4	29.0	32.4	"
30	12.0	43.0	200.0	75.0	12.7	6.7	2.000	-	259.4	23.7	32.4	"
31	10.0	100.0	200.0	75.0	12.3	7.1	-	2.000	258.5	26.6	28.0	"
32	12.0	100.0	200.0	50.0	12.3	9.9	2.000	-	250.8	19.4	30.8	"
33	10.0	100.0	240.0	50.0	8.7	9.9	-	2.000	258.8	29.6	25.9	"
34	10.0	100.0	150.0	100.0	17.9	4.0	-	2.000	258.5	22.0	29.7	"
35	10.0	100.0	175.0	100.0	15.9	4.0	-	2.000	258.5	23.1	29.8	"
36	12.0	100.0	240.0	-	6.7	22.3	-	-	273.5	29.5	-	"
37	12.0	100.0	240.0	-	7.5	27.4	2.000	-	273.5	29.3	-	"
38	12.0	100.0	240.0	-	7.5	28.2	-	2.000	258.5	29.5	-	"
39	12.0	43.0	240.0	-	7.1	24.6	-	-	223.1	21.0	-	"
40	12.0	43.0	240.0	-	7.9	28.6	2.000	-	259.4	29.2	-	"
41	12.0	43.0	240.0	-	7.5	28.2	-	2.000	236.5	29.4	-	"
42	12.0	43.0	240.0	50.0	8.3	10.7	2.000	-	259.4	29.1	29.7	"
43	10.0	43.0	240.0	50.0	8.7	11.1	-	2.000	236.5	29.4	25.0	"
44	8.0	43.0	240.0	50.0	8.7	13.1	-	2.000	236.5	29.7	21.1	"
45	6.0	43.0	240.0	50.0	8.3	15.1	-	2.000	236.5	30.2	17.2	"

TABLE 2 (Cont.)

TUNTANG/JRAGUNG RIVERS DEVELOPMENT PLAN
RESERVOIR OPERATION STUDY

Irrigation Areas
Jragung 14,000 ha +
Gunung Wulan 21,000 ha +

RUN NO.	TUNTANG DIVERSION CAPACITY m ³ /s	STORAGE CAPACITIES (MCM)			PERCENT SHORTAGE		M & I WATER m ³ /s		POWER GENERATED Year 1			SEDIMENT MODE
		Rawa Pening	Gunung Wulan	Jragung	Gunung Wulan	Jragung	Jragung	Mancul	Upper Tuntang	Gunung Wulan	Jragung	
46	12.0	43.0	200.0	100.0	12.7	3.6	2.000	-	259.4	23.7	34.7	Stored in reservoir
47	10.0	43.0	200.0	100.0	12.3	4.0	-	2.000	177.2	19.2	25.2	"
48	12.0	43.0	150.0	100.0	15.9	1.6	-	-	259.4	21.4	30.1	"
49	12.0	43.0	150.0	100.0	17.1	3.6	2.000	-	259.4	20.8	34.6	"
50	12.0	43.0	150.0	100.0	18.3	4.0	-	2.000	236.5	21.3	29.6	"
51	2.0	43.0	240.0	100.0	3.2	13.2	-	-	223.1	26.1	15.4	"
52	4.0	43.0	240.0	75.0	4.4	9.9	-	-	259.4	31.0	19.3	"
53	6.0	43.0	240.0	75.0	5.2	6.3	-	-	259.4	30.4	26.0	"
54	4.0	100.0	200.0	75.0	9.4	6.3	-	-	273.5	29.5	18.3	"
55	6.0	100.0	150.0	75.0	13.5	6.3	-	-	250.8	18.0	23.2	"
56	6.0	100.0	150.0	75.0	17.1	8.3	-	2.000	258.5	22.8	23.0	"
57	6.0	100.0	200.0	75.0	11.1	7.9	-	2.000	258.5	28.8	23.0	"
58	6.0	100.0	200.0	50.0	8.3	19.8	2.000	-	273.5	28.9	19.2	"
59	8.0	100.0	200.0	75.0	11.5	7.1	-	2.000	258.5	28.0	27.3	"
60	10.0	100.0	150.0	75.0	15.9	6.7	2.000	-	273.5	21.9	31.7	"
61	8.0	43.0	240.0	80.0	6.7	7.5	-	2.000	177.2	23.2	19.6	"
62	8.0	43.0	240.0	80.0	5.6	8.3	2.000	-	259.4	29.8	34.9	"
63	8.0	100.0	240.0	75.0	5.2	8.3	2.000	-	273.5	29.9	24.6	"
64	8.0	100.0	240.0	75.0	6.7	7.9	-	2.000	177.2	23.1	23.5	"
65	8.0	43.0	210.0	75.0	7.1	7.1	-	-	259.4	28.4	27.7	"

TABLE 2 (Cont.)

