Republic of Iraq

Ministry of Electricity

PREPARATORY STUDY FOR DEVELOPMENT OF SOUTHERN LARGE SCALE THERMAL POWER PLANT IN REPUBLIC OF IRAQ

FINAL REPORT

(ATTACHMENT)

March 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

TOKYO ELECTRIC POWER SERVICES CO., LTD.
TOYO ENGINEERING CORPORATION
MITSUBISHI HEAVY INDUSTRIES, LTD.
UNICO INTERNATIONAL CORPORATION
MITSUI & CO., LTD.

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Attachment - 1.1 Minutes of Meeting (1st Mission)

MINUTES OF MEETING
ON
THE FIRST MISSION OF THE
PREPARATORY STUDY FOR DEVELOPMENT OF SOUTHERN
LARGE SCALE THERMAL POWER PLANT IN IRAQ

AGREED UPON BETWEEN
MINISTRY OF ELECTRICITY
AND
THE STUDY TEAM OF
JAPAN INTERNATIONAL COOPERATION AGENCY

AMMAN, 12 July, 2011

MINISTRY OF ELECTRICITY

13/07/2011

Adel Hameed Mahdi
Minister Advisor
Ministry of Electricity in Iraq

THE JICA STUDY TEAM

13 Jul 2011

Masayuki ITO
Team Leader
JICA Study Team

The Japan International Cooperation Agency (hereinafter referred to as JICA) organized and dispatched a study team (referred to as the Study Team) for the Preparatory Study for Development of Southern Large Scale Thermal Power Plant (referred to as the Study) in Iraq.

1. Kick-off Meeting

The Study Team Leader, Mr. Masayuki ITO, held a kick-off meeting with the Iraqi Team led by Mr. Adel Hameed Mahdi on July 10, 2011. The Study Team explained and the Iraqi Team agreed on the following terms.

- Inception Report.
- Schedule of overall study and the 1st mission.
- The details of the contents of the study to be discussed through group meetings.

The main points of discussion and agreements reached during the meeting are as follows (referred to Attachment -1):

1) The Study Team and Iraqi Team agreed that the first mission should be executed based on the schedule submitted by the Study Team.
2) The Study Team submitted Inception Report and Questionnaire to the Iraqi Team and explained main contents of Inception Report and Questionnaire.
3) The Study Team and the Iraqi Team agreed that the Alkahlaa Amara 1&2, Hartha 2 and Nasirya were selected as likely candidate sites and F/S site is selected among the likely candidate sites based on the results of additional site reconnaissance.

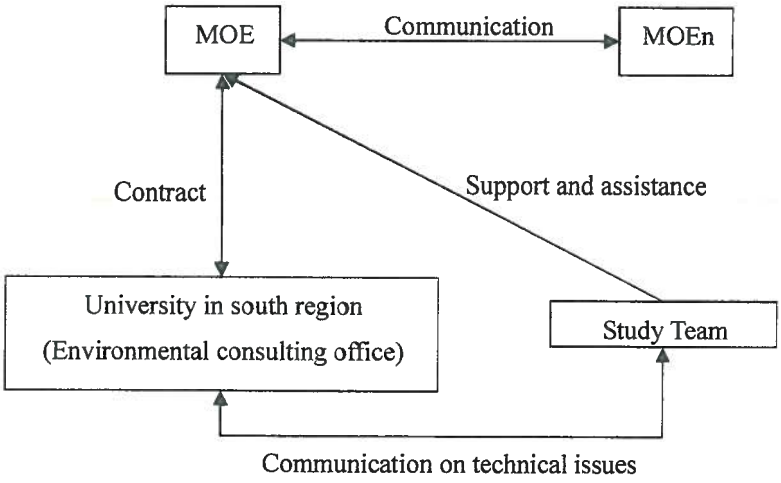
2. Group Meetings

Following kick-off meeting, the Study Team and the Iraqi Team were divided into three groups, Optimization of Development Plan Group, Thermal Power Plant Planning Group and Environmental Considerations Group and Group meetings were held on July 11 and 12, 2011. Counterparts of each group meeting are as follows:

- Optimization of Development Plan Group
  Mr. Mahdi Daham Jasim (Assistant General Manager of Planning and Studies Office)
  Mr. Naseer Aziz (Senior Engineer/Ministry of Oil)
- Thermal Power Plant Planning Group
  Mr. Adel Hameed Mahdi (Minister Advisor/Ministry of Electricity)
  Mr. Abdul Kadhim Fadel Abbas (Expert/Planning and Studies Office)
- Environmental Considerations Group
  Dr. Mohammed Ahmad Salih (Renewable Energy and Environment Center/Planning and Studies Office).

Outcomes of Group Meetings are as follows:

1) The Study Team collected necessary data and information as Attachment - 2 (Questionnaire check list).
2) The Study Team examined and re-requested the provision of remaining necessary data and information to be collected as Attachment -3 (Re-questionnaire).
3) The Study Team and the Iraqi Team agreed the study preconditions as Attachment–4 (Confirmed Conditions).
4) The Study Team proposes the Iraqi Team that the Study Team entrusts a local consultant (LC), a private company, to collect information and data necessary for quick evaluation of three likely candidate sites. However, the Study Team and the Iraqi Team agreed that MOE organizes a project team upon return to Baghdad and the Iraqi Team allocates adequate engineers of provincial office of MOE in each governorate to collect information and data in accordance with the questionnaire as Attachment - 5 and inform the results to the JICA Study Team by the beginning of August.
5) The Study Team and the Iraqi Team agreed on the following study organization. MOE gets into a contract with a university in the region for the preparation of an EIA report for the Project at the F/S site in the similar manner of Akkaz Gas Turbine Power Project, therefore, no LC is entrusted by the Study Team.



6) The Iraqi Team proposes to change the project site to Baghdad due to severe shortage of electricity supply in Baghdad area. JICA explains that the study location is southern area in Iraq based on the official request from the Government of Iraq. JICA will consider a new study on a power plant project in the central area of Iraq in near future.

3. Next Step

The Study Team will perform the 1.5th mission in the end of August and explain the selection results of F/S site and determine the F/S site in consultation with the Iraqi Team. And the Study Team will start the site survey on the F/S sites through Local Consultant.

4. The Second Mission in Japan

The Study Team proposed to the Iraqi Team that the second mission is held in Japan in the end of September 2011 by inviting the Iraqi Team Members to Tokyo. The Iraqi Team will consult with MOE on the above proposal.

Attachment -1-

Minutes of Meeting		
Project:	Study for Development of Southern Large scale Thermal Power Plant in Iraq	
Purpose of Meeting:	Kick Off Meeting	
Time & Date:	10th – 14st July, 2011	
Place/Location:	TEPSCO Amman Office Kempinski Hotel – Amman	
Attended by: **MOE** **JICA** **TEPSCO** **TEPCO** **MITSUI & Co. Ltd.** **UNICO** **TOYO Engineering**	**Attendees:** As per attached (Attendance List)	**Distribution :** **MOE** **JICA** **TEPCO** **TEPSCO** **MITSUI & Co. Ltd.** **UNICO** **TOYO Engineering**
MOM Prepared By: **TEPSCO**		**Date Issued :** 13th July 2011

Endorsed By	
Signature: **Name:**	**Signature:** **Name :**

No	Description	Action
1	**Purpose of Meeting** As per record of discussion between Ministry of Electricity, JICA and the FS study team for the "The Preparatory Study for Development of Southern Large Scale Thermal Power Plant in Iraq", the first meeting has taken place on 10th July, 2011. The main view of the meeting was to agree on the comprehensive framework and term of study.	
2 2.1 2.2	**Opening Remarks** Mr. Fujimagari and Mr. ITO have inaugurated the meeting by welcoming all participants and have expressed the importance of `The Preparatory Study for Development of Southern Large Scale Thermal Power Plant in Iraq`. All participants were introduced and the Kick Off Meeting was initiated.	**Information**
3 3.1 3.2	**Background** Under the chair of Minister Advisor, Mr. Adel Mahdi, the Inception Report which described the framework and term of study was finalized. (Inception Report is attached). Basic Study Information was presented followed by a detailed analysis of the project including Planning, Evaluation of Existing Power Network and then Formulating the Power Network Expansion Plan. Mr. ITO has briefed the purpose of Large Scale Project and has fully explained the four stages of scope of work continued by the methodology of the Project that was revealed as per the attached Schedule.	
4 4.1	**Proposed Sites** Likely Candidates Sites proposed were a) Alkahlaa Amara 1 & 2 b) Hartha 2 c) Nasirya Mr. ITO has confirmed that on August, and during next mission, a site will be selected out of the three candidate sites and will be proposed to MOE after a thorough consideration and study by the FS team. MOE will provide detailed information of the sites as per the outcome of group works in item 5 of this MOM.	

