

JOINT EVALUATION REPORT
ON
THE TECHNICAL COOPERATION PROJECT
FOR
THE ELECTRIC POWER TRAINING CENTER

OCTOBER 1990

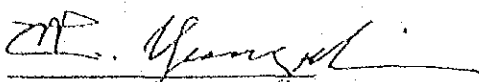
AMMAN JORDAN

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MUTUALLY ATTESTED AND SUBMITTED
TO ALL CONCERNED

Amman, Jordan
14, October, 1990



MUNESHIGE YAMAZAKI

Leader
Japanese Evaluation Team
Managing Director
M.I.D.C. Dept.
Japan International
Cooperation Agency
JAPAN



WALID JANNI

Leader
Ass. Director General
Jordan Electricity
Authority
JORDAN

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Date: 9-14, Oct. 1990

Place: JEA, AMMAN JORDAN

ATTENDANTS

JORDANIAN PANEL

- | | |
|---------------------|---|
| 1. MR. W. JAUNI | Ass. Director General, JEA |
| 2. MR. A. ISMAEL | Production Dept. Manager, JEA |
| 3. MR. M. QAWASMEH | Distribution Dept. Manager, JEA |
| 4. MR. G. ABDELHADI | Educ. & Training Sect. Head, JEA |
| 5. MR. I. EL-KHAIRY | E.T.C. Manager, JEA |
| 6. MR. H. SAFFARINI | Coordination & Marketing Branch
Head, ETC, JEA |

JAPANESE PANEL

- | | |
|--------------------------|---|
| 1. MR. MUNESIGE YAMAZAKI | Managing Director of Mining and
Industrial Development
cooperation Dept, JICA |
| 2. MR. KAZUSHI NISHIDA | Technical Cooperation Division,
Economic Cooperation Bureau,
Ministry of Foreign Affairs. |
| 3. MR. MIHARU YOSHII | Deputy Manager, Proj. Management
Office, Overseas Engineering Dept,
EPDC |
| 4. MR. YASUSHI YAMADA | Technical Cooperation Division
Mining and Industrial Development
Cooperation Dept, JICA |
| 5. MR. TADAO SATO | Chief Advisor, Expert Team |
| 6. MR. KAZUO KOIZUMI | Coordinator, Expert Team |
| 7. MR. TSUTOMU ABE | Expert, Expert Team |

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[1] INTRODUCTION

1. Objective

The Japanese Evaluation Team organized by Japan International Cooperation Agency (JICA), headed by Mr. YAMAZAKI visited Jordan from October 9, to 15, 1990 in order to evaluate jointly with Jordan Electricity Authority the Electric Power Training Center Project which has been carried out for five (5) years on the basis of the Record of Discussion signed on September 24, 1985 between Japanese Implementation Survey Team and Jordan Electricity Authority.

Both parties discussed and studied with the Jordanian counterpart personnel concerned and the Japanese experts on the aspects about the performance and achievement of the activities on the Electric Power Training Center Project.

Through careful studies and discussions, both parties summarized their findings and observations as described in the following chapters.

2. Brief Background of the Project

The Government of Jordan made a plan for setting up an Electric Power Training Center (hereinafter referred to as the ETC) to meet the increasing demand for skilled technicians in the field of the electric power industry, which was expected to grow according to the increasing demand for electricity.

In June 1982, the Hashemite Kingdom of Jordan requested the Government of Japan to provide assistance to establish such a center. This center aimed at providing practical and theoretical training to the Jordanian technicians to enable them to contribute in the socio economic development of Jordan.

Upon request, the Government of Japan, through JICA, despatched the preliminary survey team to Jordan in April 1984. The preliminary survey team conducted surveys, studies and discussions on the background and validity of the project with the authorities concerned of the Government of Jordan.

On the basis of the report of the preliminary survey team, the Japanese authorities concerned decided to cope with further work toward carrying out the collaboration. So two surveyers' team were despatched to Jordan in February and August 1985 to make further survey and discussion on the major items of the project.

In September 1985, the implementation survey team,

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organized by JICA, was despatched to Jordan for working out the details of the technical cooperation program for the project and the Record of Discussions(R/D) was concluded between the team and JEA on September 24,1985. Then the five-year project started.

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[2] METHOD OF EVALUATION

1. In order to evaluate the past performance and achievement both quantitatively and qualitatively, the following items are adopted as reference.

(1) The Record of Discussions

(2) The official request made by the Government of Jordan with respect to expert services, training of counterpart personnel in Japan and provision of equipment by means of A-1, A-2, A-3, and A-4 Forms respectively.

(3) Minutes of Meetings and the Annual Work Plans agreed or accepted in the course of implementation of the project.

2. For the purpose of evaluation, both parties discussed various aspects of the project and observed the buildings, machinery, equipment, facilities and utilities made available for the project.

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[3] RESULT OF EVALUATION

1. Buildings and Facilities

After signing the Record of Discussion on September 24, 1985, the basic design for the Electric Power Training Center was prepared by the Japanese side. The design was discussed by both sides. In February 1986, JEA started to construct the center consisting of one administration building, two training and laboratory buildings and two work-shops. By the end of October 1987, all the buildings and facilities including the access road were completed by JEA in time and the center started operation in October 1987.

In addition, some facilities were added to the center by JEA that is, outdoor substation and overhead lines training yard for both transmission and distribution, and two dormitories which are almost completed, and a diesel power plant and its house.

As of September 1990, the whole scheme of buildings and facilities have been fulfilled.

2. Staffing

At the beginning of the project in March 1986, JEA allocated 9 engineers and technicians to the project to make preparations and arrangements for establishing the center. As of the starting of the center in October 1987, 18 engineers and technicians including a center manager belonged to the center.

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During the operation period there has been constantly 20 - 24 staff, excluding service staff, in the center so that the center has been operating smoothly.

Since the early beginning, JEA has made its best efforts to allocate staff to the center and training them to improve their teaching ability. Such is thought to reflect JEAs keenness for this project.

The list of counterpart personnel as of September 1990 is stated in Annex 6,7.

3. Equipment

Machinery and equipment are worth about CIF ¥ 579 million, listed in Annex 8,9 and 10, have been donated by the Japanese Government.

For selecting machinery and equipment to be provided to the center, lists of those used in electrical engineering departments of technical colleges in Japan and some more equipments necessary for the training were added to the list for adjusting it to the curriculum of the center.

The equipments have been shipped from Japan divisionally according to the schedule of the center.

The equipments included items related to electrical experiments, machine practice, chemical experiments, cable jointing, outdoor substations, simulation of thermal power plant operation etc. In the course of the project, some additional equipment were also provided.

The equipment and machinery so far provided have been put into practical use in each curriculum and well maintained

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by JEA, especially the simulator which has been utilized so effectively for up-grading courses for JEA staff.

This center is best equipped in electric power field in the country so that the center has got the result of encouraging Yarmouk university and Amman polytechnic to utilize the center.

Furthermore, JEA is planning to expand facilities as the center is expected to become a regional center in the Arab world.

4. Materials

Text books in English had been prepared and provided by Japanese side before the inauguration. JEA has utilized them in teaching students and some have been translated into Arabic as occasion demanded

Besides that the instructors of the center have made their original material including OHP material and textbooks.

The list of textbooks provided by JICA is as shown in Annex 11.

5. JICA Experts

A total of 10 long term experts and 12 short term experts have been despatched by JICA for the project. The list of the experts is as shown in Annex 3.

As the instructors of the center have been highly motivated, the originally planned technical transfer has been achieved smoothly.

6. Training of counterpart personnel in Japan.

In each year of the project period, 3 counterpart personnel have been despatched to Japan and in consequence a total of 15 persons have taken part in training in Japan. The list of the counterpart personnel despatched to Japan and their training fields is as in Annex 12.

In addition, training division manager of the head office was despatched to Japan in order to study the actual training circumstances of Japanese electric power companies, and acquire knowledge.

7. Budget

In spite of the aggravation of the economic situation in the country, the annual budgets required for operating the center have been obtained.

It deserves special mention that JEA constructed dormitories and installed a diesel power plant for foreign trainees, investing the center to be substantial.

The budgets of the center during the project period is as shown in Annex 15.

8. Management and Administration

(1) Having been very positive to this project since the beginning, JEA is making efforts in developing the center as a

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regional center in the Arab world in the field of electric power training. Consequently the center got a result of accepting foreign trainees from Mauritania and Syria in 1990 and some other countries are under negotiations.

(2) As of September 1990, the center has 26 full-time instructors, 15 service staff including drivers, cleaning staff, guards, etc, and a center manager, in addition to part time instructors. The organization chart of the center is in Annex 5.

As a whole, it is deemed that the center has been operating properly.

(3) Concerned bodies of Japanese side for the project are Ministry of Foreign Affairs, Japan International Cooperation Agency (JICA), Ministry of International Trade and Industry (MITI), Agency of Natural Resources and Energy, Japan Electric Power Information Center (JEPIC), Electric Power Development Co (EPDC) and Tokyo Electric Power Co (TEPCO). All of these are cooperating and assisting the project in various aspects through JICA.

During the cooperation period, technical information needed for the project were mainly given by EPDC and TEPCO from which all long term experts were despatched to JEA.

9. Project accomplishment

(1) Regular Program (2-year-course)

In October 1987, the center started operation and a hundred students were admitted to the center.

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In the first year of the course, students learn fundamental subjects such as mathematics, dynamics, electrical engineering, mechanical engineering etc.

In the second year, they are classified into four groups of respective fields, namely power generation group, transmission group, substation group and distribution group.

In November 1988, the second year, 50 new students were accepted by the center as a second group of trainees and next November 1989, 69 students of the first group of trainees were graduated, of whom 56 graduates were employed by JEA and the rest are in other local and Arab companies. The list of the graduates and their current jobs is as shown in Annex 20.

In January 1990, 50 fresh students of the third group were admitted to the center while there were more than 170 applicants.

At present, Technician Training Course is managed by the Jordanian counterparts themselves in condition.

(2) Up-grading Courses

In December 1988, the center started up-grading courses for JEA employees.

There are seven types of Up-grading Courses.

They are:

- 1) Thermal power plant operation (Simulator) courses.
- 2) Thermal power plant maintenance courses.
- 3) Instrumentation maintenance courses.
- 4) Distribution courses.

- 5) Surveying courses.
- 6) Wiring courses.
- 7) Substation courses.

Among those up-grading courses, the center lays great emphasis on the power station operation course using the sophisticated training simulator provided by JICA and satisfactory results have been obtained. The results of the courses so far achieved are as shown in Annex 16.

In the year 1989, 324 JEA employees were trained in the up-grading courses in total.

(3) Third country training

In 1990, the center received 13 foreign trainees from Mauritania according to the agreement made between the both countries. Their training program will last for one year during which they stay at the dormitory of the Center.

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[4] Conclusions and Recommendations

1. Conclusions

(1) The ETC is designed a maximum capacity of 200 students. The actual numbers of accepted students were 100 as the first-term students and 50 each as the following second and third-term students. This must be considered as an inevitable consequence of unforeseen changes of socioeconomic circumstances in Jordan. In spite of hard business situation, JEA highly estimates the importance of ETC and is planning for the admission of 75 for the fourth-term (1991) students.