TUNTANG/JRAGUNG RIVERS DEVELOPMENT PLAN

RESERVOIR OPERATION STUDY

Irrigation Areas

Jragung 14,000 ha +

Gunung Wulan 21,000 ha +

RUN NO.	TUNTANG DIVERSION CAPACITY m ³ /s	STORAGE CAPACITIES (MCM)			PERCENT SHORTAGE		M & I WATER m ³ /s		POWER GENERATED Year 1			SEDIMENT MODE
		Rawa Pening	Gunung Wulan	Jragung	Gunung Wulan	Jragung	Jragung	Muncul	Upper Tuntang	Gunung Wulan	Jragung	
66	8.0	43.0	220.0	75.0	6.3	6.7	-	-	259.4	28.9	27.7	Stored in reservoir
67	7.0	43.0	240.0	80.0	5.2	9.1	2.000	-	259.4	30.1	33.8	"
68	7.0	43.0	240.0	80.0	6.3	7.9	-	2.000	236.5	29.8	27.1	"
69	6.0	43.0	200.0	100.0	7.5	9.1	2.000	-	259.4	28.6	29.3	"
70	5.0	43.0	200.0	100.0	7.1	10.7	2.000	-	259.4	28.9	23.5	"
71	5.0	43.0	200.0	100.0	9.1	7.1	-	2.000	236.5	26.5	27.2	"
72	6.0	43.0	200.0	100.0	10.3	6.0	-	2.000	236.5	23.2	28.0	"
73	7.0	43.0	240.0	85.0	6.3	7.9	-	2.000	236.5	29.8	27.5	"
74	8.0	43.0	240.0	90.0	5.6	7.1	2.000	-	259.4	29.8	35.9	"
75	8.0	100.0	240.0	85.0	5.2	7.1	2.000	-	273.5	29.9	35.6	"
76	7.0	100.0	240.0	90.0	6.3	6.7	-	2.000	258.5	30.1	28.2	"
77	8.0	43.0	225.0	85.0	6.3	5.2	-	-	259.4	29.2	23.5	"
78	7.0	43.0	225.0	85.0	5.6	5.6	-	-	259.4	29.5	28.0	"
79	6.0	43.0	220.0	90.0	5.2	6.0	-	-	259.4	29.5	27.8	"
80	6.0	43.0	210.0	100.0	6.7	9.1	2.000	-	259.4	29.1	29.3	"
81	6.0	43.0	210.0	100.0	8.7	6.0	-	2.000	236.5	28.7	28.0	"
82	12.0	100.0	220.0	75.0	7.5	7.5	2.000	-	273.5	27.4	37.1	"
83	10.0	100.0	220.0	75.0	8.3	7.9	-	2.000	258.5	28.3	28.4	"
84	15.0	100.0	260.0	-	3.6	22.6	-	-	273.5	30.4	-	"
85	20.0	100.0	260.0	-	3.6	22.6	-	-	273.5	30.4	-	"

TABLE 2 (Cont.)

TUNTANG/JRAGUNG RIVERS DEVELOPMENT PLAN
RESERVOIR OPERATION STUDY

Irrigation Areas

Jragung 14,000 ha \pm Gunung Wulan 21,000 ha \pm

RUN NO.	TUNTANG DIVERSION CAPACITY m^3/s	STORAGE CAPACITIES (MCM)			PERCENT SHORTAGE		M & I WATER m^3/s		POWER GENERATED Year 1			SEDIMENT MODE
		Rawa Pening	Gunung Wulan	Jragung	Gunung Wulan	Jragung	Jragung	Muncul	Upper Tuntang	Gunung Wulan	Jragung	
86	7.0	43.0	240.0	85.0	13.1	9.5	-	2.000	236.5	28.4	25.9	Sediment passed downstream partially.
87	8.0	43.0	240.0	90.0	10.7	12.7	2.000	-	259.4	28.4	30.7	
88	8.0	100.0	240.0	85.0	10.3	12.7	2.000	-	273.5	28.5	31.1	"
89	7.0	100.0	240.0	90.0	13.1	9.1	-	2.000	258.5	28.7	26.2	"
90	20.0	100.0	260.0	-	6.0	22.6	-	-	273.5	29.0	-	"
91	15.0	100.0	260.0	-	6.0	22.6	-	-	273.5	29.0	-	"
92	6.0	43.0	210.0	100.0	8.7	18.7	2.000	-	259.4	27.9	16.6	"
93	12.0	43.0	240.0	85.0	13.1	8.3	2.000	-	259.4	27.2	34.6	"
94	10.0	43.0	240.0	90.0	11.1	4.4	-	-	259.4	27.9	28.2	"
95	8.0	100.0	230.0	90.0	10.3	12.3	2.000	-	273.5	28.1	31.1	"

TABLE 3

WATER DEMANDS FOR THE CITY OF SEMARANG

	YEARS				
	1980	1985	1990	1995	2000
Projection A (Heavy Industrial Growth)	1,220	1,620	2,460	3,720	6,010
Projection B (Moderate Industrial Growth)	940	1,435	2,100	3,075	4,965