Data Collection

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Fuel Planning expert				
	Fuel Plan				
1	**General Information**				
	Primary Energy Law or Policy	OK	11/07	Mr. Hashem	
	Primary Energy Reserve Inferred (Reserve, Location, Fuel type, etc.)	OK	11/07	Mr. Hashem	
	List of Primary Energy Field (Production, Location, Fuel type etc.) Location map	OK	11/07	Mr. Naseer	
	List of all Infrasturucture of Primary Energy (Refinery, Pipeline, Compressor Station, etc.) Location Map	OK	11/07	Mr. Naseer	
	Long-term Primary Energy Development Plan (including retirement plan) Latest version	OK	11/07	Mr. Naseer	
2	**Demand**				
	Demand (as of from 2006 to 2010 by type of product)	OK	11/07	Mr. Naseer	
	Demand forecast (2015, 2020, 2025, 2030 by type of product)	OK	11/07	Mr. Naseer	
3	**Supply**				
	List of all Infrasturucture of Primary Energy (Refinery, Pipeline, Compressor Station, etc.) Location Map	OK	11/07	Mr. Naseer	
	Characteristics of each fuel (calorific value, composition, specific gravity etc.) (Well-wise)	OK	11/07	Mr. Naseer	Thermal PP Group received the data
	Availability of annual fuel production (Well-wise future prediction)	OK	11/07	Mr. Naseer	
4	**Economy**				
	Actual Fuel Price (at Platform, at refinery, at connection points by fuel type)	OK	11/07	Mr. Adel	
	Forecast of Fuel Price (at Platform, at refinery, at connection points by fuel type)	OK	11/07	Mr. Adel	

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Power Development Planning expert				
1	**Power Development Planning**				
1.1	**General information**				
▵	Electricity Law				
●	Installed Capacity (MW: as of 2010 end) (Fuel type-wise, Area-wise, Owner-wise)	✓			
●	Generated energy (GWh: as of 2010, 2009, 2008, 2007, 2006) (Power plant-wise)		17/07/2011	Mr. Mahdi	through e-mail (especially hydro generation)
●	List of all Power Plants (Output, Owner, Location, Fuel type etc.) List of new power development projects **<FORM-4>**	✓			from WASP data
●	Location Map of all Power Plants		17/07/2011	Mr. Mahdi	through e-mail
●	Latest input data for WASP **<FORM : Electric Data (**.dat file)>**		17/07/2011	Mr. Mahdi	through e-mail
○	Criteria of supply reliability (LOLP value or LOLE value) Unit outage cost (cent/kWh)				from WASP data
●	Long-term Power Development Plan (including retirement plan) Latest version	✓			from WASP data
○	Idea for retirement of power plants	✓			30 years
▵	Policy for promotion of renewable energy	✓			
▵	Power Purchase Agreement with IPP	✓			
▵	Idea (or future plan) for power exchange with neighboring countries	✓			
○	Power exchange with neighboring countries (GWh: as of 2010, 2009, 2008, 2007, 2006) (Interconnected line-wise)	✓			Not interconnected Iran supplies power to isolated areas
▵	Actual results of frequency fluctuations (Method for frequency control)				
▵	Past experience of wide-area Black-out (Caused by power system trouble)				
●	Master plan (2010 Dec.) - Full report (only generation part)		17/07/2011	Mr. Mahdi	through e-mail (additional request)
1.2	**Demand**				
●	Hourly demand (8760hrs 2010, 2009, 2008) **<FORM : FREE,** electric data is preferable**>**		17/07/2011	Mr. Mahdi	through e-mail (Future load profile)
●	Future demand forecast (2015, 2020, 2025, 2030)	✓			by using Master Plan (2010 Dec)
▵	Prediction method of power demand (prediction on the next year, 5 years after, 10 years after)				
1.3	**Power Plant**				
○	Various thermal power plants **<FORM-1: 1 sheet/1 power plant>**				from WASP data
○	Medium scaled or larger hydropower plants **<FORM-2: 1 sheet/1 power plant>**				from WASP data
1.4	**Economic**				
▵	Actual record and prediction of discount rate Past economic indicators (GDP etc.)				
●	Actual record and prediction of fuel price (Coal, Gas, Oil etc.) **<FORM-3>**				from WASP data
○	Cost for new power plant construction (construction cost, annual expenses), cost of existing power plant (construction cost, annual expenses) **<FORM-3>**				from WASP data from team member

Priority: ● highest, ○ high, ▵ medium

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Network Analysis and Transmission Planning expert				
1	**Present Situations of Transmission Network**				
1.1	Transmission Network Diagram	Done	11 July	Mr. Mahdi	
2	**Long term power development plan**				
2.1	Demand forecast, Planned power stations, substations and transmission lines				
3	**Power Flow Diagrams**				
3.1	Power flow diagrams for the existing and the planned power network systems				
4	**PSS/E Data (Version 31) for existing and future networks**				
	Existing network data	Done	11 July	Mr. Mahdi	"sav" data (network data) was provided, and "sld" data (diagram data) will be provided by 26 July.
	Future network data				
5	**Single Line Diagram**				
5.1	Single line diagrams for the existing and the planned power network systems	Done	12 July	Mr. Abbas	
6	**Facility data for existing network system**				
6.1	Power stations with the names of substations, locations, types, nominal voltages, nominal power, reactive power (power factor), step-up transformers (with capacites, impedances and tap positions) and bus configurations **<FORM K-1>**	Done	11 July	Mr. Jasim	These data and information are incluced in PSSE data
6.2	Substation with the names of substations, locations, transformers (types, nominal voltages, capacities, impedances, tap-changers), capacitors, reactors, series capacitors, circuit breakers, dis-connectors and bus configurations **<FORM K-2>**	Done	11 July	Mr. Jasim	These data and information are incluced in PSSE data
6.3	Transmission lines with nominal voltages, from-substations, to-substations, lengths and used conductors **<FORM K-3>**	Done	11 July	Mr. Jasim	These data and information are incluced in PSSE data
7	**Power System Planning Criteria**				
7.1	Power System Planning Criteria **<FORM K-4>**	Done	11 July	Mr. Adel	GRID CODE (Draft version) describing planning critena was provided
8	**Facility data for planned network system**				
8.1	Planned power station **<FORM K-5>**				
8.2	Planned substation **<FORM K-6>**				
8.3	Planned transmission line **<FORM K-7>**				
9	**Design of Transmission Facilities**				
9.1	Typical 400 kV and 132kV Over Head Line towers and conductors	Done	12 July	Mr. Abbas	
9.2	Typical 400 kV substations design, Layout, bus bar configuration	Done	12 July	Mr Abbas	
10	**Cost Estimation of Transmission Facilities**				
10.1	Standard cost for a 400kV substation, 400kV and 132kV transmission line	Done	12 July	Mr. Abbas	