(2) At this last year of cooperation term, 69 trainees were graduated in October 1989, among the first 100 enrolled trainees, of whom 56 graduates were employed at JEAs' job sites. For the second and following graduates, full employment of them in JEA and the two private power companies is anticipated.

(3) In order to make good use of existing training facilities, JEA is promoting acceptance of trainees from other Arab countries. To begin with, JEA has admitted Mauritanian trainees through the Arab Fund.

(4) JEA is also encouraging the utilization of the ETC facilities by making them open to domestic universities, polytechnics and vocational schools etc.

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(5) It is now five(5) months to go till the cooperation agreement completion, and the Project has progressed in good order. Thanks to the earnest efforts and cooperation of both countries involved. The technical cooperation, as stipulated in the Record of Discussion (R/D), i.e. sending of long and short term experts, supply of training equipment and materials and acceptance of Jordanian counterparts in Japan, has been mostly completed.

(6) The project is in its third year since ETC was inaugurated. Now the curriculum of each course has been much improved, and also the instructors have acquired proficiency in teaching. All lessons are given by ETC staff themselves effectively.

(7) JEA has built two buildings for dormitory accomodating 35 persons. JEA also has installed 2 units of diesel generators for the new course of "Diesel Power Generation Course", O.H.T.L., distribution networks, indoor and outdoor substations training facilities which JEA voluntarily prepared. In such way, JEA is disbursing its own budget to raise the status of ETC without stint.

(8) JEA, who realizes the importance of depending on technical training as a basis for proper qualification, relies greatly upon this Project. In addition to domestic training, JEA makes the third country training a main goal of business activity. JEA is expecting itself to be a service center on power engineering in the Arab countries, and has been preparing itself for this target steadily, and established JEA International and has already requested JICA through proper

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channels for this purpose. In this concern, JEA has stepped out and started its way for self reliance. JEA plans for replenishment of ETC courses and grade-up of HTPS workshops, located close to ETC, for the next step.

(9) Considering all the aspects, the Project is implemented on schedule in good order, fulfilling all requirements described in the R/D. As far as JEA carries on its present policy, no problem will be anticipated in running ETC by JEA itself, after the cooperation term is over, both parties are convinced that the objectives of this Project have been successfully achieved, and agreed to terminate the Project on 28 February 1991, in accordance with the Record of Discussion.

2. Recommendations

In order to maintain and run the ETC with the best circumstances and make the ETC more beneficial after the cooperation term is completed, JEA should take the following matters into consideration.

(1) To secure and raise good teachers

One of the most important factors of such center is the ability of teachers. Therefore, JEA should continue arranging attractive conditions to the existing teachers and newly recruited ones. To have them motivated, it is required to give them suitable power and responsibility irrespective of being engineers or technicians. To let them have an interest on their job, it is also important to let them study new fields of

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engineering, continuously. Mitigating the effect of monotonous nature of job, JEAs'special endeavor, for instance ... multi disciplinary training and rotation of one's duty etc., is strongly recommended.

(2) To secure good trainees

Admission of good trainees is also an important factor for giving the ETC a good reputation which is the policy followed by ETC. Only the time will give us fair result, that is when ETC raises good graduates, good applicants will naturally gather to.

(3) Number of trainees

The number of first year class is only 50 students at present. This was caused by various factors in socioeconomical situation of this country. However, it is important that JEA shall continue admission and training of new trainees of not less than 50.

(4) Third country training

In view of utilization of the center as well as maintaining the engineering level, the third country training is very much useful. With Mauritanian trainees as the beginning, JEA has been pushing forward acceptance of other Arab country trainees. In order to make JEA as a center of power engineering services in the Arab countries, JEA should promote the third country training positively from now on.

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(5) Training curriculum

As engineering of electric power has been progressing day by day, adoption of new engineering field to the center should be required in order to grade up the engineering level of ETC. For instance, environmental preservation, plant automatic control and preventive maintenance of machinery and tools etc. will be counted, and related equipment should be made available.

(6) Maintenance of training equipment and tools

Training equipment and tools of ETC are of the most advanced ones in Kingdom. Continuation of thorough maintenance of these equipment and tools is a matter of great interest for JEA.

(7) Local cost

Concerning supplement of the expendables such as conductor joints and cutters for cutting machines, those arises due to training. JEA should take the necessary financial measures for procurement of those expendables in addition to personal expenses.

(8) Utilization of equipment and tools

Regarding taking in and out of training equipment and tools JEA already has been managing it by lodgering method. It

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is recommended, for the future, that JEA apply the computer assisted system to manage the above job, including maintenance record on the said equipment and materials.

(9) To open the ETC facilities for the outside sectors

JEA has been pushing forward accommodating ETC facility for the domestic institutions such as universities, polytechnics, vocational schools, and local industries etc. This is considered to be an effective and useful policy to utilize existing ETC facilities and to publicize ETC for recruiting good trainees. JEA's further endeavor to promote such policy is much preferable.

(10) Qualification

Although JEA gives the certificates for the ETC graduates, it is preferable for the future, that the more authoritative qualification be issued for the graduates by the government say the Ministry of Education etc.

Since this matter is very important for future development of this center, it is requested that JEA should strongly work upon the government on this matter.

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ELECTRIC POWER TRAINING CENTER

TECHNICAL COOPERATION PROGRAM

Revisions

Rev. 1	
Rev. 2	
Rev. 3	

	1986												1987												1988												1989												1990												1991																																			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12																								
1. Terms of Cooperation	1/4												ETC. 10/1																																																2/3																																			
2. Training Schedule																																																																																																
(1) 1st Group													10/1																																																11/30																																			
(2) 2nd Group																																					1/1																								11/30																																			
(3) 3rd Group																																																	1/1																																															
(4) Grade Up Course																																					1/5																																																											
3. Construction of Building													10/1																																																																																			
4. Dispatch of Survey Team																																																																																																
(1) Preliminary Survey Team	Apr. 84																																																																																															
(2) Long Term Survey Team	Feb. 85																																																																																															
(3) Implementation Survey Team	Sep. 85																																																																																															
(4) Technical Consultation Team	1/4 - 3/30																																																																																															
(5) Guidance Team													1/4 - 1/3												1/3 - 1/4												1/4 - 1/11																																																											
(6) Evaluation Team																																																																																																
5. Dispatch of Expert																																																																																																
(1) Long Term Expert																																																																																																
a) Chief Advisor													1/4																																																1/28																																			
b) Coordinator													1/9																																																1/18																																			
c) Electrical Engineer (Electrical Machines)													1/9																																																1/21																																			
d) Electrical Engineer (Electrical Fundamentals)													1/9																																																1/8																																			
e) Electrical Engineer (Distribution)																									1/8																																				1/2																																			
f) Electrical Engineer (Transmission)																																					1/1																								1/8																																			
g) Mechanical Engineer (Mechanical Fundamentals)																									1/1																																				1/1																																			
h) Mechanical Engineer (Thermal Power Generation)																																					1/1																								1/28																																			
(2) Short Term Expert													1/4 - 3/30, 1/10/15												1/3 - 1/5, 1/11/12, 1/17/18, 1/24/25												1/1 - 1/3, 1/10/11, 1/17/18, 1/24/25												1/1 - 1/2, 1/10/11, 1/17/18, 1/24/25																																															
6. Training Jordanians in Japan	1/2 - 1/7																								1/8 - 1/2																								1/1 - 1/3																								1/4 - 1/11												1/9 - 1/11											
7. Provision of Equipment																																																																																																

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[EVALUATION SHEET OF TECHNOLOGY TRANSFER]

The rule of evaluation

A : The purpose of the R/D is satisfactorily achieved and there is no problem in operating the ETC.

B : The purpose of the R/D is well achieved up to a point, while further effort for advancement is required.

C : The purpose of the R/D is not completed yet.

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[EVALUATION SHEET OF TECHNOLOGY TRANSFER 1/3]

Evaluation Items	Evaluation			Remarks
	A	B	C	
1. BUILDINGS and FACILITIES	<input type="radio"/>			All planned buildings and facilities including classroom buildings, workshops and dormitories are completed.
2. STAFFING	<input type="radio"/>			Sufficient number of staff are allocated to the center for the number of students.
3. EQUIPMENT				
① Mechanical	<input type="radio"/>			Both quantitatively and qualitatively equipment of the center is substantial.
② Electrical	<input type="radio"/>			Ditto
③ Transmission	<input type="radio"/>			Ditto
④ Distribution	<input type="radio"/>			Ditto
⑤ Substation	<input type="radio"/>			Ditto
⑥ Up Grading		<input type="radio"/>		Along the expansion of training items, it is necessary to continue supplying equipment.
4. MATERIALS				
① Mechanical	<input type="radio"/>			Appropriate materials have been prepared for each class.
② Electrical	<input type="radio"/>			Ditto
③ Transmission	<input type="radio"/>			Ditto
④ Distribution	<input type="radio"/>			Ditto
⑤ Substation	<input type="radio"/>			Ditto
⑥ Up Grading		<input type="radio"/>		Along the expansion of training items, it is necessary to continue making pertinent materials.
5. TECHNICAL TRANSFER				
① Mechanical	<input type="radio"/>			Technical transfer of the current training items having been completed, counterpart personnel themselves operate class appropriately.

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[EVALUATION SHEET OF TECHNOLOGY TRANSFER 2/3]

Evaluation Items	Evaluation			Remarks
	A	B	C	
② Electrical	<input type="radio"/>			Technical transfer of the current training items having been completed, counterpart personnel themselves are operating class appropriately.
③ Transmission	<input type="radio"/>			Ditto
④ Distribution	<input type="radio"/>			Ditto
⑤ Substation	<input type="radio"/>			Ditto
⑥ Up Grading	<input type="radio"/>			Ditto
6. EXPANSION OF UPGRADE COURSE		<input type="radio"/>		It is considered beneficial to the ETC in terms of improving the technical level that ETC develops training items in new training fields and this needs proper equipment.
7. CURRICULUM	<input type="radio"/>			At present curriculums are prepared by ETC staff and its contents are proper.
8. TRAINING IN JAPAN	<input type="radio"/>			By the end of the cooperation period, the planned number of ETC staff will have been trained in Japan.
9. NUMBER OF STUDENTS		<input type="radio"/>		To get more excellent students, JEA should make further effort in spite of socioeconomic situation.
10. GRADUATES' PLACE of EMPLOYMENT	<input type="radio"/>			All those who wanted to enter JEA were employed by JEA and others got job in local or Arab companies.
11. BUDGET of THE ETC	<input type="radio"/>			Necessary budget for the operation of the ETC has been allocated by the JEA.
12. MANAGEMENT of ETC	<input type="radio"/>			ETC is being managed and operated properly by Jordanian side.
13. ATTITUDE TOWARD THE FUTURE	<input type="radio"/>			Continuing efforts are made to improve and develop ETC, such as enrichment of UG course, execution of third country training.