PROPOSED ALTERNATIVES

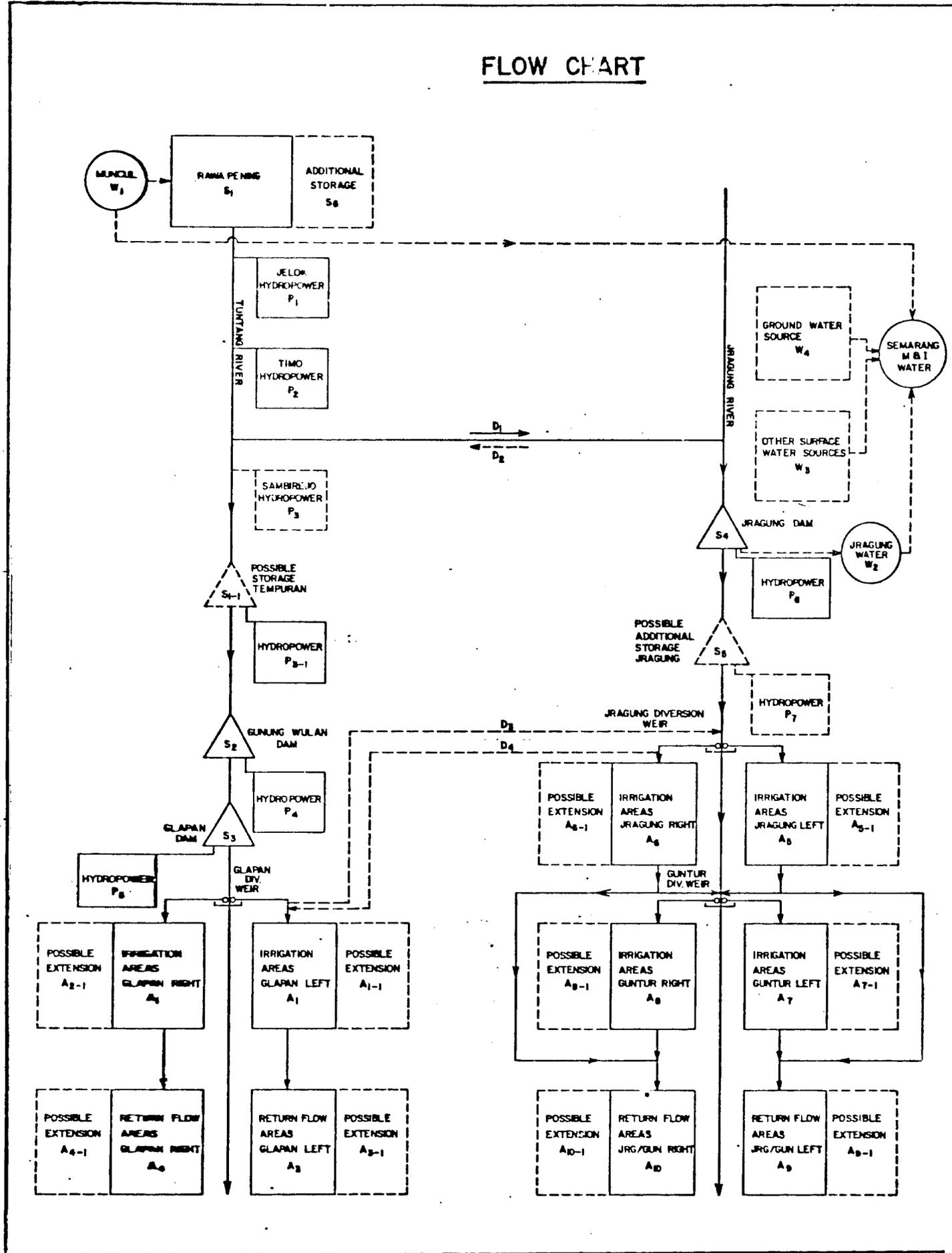
ELEMENTS OF PLAN	ALTERNATIVES				
	I (C-1)	II (C-2)	III (C-3)	IV (D-1)	V
1 RAWAPENING a EXISTING CAPACITY (MCM) b PROPOSED CAPACITY (MCM)	48.5 48.5	48.5 48.5	48.5 48.5	48.5 48.5	48.5 110.00
2 HYDROPOWER a JELOK (EXISTING) b TIMO (EXISTING) c SAMBIREJO (PROPOSED) d GUNUNG WULAN (PROPOSED) e JRAGUNG (PROPOSED)	NO EFFECT ON TOTAL HYDROPOWER POTENTIAL OF JRAGUNG AND TUNTANG RIVERS	TOTAL HYDROPOWER POTENTIAL OF JRAGUNG AND TUNTANG RIVERS WILL BE REDUCED BY 6.6 MW	NO EFFECT ON TOTAL HYDROPOWER POTENTIAL OF JRAGUNG AND TUNTANG RIVERS	TOTAL HYDROPOWER POTENTIAL OF JRAGUNG AND TUNTANG RIVERS WILL BE REDUCED BY 6.6 MW	TOTAL HYDROPOWER POTENTIAL OF JRAGUNG AND TUNTANG RIVERS WILL BE INCREASED IF M & I WATER IS TAKEN FROM JRAGUNG
3 GUNUNG WULAN DAM a DAM CREST b FULL SUPPLY LEVEL c RESERVOIR CAPACITY (MCM) (1) GROSS (2) LIVE	EL. 70.00 EL. 65.00 340 220	70.00 65.00 340 220	70.50 65.75 355 235	69.0 64.0 310 235	70.5 (69.0) 65.75 (64.0) 355 (310) 235
4 JRAGUNG DAM a DAM CREST b FULL SUPPLY LEVEL c RESERVOIR CAPACITY (MCM) (1) GROSS (2) LIVE	EL. 135.3 EL. 131.0 177 100	135.3 131.0 177 100	135.3 131.0 177.0 100.0	130 125 140 100	105 100 * (75) * (50)
5 TRANSBASIN DIVERSION (SEE NOTES) TUNTANG - JRAGUNG a AVG DISCHARGE (m ³ /s) b MONTHLY VOLUME (MCM)	3.25 8.4	3.25 8.4	3.25 8.4	3.25 8.4	10.0 26.0
6 MUNICIPAL WATER SUPPLY a FROM MUNCUL (l/s) b FROM JRAGUNG (l/s)	0 0	2,000 0	0 2,000	2,000 0	0 2,000
7 IRRIGATION SERVICE AREA (ha)	35,000	35,000	35,000	35,000	35,000
8 IRRIGATION FIRMNESS (%)	100	± 95	± 95	± 92	NOT CHECKED AS YET
9 POTENTIAL CONSTRAINTS	1 RESERVOIR SEDIMENTATION 2 POPULATION RESETTLEMENT 3 CONSTRUCTION MATERIAL GUNUNG WULAN	1 RESERVOIR SEDIMENTATION 2 POPULATION RESETTLEMENT 3 CONSTRUCTION MATERIAL GUNUNG WULAN	1 RESERVOIR SEDIMENTATION 2 POPULATION RESETTLEMENT 3 CONSTRUCTION MATERIAL GUNUNG WULAN	1 POPULATION RESETTLEMENT 2 CONSTRUCTION MATERIAL GUNUNG WULAN	1 POPULATION RESETTLEMENT 2 CONSTRUCTION MATERIAL GUNUNG WULAN
10 ESTIMATED COST (US \$) 1978	186,000,000	186,000,000	190,000,000	167,000,000	?
11 REMARKS	1 EXISTING HYDROPOWER SCHEDULE NOT CHANGED 2 NO M & I WATER SUPPLIED	1 EXISTING HYDROPOWER SCHEDULE NOT CHANGED 2 HYDROPOWER POTENTIAL DECREASED	1 EXISTING HYDROPOWER SCHEDULE NOT CHANGED 2 HYDROPOWER POTENTIAL COULD BE INCREASED	1 EXISTING HYDROPOWER SCHEDULE NOT CHANGED 2 HYDROPOWER POTENTIAL DECREASED. SAME CAN BE INCREASED BY TAKING M & I WATER FROM JRAGUNG RATHER THAN MUNCUL 3 SEDIMENT PASSED THRU LOW LEVEL OUTLETS IN JRAGUNG AND GUNUNG WULAN DAMS	1 EXISTING HYDROPOWER SCHEDULE WILL BE CHANGED 2 HYDROPOWER POTENTIAL WILL BE DECREASED BY 6.6 MW IF M & I WATER IS TAKEN FROM MUNCUL 3 (2) SEDIMENT STORAGE NOT PLANNED 4 FIGURES IN PARENTHESES ARE FOR CONDITION OF SEDIMENT PASSING