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Expert of Economic / Financial Analysis & Structure for Project Implementation				
	Study on Business Plan				
1	**Structure for Project Implementation of the Power Plant**				
	Referring to the past similar projects such as Al-Musayab Thermal Power Station, we would like to acquire the following information or data.				
1.1	Procedures and Milestones in Iraq Required for Completion of the Power-plant Construction		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will advise FS team in due course if any modification is necessary for the following procedure up to MOE's official announcement for project bidding.* 1) Identification of the project is prepared by MOE/Planning & Studies Office and it has to be confirmation by Minister of Electricity; 2) With project identification, MOE will obtain permission for the selected site for a new power plant from Ministry of Environment and also Ministry of Antiques and Tourism. 3) With permission for site, MOE will obtain confirmation budget from Ministry of Finance and also Ministry of Planning; 4) EIA shall be conducted by the consultant selected by MOE 5) Project announcement is made officially by MOE and bidding procedure will start. *Mr. Mahdi Jasim will ask his colleague in MOE for the required procedures and milestones during the construction period.*
1.2	Government Offices / Agencies Related to the Completion				
(1)	The project team expected to be formed in Iraqi Ministry of Electricity (MOE)* and the team members, and functions and authority thereof		By Jul 25	Mr. Mahdi Jasim	- Planning & Studies Office in MOE/HQ is responsible for developing the project and making decision to proceed for implementation or not. Once it is decided that project should be implemented, then Project Directorate (not in MOE/HQ) under Minister's Deputy for Projects is responsible for the project afterwards such as bidding procedure. - Organization chart for MOE/HQ is received, however, *Organization chart for the whole MOE including other Directorates such as Project Directorates is required.* - Project team for each specific project is formed as if it is a independent department in the Regional Office under DG of Production Project of the Project Directorate.
(2)	The departments / sections of Iraqi Ministry of Environment (MoEn)* in charge of environmental and social consideration, and functions and authority thereof		On Jul 12	Mr. Mahdi Jasim	- Regarding environmental issues, Electricity of MoEn is responsible and they coordinate with MOE/Project Directorate. - Regarding social issues, Municipal Consultant from Provincial Government is responsible and they coordinate with MOE/Project Directorate.
(3)	The departments / sections of Iraqi Ministry of Finance (MOF) and Ministry of Planning (MoP) to handle the ODA Loan for the Project	Done	On Jul 12	Mr. Adel Mahdi	- MOE/Investment and Contract Office is responsible for coordination with MOF and MoP. - MOF/Debit Management Office (Dr. Salah Hadin, Deputy DG) is responsible for Japanese ODA Loan. - MOP/International Cooperation Directorate is responsible for internal coordination in Iraqi Government for Japanese ODA Loan. - MOE identifies project to MOF and MOP with its letter to be approved and identified as a new project.
	We desire to acquire the organization chart of the related offices / agencies of the central and of the provincial respectively, showing the numbers of the members.		By Jul 25	Mr. Mahdi Jasim	*- Organization chart of the related offices / agencies of the central and of the provincial, respectively, showing the numbers of the members.*
				Mr. Mahdi Jasim	<Others> - In case the land for new power plant belongs to MOE, MOE needs to provide project identification to MOF and MoPDC for the use of land for new power plant and to receive approval from MOF. - In this Feasibility Study, it is supposed that MOE secures the land for new power plant in any case
1.3	Training for the Operation and Maintenance of the Plant		Whenever available	Mr. Mahdi Jasim	There are 3 MOE's Training Center in Baghdad, Nasyria, and Mosul) and they are under Training and Development Office of MOE/HQ. Training program at the Training Center may not cover the necessary training program for big-scale combined cycle gas turbine. Meanwhile, MOE is now developing a new training program using simulator for GE gas turbine. *When such a new program is prepared, Mr. Mahdi Jasim will share the information on such program to FS team.*
2	**Economic / Financial Analysis**				
2.1	Iraqi Data / Information to Calculate the Project Cash-flow				
(1)	Project Period (We assume the period at 30 years, if not any specified)	Done		Mr. Mahdi Jasim	It is confirmed that FS team will apply 30 years for this study
(2)	Rate of Inflation	Done		Mr. Mahdi/Mr. Jasim	It is confirmed that FS team will apply data from IMF for inflation rate that will provided by JICA.
	Note: The calculation of the cash flow would be made with use of the US$ unit.				
(3)	Discount Rate (We assume the rate at 10 %, if not any specified)	Done		Mr. Adel Mahdi	It is confirmed that FS team will apply 10 % to discount rate for this study.
(4)	Preoperational Cost to Be Born by the Iraqi Side Required Before the Plant Operation Including the Training Cost	Done		Mr. Adel Mahdi	It is confirmed that MOE advised that 15 % of the total project cost would be for preoperational cost for MOE
(5)	Contents of Spare Parts Required for the Construction and the Operation in the Precedent Cases of the Existing Plants	Done		Mr. Adel Mahdi	It is confirmed that There is no sanction and spare parts required is as usual for a new power plant.
(6)	Electricity Sales Price to Be Set by the Iraqi Authority at the Project-battery Limit		By Jul 25	Mr. Mahdi Jasim	*MOE advised that the current tariff for electricity is as follows:* *1) Domestic, Commercial, Govern mental* - 1 - 1000 Kwh: ID 20/Kwh (= 1.66 cent/Kwh) - 1001 - 2000 Kwh: ID 50/Kwh (= 4.18 cent/Kwh) - 2001 - 3000 Kwh: ID 80/Kwh (= 6.66 cent/Kwh) - 3001 - 4000 Kwh: ID 100/Kwh (= 8.33 cent/Kwh) - 4000 & more Kwh: ID 135/Kwh (= 11.25 cent/Kwh) 2) Industrial and Agricultural - Flat rate ID 120/Kwh (= 10 cent/Kwh) Currently a committee under MOE/Planning & Studies Office is working on new tariff and it will be sent to the FS team when it is ready in 2 weeks even as a draft before the approval of Parliament.
(7)	Transmission Loss Anticipated		By Jul 25	Mr. Mahdi Jasim	MOE advised as follows: - Loss from transmission: 10% (counting technical reason and un-technical reason) - Loss from distribution: 25% *Detail data and information will be sent to the FS team.*
(8)	Cost for Purchasing Fuel at the Plant				
	Raw Gas in a unit of US$ / MMBTU at the Gas-production Site (A new pipeline will be laid from the site to the Plant)	Done		Mr. Mahdi Jasim	No raw gas will not delivered to the power plant but dry gas will be.
	Dry Gas in a unit of US$ / MMBTU at a nearest point on the Strategic Pipeline (A new pipeline will be laid from the pipeline to the Plant)	Done	On Jul 12	Mr. Adel Mahdi	MOE advised that it is expected to be US$3-5/mmbtu MOO is responsible for laying pipeline from the Strategic Pipeline to the new power plant under MOO's budget.
	Crude Oil in a unit of US$ / barrel at a nearest point on the Strategic Pipeline (A new pipeline will be laid from the pipeline to the Plant)	Done	On Jul 12	Mr. Adel Mahdi	MOE advised that it is not necessary to consider crude oil for fuel for this project
	HFO in a unit of US$ / barrel at the Plant (HFO will be transported with a tank truck or train)	Done	On Jul 12	Mr. Adel Mahdi	MOE advised that it is ID 100/MT (=US 8-9 cent/MT) HFO will be transported by a tank truck, train if available and also by pipeline if there is a refinery nearby.
	Note: The other petroleum products such as kerosene and gas oil may not be used considering the product values.	Done	On Jul 13	Mr. Mahdi Jasim	MOE advised that it is not necessary to consider gas oil because it may be used for emergency use only. MOE suggested that FS team apply US$1,000/MT for diesel oil for this study (receiving point for delivery is supposed be at the power plant), which price level derived from international market (Arabian Gulf and Mediterranean Sea Plat).
(9)	An allowance and wages per year for a Plant employee who is classified into a manager class and the others		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Financial Office.*
(10)	Insurance costs of an operation cost (We would get data on how many percent of the EPC cost in the precedent case)		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Generation Office.*
(11)	Other Operating Costs including environment-preservation costs, and consumable costs if necessary.		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Generation Office.*
(12)	Tax rates and the Life Period (we assume the rates at zero because we regard the Plant as an institution under MOE. The life period is not considered because the tax calculation is not necessary)		By Jul 25	Mr. Mahdi Jasim	There is no tax imposed on selling power by MOE. *Import Tax: Mr. Mahdi Jasim will check with MOE/Generation Office.* *Life cycle (depreciation period) for power plant: Mr. Mahdi Jasim will check with MOE/Generation Office.*
2.2	Items to Be Considered for the Economic Analysis				
(1)	Resettlement Costs (We regard that the costs be indicated by the Authority)		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Generation Directorate for the previous example for other projects in the past (how much was paid to people who had to move out the area, paid to how many people?)*
(2)	Land-related Cost (We assume that the land for the Plant, the transformer substation, the transmission tower for the Project be owned by MOE)		By Jul 25	Mr. Mahdi Jasim	MOE shall own the necessary land. And there may be the cases below to secure the land: Case 1: If the land for a new power plant belongs to MOE, the land cost is free. Case 2: If the land belongs to MOF, MOF will allocate the land to MOE (still being owned by MOF) for free. Case 3: If the land belongs to Ministry of Municipalities, approval from the MoM is required and MOE will buy the land. The above is a part of the procedure mentioned in 1.1 above.
(3)	Land-related Costs such as Right of Way, for laying of transmission line, fuel pipeline and water pipeline (The costs are not considered in the Study)		Whenever available	Mr. Mahdi Jasim	Cost of Right of Way is not included in this Feasibility Study because it is MOE's responsibility to secure the required land for power plant, transmission line and water pipeline/canal. Fuel pipeline construction is the responsibility of MOO. *If any more concrete and official information is available, Mr. Mahdi Jasim will provide it to FS team accordingly.*
(4)	Beneficiary Area and Population				
	- Area and Population to be benefitted by the Project		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
	- Electric Power to be consumed per household in the area		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
	- Average number of persons per household in the area		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
	- GDP to be generated in the area		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
3	**Setting of the Operation and Effect Indicators**				
(1)	Circumstances of the Electricity Utilities in the Southern Region, in view of functions, organization, institutions and financial states		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will provide the following information to the FS team:* *- Data on operational Performance of the existing power plants* *- Information on management system of a existing power plant* *- organization chart, responsibility of main divisions, number of employees* *- human resource management (how to recruit required number of employees for new plant and how to train the employees)* *- financial management (how budget is allocated to each power plant, something like financial statement (balance sheet, profit and loss statement for private entity)* *- IT management system (how to manage IT among MOE/HQ and each power plant?)* *- Safety management system (HSE policy available?)* *- Legal management system (Electricity Law?) (Each power plant has legal division? If so, what is the demarcation with Legal Office in MOE/HQ?)*
(2)	Trends and forecasting of the number of power users (residence, commercial and industry)		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with Governorate and provide information to FS team.*
(3)	Trends and forecasting of the electricity tariff		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with Committee in MOE/Planning & Studies Office and provide information to the FS team.*
(4)	Trends and forecasting of the population in the transmission-targeted area		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with Governorate and provide information to the FS team.*

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Memo for discussion on 11 Jul. 2011	Notes
	Mechanical, Electrical and I&C experts				Study Team : Yahashi, Tada, Kawashima	
	Power Plant Planning					
1	**General Information**					
1.1	Domestic Law applicable to Power Plant		(Sep-B-2011)	Mr. Adel Mr. Abbas	Ministry of Electricity (MOE) will issue authorization within one (1) week after selection of FS object site will be completed by Study Team. Then site specific requirements will be informed to Study Team within two (2) week. (Sep-B is expected.) Ministry of Planning will provide the local regulation including environmental issues. Except those regulations, general international standard can be applied for this study.	
1.2	Domestic Codes and Standards applicable to Power Plant		Jul-31-2011	MOE - Planning & Studies Office	There are domestic safety and health regulations (written by Arabic). MOE will check it with Ministry of Workers and kindly translate it into English for this study. Study Team appreciated MOE's cooperation.	
1.3	Grid Connection interface conditions (Electrical and I&C)		(Sep-B-2011)	MOE - Planning & Studies Office	MOE explained the grid connection interface condition as follows. 1. New power plant must be connected to 400kV network. 2. 400kV Switchyard shall be 1-1/2 circuit breaker configuration. 400kV shall be connected to 132kV via auto-transformer. MOE prefer GIS. 3. System parameters shall be studied by MOE using PSSE software considering LFC, AGC and economic dispatch for Iraqi network. 4. Control system for new power plant shall include SCADA system to communicate with dispatch control center. 5. Diesel oil (HSD) shall be used for back-up fuel for gas turbine. 6. Emergency diesel engine generator shall be provided for safe shut down. Black start capability is not required.	
					7. Gas regulation system (GRS) shall be provided in the plant. MOE expect to apply new natural gas pipe lina to be provided by Ministry of Oil (MOO). Supply pressure and gas component will be informed by MOO. 8. Typical singla line diagram will be provided by MOE within two (2) weeks after selection of FS object site will be completed by Study Team. 9. Study team will request MHI to provide the GTG/STG parameters for PSSE system study by MOE. 10. MOE passed the draft information on grid (grid code rev 2.2). Update version will be provided when issued.	
1.4	Permits and Permitting process required for Power Plant		Any time	MOE - Planning & Studies Office	MOE explained permits required for the project as follows. Land Acquisition : 6 months Fuel : MOO Environment : Ministry of Environment (MOEN) For new location, min two (2) months are required. Three (3) to six (6) months are required in general. Heritage : Not applicable for this project Water : Application only for Ministry of Water Resources Approval by Ministry of Agriculture and MOEN is required. Once through river water cooling is not permitted, since lack of river water is expected in future. For existing location, the required duration is quite shorter because the required process is extension only. MOE commented that no permission is required for water resources and heritage for candidate locations. Permission of land, fuel, environment and agriculture will be required. During this discussion, MOE explained that one (1) through cooling system is NOT allowed by government. FS team noted it.	
1.5	Applicability and Acceptability of International Codes and Standards for Power Plant	X	Jul-11-2011	Mr. Adel Mr. Abbas	See above items 1.1 and 1.2.	
1.6	Applicability and Acceptability of English Language for Power Plant	X	Jul-11-2011	Mr. Adel Mr. Abbas	English shall be applied for all the documentation, labels in plants and DCS operator graphic display. No Arabic indication shall be provided.	
1.7	Requirement for Local Content	X	Jul-11-2011	Mr. Adel Mr. Abbas	There is no regulation for percentage of local content to the project. In other words, there is no limitation for international contractors and suppliers.	
2	**Construction Contractor Information**					
2.1	Local (Iraq domestic) Construction Contractors Information - Company Name and Contact - Company general Information (sales, fields, resources, experience etc.) - Experience in construction (Civil, Erection, General) of Power Plants		Jul-31-2011	MOE - Planning & Studies Office	MOE will provide the available construction contractor information in e list format.	
2.2	International Construction Contractors (being active in Iraq) Information - Company Name, Country and Contact - Company general Information (sales, fields, resources, experience etc.) - Experience in construction (Civil, Erection, General) of Power Pla		Jul-31-2011	MOE - Planning & Studies Office	MOE will provide the available construction contractor information in e list format.	
3.	**Additional Information**					
3.1	Gas Turbine Configuration		Jul-11-2011	Mr. Adel Mr. Abbas	1. Basically, larger gas turbine is preferable. F class gas turbines, such as M701F, is applicable. 2. MOE has no experience on single shaft configuration. Study team introduced some websites for information. Study team will include comparative study for single-shaft and multi-shaft configuration in the report. 3. MOE has no experience on bypass stack. Study team will include comparative study for with or without bypass stack.	
3.2	Diesel Oil (HSD)		Jul-31-2011	MOE - Planning & Studies Office	1. Sulfur content < 0.5% MOE will provide detailed specification for diesel oil. 2. Back up storage capacity is 15 days for continuous rated power operation of the plant.	
3.3	Cooling Tower Make-up Water		(Sep-B-2011)	MOE - Planning & Studies Office	There is no general criteria for river water consumption and MOE will advise the requirements to Study Team after selection of FS object site. In Nasirya, the existing power plant is consuming 600 ton /h make-up water for a 200MW STG. (4 STGs are installed in Nasirya existing power station.)	