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[EVALUATION SHEET OF TECHNOLOGY TRANSFER 3/3]

Evaluation Items	Evaluation			Remarks
	A	B	C	
14. TOTAL	○			<p>ETC is being operated properly by Jordanian side. Its facilities and equipment are excellent and well maintained. Further ETC endeavours to become a regional centre of the Middle East in the field of electric power training, which deserves of admiration.</p> <p>In consequence, it is deemed that ETC has enough ability in executing and fulfilling the project itself in terms of its technical level, management and positive attitude toward the future.</p>

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[LIST OF JICA EXPERTS AND TEAM WHO HAD BEEN DISPATCHED TO THIS PROJECT]

1. Long Term Experts

(1)	K.YANASHITA	Chief advisor	Mar.12,1987	May 9,1988
(2)	K.KOBAYASHI	Chief advisor Electrical Engineering	Feb.19,1987	Feb.18,1990
(3)	T.SATO	Chief advisor Transmission line Engineering	Mar. 1,1989	Feb.28,1991
(4)	T.KAWASHIMA	Coodinator	Feb.19,1987	Feb.18,1989
(5)	K.KOIZUMI	Coodinator	Mar. 1,1989	Feb.28,1991
(6)	T.OGUSHI	Electrical Fundamentals	Feb.19,1987	Feb.18,1989
(7)	M.TSUKUDA	Mechanical Fundamentals	Jan.12,1988	Jan.11,1990
(8)	Y.TAKAHASHI	Distribution Engineering	Mar. 8,1988	Mar. 7,1990
(9)	T.KUSUDA	Electrical Engineering	May 22,1988	May 21,1990
(10)	T.ABE	Thermal Power Plant Engineering	Mar. 1,1989	Feb.28,1991

2. Short Term Experts

(1)	F.SAKAMOTO	Arrengement of Simulator Installation	Aug.14,1987	Aug.20,1987
		Training Guidance of Simulator	Nov.17,1988	Jan.15,1989
(2)	T.MAEHARA	Installation of Over-head crane	Oct. 2,1987	Oct.15,1987
(3)	S.OONUMA	Installation and Adjustment of Chemical labolatory Equipment	May 23,1988	Jun. 5,1988
(4)	E.KIMURA	Ditto	May 23,1988	Jun. 5,1988
(5)	A.YAMAGUCHI	Operation Training of Automatic Control Equipment	Aug.26,1988	Sep.11,1988
(6)	S.ISHIMOTO	Installation of Simulator	Sep.30,1988	Oct. 7,1988
(7)	T.NAKAMURA	Ditto	Oct. 3,1988	Oct.12,1988
(8)	M.MANZAWA	Training Guidance of Simulator	Jan. 9,1989	May 15,1989

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(9) Y. HARA	Installation of Outdoor Sub Station Model	Jan. 13, 1989 ~ Jan. 23, 1989
	Remodeling of Outdoor Sub Station Model	Dec. 1, 1989 ~ Dec. 14, 1989
(10) J. OGAWA	Installation of Outdoor Sub Station Model	Jan. 13, 1989 ~ Jan. 23, 1989
(11) K. KANITANI	Remodeling of Outdoor Sub Station Model	Dec. 1, 1989 ~ Dec. 14, 1989
(12) H. SATOU	Training Guidance of Cable Jointing	Jul. 12, 1990 ~ Aug. 12, 1990

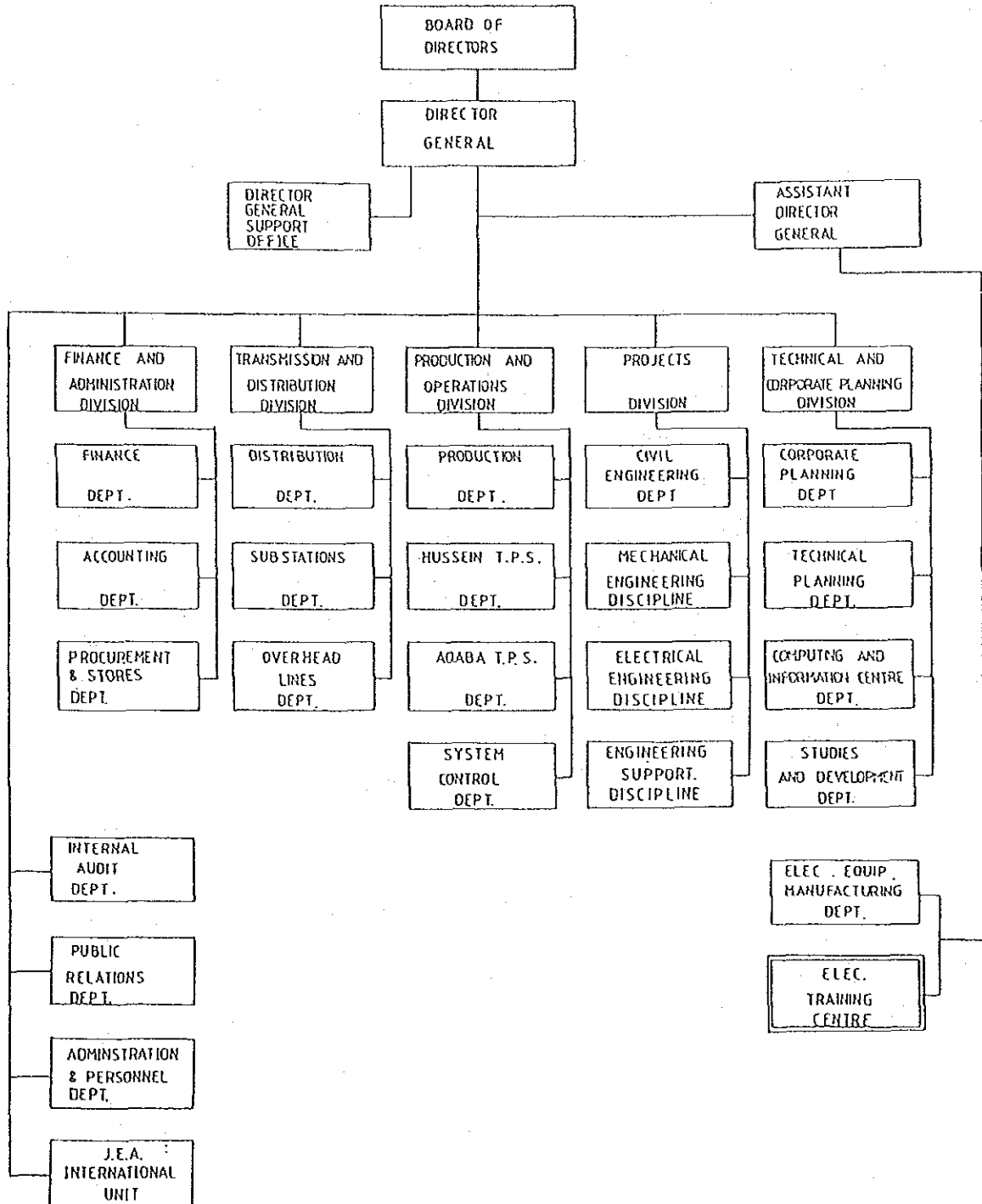
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JORDAN ELECTRICITY AUTHORITY
ORGANISATION STRUCTURE

ANNEX-4

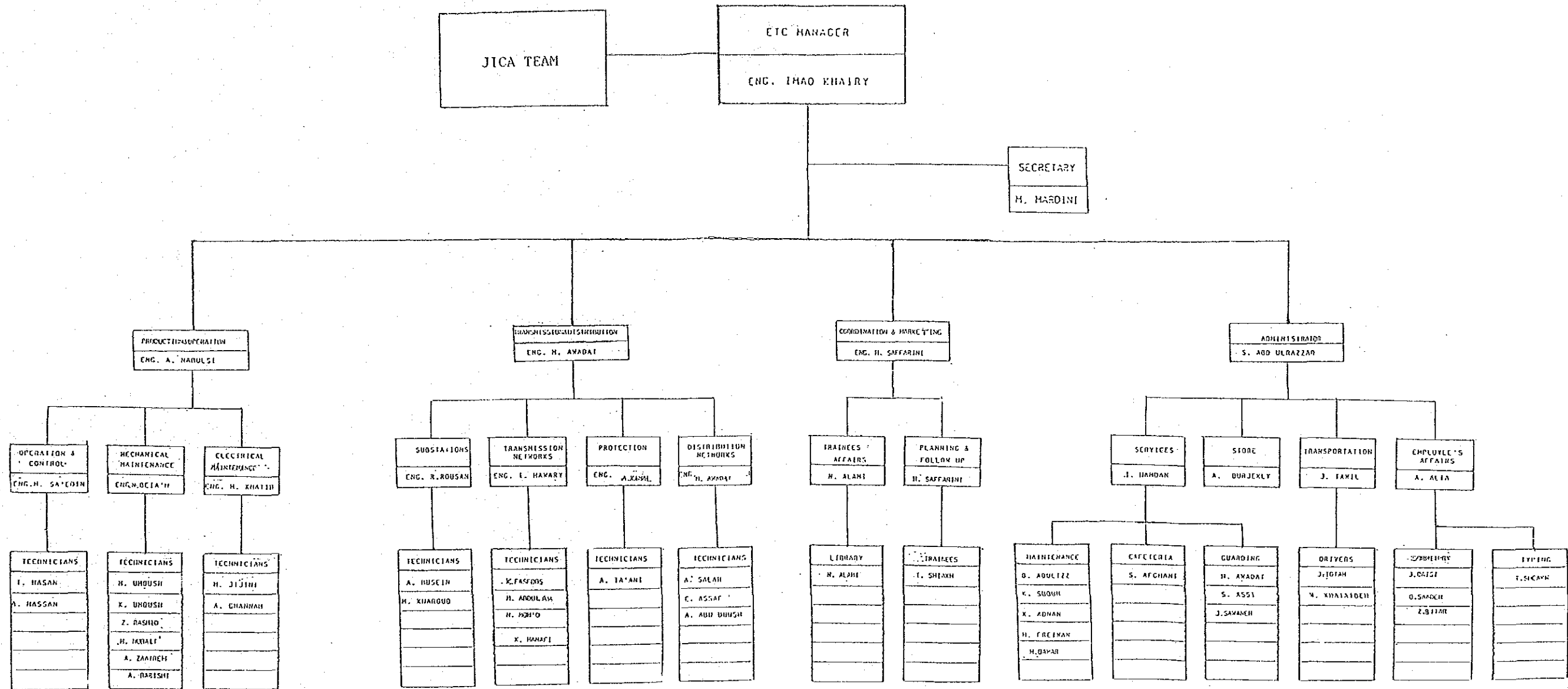
(1990)



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[ORGANIZATION CHART OF THE CENTER]



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[LIST OF COUNTERPART PERSONNEL]