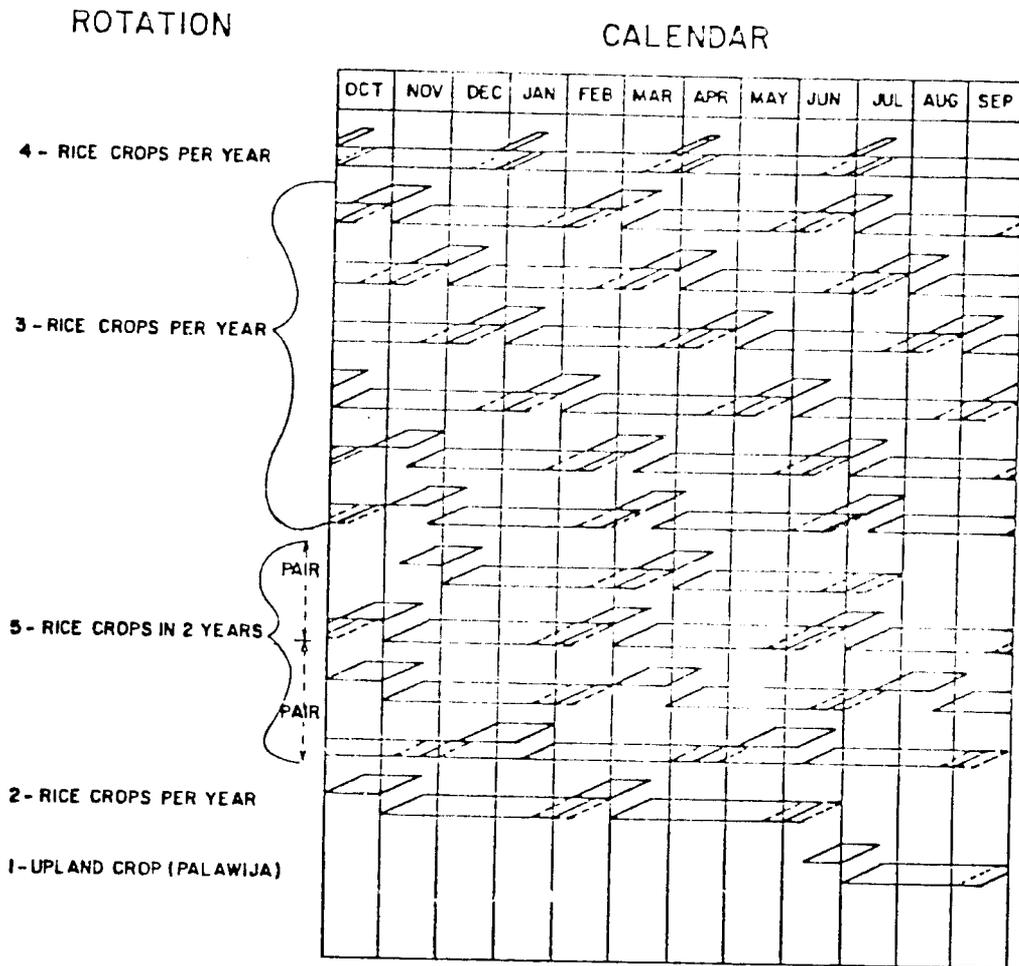
NOTE :

- IN THE FLOW CHART FOLLOWING SYMBOLS HAVE BEEN USED
 S STORAGE (MCM)
 P HYDROPOWER (MW)
 W MUNICIPAL WATER (l/s)
 A IRRIGATION SERVICE AREA (ha)
 D TRANSBASIN DIVERSION (MCM)
- FOR VALUES NOT SHOWN ON THE FLOW CHART SEE PROPOSED ALTERNATIVES
- DIVERSION CAPACITIES SHOWN WERE USED IN PRELIMINARY OPERATION STUDIES BUT WILL BE OPTIMIZED IN FUTURE STUDIES

TUNTANG /JRAGUNG RIVERS
 INTEGRATED DEVELOPMENT PLAN
 FLOW CHART AND
 PROPOSED ALTERNATIVES

FLOW CHART

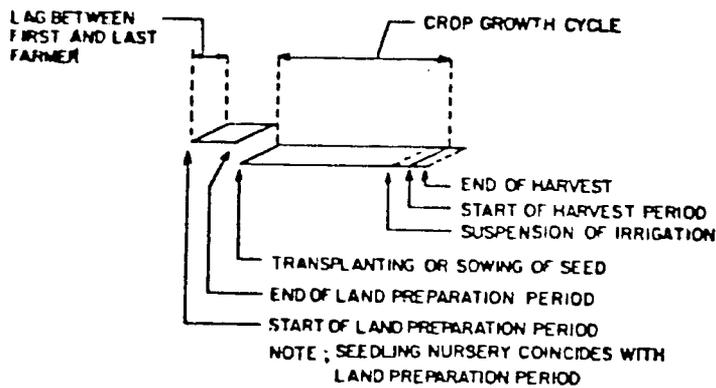




BEST AVAILABLE DOCUMENT

NOTES

- RECOMMENDED CROPPING PATTERN FOR JRAGUNG / TUNTANG SERVICE AREA IS AS FOLLOWS:
 - 3 RICE CROPS PER YEAR - 75 PERCENT OF SERVICE AREA
 - 5 RICE CROPS IN TWO YEARS - 10 PERCENT OF SERVICE AREA
 - 2 RICE CROPS AND 1 UPLAND CROP PER YEAR - 15 PERCENT OF SERVICE AREA
- CROPPING CALENDAR OF 4 RICE CROPS PER YEAR IS PRESENTED AS A POSSIBILITY FOR LIMITED AREAS IN THE FUTURE AND IS FOR INFORMATIONAL PURPOSES ONLY



TUNTANG / JRAGUNG RIVERS
 INTEGRATED DEVELOPMENT PLAN
 PROPOSED CROPPING CALENDAR

SECTION II

PERSONNEL

A. EXPATRIATE

1. At Semarang on May 16, 1979

Saeed A. Rana Resident Manager

2. Arrived in Semarang during May 16 to Aug 31, 1979

Mr. M.K. Kuehl	V.P. Engineering
Andrew Tczap	Chief Engineer
P.L. Strauss	Chief Geologist
J. Diebel	Municipal Water Engineer
J. Nemeč	Chief Irrigation/Agriculture Engineer
Howard Dennis	Environmentalist
Dr. Patterson	Planning Engineer
S.F. Hillis	Dam Design Specialist
Jeffery P. Frey	Hydrologist
Richard J. Bielefeld	Geologist
Dr. Louis Haley	Agricultural Scientist
Dr. M.A. Stevens	Sedimentologist
Rudolpho Clarke	Flood/Drainage Engineer
Robert L. Berger	Economist