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Civil Engineering and Geology experts				
	Natural condition of site				
1	**Meteorological Condition**				
	Ambient temperature : Annual average, Annual High/Low Annual average, Maximum monthly average, Minimum monthly average, Maximum temperature, Minimum temperature		11-Jul	MOE	Try to collect
	Ambient relative humidity : Annual average, Annual High/Low		11-Jul	MOE	Try to collect
	Wind speed:Annual average, Annual high, Wind direction		11-Jul	MOE	Try to collect
	Rainfall amount : Monthly average, Annual average, Maximum annual average, Maximum per 24 hrs in 10 years		11-Jul	MOE	Try to collect
	Atmospheric pressure : Monthly average, Annual average, Annual High/Low		11-Jul	MOE	Try to collect
2	**Geographical condition**				
	Land utilization situation		11-Jul		Nasirya;available Hartha 2;need to get permission (6months) Amara ;need to get permission (6months)
	Topographic map 1/100,000[more accurate with contour line]		11-Jul	MOE	Available to be provided by soft copy
	Bathymetric chart [sea/river]		11-Jul	MOE	Try to collect existing power plant site(Nasirya, Hartha)
	GPS coordination of each site		11-Jul	MOE	Available
3	**Geotechnical condition (the site or near the existing structure's information)**				
	Geotechnical survey result [bearing layer, Geological column] 【the site or near the existing structure's information】 Geological maps and documents + 1/200,000 geological map (project area) + Information of latest geological studies surrounding the project area ~~+ Map of Land use and vegetation~~ + Map of surface geology + Map of Land Use ~~+ Record of historical floods~~ ~~+ Record of historical earthquakes~~		11-Jul	MOE	Try to collect and be collected by soft copy
4	**Water condition (the site or near gauging station(notice location information)) 【For Sea water, River/Channel water, Lake water, Underground water, Industrial water】**				
	Water source/ Distance from the site		11-Jul	MOE	Try to collect
	Available usage amount		11-Jul	MOE	Try to collect
	Discharge flow rate [High, Average, Minimum], Flow velocity 【only River/Channel water】		11-Jul	MOE	Try to collect (for 30 years)
	Intake water volume of the existing industrial/irrigation plant water near the site (notice location information)		11-Jul	MOE	Try to collect Cooling system Can't apopt once-through cooling systemy
	Source, Supply capacity, Fee 【only industrial water (notice location information)】		11-Jul		Not available (No information)
	Water quality for Thermal Power plant		11-Jul	MOE	Try to collect
	Water temperature [Annual Average, Maximum, Minimum]		11-Jul	MOE	Try to collect (for 30 years)
	Water Level [High, Average, Minimum]		11-Jul	MOE	Try to collect (for 30 years)
	Effect of tidal wave		11-Jul	MOE	Try to collect
	~~Flood historical~~				
	Wave data [Hmax, Hmin, H1/3:significant wave height]		11-Jul	MOE	Try to collect (for 30 years)
5	**Natural environmental condition (the site or near gauging station(notice location information))**				
	Ambient air quality [NOx, SOx, Particulate, CO etc.]				[to be collected by Environmental Group]
	Noise				[to be collected by Environmental Group]
	Vibration				[to be collected by Environmental Group]
	Precious animals/plants				[to be collected by Environmental Group]
	Conservation area				[to be collected by Environmental Group]
6	**Material and equipment transportation condition**				
	Water way [near port unloading more than 1,000DWT class (notice location information)	done	11-Jul	MOE	Nasirya; Impossible from Umm Qasr port Harthn;Possible from Umm Qasr port Amara;Impossible
	Rail terminal (notice location information)	done	11-Jul	MOE	Impossible for heavy eqipments
	Road way [width, capacity load of road and bridge, route from near port and rail terminal]	done	11-Jul	MOE	3 candidate sites ;recommendable
7	**Disaster situation**				
	Seismic [Historical record of earthquake, Map of Quaternary Era Faults, Seismic design (seismic hazard zoning map etc.)		11-Jul	MOE	Try to collect
	Flood historical		11-Jul	MOE	Try to collect
	Map of Wadi / Shaib histrical		11-Jul	MOE	Try to collect
8	**Fuel condition**				
	Fuel source / Distance from site				[to be collected by Fuel Group]
	Supply capacity, Pipe diameter, Pressure, Cost	×	11-Jul	MOE	Pipe diameter: Main Pipe 42inch, Fuel Cost:will provide international cost
	Fuel Quality				[to be collected by Fuel Group]

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes 11 July 2011
	Environmental Consideration experts				
	Activities for Environmental Influence of the Power Construction				
1	**Current Situation of Natural Environment**				
1.1	Ecosystems of Iraq (1) National Biodiversity Strategy (2) Important fauna and flora (Red Data Book) (3) List of important ecosystems with their descriptions and maps (4) Vegetation maps				(1) The Study Team has already obtained the "Iraq 4th National Report to the Convention on Biological Diversity". (2) Dr. Mohammed will investigate the Red Data Book of Iraq. (3) It may be difficult to obtain the information but Dr. Mohammed will investigate it. (4) Although there are not vegetation maps, there may be a list of vegetation types. Dr. Mohammed will look for the list.
1.2	Existing protected areas (1) Supporting laws (2) Description of each protected area with its map (including Ramsar sites and World Heritage sites)				(1) Dr. Mohammed will look for the laws. (2) Dr. Mohammed will look for the maps.
1.3	Proposed protected areas (1) Future plan of new protected areas (including Ramsar sites and World Heritage sites) (2) Description of each protected area with its map				(1), (2) It seems that the Ministry of Environment does not have definite plan yet. Dr. Mohammed will investigate the situation.
2	**Current Situation of Social Environment**				
2.1	Standards (air, water and noise) (1) Policy of the government (2) Related laws (3) Related issues and problems				Regarding the standard, Dr. Mohammed will look for the current standards.
2.2	Solid waste management especially regulations of dumping site (1) Policy of the government (2) Related laws (3) Related issues and problems				Solid waste management is a mandate of each provincial government. Once F/S site is selected, the situation in that provincial government needs to be investigated.
2.3	Labour conditions (1) Policy of the government (2) Related laws (3) Related issues and problems				Management of labour conditions is a mandate of each provincial government. Once F/S site is selected, the situation in that provincial government needs to be investigated.
2.4	Health standards (1) Policy of the government (2) Related laws (3) Related issues and problems				Regarding the status of infectious diseases, Dr. Mohammed will look for the statistics.
2.5	Aviation regulation (especially height of facilities near airport) (1) Policy of the government (2) Related laws (3) Related issues and problems				Dr. Mohammed will investigate regulations on lights of high tower, indicators of power lines.
2.6	Land transportation (1) Policy of the government (2) Related laws (3) Related issues and problems				Dr. Mohammed will investigate regulations on transportation infrastructure.
2.7	Expropriation of land and resettlement (1) Policy of the government (2) Related laws (3) Related issues and problems				Dr. Mohammad will investigate related laws especially Law No. 12, 1981.
2.8	Information disclosure (1) Policy of the government (2) Related laws (3) Related issues and problems				In Iraq, all projects are announced officially in local news paper in Arabic. Dr. Mohammed will inform the detailed information on it. There is no information on stakeholders' meeting
2.9	Ethnic minorities and the socially vulnerable (1) Policy of the government (2) Related laws (3) Current status of them (4) Related issues and problems				In the southern Iraq, the society is stable. Regarding the Marsh Arab, they live in the marsh, it is unlikely that the project gives any negative impacts to them.
2.10	Cultural and historic sites (1) Related laws (2) Current status of them: description of each site with its map				Based on the information collected by the Study Team, there will be no problem regarding impacts induced by the project. Dr. Mohammed will investigate the exact location of Ur proposed World Heritage site near Narsirya.
2.11	NGO's Activities (1) List of NGOs (Directorate General of Foundation, Associations, and Private NGOs) (2) Information of NGOs' activities				There are many political NGOs and it is unlikely that these NGOs have concerns on the project.
2.12	Permission and authorization (license) for construction of thermal plant (1) Related laws and regulations (2) Related issues and problems				Dr. Mohammed will investigate these permissions, licenses, and certificates.
3	**Environmental Impact Assessment**				
3.1	Framework of EIA (1) Related laws (2) Main authority's activities (3) Guidelines				Dr. Mohammed will ask the Ministry of Environment about the details of the latest EIA regulations and procedures.
3.2	Existing Approved EIA Reports (1) Approved EIA Reports (including resettlement with Thermal Plant Construction) (2) Related issues and problems, if any				The Study Team obtained the EIA report of Akkaz project in north western Iraq.
4	**Natural environmental condition [the site or near gauging station(notice location information)]**				
4.1	Ambient air quality [NOx, SOx, Particulate, CO etc.]				Dr. Mohammed will investigate data from the existing thermal plants and stations of the Ministry of the Environment.
4.2	Noise				Dr. Mohammed will investigate data from the existing thermal plants and stations of the Ministry of the Environment.
4.3	Vibration				Dr. Mohammed will investigate data from the existing thermal plants and stations of the Ministry of the Environment.