	N A M E	P O S I T I O N	S P E C I A L I T Y	D A T E O F S E R V I C E
1	IMAD EL KHAIRY	Manager	MANAGER OF ETC	Mar. 1986 ~ Present
2	AMER NABULSI	Mec. Eng.	PRODUCTION and OPERATION	Mar. 1986 ~ Present
3	MOHAMAD AWADAT	Ele. Eng.	TRANSMISSION and DISTRI- BUTION	Mar. 1986 ~ Present
4	HASSAN SAFFARINI	Ele. Eng.	COORDINATION and MARKETING	Jul. 1987 ~ Present
5	RIYAD ROUSAN	Ele. Eng.	SUBSTATION	Mar. 1986 ~ Present
6	AKHAR KAMAL	Ele. Eng.	ELECTRICAL MACHINE ELECTRICAL WIRING	Mar. 1986 ~ Sep. 1989 Jun. 1990 ~ Present
7	MOHAMAD SAIDIN	Mec. Eng.	OPERATION and CONTROL (SIMULATOR)	Jun. 1988 ~ Sep. 1989
8	NAEEM BAIJAH	Mec. Eng.	MECHANICAL MAINTENANCE	Sep. 1987 ~ Present
9	MUSTAFA KHATIB	Ele. Eng.	ELECTRICAL MAINTENANCE	Sep. 1989 ~ Present
10	IBRAHIM HAWARY	Ele. Eng.	TRANSMISSION	Sep. 1987 ~ Present
11	FALAH ABABNEH	Ele. Eng.	DISTRIBUTION	Sep. 1987 ~ May 1990
12	MOHAMAD DHEEB	Ele. Eng.	PROTECTION & SWITCHGEAR	Oct. 1987 ~ Feb. 1990
13	RIYAD ATTAR	Ele. Eng.	DISTRIBUTION	Feb. 1989 ~ May. 1990
14	TANA HASSAN	Ele. Tec.	OPERATION AND CONTROL (SIMULATOR)	Mar. 1986 ~ Present
15	MUNAF JIJINI	Ele. Tec.	ELECTRICAL MAINTENANCE	Mar. 1986 ~ Present
16	ABDULA HUSSEIN	Ele. Tec.	TRANSFORMATION	Mar. 1986 ~ Present
17	MOHAMAD KHAROUB	Ele. Tec.	TRANSFORMATION	Mar. 1986 ~ Feb. 1990
18	ADEL SALAH	Ele. Tec.	DISTRIBUTION	Mar. 1986 ~ Present
19	ADNAN ABU DOUSH	Ele. Tec.	DISTRIBUTION	Mar. 1987 ~ Present
20	EID ASSAF	Ele. Tec.	DISTRIBUTION	Mar. 1987 ~ Present
21	AMHAD TAANI	Ele. Tec.	TRANSMISSION	Mar. 1987 ~ Present
22	OSMAN TAWALBEH	Ele. Tec.	TRANSMISSION	Mar. 1987 ~ Feb. 1990
23	KAMIL AL FASFOS	Ele. Tec.	TRANSMISSION	Nov. 1988 ~ Present

	N A M E	P O S I T I O N	S P E C I A L I T Y	D A T E O F S E R V I C E
24	MARZOUG UHOUSH	Nec. Tec.	MECHANICAL MAINTENANCE	Jan. 1988 ~ Present
25	KHALAF UHOUSH	Nec. Tec.	MECHANICAL MAINTENANCE	Nov. 1988 ~ Present
26	AHMAD HASSAN	Ele. Tec.	INSTRUMENTATION	Jul. 1989 ~ Present
27	AKEL GHANNAH	Ele. Tec.	ELECTRICAL MAINTENANCE	Jul. 1989 ~ Present
28	MOHAMAD ABUDULAH	Ele. Tec.	TRANSMISSION	Nov. 1988 ~ Present

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[1] Electrical field

1. Electric Machine Practice Training Equipment

DC power source, DC motors, Three-phase induction motors, High-tension transformers, Low-tension transformers, Eddycurrent dynamometer, Condensers, Silicone rectifier, Induction regulators, Variable resistors, Electric furnace, Ward Leonard control device, Coil winding machines, Arc-welder, Cut models (motor, circuit breaker, transformer), Circuit breakers, Contactors, etc.

2. Basic Electric Experiment Apparatuses

Regulated DC power supplies, Ammeters, GS alkali storage batteries, Gaussmeters, Pen recorder, Photocoder, Wattmeters, Q-meters, Standard resistors, Slide resistors, Condensers, DC-potentiometers, etc.

3. Measuring Experiment Apparatuses

Standard resistances, Standard condensers, Standard inductances, Variable resistances, Double bridge, Kohlraush bridge, Wheatstone bridges, Variable condensers, Variable inductances, DC-potentiometers, DC-standard generators, Fluxmeter, Election magnetic oscillograph, Photometer, Pen recording oscillograph, Optical pyrometer, Resistance thermometer, Low frequency oscillator, etc.

4. Electric Experiment Instruments

AC ammeters, DC voltmeters, AC voltmeters, Wattmeters, Frequency meters, Insulation resistance testers, Ohmmeter, AVO meters, Earthing resistance testers, etc.

5. High Tension Testing Devices

Testing transformer, Impulse machine, Sphere gap device, High-speed Braun tube oscillograph, Electrostatic voltmeter, Oil testing device, Oil purifier, etc.

6. Basic Electronics Experiment Apparatuses

DC power supplies, AC power supplies, Electronic Avo meter, Frequency meters, Pulse generators, Thermistors, Transistors, Diodes, Resistors,

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Capacitor, IC, Deformation ratio meters, High frequency oscillators, Lux meters, etc.

[2] Mechanical field

1. Machines and Tools for Mechanical Practice Training

Lathe machines, Drilling machines, Bench grinders, Arc welders, Argon arc welders, Milling machines, Measuring tools (dial gauge, thickness gauge, vernier caliper, micrometer) Pipe cutters, Hydraulic pipe bender, Cast iron surface plate, Tube expander, Furnaces, Drill chucks, Drills, Cutting torches, Welding torches, Disk grinders, Vertical type milling machine, Universal tool grinding machine, etc.

2. Material Testing Laboratory Devices

Amsler's universal testing machines, Hardness testing machine, Impact testing machine, Photo elasticity viewer, Metallurgical microscopes, etc.

3. Machines Dismantling Devices

Over head travelling crane, Chain blocks, Gear pullers, Hand trucks, Torque wrenches, Hammers, etc.

[3] Power Generation field

1. Operator Training Simulator System

Simulator, software, Spair parts for maintenance, etc.

2. Experiment Devices for Power Generation

Sequence control devices, Experiment devices of relay, Relay tester, Power factor meter, etc.

3. Automatic Control Experimental Equipment

Flow rate control experimental unit, Pressure control experimental unit, Temperature control experimental unit, Level control experimental unit, Air compressor, Air drier, etc.

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4. Power Receiving Equipment
Transformers, Power capacitors, Liquid control training bord, High tension switch bord, Distribution arrester, etc.
5. Instrument's Characterization testing equipment
Fan testing equipment, Pump testing equipment, Air compressor testing equipment, etc.
6. Machines for Mechanical Maintenance
Volute pump, Valves, Lapping tools for valves, Turbo fan, etc.

[4] Transmission and Distribution field

1. Outdoor sub-station Model
Disconnecting switch, Current transformers, MOF type transformer, Circuit breaker, Arrester, Control panel, etc.
2. Transmission Line Simulator Equipment
Transmission line simulator equipment.
3. Transmission Line Maintenance Devices
Theodlites, Dumpy-levels, Hydraolic compressure, Hydrauric cutter, Insulator checker, Winches, Insulator exchangers, etc.

[5] Distribution field

1. Underground Line Practice Devices
Compression tools, Terminals for cable, Electric soldering irons, Cable cutters, Murry loop testers, etc.
2. Power Cable Jointing Materials and Tools
Cable, Straight through joints, Termination kits, Jointing tools, Insulating resistance measures, etc.

3. 650V live-line operation tools

Insulated screw drivers, Insulated rubber gloves, Shroud set, Voltage detector, etc.

4. Indoor Wiring Tools and Materials

Wire cable, No fuse breakers, Distribution board models, Conduit pipe, Pliers, Nippers, Screw drivers, Soldering irons, Gasoline torches, Hydraulic punchers, Insulation resistance testers, Wattmeters, Frequency meters, Power factor meters, Electric wiring training boards, etc.

[6] Chemical Experiment field

1. Experiment Devices for Chemical Laboratory

P.H.meters, Electro conductivity meters, Spectrophotometers, Drying ovens, Calorie meters, Electronic reading balances, Electronic analytical balances, Muffle furnaces, Crucible furnaces, Fume hoods, Water bathes, Electro tube furnace, Electronic moisture balance, Hydrometer, Demineralizer, Utensils (beakers, flasks, pipets, etc.) Chemical for test (hydrochloric acid, sulfuric acid, nitric acid, etc.) etc.

[7] Others

1. Personal computer

Personal computers, Software, Operators console, etc.

2. Visual and Auditory Instruments

VTR, TV, VTR-Camera, Video training cassetts, etc.

3. Drafting Boards

Drafting boards.

4. Vehicle

Nissan patrol.

[1] Electrical field

1. Electric Machine Practice Training Equipment	38,601,800 Yen
2. Basic Electric Experiment Apparatuses	15,984,150 Yen
3. Measuring Experiment Apparatuses	10,142,950 Yen
4. Electric Experiment Instruments	3,775,400 Yen
5. High Tension Testing Devices	5,747,050 Yen
6. Basic Electronics Experiment Apparatuses	<u>3,126,150 Yen</u>
sub total	77,377,500 Yen

[2] Mechanical field

1. Machines and Tools for Mechanical Practice	36,954,400 Yen
2. Material Testing Laboratory Devices	18,989,200 Yen
3. Machines Dismantling Devices	<u>4,656,450 Yen</u>
sub total	49,982,850 Yen

[3] Power Generation field

1. Operation Training Simulator System	205,500,000 Yen
2. Experiment Devices for Power Generation	12,223,930 Yen
3. Automatic Control Equipment	19,263,900 Yen
4. Power Receiving Equipment	17,831,900 Yen
5. Instrument's Characterization Testing Machine	15,862,870 Yen
6. Machines for Mechanical Maintenance	<u>5,698,000 Yen</u>
sub total	276,380,600 Yen

[4] Transmission and Transformation field

1. Outdoor Sub Station Model	33,200,000 Yen
2. Transmission Line Simulator Equipment	3,800,000 Yen
3. Transmission Line Maintenance Devices	<u>7,618,600 Yen</u>
sub total	44,618,600 Yen

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[5] Distribution field

1. Underground Line Practice Devices	4,311,580 Yen
2. Power Cable Jointing Materials and Tools	35,560,000 Yen
3. 650V Live-line Operating Tools	1,833,420 Yen
4. Indoor Wiring Tools and Materials	8,277,850 Yen
sub total	49,982,850 Yen

[6] Chemical Experiment field

1. Experiment Devices for Chemical Laboratory	21,151,650 Yen
sub total	21,151,650 Yen

[7] Others

1. Personal Computer	8,565,000 Yen
2. Visual and Auditory Instruments	2,420,600 Yen
3. Drafting Bords	1,792,000 Yen
4. Vehicle	2,420,000 Yen
sub total	15,197,600 Yen

Grand Total 545,308,850 Yen
(Free On Board Price)

C.I.F. Price 579,000,000 Yen (about 4million U.S. dollars)

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[ARRIVAL DATES OF PROVIDED EQUIPMENT]