3. Departed from Semarang during May 16 to August 31, 1979

Mr. M.K. Kuehl	V.P. Engineering
Andrew Tczap	Chief Engineer
P.L. Strauss	Chief Geologist
Dr. M.A. Stevens	Sedimentologist
Dr. Louis E. Haley	Agricultural Scientist
Robert L. Berger	Economist
S.F. Hillis	Dam Design Specialist
J.P. Frey	Hydrologist

Richard J. Bielefeld	Geologist
Rudolpho Clarke	Flood/Drainage Engineer
J. Diebel	Municipal Water Engineer
J. Nemeč	Chief Irrigation/Agriculture Engineer
Dr. Patterson	Planning Engineer
Howard Dennis	Environmentalist

4. At Semarang on August 31

Saeed A. Rana	Resident Manager
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SECTION III

MEETINGS CONFERENCES AND MAJOR EVENTS

<u>Date</u>	<u>Place</u>	<u>Event</u>	<u>Participation</u>	<u>Organization</u>
May 15, 1979	Jakarta	Letter of Intent issued by DGWRD.		
May 16, 1979	Jakarta/ Semarang	ECI notified DGWRD and U.S. AID that work on the Tuntang River Basin Develop- ment Plan was started.		
May 18, 1979	Glapan/ Gunung- Wulan	Field visit	Rana Ir. M. Ali Ir. Soedaryanto	ECI Jratunseluna
May 21, 1979	Glapan/ Muncul	Field visit	Rana Ir. M. Ali Ir. Soedaryanto	ECI Jratunseluna
May 22-23, 1979	Semarang	Discussion Work Schedule	Rana Mr. Maryono Bony Ir. Yusuf Gayo	ECI Jratunseluna
May 25, 1979	Jelok/ Timo	Visit to Power Plants	Rana Mr. Maryono Bony Ir. Mohammad Ali	ECI Jratunseluna
May 26, 1979	Semarang	Discussion Project Matters and Work Schedule.	Rana Ir. Martopo Mr. Maryono Bony Ir. Yusuf Gayo	ECI Jratunseluna
May 31- June 2, 1979	Jakarta	Discussion Project Matters		ECI U.S. AID
June 4-5, 1979	Jakarta	ECI Management Meetings	Mr. R.E. Mathe Rana, Ramu, Rogers	ECI

SECTION III

MEETINGS, CONFERENCES AND MAJOR EVENTS

(Cont.)

<u>Date</u>	<u>Place</u>	<u>Event</u>	<u>Participation</u>	<u>Organization</u>
July 5, 1979	Semarang	Discussion Project Planning	Ir. Bambang Soedjono Mr. Maryono Bony M.K. Kuehl A. Tczap S.A. Rana	Jratunseluna Project ECI
July 2-5, 1979	Semarang Tuntang River	Field Visits Office Discussions	M.K. Kuehl A. Tczap P. Strauss S.A. Rana R. Bielefeld	ECI
July 14 - July 15, 1979	Semarang	Discussion about Gunung Wulan Damsite	S.F. Hillis S.A. Rana R. Bielefeld	ECI
July 24, 1979	Semarang	Discussion and Field Trip	Mr. J. Lemaire Maryono Bony S.A. Rana	U.S. AID Jratunseluna ECI
July 26 - July 27, 1979	Jakarta	Discussion Project Matters	S.A. Rana A. Grayson DGWRD Officials	ECI U.S. AID Ministry
July 28, 1979	Semarang	Project Briefing Meeting	All Staff Ir. Martopo and staff Mr. Ankum Mr. Sasono Mr. Selamato Mr. Sasmito Mr. Krisno	ECI Jratunseluna NEDECO DPU Wil. Semarang PLN Director PAM Semarang Proj. Manager M.I. Central Java Project
July 26 - July 31, 1979	Jakarta	Reservoir Operation Studies on DPU Computer	Dr. Patterson S.A. Rana	ECI
July 31, 1979	Jakarta	Discussion Project Planning	A. Grayson S.A. Rana	U.S. AID ECI

SECTION III

MEETINGS, CONFERENCES AND MAJOR EVENTS

(Cont.)

<u>Date</u>	<u>Place</u>	<u>Event</u>	<u>Participation</u>	<u>Organization</u>
August 4, 1979	Jakarta	Discussion concerning relocation of railroads in Project Area	Mr. Maryono S.A. Rana Mochamad Qomar	Jratusseluna ECI Railroad Dept
August 14, 1979	Semarang	Interim Report on the Tuntang/Jragung Integrated Development Plan submitted		
August 14- 17, 1979	Semarang	Discussion on reservoir sedimentation	Dr. Stevens S.A. Rana	ECI
August 20- 28, 1979	Jakarta	Computer Work for Reservoir operation studies on DPU Computer at Jakarta	Mr. Radimin S.A. Rana	Chief DPU Computer ECI
August 21, 1979	Jakarta	Discussion Project Matters	Ir. Mardjono Notodihardjo S.A. Rana	DGWRD ECI
August 27, 1979	Jakarta	Discussion Project Matters	Ir. Mashudi S.A. Rana	DGWRD ECI
August 27, 1979	Jakarta	Discussion Project Matters	Mr. J. Lemaire S.A. Rana	U.S. AID ECI

SECTION IV

PREPARATION OF REPORTS

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

<u>Name of Report</u>	<u>Date Due</u>	<u>Status</u>	<u>Date Submitted</u>
1. Monthly Progress Reports	10th Day of the following month	Schedule being met	
2. Quarterly Progress Reports	20th Day of the following month	Schedule being met	
3. Development Plan Interim Report	August 15, 1979	Submitted	August 14, 1979
4. Development Plan Draft	October 31, 1979		
5. Development Plan Final	November 30, 1979		
6. Completion Report	November 30, 1979		

SECTION V
PROBLEM AREAS

None

BEST AVAILABLE DOCUMENT

SECTION VI

FINANCIAL

Dollar Accounts

Up to the end of July 1979, a total amount of \$ 85,305.44 was expended. This represents 28.5 percent of the total Dollar reimbursement costs provided in the Contract.

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

Rupiah Accounts

Up to the end of the month under report, a total amount of Rp. 10,439,925.- was expended. This represents 29.54 percent of the total Rupiah reimbursement costs provided in the Contract. The corresponding percentage of the contract period elapsed is 39.46.