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Operation & Maintenance expert				
	Structure for Operation and Maintenance of the Plant				
1	**Organization**				
1.1	Organization of Ministry of Electricity (MOE)	√	12/7/2011	MOE	
1.2	Organization of each province	√	12/7/2011	MOE	Each Province is under MOE Management
	Members of employment in each department if any	√	12/7/2011	MOE	Total No. of employees is 100k, including Labor, Technicians, Engineers. Engineers consist about 30% of Total No.
1.3	Typical organization of Power Station				
	Members of employment in each department especially, Operation Group, Maintenance Group shall be designed in details.	√	12/7/2011	MOE	
					For example Hartha, Boiler and Turbine Dept. has 182 personnel. Electrical 110, Control 60, Operater 160, Water Treatment 80.
2	**Structure for Operation and Maintenance of the Plant**				
2.1	Shift Engineer	√	12/7/2011	MOE	4 Shifts
	How many shifts do you have for one day operation?				
	Working time per shift				8 Hours, two days morning shifts and another two days day time shift and two days night time shift and the last two days are off
2.2	Plant Operation System	√	12/7/2011	MOE	
3	**Communication Method between Shifts**				
3.1	Is it a Shift Repeat Transfer next shift?	√	12/7/2011	MOE	Once shift is ended, any information transfers to the next shift by meeting.
3.2	Is it Sample Maintenance carried out shift operation?	√	12/7/2011	MOE	Daily Maintenance, Green card (Program Maintenance), Red Card (emergency) and yellow Card (Operation Maintenance) according to Patrol of Operator.
4	**Operational Training and Its Programs**				
4.1	Do you have operation Training program? If so, please provide us in details.	√	12/7/2011	MOE	They conduct training programs, detailed information will be provided within two weeks.
5	**Maintenace**				
5.1	Shift Engineer				
5.2	The Number of maintenance staff				
5.3	Working time				
6	**Workshop**				
6.1	Do you have workshop in each thermal power plant for maintenance purposes?	√	12/7/2011	MOE	They have 3 workshops for large maintenance repair purposes and each power plant has workshop for daily maintenance.
	Layout of workshop				will be provided within one month.
	Name of machinery				will be provided within one month.
	The Number of workers				will be provided within one month.
7	**Maintenance Interval**				
7.1	Do you have any problems in Maintenance intervals?	√	12/7/2011	MOE	One year interval which simple file maintenance. Two Years interval which open inspection with Turbine. 4 years maintenance and major inspection.
7.2	Do you have Periodical Inspection, Maintenance?				
	Turbine Field				
	Boiler (water treatment)				
	B.O.P				
7.3	Precaution Maintenance	√	12/7/2011	MOE	Daily Maintenance, Green card (Program Maintenance), Red Card (emergency) and yellow Card (Operation Maintenance) according to Patrol of Operator.
7.4	Maintenance Cost per year				Will be provided within one month.
8	**Spare Parts Management**				
8.1	Do you have any problems in Maintenance spare parts?				Lack of Spare Parts.
	Spare parts management system				
	Budgetary Control for purchase of spare parts. If you have flowchart, please provide				Will be provided within one month.
9	**Training**				
9.1	Do you have Maintenance Training program? If so, please provide us in details.				Will be provided within one month.

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No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Power Development Planning expert				
	Power Development Planning				
	Generated energy (GWh: as of 2010, 2009, 2008, 2007, 2006) (especially Hydro Power plant)		17/7/2011	Mr. Mahdi	through e-mail (especially hydro generation)
	Location Map of all Power Plants		17/7/2011	Mr. Mahdi	through e-mail
	Latest input data for WASP <FORM : Electric Data (**.dat file)>		17/7/2011	Mr. Mahdi	through e-mail
	Master plan (2010 Dec.) - Full report (only generation part)		17/7/2011	Mr. Mahdi	through e-mail
	Future load profile		17/7/2011	Mr. Mahdi	through e-mail (Future load profile)
	Network Analysis and Transmission Planning expert				
2	**Long term power development plan**				
2.1	Demand forecast, Planned power stations, substations and transmission lines		By 26 July	Mr. Mahdi	These data and information will be incluced in PSSE data
3	**Power Flow Diagrams**				
3.1	Power flow diagrams for the existing and the planned power network systems		By 26 July	Mr. Mahdi	Load Flow Profile File for the existing and future network
4	**PSS/E Data (Version 31) for existing and future networks**				
	Future network data		By 26 July	Mr. Mahdi	Network data for year 2015 and 2020 will be provided by E-mail by 26 July, and available data for other year will also be provided
8	**Facility data for planned network system**				
8.1	Planned power station <FORM K-5>		By 26 July	Mr. Mahdi	These data and information will be incluced in PSSE data
8.2	Planned substation <FORM K-6>		By 26 July	Mr. Mahdi	These data and information are incluced in PSSE data
8.3	Planned transmission line <FORM K-7>		By 26 July	Mr. Mahdi	These data and information are incluced in PSSE data

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No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Expert of Economic / Financial Analysis & Structure for Project Implementation				
	Study on Business Plan				
1	**Structure for Project Implementation of the Power Plant**				
	Referring to the past similar projects such as Al-Musayab Thermal Power Station, we would like to acquire the following information or data.				
1.1	Procedures and Milestones in Iraq Required for Completion of the Power-plant Construction		By Jul 25	Mr. Mahdi	*Mr. Mahdi Jasim will advise FS team in due course if any modification is necessary for the following procedure up to MOE's official announcement for project bidding:* 1) Identification of the project is prepared by MOE/Planning & Studies Office and it has to be confirmation by Minister of Electricity; 2) With project identification, MOE will obtain permission for the selected site for a new power plant from Ministry of Environment and also Ministry of (Heritage???). 3) With permission for site, MOE will obtain confirmation budget from Ministry of Finance and also Ministry of Planning; 4) EIA shall be conducted by the consultant selected by MOE; 5) Project announcement is made officially by MOE and bidding procedure will start. *Mr. Mahdi Jasim will ask his colleague in MOE for the required procedures and milestones during the construction period.*
1.2	Government Offices / Agencies Related to the Completion				
(1)	The project team expected to be formed in Iraqi Ministry of Electricity (MOE)* and the team members, and functions and authority thereof		By Jul 25	Mr. Mahdi	- Planning & Studies Office in MOE/HQ is responsible for developing the project and making decision to proceed for implementation or not. Once it is decided that project should be implemented, then Project Directorate (not in MOE/HQ) under Minister's Depty for Projects is responsible for the project afterwards such as bidding procedure. - Organization chart for MOE/HQ is received, *however, Organization chart for the whole MOE including other Directorates such as Project Directorates is required.* - Project team for each specific project is formed as if it is a independent department in the Regional Office under DG of Production Project of the Project Directorate.
"	We desire to acquire the organization chart of the related offices / agencies of the central and of the provincial, respectively, showing the numbers of the members.		By Jul 25	Mr. Mahdi Jasim	*- Organization chart of the related offices / agencies of the central and of the provincial, respectively, showing the numbers of the members.*
1.3	Training for the Operation and Maintenance of the Plant		Whenever available	Mr. Mahdi Jasim	There are 3 MOE's Training Center in Baghdad, Nasyria, and Mosul) and they are under Training and Development Office of MOE/HQ. Training program at the Training Center may not cover the necessary training program for big-scale combined cycle gas turbine. Meanwhile, MOE is now developing a new training program using simulator for GE gas turbine. *When such a new program is prepared, Mr. Mahdi Jasim will share the information on such program to FS team.*
2	**Economic / Financial Analysis**				
2.1	Iraqi Data / Information to Calculate the Project Cash-flow				
	Note: The calculation of the cash flow would be made with use of the US$ unit.				
(6)	Electricity Sales Price to Be Set by the Iraqi Authority at the Project-battery Limit		By Jul 25	Mr. Mahdi Jasim	*MOE advised that the current tariff for electricity is as follows:* *1) Domestic, Commercial, Governmental* *- 1* - 1000 Kwh: ID 20/Kwh (= 1.66 cent/Kwh) - 1001 - 2000 Kwh: ID 50/Kwh (= 4.16 cent/Kwh) - 2001 - 3000 Kwh: ID 80/Kwh (= 6.66 cent/Kwh) - 3001 - 4000 Kwh: ID 100/Kwh (= 8.33 cent/Kwh) - 4000 & more Kwh: ID 135/Kwh (= 11.25 cent/Kwh) 2) Industrial and Agricultural - Flat rate ID 120/Kwh (= 10 cent/Kwh) Currently a committee under MOE/Planning & Studies Office is working on new tariff and it will be sent to the FS team when it is ready in 2 weeks even as a draft before the approval of Parliament.
(7)	Transmission Loss Anticipated		By Jul 25	Mr. Mahdi Jasim	MOE advised as follows: - Loss from transmission: 10% (counting technical reason and un-technical reason) - Loss from distribution: 25% *Detail data and information will be sent to the FS team.*
(9)	An allowance and wages per year for a Plant employee who is classified into a manager class and the others		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Financial Office.*
(10)	Insurance costs of an operation cost (We would get data on how many percent of the EPC cost in the precedent case)		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Generation Office.*
(11)	Other Operating Costs including environment-preservation costs, and consumable costs if necessary.		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Generation Office.*
(12)	Tax rates and the Life Period (we assume the rates at zero because we regard the Plant as an institution under MOE. The life period is not considered because the tax calculation is not necessary)		By Jul 25	Mr. Mahdi Jasim	There is no tax imposed on selling power by MOE. *Import Tax: Mr. Mahdi Jasim will check with MOE/Generation Office.* *Life cycle (depreciation period) for power plant: Mr. Mahdi Jasim will check with MOE/Generation Office.*
2.2	Items to Be Considered for the Economic Analysis				
(1)	Resettlement Costs (We regard that the costs be indicated by the Authority)		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with MOE/Generation Directorate for the previous example for other projects in the past (how much was paid to people who had to move out the area, paid to how many people?)*
(2)	Land-related Cost (We assume that the land for the Plant, the transformer substation, the transmission tower for the Project be owned by MOE)		By Jul 25	Mr. Mahdi Jasim	MOE shall own the necessary land. And there may be the cases below to secure the land: Case 1: If the land for a new power plant belongs to MOE, the land cost is free. Case 2: If the land belongs to MOF, MOF will allocate the land to MOE (still being owned by MOF) for free. Case 3: If the land belongs to Ministry of Municipalities, approval from the MoM is required and MOE will buy the land. The above is a part of the procedure mentioned in 1.1 above.
(3)	Land-related Costs such as Right of Way, for laying of transmission line, fuel pipeline and water pipeline (The costs are not considered in the Study)		Whenever available	Mr. Mahdi Jasim	Cost of Right of Way is not included in this Feasibility Study because it is MOE's responsibility to secure the required land for power plant, transmission line and water pipeline/canal. Fuel pipeline construction is the responsibility of MOO. *If any more concrete and official information is available, Mr. Mahdi Jasim will provide it to FS team accordingly.*
(4)	Beneficiary Area and Population				
	- Area and Population to be benefitted by the Project		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
	- Electric Power to be consumed per household in the area		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
	- Average number of persons per household in the area		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
	- GDP to be generated in the area		By Jul 25	Mr. Mahdi Jasim	*Mr. Mahdi Jasim will check with the provincial government and/or any other possible ministries and provide information to FS team.*
3	**Setting of the Operation and Effect Indicators**				
(1)	Circumstances of the Electricity Utilities in the Southern Region, in view of functions, organization, institutions and financial states		By Jul 25	Mr. Mahdi	*Mr. Mahdi Jasim will provide the following information to the FS team:* *- Data on operationnal Performance of the existing power plants.* *- Information on management system of a existing power plant:* *- organization chart, responsibility of main divisions, number of employees* *- human resource management (how to recruit required number of employees for new plant and how to train the employees)* *- finacial management (how budget is allocated to each power plant, something like financial statement (balance sheet, profit and loss statement for private entity))* *- IT management system (how to manage IT among MOE/HQ and each power plant?)* *- Safety management system (HSE policy available?)* *- Legal management system (Electricity Law?) (Each power plant has legal division? If so, what is the demarkation with Legal Office in MOE/HQ?)*
(2)	Trends and forecasting of the number of power users (residence, commercial and industry)		By Jul 25	Mr. Mahdi	*Mr. Mahdi Jasim will check with Governate and provide information to FS team.*
(3)	Trends and forecasting of the electricity tariff		By Jul 25	Mr. Mahdi	*Mr. Mahdi Jasim will check with Committee in MOE/Planning & Studies Office and provide information to the FS team.*
(4)	Trends and forecasting of the population in the transmission-targeted area		By Jul 25	Mr. Mahdi	*Mr. Mahdi Jasim will check with Governate and provide information to the FS team.*