ANNEX-10

1. Mar. 1987	Vehicle(Nissan Patrol)	2,420kY
2. Apr. 1987	Mechanical & Electrical Practice Training Equipment	83,500kY
3. Sep. 1987	Experiment Devices for Chemical Laboratory.	58,210kY
4. Nov. 1987	Instrument's Characteraization Testing Machine	48,890kY
5. Apr. 1988	Underground Line Practice Devices	6,145kY
6. Jun. 1988	Operater Training Simulater System	179,500kY
7. Jun. 1988	Power Cable Jointing Materials & Tools	24,980kY
8. Aug. 1988	Outdoor Sub Station Model	32,810kY
9. Feb. 1989	Additional Devices for Outdoor S/S Model	3,400kY
10. Aug. 1989	Spair Parts for Operater Training Simulater	26,000kY
11. Jan. 1990	Basic Electric Experiment Apparatuses	22,802kY
12. Jan. 1990	Electric Machine Practice Devices	21,088kY
13. Apr. 1990	Cable Jointing Materials & Tools	10,580kY
14. Nov. 1990	Basic Electronics Experiment Apparatuses (scheduled)	24,984kY
		Total 545,309kY
		(FOB Price)

[LIST OF TEXT BOOKS PROVIDED BY JICA]

1. ELECTRICAL MACHINES
2. ELECTRICAL FUNDAMENTALS
3. ELECTRICAL THEORIES
4. ELECTRICAL MATERIALS
5. THE APPRICATION OF ELECTRICITY
6. EXPERIMENT OF ELECTRICITY
7. EXPERIMENT ON ELECTROMAGNETISMS Vol 1
8. EXPERIMENT ON ELECTROMAGNETISMS Vol 2
9. ELECTRONICS APPRICATIONS
10. ELECTRONICS THEORIES
11. POWER TRANSMISSION AND DISTRIBUTION
12. POWER GENERATION AND TRANSFORMATION
13. DRAWING
14. DRAWING SAMPLES
15. HEAT AND THERMODYNAMICS
16. STRENGTH OF MATERIAL
17. MACHINE ELEMENT
18. HYDRAURICS
19. AUTOMATIC CONTROL FOR THERMAL POWER STATION
20. TRANSMISSION ENGINEERING Part 1
21. TRANSMISSION ENGINEERING Part 2
22. TRANSMISSION ENGINEERING Part 3
23. TRANSFORMATION ENGINEERING Part 1
24. TRANSFORMATION ENGINEERING Part 2
25. DISTRIBUTION AND PRACTICAL DESIGN OF OVERHEAD DISTRIBUTION LINE

[LIST OF COUNTERPART PERSONNEL WHO HAD BEEN TRAINED IN JAPAN] ANNEX-12

1. 1st (Nov. 2, 1986---Dec. 27, 1986)

- (1) IMAD EL KHAIRY Maneger
- (2) AMER NABLSI Mechanical Engineer (Chief of Production and Operation Section)
- (3) MOHAMAD AWADAT Electrical Engineer (Chief of Transmission and Distribution Section)

2. 2nd (Feb. 8, 1988---Apr. 2, 1988)

- (1) RIYAD ROUSAN Electrical Engineer (Substation)
- (2) ABDULLAH DAOUD Electrical Technician (Substation)
- (Jan. 11, 1988---Mar. 16, 1988)
- (3) TAHA HASSAN Electrical Technician (Operation and Control)

3. 3rd (Oct. 31, 1988---Dec. 23, 1988)

- (1) HASSAN SAFFARINI Electrical Engineer (Chief of Coordination and Marketing Section)
- (2) ADEL SALAH Electrical Technician (Distribution)
- (3) ADNAN ABU DOUSH Electrical Technician (Distribution)

4. 4th (Oct. 9, 1989---Nov. 26, 1989)

- (1) IBRAHIM HAWARY Electrical Engineer (Transmission)
- (2) MOHAMAD DEEB Electrical Engineer (Protection)
- (3) MOHAMAD KHAROUB Electrical Engineer (Substation)

5. 5th (Sep. , 1990---Nov. , 1990)

- (1) NAEEM BATAH Mechanical Engineer (Mechanical Maintenance)
- (2) MUNAF JIJINI Electrical Technician (Electrical Maintenance)
- (3) EID ASSAF Electrical Technician (Electrical Wiring)

6. Extra (Mar. 18, 1990---Apr. 9, 1990)

- (1) GHAZI ABDEL HADI Manager of Training Department of JEA

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1. 1st Semester

1. Mathematics	4
2. Physics	3
3. English	2
4. Activity	2
5. Safety	2
6. Drawing	3
7. Work Shop	3
8. Electrical Fundamentals I	3
9. Electrical Fundamentals I Laboratory	3
10. Wiring)	3
	<hr/>
Total	28

2. 2nd Semester

1. English	2
2. Library	1
3. Activity	2
4. Drawing II	3
5. Strength of Materials	1
6. Strength of Materials Laboratory	3
7. Electrical Fundamentals II	3
8. Electrical Fundamentals II Laboratory	3
9. D.C.Machines Laboratory	5
10. Power Systems	2
	<hr/>
Total	25

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3. 3rd Semester

1) MECHANICAL MAINTENANCE GROUP

1. English	2
2. Thermodynamics	2
3. Hydraulics	2
4. Steam Generator I	2
5. Steam Generator Laboratory I	3
6. Chemistry	1
7. Chemistry Laboratory	3
8. Mechine Elements	1
9. Mechine Elements Laboratory	2
10. Automatic Control	1
11. Automatic Control Laboratory	3
12. Workshop	6
Total	28

2) ELECTRICAL MAINTENANCE GROUP

1. English	2
2. Generator	2
3. Generator Laboratory	3
4. Automatic Control	2
5. Automatic Control Laboratory	3
6. Transformers	2
7. Transformers Laboratory	3
8. Steam Generator I	2
9. Steam Generator Laboratory I	3
10. Switch gear and Protection	2
11. Switch gear and Protection Laboratory	3
12. Practical	1
Total	28

3) TRANSHISSION GROUP

1. Basics of Transmission	15
2. Practical	13
Total	28

4) SUBSTATION AND DISTRIBUTION GROUP

1. English	2
2. Basics of Substation and Distribution	14
3. Switch gear and Protection	2
4. Switch gear and Protection Laboratory	3
5. Transformers	2
6. Transformers Laboratory	3
7. Surveying	2
	<hr/>
Total	28

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4. 4th Semester

1) MECHANICAL MAINTENANCE GROUP

1. Steam Generator II	2
2. Steam Generator Laboratory II	3
3. Automatic Control	2
4. Automatic Control Laboratory	3
5. On Job Training	1.5
Total	2.5

2) ELECTRICAL MAINTENANCE GROUP

1. Motors	1
2. Motors Laboratory	1.5
3. Basics of Substation	2.5
4. Automatic Control	2
5. Automatic Control Laboratory	3
6. On Job Training	1.5
Total	2.5

3) SUBSTATION GROUP

1. Transformer and Substation	2
2. High Voltage Practical	1
3. On Job Training	2.2
Total	2.5

4) TRANSMISSION GROUP

1. Line Simulator	1
2. Line Simulator Laboratory	1.5
3. High Voltage Theory	1
4. High Voltage Laboratory	1.5
5. Protection	2
6. Protection Laboratory	3
7. On Job Training	1.5
Total	2.5

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5) DISTRIBUTION GROUP

1. Line Simulator	1
2. Line Simulator Laboratory	1.5
3. High Voltage Theory	1
4. High Voltage Laboratory	1.5
5. On Job Training	2.0
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Total	2.5

6) WIRING GROUP

1. High Voltage Laboratory	2
2. On Job Training	2.3
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Total	2.5

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1st SEMESTER [TIME TABLE]

12/88-5/89

DAY		8:00	9:00	10:00	11:00	12:00	13:00
		1	2	3	4	5	6
SATURDAY	A	ELECT. FUNDAMENTALS I		REST	ELECT. LABORATORY I		
	B	ELECT. FUNDAMENTALS I		REST	WIRING		
SUNDAY	A	MATHEMATICS		REST	WIRING		
	B	MATHEMATICS		REST	WORKSHOP		
MONDAY	A	ELE. FUND I	PHYSICS	REST	DRAWING I		
	B	ELE. FUND I	PHYSICS	REST	ENGLISH	ACTIVITY	
TUESDAY	A	PHYSICS		REST	ENGLISH	ACTIVITY	
	B	PHYSICS		REST	DRAWING I		
WEDNESDAY	A	MATHEMATICS		REST	WORKSHOP		
	B	MATHEMATICS		REST	ELECT. LABORATORY I		
THURSDAY	A	ENGLISH	SAFETY				
	B	ENGLISH	SAFETY				

DAY		8:00	9:00	10:30	11:00	12:00	13:00
		1	2	3	4	5	6
SATURDAY	A	ST. of MA.	ELE. FUND2	REST	STRENGTH OF MATERIALS LABO.		
	B	ST. of MA.	ELE. FUND2	REST	ELECT. LABORATORY 2		
SUNDAY	A	ELECT. FUNDAMENTALS 2		REST	DRAWING 2		
	B	ELECT. FUNDAMENTALS 2		REST	D.C. MACHINES LABORATORY		
MONDAY	A	ENGLISH		REST	ELECT. LABORATORY 2		
	B	ENGLISH		REST	STRENGTH OF METERIALS LABO.		
TUESDAY	A	POWER SYSTEMS		REST	D.C. MACHINES LABORATORY		
	B	POWER SYSTEMS		REST	LIBRARY	ACTIVITY	
WEDNESDAY	A	D.C. MACHINES		REST	LIBRARY	ACTIVITY	
	B	D.C. MACHINES		REST	DRAWING 2		

DAY	TIME	8:00	9:00	10:00	11:00	12:00	13:00
	PERIOD SECTION	1	2	3	4	5	6
S A T	MECH. MAINTE.	HYDRAURICS		REST	THERMODYNAMICS		ENGLISH
	ELEC. MAINTE.	SWGR & PROTECTION		REST	SWGR & PROTECTION LABORATORY		
	TRANSMISSION	BASICS OF TRANS.		REST	BASICS OF TRANSMISSION		
	SUBST. DISTR.	SWGR & PROTECTION		REST	ENGLISH	SURVEYING	
S U N	MECH. MAINTE.	CHEMISTRY	REST	CHEMISTRY LABORATORY		ENGLISH	
	ELEC. MAINTE.	GENERATORS		REST	GENERATORS LABORATORY		
	TRANSMISSION	BASICS OF TRANS.		REST	BASICS OF TRANSMISSION		
	SUBST. DISTR.	ENGLISH	REST	BASICS OF SUBSTATIONS & DISTRIBUTION			
M O N	MECH. MAINTE.	MECH. ELE.	AUTO. CON.	REST	AUTO. CON.	WORKSHOP	
	ELEC. MAINTE.	AUTOMATIC CONTROL		REST	AUTOMATIC CONTROL LABORATORY		
	TRANSMISSION	BASICS OF TRANS.		REST	BASICS OF TRANSMISSION		
	SUBST. DISTR.	BASICS OF SUB. & DIS		REST	BASICS OF SUB. & DIST.		
T U E	MECH. MAINTE.	MECHA. ELEMENTS LABO		REST	WORKSHOP		
	ELEC. MAINTE.	TRANSFORMERS		REST	PRACTICAL	ENGLISH	
	TRANSMISSION	PRACTICAL		REST	PRACTICAL		
	SUBST. DISTR.	TRANSFORMERS		REST	SWGR & PROT. & TRANSFO. LABO.		
W E D	MECH. MAINTE.	STEAM GENERATOR 1		REST	STEAM GENERATOR LABORATORY 1		
	ELEC. MAINTE.	STEAM GENERATOR 1		REST	TRANSFORMERS LABORATORY		
	TRANSMISSION	PRACTICAL		REST	PRACTICAL		
	SUBST. DISTR.	BASICS OF SUB. & DIS		REST	BASICS OF SUB. & DISTRIBUTION		
T H U	MECH. MAINTE.	WORKSHOP					
	ELEC. MAINTE.	STEAM GENERATOR LABO. 1					
	TRANSMISSION	PRACTICAL					
	SUBST. DISTR.	TRANSFORMERS & SWGR & PROT. LABO					