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

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Quarterly Progress Report No. 1
 Period : Ending August 1979

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	May 16, 1979		6.5	3.5
2. Jeffery P. Frey	U.S.A.	Hydrologist	June 1, 1979	Aug. 18, 1979	2.5	2.5
3. Richard J. Bielefeld	U.S.A.	Geologist	June 12, 1979	Aug. 5, 1979	2.0	2.0
4. Robert L. Berger	U.S.A.	Economist	June 17, 1979	July 14, 1979	2.0	1.0
5. Rudolpho Clarke	U.S.A.	Flood/Drainage Engineer	June 20, 1979	Aug. 15, 1979	2.0	2.0
6. Andrew Tezap	U.S.A.	Dam/Hydropower	June 12, 1979 July 24, 1979	Aug. 15, 1979	3.0	1.12
7. Louis E. Haley	U.S.A.	Agricultural Specialist	June 27, 1979	July 29, 1979	1.0	1.0
8. Dr. M.A. Stevens	Canada	Sedimentologist	June 29, 1979 Aug. 14, 1979	July 1, 1979 Aug. 17, 1979	1.5	0.2
9. Dr. T. Patterson	U.S.A.	Planning Engineer	July 11, 1979	Aug. 7, 1979	2.0	1.0
10. J. Nemeč	U.S.A.	Irrigation Engineer	July 20, 1979	Aug. 8, 1979	2.0	0.7

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Quarterly Progress Report No. 1
Period: Ending August 1979

Assignment of Resident and TDY Staff

	<u>NAME</u>	<u>NATIONALITY</u>	<u>JOB TITLE</u>	<u>PROJECT ASSIGNMENT</u>		<u>MANMONTHS IN INDONESIA</u>	
				<u>ARRIVAL</u>	<u>DEPARTURE</u>	<u>SCHEDULED</u>	<u>ACTUAL</u>
	11. J. Diebel	U.S.A.	Water Supply Engineer	July 1, 1979	Aug. 23, 1979	2.0	2.0
	12. Howard Dennis	U.S.A.	Environmentalist	July 17, 1979	Aug. 13, 1979	1.0	1.0
	13. S.F. Hillis	U.S.A.	Dam Design Specialist	July 14, 1979	July 15, 1979	-	0.1
23	14. P.L. Strauss	U.S.A.	Chief Geologist	July 1, 1979 July 10 1979	July 7, 1979 July 12, 1979	0.25	0.30
	15. Max K. Kuehl	Canada	V.P. Engineering	July 1, 1979	July 6, 1979	0.25	0.25

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Quarterly Progress Report No. 1

Period: Ending August 1979

Assignment of Counterparts and Technical Personnel

<u>NAME</u>	<u>EXPERTISE (POSITION)</u>	<u>DATE OF ASSIGNMENT</u>	<u>PERIOD OF ASSIGNMENT</u>		<u>MAN MONTHS WORKED</u>
			<u>STARTING</u>	<u>ENDING</u>	
<u>Counterparts</u>					
1. Ir. Martopo	Project Manager/Chief of Counterpart	June 9, 1979	May 16, 1979		3.5
2. Ir. Bambang Soedjono	Deputy Project Manager / Deputy I Chief of Counterpart	June 9, 1979	May 16, 1979		3.5
3. Mr. Maryono Rony M.E.	Deputy II Chief of Counterpart Dam/Hydropower	June 9, 1979	May 16, 1979		3.5
4. Ir. Yusuf Gayo	Deputy II Chief of Counterpart/Project Planning Engineer/ Watershed Management	June 9, 1979	May 16, 1979		3.5
5. Drs. Redjiono	Hydrologist/Sedimentation	June 9, 1979	May 16, 1979		3.5
6. Ir. Sudaryanto	Engineering Geologist	June 9, 1979	May 16, 1979		3.5
7. Ir. Sudarmanto	Agricultural Scientist	June 9, 1979	June 27, 1979	July 29, 1979	1.0
8. Ir. Eman Reyman	Agro Economist/ Project Economist	June 9, 1979	June 17, 1979	July 15, 1979	1.0
9. Mr. Takrim	Environmentalist	June 9, 1979	May 16, 1979		3.5
10. Ir. Soedarsono	Irrigation Engineer	June 9, 1979	May 16, 1979		3.5
11. Ir. Wisnu Suharto	Flood Control & Drainage	June 9, 1979	May 16, 1979		3.5

TUNJANG RIVER BASIN DEVELOPMENT PLANQuarterly Progress Report No. 2
Period: Ending August 1979Assignment of Counterparts and Technical Personnel

<u>NAME</u>	<u>EXPERTISE (POSITION)</u>	<u>DATE OF ASSIGNMENT</u>	<u>PERIOD OF ASSIGNMENT</u>		<u>MAN MONTHS WORKED</u>
			<u>STARTING</u>	<u>ENDING</u>	
<u>Assistant Counterparts</u>					
1. Ir. Soedarno	Project Planning Engineer	June 9, 1979	May 16, 1979		3.5
2. Buang Sukardjono BE	Sedimentation/ Hydrologist	June 9, 1979	May 16, 1979		3.5
3. Susanto B.Sc.	Engineering Geologist	June 9, 1979	May 16, 1979		3.5
4. Sutardjo BE	Engineering Geologist	June 9, 1979	May 16, 1979		3.5
5. Trijono BE	Engineering Geologist	June 9, 1979	May 16, 1979		3.5
6. Ir. Tri Hardhono	Environmentalist	June 9, 1979	May 16, 1979		3.5
7. Ismail DA B.Sc.	Environmentalist	June 9, 1979	-		-
8. Ir. Mohammad Ali	Dam/Power Station	June 9, 1979	May 16, 1979		3.5
9. Sutrisno BE	Dam/Power Station	June 9, 1979	-		-
10. Djacriandah Ah.T.	Dam/Power Station	June 9, 1979	-		-
11. Ir. Rusliyanti	Irrigation	June 9, 1979	May 16, 1979		3.5
12. Edy Ariefin BE	Flood Control/ Drainage	June 9, 1979	May 16, 1979		3.5
13. Nursalim B.Sc.	Flood Control/ Drainage	June 9, 1979	May 16, 1979		3.5

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Quarterly Progress Report No. 1
Period: Ending August 1979

Assignment of Counterparts and Technical Personnel

<u>NAME</u>	<u>EXPERTISE (POSITION)</u>	<u>DATE OF ASSIGNMENT</u>	<u>PERIOD OF ASSIGNMENT</u>		<u>MAN MONTHS WORKED</u>
			<u>STARTING</u>	<u>ENDING</u>	
<u>Draftsmen</u>					
1. S.V. Barleyanto	Draftsman	June 9, 1979	May 16, 1979		3.5
2. Bambang Prayitno	Draftsman	June 9, 1979	May 16, 1979		3.5
3. Anis Mudjiyanto	Draftsman	June 9, 1979	May 16, 1979		3.5

Engineering Consultants, Inc.