RE-QUESTIONNAIRES Jul-13-2011

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Mechanical, Electrical and I&C experts				
	Power Plant Planning				
1	**General Information**				
1.1	Domestic Law applicable to Power Plant				
	Ministry of Electricity (MOE) will issue authorization for selection of FS site within one (1) week after selection of FS object site will be completed by Study Team. Then site specific requirements will be informed to Study Team within two (2) week. (Sep-B is expected.)		(Sep-B-2011)	MOE - Planning & Studies Office	
	Ministry of Planning will provide the local regulation including environmental issues. Except those regulations, general international standard can be applied for this study.		(Sep-B-2011)	MOE/MOP	
1.2	Domestic Codes and Standards applicable to Power Plant				
	There are domestic safety and health regulations (written by Arabic). MOE will check it with Ministry of Workers and kindly translate it into English for this study.		Jul-31-2011	MOE - Planning & Studies Office	
1.3	Grid Connection interface conditions (Electrical and I&C)				
	Typical single line diagram will be provided by MOE within two (2) weeks after selection of FS object site will be completed by Study Team.		(Sep-B-2011)	MOE - Planning & Studies Office	
	MOE passed the draft information on grid (grid code rev 2.2). Update version will be provided when issued.		End of Aug. 2011	MOE - Planning & Studies Office	
1.4	Permits and Permitting process required for Power Plant				
	Update of the information for permits.		Any time	MOE - Planning & Studies Office	
2	**Construction Contractor Information**				
2.1	Local (Iraq domestic) Construction Contractors Information - Company Name and Contact - Company general information (sales, fields, resources, experience etc.) - Experience in construction (Civil, Erection, General) of Power Plants				
	MOE will provide the available construction contractor information in a list format.		Jul-31-2011	MOE - Planning & Studies Office	
2.2	International Construction Contractors (being active in Iraq) Information - Company Name, Country and Contact - Company general information (sales, fields, resources, experience etc.) - Experience in construction (Civil, Erection, General) of Power Plants				
	MOE will provide the available construction contractor information in a list format.		Jul-31-2011	MOE - Planning & Studies Office	
3.	**Additional Information**				
3.2	Diesel Oil (HSD)				
	MOE will provide update detailed specification for diesel oil.		Jul-31-2011	MOE - Planning & Studies Office	
3.3	Cooling Tower Make-up Water				
	MOE will advise the requirements to Study Team after selection of FS object site.		(Sep-B-2011)	MOE - Planning & Studies Office	

No.	Necessary Data for the Study Documents or Reports	Date	From Whom	Notes
	Environmental Consideration experts			
	Activities for Environmental Influence of the Power Construction			
1	**Current Situation of Natural Environment**			
1.1	Ecosystems of Iraq (1) Important fauna and flora (Red Data Book) (2) List of important ecosystems with their descriptions and maps (3) List of vegetation types	29-Jul-11	Dr. Mohammed	
1.2	Existing protected areas (1) Supporting laws (2) Description of each protected area with its map (including Ramsar sites and World Heritage sites)	29-Jul-11	Dr. Mohammed	
1.3	Proposed protected areas (1) Future plan of new protected areas (including Ramsar sites and World Heritage sites) (2) Description of each protected area with its map	29-Jul-11	Dr. Mohammed	
2	**Current Situation of Social Environment**			
2.1	Standards (air, water and noise) (1) Standards (2) General information on laws and policy	29-Jul-11	Dr. Mohammed	
2.2	Health standards (1) Statistics on infectious diseases	29-Jul-11	Dr. Mohammed	
2.3	Aviation regulation (especially height of facilities near airport) (1) Regulations	29-Jul-11	Dr. Mohammed	
2.4	Land transportation (1) Regulations on infrastructure	29-Jul-11	Dr. Mohammed	
2.5	Expropriation of land and resettlement (1) The related law and procedure	29-Jul-11	Dr. Mohammed	
2.6	Information disclosure (1) Details of official announce system of each project	29-Jul-11	Dr. Mohammed	
2.7	Ethnic minorities and the socially vulnerable (1) Other general information on policy	29-Jul-11	Dr. Mohammed	
2.8	Cultural and historic sites (1) Details information of Ur proposed World Heritage Site	29-Jul-11	Dr. Mohammed	
2.9	Permission and authorization (license) for construction of thermal plant (1) Detailed procedure and information on permissions, licenses and certificates for project realization.	29-Jul-11	Dr. Mohammed	
3	**Environmental Impact Assessment**			
3.1	Framework of EIA (1) Related law and guidelines (2) Details of the latest procedure	29-Jul-11	Dr. Mohammed	

Attachment - 4

Confirmed Conditions

<Power Development Planning>

1. Future demand forecast of the Master Plan 2010 will be applied to the study.

<Power Plant Design>

2. Once through river water cooling is not permitted, since shortage of river water is expected in future.
3. New power plant must be connected to 400kV network. 400kV Switchyard shall be 1-1/2 circuit breaker configuration. 400kV shall be linked to 132kV via auto-transformer.
4. System parameters shall be studied by MOE using PSSE software considering LFC, AGC and economic dispatch for Iraqi network.
5. Control system for new power plant shall include SCADA system to communicate with dispatch control centre.
6. Diesel oil shall be used for back-up fuel for gas turbine. Back up storage capacity of diesel oil is 15 days for continuous rated power operation of the plant.
7. Emergency diesel engine generator shall be provided for safe shut down. Black start capability is not required.
8. Gas regulation system (GRS) shall be included in the Project. MOE expects to apply new natural gas pipe line to be provided by Ministry of Oil (MOO).
9. English shall be applied for all the documentation, labels in plants and DCS operator graphic display.