2/2

DAY	TIME	8:00	9:00	10:30	11:00	12:00	13:00
	PERIOD SECTION	1	2	3	4	5	6
S A T	MECH.MAINT.	AUTOMATIC CONTROL		REST	AUTOMATIC CONTROL LABO.2		
	ELEC.MAINT.	MOTORS BASICS OF SUBST.		REST	MORTORS LABO. BASICS OF SUBSTATIONS		
	TRANSMISSION	LINE SIMURATOR H.V.THEORY		REST	SIMULATOR LABO. H.V.LABO.		
	SUBSTATION DISTRIBUTION WIRING	ON JOB TRAINING		REST	ON JOB TRAINING		
S U N	MECH.MAINT.	STEAM GENERATOR 2		REST	STEAM GENERATOR LABO.2		
	ELEC.MAINT.	AUTOMATIC CONTROL 2		REST	AUTOMATIC CONTROL LABO.2		
	TRANSMISSION	PROTECTION		REST	PROTECTION LABO.		
	SUBSTATION	TRANS.S/S	O.J.T.	REST	ON JOB TRAINING		
M O N	DISTRIBUTION WIRING	ON JOB TRAINING		REST	ON JOB TRAINING		
	MECH.MAINT. ELEC.MAINT. TRANSMISSION DISTRIBUTION	ON JOB TRAINING		REST	ON JOB TRAINING		
	SUBSTATION	ON JOB TRAINING		REST	ON JOB TRAINING	H.V.PRACT	
T U E	WIRING	H.V.LABOLATORY		REST	ON JOB TRAINING		
	MECH.MAINT. ELEC.MAINT. TRANSMISSION WIRING	ON JOB TRAINING		REST	ON JOB TRAINING		
	SUBSTATION	TRANS.S/S	O.J.T.	REST	ON JOB TRAINING		
W E D	DISTRIBUTION	LINE SIMULATOR H.V.THEORY		REST	SIMULATOR LABO. H.V.LABO.		
	MECH.MAINT. ELEC.MAINT. TRANSMISSION SUBSTATION DISTRIBUTION WIRING	ON JOB TRAINING		REST	ON JOB TRAINING		

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[INPUT FROM NATIONAL BUDGET BY THE GOVERNMENT OF JORDAN]

(unit:one thousand dinars)

Category	Year	1987	1988	1989	1990
	Personnel cost		153	130	126
Construction cost		-	-	54	45
Operation cost		267	70	154	35
Equipment		43	-	120	17
Materials		11	30	26	10
Repairing, Light, Fuel		213	40	8	8
Allowance for students		91	85	90	68
Others		-	-	-	8
TOTAL		511	285	424	286

* This is in addition to several training facilities and equipment supplied by JEA internally.

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[Up-Grading Course Items]

1. Simulator Training
2. Distribution System Equipment
3. Switch Operation
4. Middle Voltage Equipment Operation
5. Safety and Health
6. Outdoor Substation Maintenance
7. Low Voltage Live Line Working
8. Industrial Drawing
9. Instrumentation
10. On duty Eng. Behavior
11. Distribution Networks Operation
12. Trigonometry for Surveyers
13. Low Voltage Problems and Testing
14. Wiring
15. Instalation and Jointing 33kv Equipment
16. Distribution Equipment Technics
17. Quantities Calculation
18. Survey for Biginners
19. Machine Performance
20. Survey Application
21. Distribution Equipment Operation and Maintenance
22. Substation Maintenance
23. Over Head Line Project Establishment
24. Over Head Line Construction Basics
25. Over Head Line Construction Rules
26. Over Head Line Construction Methods
27. Over Head Line Maintenance
28. Live Line Equipment Testing
29. Drivers as Assistant Technician

[LIST OF UPGRADING COURSES WHICH HAD ALREADY BEEN CONDUCTED]

15 Oct. 1988---30 Sep. 1989

No.	TYPE	No. of COURSES	No. of ATTENDANTS	EQUIVALENT MAN-DAY	REMARKS
1	SIMULATOR	19	66	504	NOT INCRUDING ETC STUDENTS
2	DISTRIBUTION	11	64	355	
3	SURVEYING	3	41	246	
4	WIRING	2	12	72	
5	INSTRUMENTATION	1	8	48	
6	SUBSTATION	1	8	104	
7	POWER STATION	23	125	993	
	TOTAL	60	324	2322	

* For the year 1990, it is planned to hold upgrading courses totaling 2790 man-day.

[TRAINING PROGRAM OF THIRD COUNTRY TRAINING]

1. Steam Power Station Operation
2. Indoor Substation
3. Construction and Maintenance of Outdoor Substation
4. Construction and Maintenance of Distribution Networks
5. Construction and Maintenance of Overhead Transmission Lines

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Preface

The most part of the electrical energy produced in the world nowadays is produced from Thermal power station.

In Jordan, the first steam power station was constructed in 1975 with a capacity of 33 MW and then many different thermal power stations were constructed (diesel, steam & gas) so as to meet the increasing load demand. The rate of the steam power stations energy in Jordan is about 60% of the total power.

Purpose

The purpose of this programme, the attendance will be able to operate the steam power station.

Aims

Through this programme, the attendance is expected to be familiar with:

- 1- Operating the steam unit.
- 2- Overcoming the emergency faults which may happen on this unit.

Finance

Period

This programme will be held for 17 weeks from / /19 to / /19

Place

This programme will be held in the ETC which is far about 30 km. from Amman.

Contents

A- The Orientation programme:-

- 1- Identification of Jordan (the Jordanian society, the history and the culture).
- 2- Identification of JEA
- 3- Identification of ETC
- 4- Short trip in both Amman and Zarqa cities.

B- The Technical Programme.

1- Basics

- 1.1- Pressure
- 1.2- Flow
- 1.3- Heat and Temperature
- 1.4- Water Properties.

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- 2- Combustion
 - 2.1- Air
 - 2.2- Fuel
 - 2.3- Flue gases
 - 2.4- Fuel additives

 - 3- Steam-Water Cycle
 - 3.1- Steam turbine
 - 3.2- Condenser
 - 3.3- Condensate cycle.
 - 3.4- Feed water cycle.
 - 3.5- Boiler.

 - 4- Station Service Systems
 - 4.1- Cooling water.
 - 4.2- Plant air.

 - 5- Lubrication
 - 5.1- Bearings
 - 5.2- Lubrication Oil
 - 5.3- Purification
 - 5.4- Greasing

 - 6- Mechanical Elements
 - 6.1- Valves
 - 6.2- Steam traps
 - 6.3- Pumps
 - 6.4- Compressors
 - 6.5- Fans

 - 7- Safety Rules & Fire Fighting

 - 8- Control and Instrumentation
 - 8.1- Pressure control
 - 8.2- Temperature control
 - 8.3- Flow control
 - 8.4- Level control
 - 8.5- Main control systems.
 - 8.5.1- Feed water control systems.
 - 8.5.2- Fuel control systems.
 - 8.5.3- Combustion control system
 - 8.5.4- Air control system.
 - 8.6- Protection
 - 8.6.1- Boiler Protection
 - 8.6.2- Turbine Protection
 - 8.6.3- Electrical Protection
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9- Steam Unit Operation

9.1- Cold start

9.2- Warm start

9.3- Hot start

10- Malfunctions on steam unit

11- Training visits to Hussein Thermal Power Station.

12- Simulator Training in ETC

C- Visits

* Supervisory Control Centre

* Amman South S/S.

* Marka Power Station.

* Energy & Electricity Information & Advisory Centre.

* King Talal Dam Power Station

* Aqaba Thermal Power Station

* Ibrahimiyah Power Station

D- Evaluation and Closing Ceremony.

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Preface

As we transmit the energy by high voltage, we can't generate so we need to subtain the generation voltage to a higher voltage to be transmitted in a higher efficiency, and after it is transmitted, we must subtain it again to a lower voltage for consuming.

In Jordan there are s/s. 132/33 kV., 132/11 kV., 33/11 kV., 33/0.4 kV. and 11/0.4 kV.

Purpose

The purpose of this programme is to give the attendance the technical practical and theoretical information concerning the indoor s/s.

Aims

- Through this programme, the attendance is expected to be familiar with:
- 1- The importance of S/S. in the electrical system and taking care of them.
 - 2- The construction of S/S. equipment.
 - 3- *Constructing, maintaining and testing the S/S equipments.*
 - 4- The safety rules during the work.

Finance

Period

This programme will be held for 17 weeks from / /19 to / /19

Place

This programme will be held in the ETC which is far about 30 km. from Amman.

Contents

- A- The Orientation programme:
1. Identification of Jordan (the Jordanian Society, the history and the culture).
 2. Identification of JEA
 3. *Identification of ETC*
 4. Short trip in both Amman and Zarqa cities.
- B- The technical programme.
- 1- Substation
- 1.1. Rule of substation in the supply of electrical energy.
 - 1.2. Construction of transmission substation.
 - 1.3. *Construction of distribution substation.*
 - 1.4. Duty of substation technician.
 - 1.5. Substation safety rules.

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- 2- The principle of work of main equipment in S/S.
 - 2.1. Transformers.
 - 2.2. Switchgears.
 - 2.3. D.C. Circuits.
 - 2.3.1. Batteries.
 - 2.3.2. Rectifiers.
 - 2.3.3. Charger.
 - 2.4. Protection and Control Circuits.
 - 3- The maintenance of indoor S/S equipment.
 - 3.1. Transformers maintenance.
 - 3.2. Switchgears maintenance.
 - 3.3. Distribution board's maintenance.
 - 3.4. Batteries' maintenance.
 - 4- Switchgear Construction.
 - 4.1. Switch disconnectors and fuse switches construction.
 - 4.2. Housing construction.
 - 4.3. Busbar construction.
 - 4.4. Protection and instrument construction.
 - 4.5. Protection and instrument wiring.
 - 5- Preparing of wiring diagram drawing.
- C- Visits
- * Supervisory control centre
 - * Amman South S/S.
 - * Marka Power Station.
 - * Hussein Thermal Power Station.
 - * Energy & Electricity Information & Advisory Centre.
 - * Ashrafiyah S/S.
- D- Evaluation and Closing Ceremony.