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Quarterly Progress Report No. 1
 Period: Ending August 1979

Direct-hire Indonesian Personnel

	<u>NAME</u>	<u>POSTION</u>	<u>PERIOD OF SERVICE</u>		<u>MAN/WOMAN MONTHS</u>	
			<u>DATE STARTED</u>	<u>DATE ENDED</u>	<u>PROVIDED</u>	<u>SPENT</u>
	1. Mrs. Tan Ik Goen	Interpreter/Translator	June 11, 1979		6.5	2.67
	2. Miss Dra. L. Murtianingsih	Secretary	May 16, 1979		6.5	3.5
	3. Mrs. Sri Anon Bintarko	Clerk/Typist	June 29, 1979		6.5	2.07
33	4. Niss Lanny Kristanta Hardy	Clerk/Typist	July 23, 1979		3.0	1.25
	5. Mr. Suhandi	Messenger	May 16, 1979		6.5	3.5
	6. Mr. Warsito	Office Helper	May 16, 1979		6.5	3.5

PRC Engineering Consultants, Inc.

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Quarterly Progress Report No. 1.
 Period: May 15 - July 31, 1979
Summary of U.S. Dollar Expenditures

<u>COST ITEMS</u>	<u>AMOUNT AVAILABLE</u> US \$	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		<u>PRIOR</u>	<u>DURING PERIOD</u>	<u>UP TO DATE</u>	<u>EXPENDITURE</u>	<u>TIME ELAPSED</u>
1. Resident Staff Base Salaries	14,300.-	-	5,544.-	5,544.-	38.77	38.46
2. Overseas Differential	3,575.-	-	1,386.-	1,386.-	38.77	
3. Overhead Resident Staff (75% base salaries)	10,725.-	-	4,158.-	4,158.-	38.77	
4. TDY & Denver Staff Salaries	62,351.-	-	27,355.85	27,355.85	43.87	
5. Overhead TDY & Denver (95% base salaries)	56,116.-	-	24,620.27	24,620.27	43.87	
6. Fixed Fee Less 10% Retainage	26,825.- (2,682.50)	-	11,175.- (1,117.50)	11,175.- (1,117.50)	41.66	
7. Travel	45,600.-	-	5,470.-	5,470.-	12.00	
8. Per Diem	1,920.-	-	280.-	280.-	14.58	
9. Transportation (Relocation)	3,000.-	-	-	-	-	
10. Other Direct Costs & Miscellaneous Expenses	22,100.-	-	652.50	652.50	2.95	

PRC Engineering Consultants, Inc.

TUNTIANG RIVER BASIN DEVELOPMENT PLAN

Quarterly Progress Report No. 1.
Period: May 15 - July 31, 1979

Summary of U.S. Dollar Expenditures

<u>COST ITEMS</u>	<u>AMOUNT AVAILABLE</u> US \$	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		PRIOR	DURING PERIOD	UP TO DATE	EXPENDITURE	TIME ELAPSED
11. Overhead Contingency	15,330.-	-	-	-		38.46
12. Overseas Allowance TDY	12,747.-	-	5,781.21	5,781.21	37.71	
13. Contingencies	24,776.-	-	-	-	-	
Total Dollar Costs	299,365.- (2,682.50)	-	86,442.94 (1,117.50)	86,422.94 (1,117.50)	28.87	38.46
	296,682.50		85,305.44	85,305.44		

Engineering Consultants, Inc.

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Annexure V

Quarterly Progress Report No. 1
 Period: Ending August 1979

Summary of Rupiah Expenses

<u>COST ITEMS</u>	<u>BUDGET ALLOCATION</u> (Rp.)	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		PRIOR	PERIOD REPORTED	TO DATE	EXPENDITURE	TIME ELAPSED
<u>I. PER DIEM</u>						
Jakarta	3,750,000	375,000	350,000	725,000	19.33	38.46
Major Cities	1,500,000	-	45,000	45,000	3	-
Other	450,000	-	-	-	-	-
Sub Total	5,700,000	375,000	395,000	770,000	13.51	38.46
<u>II. OTHER DIRECT COSTS</u>						
Cable & Telephone	1,000,000	88,345	154,425	242,770	24.28	-
Postage	600,000	21,895	41,930	63,825	10.64	-
Reproduction & Printing	8,000,000	66,060	284,370	350,430	4.38	-
In Country Transportation	4,300,000	160,900	460,971	621,871	14.46	-
Supplies & Materials	500,000	23,550	61,690	85,240	17.05	-
Miscellaneous	5,000,000	68,325	259,885	328,210	6.56	-
Sub Total	19,400,000	429,075	1,263,271	1,692,346	8.72	38.46

Engineering Consultants, Inc.