Candidate Site Selection

No.	Necessary Data for selection of 3 candidate sites Documents or Reports
1	**Power Network**
	The Whole Power System Structure in Iraq
	Distance from 400kV Network
2	**Water condition [the site or near gauging station(notice location information)] 【For Sea water, River/Channel water, Lake water, Underground water, Industrial water 】**
	Water source/ Distance from the site
	Available Water Flow Rate (m^3/s)
	Discharge flow rate [High, Average, Minimum], Flow velocity 【only River/Channel water】
	Intake water volume of the existing industrial/irrigation plant water near the site (notice location information)
	Water quality for Thermal Power plant
	Water temperature [Annual Average, Maximum, Minimum]
	Water Level [High, Average, Minimum]
	Effect of tidal wave
	Wave data [Hmax, Hmin, H1/3:significant wave height]
4	**Transportation of Heavy Load**
	Transportation Method (River, Overland, Railway)
	Weight Limits (Bridge, Road, Water Depth of River in Dry)
	Dimension Limits (Bridge, Road, Tunnel, Width of River in Dry)
5	**Site area**
	Detailed Site Map

Candidate Site Selection

6	**Natural condition**
6-1	**Meteorological Condition**
	Ambient temperature : Annual average, Annual High/Low Annual average, Maximum monthly average, Minimum monthly average, Maximum temperature, Minimum temperature
	Ambient relative humidity : Annual average, Annual High/Low
	Wind speed:Annual average, Annual high, Wind direction
	Rainfall amount : Monthly average, Annual average, Maximum annual average, Maximum per 24 hrs in 10 years
	Atmospheric pressure : Monthly average, Annual average, Annual High/Low
6-2	**Disaster condition**
	Seismic [Historical record of earthquake, Map of Quaternary Era Faults, Seismic design (seismic hazard zoning map etc.)
	Flood historical
	Map of Wadi / Shaib historical
7	**Topography / Geology**
7-1	**Geographical condition**
	Topographic map 1/100,000[more accurate with contour line]
	Bathymetric chart [river]
	GPS coordinate of each site
7-2	**Geotechnical condition [the site or near the existing structure's information]**
	Geotechnical survey result [bearing layer, Geological column] 【the site or near the existing structure's information】 Geological maps and documents + 1/200,000 geological map (project area) + Information of latest geological studies surrounding the project area + Map of surface geology + Map of Land Use
8	**Fuel**
	Gas Availability and Accessability
	Pressure and Temperature at Connection Point
10	**Environmental Considerations**
	Resettlement (houses, farmlands, cemetery, etc.)
	Protected Areas (e.g. proposed National Park), World Heritages, etc.
	Endangered species
	Socially vulnerable people (including water right, fisheries in river)
	Industrial Site Applicability
	Environmental conditions [Ambient air quality (NOx, SOx, Particulate, CO etc.), noise, vibration]

Attachment - 1.2 Minutes of Meeting (1.5th Mission)

MINUTES OF MEETING
ON
THE 1.5th MISSION OF THE
PREPARATORY STUDY FOR DEVELOPMENT OF SOUTHERN LARGE SCALE THERMAL POWER PLANT IN IRAQ

AGREED UPON BETWEEN
MINISTRY OF ELECTRICITY OF IRAQ
AND
THE STUDY TEAM OF
JAPAN INTERNATIONAL COOPERATION AGENCY

AMMAN, 23 August, 2011

MINISTRY OF ELECTRICITY

23/08/2011

Adel Hameed Mahdi
Minister Advisor
Ministry of Electricity in Iraq

THE JICA STUDY TEAM

Masayuki ITO 23.08.11
Team Leader
JICA Study Team

The Japan International Cooperation Agency (hereinafter referred to as JICA) organized and dispatched the Study Team for the Preparatory Study for Development of Southern Large Scale Thermal Power Plant (referred to as the Study) in Iraq.

1. Kick-off Meeting

The Study Team Leader, Mr. Masayuki ITO, held a kick-off meeting with the Iraqi Team led by Mr. Adel Hameed Mahdi on August 21, 2011. The Study Team explained the following items.

- Schedule of the 1.5th mission
- Selection of FS object site
- FS site survey plan
- EIA study for the FS site

The main points of discussion and agreements reached during the meeting are as follows:

1) The Study Team and the Iraqi Team agreed that the 1.5th mission should be executed based on the schedule submitted by the Study Team.
2) The Study Team and the Iraqi Team agreed that Nasiryah II was selected as the FS object site.

2. Meeting

The Study Team and the Iraqi Team held a meeting to discuss in detail on the FS object site selection report, FS site survey plan and EIA study for the FS site on August 22, 2011.

Outcomes of the Meeting are as follows:

1) The Study Team submitted and explained the FS object site selection report. And the both teams agreed that FS including EIA is conducted on Nasiriyah II.
2) The Study Team explained the FS site survey plan and asked possibility to expand the site area to the eastern side. The Study Team and the Iraqi Team confirmed the availability of land of the eastern side as shown in Figure-1, although the land is owned by Ministry of Finance (MOF) and it takes one to two months to transfer the land from MOF to MOE. The Study Team and the Iraqi Team agreed the revised version of the FS site survey plan as shown in Figure-2 and that the topographical mapping range is expanded 300m to the eastern side in which area the Study Team will make the optimum plot plan.
3) The Study Team and the Iraqi Team confirmed mutually the following terms.
   - The investigation works for the site survey done by the local consultant entrusted by the Study Team can start soon under the authority of the Director General of Nasiriyah Power Station.
   - The Iraqi Team will provide available topographical map and digital elevation data of Nasiriyah existing power station area and the coordinates of two borehole drillings conducted in the Nasiriyah GT site, if available.

4) The Study Team explained the requirements of the Environmental and Social Considerations of JICA for the Nasiriyah II site, and both parties agreed on the contents of the EIA Study and its report.
5) The Study Team requested the Iraqi Team to formulate an EIA study plan. As soon as the Iraqi Team returns to the Bagdad, the Iraqi Team will start to organize an EIA study team consisting of MOE and an appropriate Iraqi consultant to start discussions on the EIA study for the FS site. The EIA study team will be lead by Dr. Mohammed, MOE. By the end of September, the Study Team will provide the Iraqi Team with necessary information on the profile of the Nasiriyah II project (e.g. configurations). Based on the above information, the EIA study team will discuss the time frame of the EIA study for the further discussions in the 2nd mission of the Study.
6) Regarding a gas pipeline to the Nasiriyah II site, MOE explained that it is Ministry of Oil (MOO) to construct the pipeline to the boundary of the site. MOO is responsible for all requirements to construct the pipeline including resettlement issue if any under the Iraqi laws and regulations. Accordingly, Gas Pipeline for the Nasiriyah II project site is out of the scope of the EIA study. Currently, MOO is designing a new gas pipeline to the Gas Turbine Plant located at the west side of the existing Nasiriyah Thermal Power Plant. MOE will request MOO to upgrade the plan for providing the necessary gas to the Nasiriyah II power plant.
7) The Study Team re-requested the provision of remaining necessary data and information to be collected as follows.
   - Re-questionnaire of Business Plan which is attached (page 16) in the MOM of the 1st mission
   - Existing (2010) and development plan (2011-2020) of the power network including geographical location of transmission lines and substations
   - Remaining information and data on Iraqi environment law, especially that related to EIA
   - Geographical map of National Gas Pipeline and branch pipelines to connect the Nasiriyah II project site

3. Next Step

The Study Team will invite the Iraqi Team to Japan in order to perform the 2nd mission from the end of September to the beginning of October (tentatively from Sep. 30th to Oct. 9th 2011). The Study Team will prepare the schedule of the 2nd mission held in Japan and send invitation letter to the Iraqi Team by the beginning of September. And the Study Team will explain the draft of Interim Report and discuss with the Iraqi Team in the 2nd mission.

4. Others

The Iraqi Team strongly requested to the Study Team to come and hold meeting in Baghdad in the 3rd mission in order to streamline finalization of the Study. The Study Team will reply the above request to the Iraqi Team in the 2nd mission.