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THIRD COUNTRY TRAINING PROGRAM

[CONSTRUCTION and MAINTENANCE of OUTDOOR SUBSTATION]

Preface

As we transmit the energy by high voltage, we can't generate so we need to substation the generation voltage to a higher voltage to be transmitted in a higher efficiency, and after it is transmitted, we must substation it again to a lower voltage for consuming.

In Jordan there are S/S 132/33 kV., 132/11 kV., 33/11 kV, 33/0.4 kV., and 11/0.4 kV.

Purpose

The purpose of this programme is to give the attendance the technical, practical & theoretical information concerning the outdoor S/S.

Aims

Through this programme, the attendance is expected to be familiar with:

- 1- The importance of S/S in the electrical system and taking care of them.
- 2- The construction of S/S equipment.
- 3- Constructing, maintaining & testing the S/S equipments.
- 4- The safety rules during the work.

Finance

Period

This programme will be held for 17 weeks from / /19 to / /19

Place

This programme will be held in the ETC which is far about 30 km. from Amman.

Contents

A- The Orientation programme:

- 1- Identification of Jordan (the Jordanian society, the history and the culture).
- 2- Identification of JEA.
- 3- Identification of ETC.
- 4- Short trip in both Amman & Zarqa cities.

B- The Technical programme.

1- Substation

- 1.1- Rule of substation in the supply of electrical energy.
- 1.2- Construction of transmission substation.
- 1.3- Construction of distribution substation.
- 1.4- Duty of substation technician.
- 1.5- Substation safety rules.

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- 2- The principle of work of main equipment in S/S.
 - 2.1- Transformers
 - 2.2- Switchgears
 - 2.3- D.C. Circuits
 - 2.3.1- Batteries
 - 2.3.2- Rectifiers
 - 2.3.3- Charger
 - 2.4- Protection & Control Circuits

 - 3- Construction of 33/11 & 132/33 kV Outdoor substation
 - 3.1- Isolater switches construction.
 - 3.2- Instrument transformers construction.
 - 3.3- Surge arrester construction.
 - 3.4- Support insulator construction.
 - 3.5- Busbar construction.
 - 3.6- Control Panel Wiring.
 - 3.7- Earthing Installation.

 - 4- Maintenance of Outdoor Substation
 - 4.1- Isolaters maintenance
 - 4.2- Instrument transformers maintenance
 - 4.3- Main transformer maintenance
 - 4.4- On load tap changer maintenance
 - 4.5- Circuit breaker maintenance.
 - 4.6- Porcelain insulators cleaning.

 - C- Visits
 - * Supervisory Control Centre
 - * Amman South S/S.
 - * Marka Power Station.
 - * Hussein Thermal Power Station.
 - * Energy & Electricity Information & Advisory Centre.
 - * Ashrafiyah S/S.

 - D- Evaluation and Closing Ceremony.
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THIRD COUNTRY TRAINING PROGRAM

[CONSTRUCTION and MAINTENANCE of DISTRIBUTION NETWORKS]

Preface

Consuming the energy depends on the kind of load whether its residence, industrial, agriculture or others.

Most of loads works on low or medium voltage in comparison with the transmission voltage.

Usually the loads are so nearer, so as it needs several supplying points for these loads.

In Jordan the energy is distributed through 33 kV, 11 kV, & 380 V. three phase or 220 v. single phase.

Purpose

The purpose of this programme is to supply the attendance with the technical practice and theoretical information concerning the distribution networks.

Aims

Through this programme, the attendance is expected to be familiar with:

- 1- The types and elements of the different distribution networks
- 2- The rules and safety instructions for the work on the distribution networks.
- 3- The equipment, tools, and vehicles which are necessary to erect and maintain the distribution network and how to use.

Finance

Period

This programme will be held for 14 weeks from / /19 to / /19

Place

This programme will be held in the ETC which is far about 30 km. from Amman.

Contents

A- The Orientation programme:-

- 1- Identification of Jordan (the Jordanian society, the history and the culture)
- 2- Identification of JEA.
- 3- Identification of ETC.
- 4- Short trip in both Amman & Zarqa cities.

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B- The Technical programme

1- Introduction

- 1.1- Describe and identify overhead lines configuration and components.
- 1.2- Explain why regulations, standards and codes of practice have been introduced.
- 1.3- Explain the need to conform with the distribution safety rules.
- 1.4- Identify and select protective clothing, equipment and tools.
- 1.5- Inspect, clean and maintain tools and equipment.
- 1.6- Climb poles and handle ropes.

2- Overhead Lines Light Construction

- 2.1- Dress Poles.
- 2.2- Erect Poles and stays.
- 2.3- Run out, joint, sag, make-off and bind-in conductors.
- 2.4- Install and test earthing systems.
- 2.5- Carry out pre-commissioning checks.

3- Services

- 3.1- Place shrouding and fit take-off fittings.
- 3.2- Fix brackets, run conductors install terminating equipment.
- 3.3- Install earth and bonding.
- 3.4- Complete connections at supply pole.
- 3.5- Test polarity, seal and secure live equipment.
- 3.6- Inspect, recover or renew all types of services.

4- Overhead Lines Heavy Construction

- 4.1- Dress single and "H" poles structures.
- 4.2- Erect single and "H" poles and stays.
- 4.3- Run out, joint, make-off and bind-in conductors.
- 4.4- Erect pole mounted equipment.
- 4.5- Carry out pre-commissioning checks.

5- Maintenance of Overhead Lines and Pole Mounted Equipment

- 5.1- Carry out the work detailed in maintenance manuals or instructions.
- 5.2- Undertake line patrols and complete the line patrol report.
- 5.3- Test and carry out preventive work on poles to ensure they are in satisfactory condition.
- 5.4- Take down and remove redundant conductors.
- 5.5- Cut and clear undergrowth trees.

6- Operation of O.H. Distribution Lines

- 6.1- Explain the purpose of the distribution rules.
- 6.2- Define the categories of competence allowed for in the distribution rules and explain their responsibilities.
- 6.3- Define terms used in operational safety work and list the stages in issuing permit to-work.
- 6.4- Use distribution network and diagrams to check on operational activities.
- 6.5- Explain the reasons for system control and the role it plays in maintaining supply.
- 6.6- Describe the principle function of protective devices as used in distribution overhead lines.

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7- L.V. Live Line Working

- 7.1- Inspect and maintain tools and equipment.
- 7.2- Work in a competent manner on live L.V. circuits.
- 7.3- Utilising wherever necessary the appropriate equipment provided to optimise personal safety and security.
- 7.4- Demonstration-connect service cable.
- 7.5- Demonstration-connect and disconnect jumpers.
- 7.6- Demonstration-erection and maintenance of street light units.

8- Carry Out Projects

- 8.1- L.V. Project.
- 8.2- M.V. Project.

C- Visits

- ★ Supervisory Control Centre
- ★ Amman South S/S.
- ★ Marka Power Station.
- ★ Hussein Thermal Power Station.
- ★ Energy & Electricity Information & Advisory Centre
- ★ Jordan Valley Distribution District.

D- Evaluation and Closing Ceremony.

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THIRD COUNTRY TRAINING PROGRAM

[CONSTRUCTION and MAINTENANCE of OVERHEAD TRANSMISSION LINES]

Preface

The power sources are not always available, where the human beings need because of far distances, so we must transmit it from its source to the places of the consumers, thus the high voltage lines ensures this purpose.

In Jordan there are high voltage line 400 kV, and 132 kV to join between the sources in Aqaba, Zarqa and Reisha to the load centres in Amman and its suburbs.

Purpose

The purpose of this programme is to give the attendance the technical, practical and theoretical information concerning over head lines.

Aims

Through this programme, the attendance is expected to be familiar with:

- 1- Types and elements of different O.H. Lines.
- 2- The safety rules used on O.H. Lines.
- 3- The equipment, tools and vehicles for constructing, maintaining and using O.H. Lines.

Finance

Period

This programme will be held for 17 weeks from / /19 to / /19

Place

This programme will be held in the ETC which is far about 30 km. from Amman.

Contents

A- The Orientation programme:-

1. Identification of Jordan (the Jordanian society, the history and the culture).
2. Identification of JEA
3. Identification of ETC
4. Short trip in both Amman and Zarqa cities.

B- The Technical programme.

I- Introduction

- 1.1- Transmission safety rules.
- 1.2- Standard and code of practice.
- 1.3- Personal protective clothing.
- 1.4- Safety tools and equipment.
- 1.5- Duties and responsibilities of linesman.

-
- 2- Networks classification
 - 2.1- The comparison between transmission and distribution overhead lines.
 - 2.2- JEA transmission overhead lines.
 - 2.3- Cost comparisons O.H. transmission lines & underground cables.
 - 3- Surveying O.H. Transmission Lines
 - 3.1- Use of different survey instruments.
 - 3.2- Setting out tower bases.
 - 3.3- Excavation of tower foundations.
 - 4- Towers Design
 - 4.1- Mechanical loads on O.H. transmission lines.
 - 4.2- Rigging and Lifting.
 - 4.3- Back Stays.
 - 5- Conductors of O.H. Transmission Lines
 - 5.1- Conductors fittings.
 - 5.2- Running-out and tensioning conductors.
 - 5.3- Saging conductors.
 - 5.4- Conductor clearances.
 - 5.5- Insulators & Fittings.
 - 5.6- Insulators Erection.
 - 5.7- Joints.
 - 6- Tower Maps (Drawing) Reading
 - 6.1- Tower Assembly using drawings.
 - 6.2- Planting of stubs.
 - 6.3- Tower erection using Derrick.
 - 6.4- Tower erection using crane.
 - 7- Tools & Equipment of O.H. Transmission Lines
 - 7.1- Safe working practices on O.H.T.L.
 - 7.2- Maintenance Procedures on O.H.T.L.
 - 7.3- Tower Climbing
 - 8- Maintenance of O.H. Transmission Lines
 - 8.1- Changing damaged bracing.
 - 8.2- Changing complete set of insulators tension-suspension.
 - 8.3- Changing single-double insulators tension-suspension.
 - 8.4- Repairing damaged conductors with repair sleeves midspan joints.
 - 8.5- Changing dampers-spacers.
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C- Visits

- * Supervisory Control Centre
- * Amman South S/S.
- * Marka Power Station.
- * Hussein Thermal Power Station.
- * Energy & Electricity Information & Advisory Centre
- * Harranah-Sahab O.H.T.L.

D- Evaluation and Closing Ceremony.

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[LIST OF THIRD COUNTRY TRAINING COURSES WHICH HAD BEEN ALREADY CONDUCTED]

Training of thirteen trainees from Mauritania, for one year, in the field of diesel generation, distribution networks, service and management as follows

1. Introduction 1 week
2. Distribution networks 14 weeks
3. Electrical wiring 1 week
4. Substations 7 weeks
5. Diesel generation plant 22 weeks
6. Consumer's services 7 weeks

This program includes On Job Training (OJT) for (21) twenty one weeks, and the training period of (31) thirty one weeks at ETC.