TUNTANG RIVER BASIN DEVELOPMENT PLAN

Annexure V
(Continued)

Quarterly Progress Report No. 1
Period: Ending August 1979

Summary of Rupiah Expenses

<u>COST ITEMS</u>	<u>BUDGET ALLOCATION</u> (Rp.)	<u>EXPENDITURE</u>			<u>PERCENTAGE</u>	
		<u>PRIOR</u>	<u>PERIOD REPORTED</u>	<u>TO DATE</u>	<u>EXPENDITURE</u>	<u>TIME ELAPSED</u>
III. <u>HOUSING</u>	8,275,000	1,789,305	1,853,735	3,643,040	44.02	38.46
IV. <u>ADMINISTRATIVE PERSONNEL</u>						
Secretary	812,500	93,500	148,500	242,000	29.78	-
Interpreter	975,000	68,667	130,311	198,978	20.41	-
Clerks /typists	902,500	16,222	111,614	127,836	14.16	-
Office Helper	195,000	22,875	25,586	48,461	24.85	-
Messenger	195,000	14,300	29,151	43,451	22.28	-
Overtime	462,000	-	-	-	-	-
Severance Pay	238,750	-	-	-	-	-
Sub Total	3,780,750	215,564	445,162	660,726	17.40	38.46
Grand Total	37,155,750	2,808,944	3,957,168	6,766,112	18.21	38.46

SUMMARY OF REIMBURSEMENT

Rupiah Payments Received by Consultant from Ministry up to the end of Report Period	=	7,000,000.-
Rupiah Expenditure by Consultant Approved for Reimbursement	=	<u>6,766,112.-</u>
Balance	=	233,888.-

DATA / HYDROPOWER

- Review Existing and Proposed Dams
- Review Existing and Proposed Power Plants
- Study Transbasin Diversions
- Site Dams Diversions and Power Plants
- Study Rehabilitation and Relocation of Power Plants
- Prepare Preliminary Designs & Costs
- Interim Report
- Revise and Prepare Definitive Project Report (Final)

ECONOMIC ANALYSES

- Develop Project Benefits
- Develop Project Costs
- Prepare Economic and Financial Analyses
- Alternate Plans
- Final Plans
- Report
- Interim
- Final

PLANNING

- Study Existing Projects
- Develop Alternate Plans
- Setup Models
- Operation Study and Optimization
- Decide Final Tunlang River Basin Development Plan
- Report
- Interim
- Final

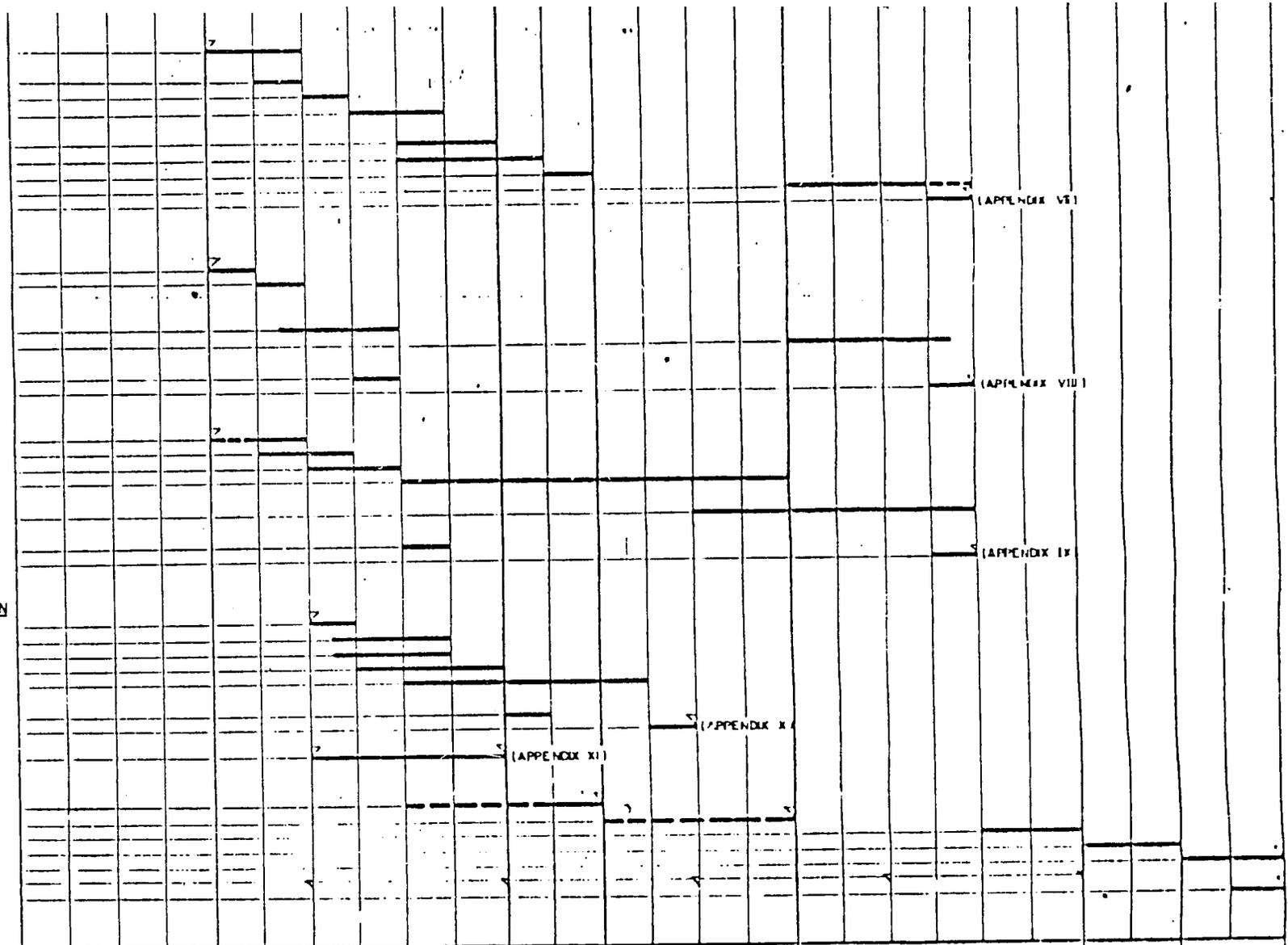
EROSION / SOIL CONSERVATION

- Collect Data
- Study Existing Practices
- Identify Problems
- Evaluate Needs
- Propose Remedial Measures
- Report
- Interim
- Final

ENVIRONMENTAL ASSESSMENT

REPORTS

- Submit Interim Report
- Discussion
- Submit Draft Report
- Review Draft Report
- Submit Final Report
- Submit Progress Reports
- Submit Completion Report



PHASE	DATA COLLECTION AND START REVIEW	ANALYZE AND PROPOSE ALTERNATE SCHEMES	PREP. INTERIM REPORT	DISCUSSIONS AND DECISIONS	FINALIZE TUNLANG PLAN AND PREPARE DRAFT REPORT	DISCUSS & REVIEW	PREP FINAL REPORT
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IMPORTANT DATES	MAY 16	JUNE 15	JULY 31	AUG 15	SEP 15	OCT 30	NOV 15	FEB 30
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