[LIST OF ORGANIZATIONS WHO RECEIVED GRADUATES FROM THE CENTER]

The total number of graduates are 69 of which 13 are now working in private sector inside Jordan and in Gulf countries.

The remaining 56 graduates are now working at JEA as follows.

1. Overhead lines dept. (Amman)	5
2. Overhead lines dept. (Irbid)	2
3. Overhead lines dept. (Karak)	2
4. Overhead lines dept. (Aqaba)	3
5. Distribution dept. (Marka)	5
6. Distribution dept. (Tafilah)	2
7. Distribution dept. (Jordan Valley)	4
8. Distribution dept. (Maan)	1
9. Distribution dept. (Aqaba)	3
10. Distribution dept. (Head Office)	1
11. Production dept. (Marka)	1
12. Production dept. (Reeshah)	1
13. Production dept. (Workshops)	3
14. Hussein Thermal Power Station	6
15. Aqaba Thermal Power Station	15
16. Electric Power Training Center	2

Total 56

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[LIST OF ORGANIZATIONS WHO UTILIZED THE CENTER FOR ITS STUDENTS TRAINING]

1. Vocational Training Cooperation
2. Amman Politechnique
3. The University of Jordan
4. Al-Hijjawi College (Yarumuk University)
5. Mutah University
6. Jordan Electric Power Company
7. Irbid Electric Power Company

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[THE RECORD OF DISCUSSIONS]

THE RECORD OF DISCUSSIONS
 BETWEEN THE JAPANESE IMPLEMENTATION SURVEY TEAM AND THE AUTHORITIES
 CONCERNED OF THE GOVERNMENT OF THE HASHEMITE KINGDOM OF JORDAN ON
 THE JAPANESE TECHNICAL COOPERATION PROJECT ON ELECTRIC POWER
 TRAINING CENTRE

The Japanese Implementation Survey Team (hereinafter referred to as the Team) organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Keiji Iimura of JICA visited the Hashemite Kingdom of Jordan from 16 September to 22 September, 1985 for the purpose of working out the details of the technical cooperation scheme concerning the Project on Electric Power Training centre in Jordan (hereinafter referred to as the "Project").

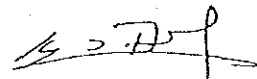
During its stay in the Hashemite Kingdom of Jordan, the team exchanged views and had a series of discussions with Jordanian authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the Project.

As a result of the discussions, both parties agreed, taking account of provisions of the agreement of technical cooperation between the Government of Japan and the Government of the Hashemite Kingdom of Jordan signed at Amman on 16 July, 1985, to recommend to their Governments the matters referred to in the document and Annex attached hereto.

Date: September 24, 1985

飯村 吉 司

Mr. Keiji Iimura
 Head,
 Japanese Implementation Survey Team,
 Japan International Cooperation Agency,
 Japan



Mr. M.S. Arafah
 Director General,
 Jordan Electricity Authority,
 Jordan.

THE ATTACHED DOCUMENT

1. COOPERATION BETWEEN BOTH GOVERNMENTS

1. The Government of Japan and the Government of the Hashemite Kingdom of Jordan will cooperate with each other in implementing the Project for the purpose of providing practical and theoretical training to the Jordanian technicians and thus contributing to the socio economic development of Jordan.
2. The Project will be implemented in accordance with the Master Plan which is given in item I. of the Annex.(and as detailed in the attached tentative schedule of implementation).

II. DISPATCH OF JAPANESE EXPERTS

1. In accordance with the laws and regulations in force in Japan the Government of Japan will take necessary measures through JICA to provide at its own expense services of Japanese experts as listed in item II. of the Annex through the normal procedure under the technical cooperation scheme of Japan.
2. The Japanese experts referred to in I. above and their families will be granted in the Hashemite Kingdom of Jordan privileges, exemptions and benefits no less favourable than those accorded to experts of third countries of international organizations performing similar missions in the Hashemite Kingdom of Jordan.

III. PROVISION OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials (hereinafter referred to as the "Equipment") necessary for the implementation of the Project as listed in item III. of the Annex through the normal procedures under the technical cooperation scheme of Japan.

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2. The Equipment will become the property of the Government of the Hashemite Kingdom of Jordan delivered upon being C.I.F. to the Jordanian authorities concerned at the ports and/or airport of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with the Japanese experts referred to in item II. of the ANNEX.

IV. TRAINING OF JORDANIAN PERSONNEL IN JAPAN

1. In accordance with the laws and regulations in force in Japan the government of Japan will take necessary measures through JICA to receive at its own expense the Jordanian personnel concerned with the project for technical training in Japan through the normal procedures under technical cooperation scheme of Japan.(and as detailed in the attached tentative schedule of implementation)
2. The Government of the Hashemite Kingdom of Jordan will take necessary measures to ensure that the knowledge and experience acquired by the Jordanian personnel from technical training in Japan will be utilized effectively for implementation of the Project.

V. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE HASHEMITE KINGDOM OF JORDAN

1. In accordance with the laws and regulations in force in the Hashemite Kingdom of Jordan, the Government of the Hashemite Kingdom of Jordan will take necessary measures to provide at its own expense:
 - (1) Necessary services of counterpart personnel and administrative personnel as listed in item IV. of the Annex;
 - (2) Land, building and facilities as listed in item V. of the Annex;
 - (3) Supply or replacement of machinery, equipment, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided by the Government of Japan through JICA under III. above;
 - (4) Transportation facilities and travel allowance for the Japanese experts for the official travel within the Hashemite Kingdom of Jordan;

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- (5) Suitably furnished accommodations for the Japanese experts and their families;
 - (6) Transportation for the Japanese experts during working hours including transportation from and to their residences.
2. In accordance with the laws and regulations in force in the Hashemite Kingdom of Jordan, the Government of the Hashemite Kingdom of Jordan will take necessary measures to meet;
- (1) Expenses necessary for the transportation of the Equipment within the Hashemite Kingdom of Jordan as well as for the installation and maintenance thereof;
 - (2) Custom duties, internal taxes and any other charges imposed on the equipment in the Hashemite Kingdom of Jordan;
 - (3) All running expenses necessary for the implementation of the Project.

VI. ADMINISTRATION OF THE PROJECT

1. Director General, the Jordan Electricity Authority (hereinafter referred to as JEA) will bear overall responsibility for the implementation of the Project.
2. The head of the Project will be responsible for the administrative and managerial matters of the Project.
3. Japanese chief advisor will provide necessary recommendation and advice on technical and administrative matters concerning the implementation of the project according to the Record of Discussions.
4. The Japanese experts will provide necessary technical guidance and advice to the Jordanian counterpart personnel on technical matters pertaining to the implementation of the Project.
5. For the effective and successful implementation of the Project, a joint committee will be established with the function and composition as referred to in item VI. of the Annex.

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VII. CLAIMS AGAINST JAPANESE EXPERTS

The Government of the Hashemite Kingdom of Jordan undertakes to bear claims, if any arises, against the Japanese experts engaged in the project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Hashemite Kingdom of Jordan except for those arising from the willful misconduct or gross negligence of the Japanese experts.

VIII. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this Record of Discussions.

IX. TERM OF COOPERATION

The duration of technical cooperation for the Project under this attached document will be basically five (5) years from 1 March, 1986, in case that the construction of the centre is completed by the end of September, 1987, according to the Tentative Schedule of Implementation. However, there will be regular reviews on the progress of construction schedule by the authorities of both Governments in order to consider whether the term and the scope of technical cooperation referred to in item I. of the ANNEX should be modified.

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ANNEX

I. MASTER PLAN

1. The objective of the Project is to establish the Electric Power Training Centre (hereinafter referred to as the Centre) for the purpose of training technicians by means of providing theoretical and practical training.
2. The objective of the Japanese technical cooperation is to transfer technology necessary for Jordanian counterparts in conducting training courses on electric power engineering by means of dispatch of experts, acceptance of Jordanian counterpart personnel and provision of equipment.

II. JAPANESE EXPERTS

1. Chief advisor
2. Coordinator
3. Long term experts in
 - 1) Electrical engineering
 - 2) Mechanical engineering
4. Short term experts;
Short term experts may be dispatched, when necessity arises, for the smooth implementation of the Project.

III. EQUIPMENT

1. The equipment necessary for implementation of the Project as listed below will be provided :
 - 1) Equipment for mechanical practice room
 - 2) Equipment for automatic control laboratory
 - 3) Equipment for chemical laboratory
 - 4) Equipment for materials laboratory
 - 5) Equipment for indoor wiring practice room
 - 6) Equipment for power generation laboratory
 - 7) Equipment for underground line practice room
 - 8) Out door substation room
 - 9) Equipment for Thermal Plant Operation Training Room

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- 10) Audio and Visual room
 - 11) Equipment for machines dismantling room
 - 12) Equipment for drawing room
 - 13) Equipment for electricity laboratory
 - 14) Equipment for mechanical performance testing room
2. Decision of specification and selection will be made in due courses through mutual consideration.

IV. JORDANIAN COUNTERPART PERSONNEL AND ADMINISTRATIVE PERSONNEL

- 1. Head of the Project.
- 2. Engineers:
 - 1) Electrical engineering
 - 2) Mechanical engineering
- 3. Required number of technicians mutually agreed upon
- 4. Administrative staff:
 - 1) Administration
 - 2) Accounting
 - 3) Clerks
- 5. Other necessary personnel mutually agreed upon.

V. LAND, BUILDING AND FACILITIES

- 1. Sufficient space of land for the implementation of the Project
- 2. Building
 - 1) Administrative rooms
 - 1) Director's room
 - 2) Chief advisor's room
 - 3) Experts' rooms
 - 4) Staff rooms
 - 5) Offices
 - 6) Conference room
 - 7) Library
 - 8) Others
 - 2) Workshops

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- 3) Rooms
 - 1) Classrooms
 - 2) Audio - visual room
 - 3) Language laboratory room
 - 4) Drawing room
 - 5) Lecture halls
 - 6) Others
- 4) Facilities
 - 1) Stores
 - 2) Canteen
 - 3) Others

VI. THE JOINT COMMITTEE

1. Functions

The Joint committee will be held at least once a year and whenever necessity arises, and work:

- 1) to formulate the Annual Work Plan of the Project in line with the Tentative Schedule of Implementation formulated under the frame work of this Record of Discussions;
- 2) To review the overall progress of the technical cooperation program setout in this Record of Discussions;
- 3) To review and exchange views on major issues arising from or in connection with the implementation of the technical cooperation program.

2. Composition

- 1) Chairman:
Director General of JEA

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2) Members:

(1) Jordanian side

- a) Chief engineer of JEA
- b) Head of the Centre
- c) Head of training section of JEA
- d) Hussein Thermal Power Station Manager
- e) Planning Manager.
- f) Others designated by the Chief engineer.

(2) Japanese side

- a) Chief advisor
- b) Coordinator
- c) Japanese experts designated by Japanese chief advisor
- d) Personnel concerned with the Project to be dispatched by JICA, if necessary.

Note : Official(s) of the Embassy of Japan in Amman may attend meetings of the joint committee as observer (s).

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