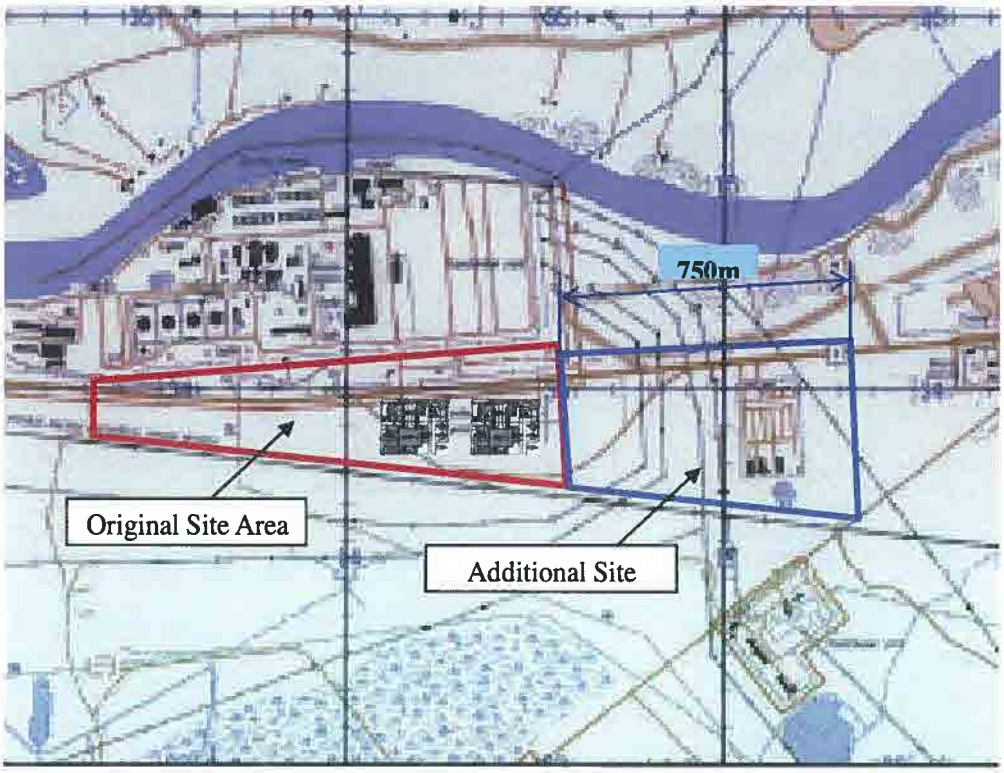


Figure-1 Availability of Land of the Eastern Side

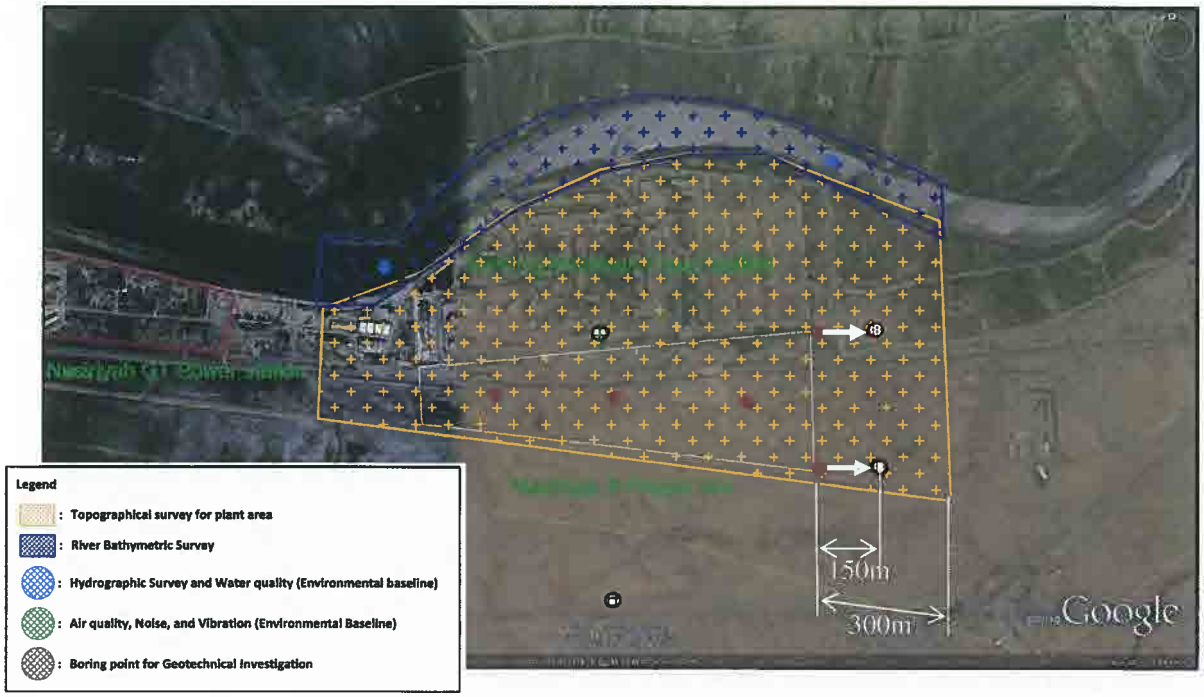


Figure-2 Revised FS Site Survey Plan

Attachment - 1.3 Minutes of Meeting (2nd Mission)

MINUTES OF MEETING
OF
THE 2nd MISSION OF THE
PREPARATORY STUDY FOR DEVELOPMENT OF SOUTHERN LARGE SCALE
THERMAL POWER PLANT IN IRAQ

AGREED UPON BETWEEN
MINISTRY OF ELECTRICITY
AND
THE STUDY TEAM OF
JAPAN INTERNATIONAL COOPERATION AGENCY

TOKYO, 17th-21st October 2011

MINISTRY OF ELECTRICITY

Mahdi Dahham Jasim
Deputy Director General
Planning and Studies Office
Ministry of Electricity
Baghdad – Iraq
21st October, 2011

THE JICA STUDY TEAM

Hideki YUKIMURA
Team Leader
JICA Study Team
21 Oct, 2011

The Study Team has been implementing the Preparatory Study for Development of Southern Large Scale Thermal Power Plant (referred to as the Study) and received MOE Team in Japan.

1. Introductory Meeting

The Study Team led by Mr. Hideki YUKIMURA held an Introductory meeting with Ministry of Electricity (MOE) Team led by Mr. Mahdi Dahham Jasim on October 17, 2011. The Study Team explained the following items.

- Introduction of a New Study Team Leader, Mr. Hideki YUKIMURA
- Schedule of the 2nd Mission
- Implementation Status until 1.5th Mission
- Explanation of Draft Interim Report contents

The main points of discussion and agreements reached during the meeting are as follows:

1) Optimization of Thermal Power Plant Development Plan

1.1) Fuel Type, Generation Type and Unit Capacity

1.2) Power Network System Expansion Plan

2) Implementation of Feasibility Study

2.1) Progress of Nasiryah II Feasibility Study (F/S) Site Survey

2.2) Environment and Social Consideration

Outcomes of the Meeting are as follows:

1) The Study Team has reviewed the Master Plan 2010 carried by PB as consultant in cooperation with MOE as described in detailed study as per attachment 1. As per Attachment 1, JICA Study Team has presented three plans of CCGT Power Plant, including Single Shaft, 1-on-1 Multi Shaft and 2-on-1 Multi Shaft. MOE Team decided preliminarily to take Single Shaft plan, subject to final approval of MOE headquarter. MOE will inform the final decision on the plan by the end of October 2011.

2) The Study Team reviewed the data and information in the MOE revised Master Plan and carried out an analysis. The result of the analysis was explained by the Study Team that further reinforcement of transmission line might be indispensable as per attachment 2.

MOE Team confirmed that MOE would complete necessary 400kV transmission lines to transmit the power generated by Nasiryah II Power Station before the

completion of Nasiryah II PS.

MOE will provide the precise 400kV line expansion plan describing from-to stations, length, transmitting capacity and completion year by the end of October, 2011.

3) Implementation Status of Feasibility Study habeen performed as per planned schedule. Photos of Progress Nasiryah II Site Survey performed so far are shown as per attachment 3.

4) The Iraqi Team has provided JICA Study Team with a shortlist of Iraqi Consulting Bureaux that have the capability to perform the EIA studies required. Names of Bureaux are specified in attachment 4.

5) The Study Team explains that the Project is categorized as `A` under JICA Guidelines which requires a comprehensive EIA report, and confirms that the EIA Report should be submitted to the Ministry of Environment by the end of March 2012. The Study Team prepares draft Terms of Reference (TOR) for the EIA Study of the Project as per attachment 5. MOE Team will confirm the contents and possibility of the EIA study, and inform the JICA Study Team of any change and necessary assistance by the end of October 2011. The TOR meets both the requirements of the Iraqi laws/regulations and the JICA Guidelines. MOE will employ a local consultant to conduct the EIA Study based on the TOR.

In case MOE Team and local consultant face any technical difficulty during the EIA study, JICA Study Team will support.

6) Regarding Re-questionnaire of Economic and Financial Analysis & Structure for Project Implementation, the JICA Study Team confirmed the response from MOE Team in the meeting as per attachment 6.

2. Next Step

The Study Team will consider and discuss with MOE the venue and timing for the 3rd mission.

The Study Team will explain the contents of Interim Report and discuss with the Iraqi Team in the 3rd mission.

3. Others

3.1 Two visits were paid to the following Thermal Power Plant and Manufacturer so as to support MOE Team observe and scrutinize efficient Gas Turbines. MOE Team was briefed of the latest energy technology of the design, configuration establishment to be considered for establishment of the Power Plant.

a) Kawasaki Thermal Power Plant –TEPCO

b) Takasago Machinery Works - Mitsubishi Heavy Industries Ltd.

3.2 MOE Team has provided the Study Team with Letter of Consent by the Chief Tribes for the construction of Electrical Power Plant and entry to Nasiryah II Project Site, as per attachment 7.

3.3 MOE Team has provided the Study Team with a proposed 400kV single line diagram for Nasiryah Gas Power Station I and II. .

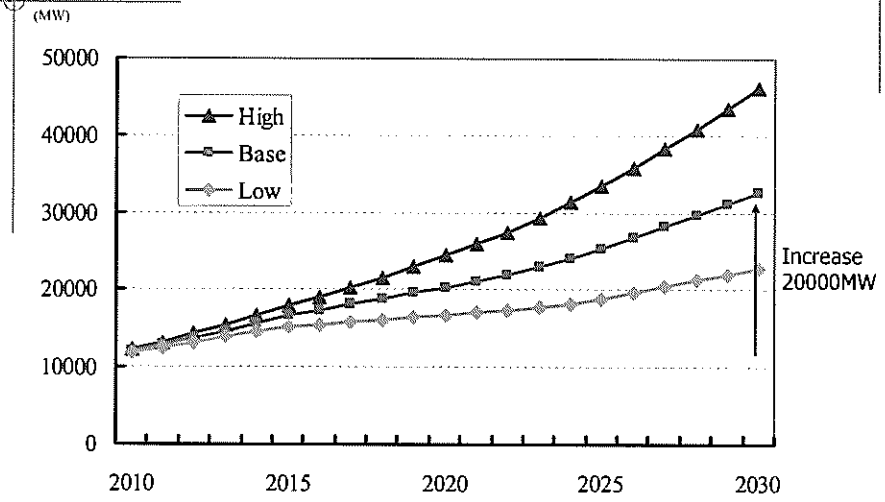
Preparatory Study for development of Southern Large Scale Thermal Power Plant in Iraq

October 2011

Tokyo Electric Power Services Co., Ltd.
Toyo Engineering Corporation
Mitsubishi Heavy Industries, Ltd.
JINGO International Corporation
Mitsui & Co., Ltd.

Review of Master Plan 2010 (carried by PB)

Demand Forecast

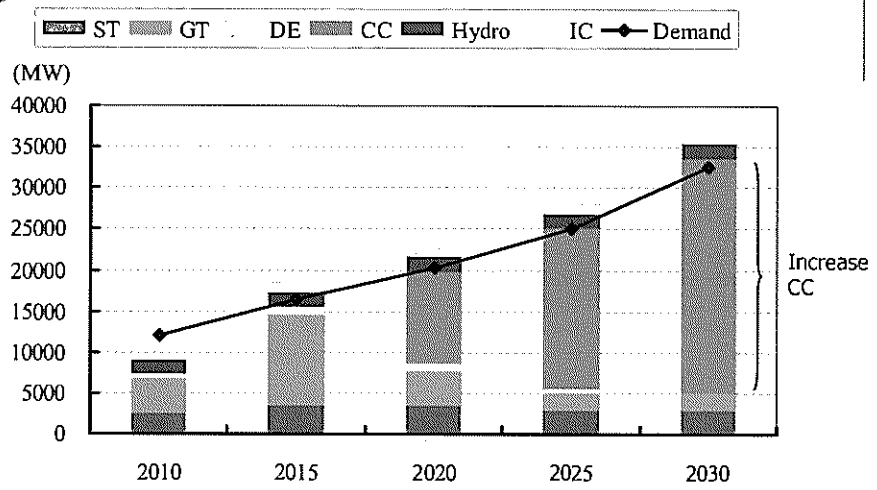


Basic Concept of PDP

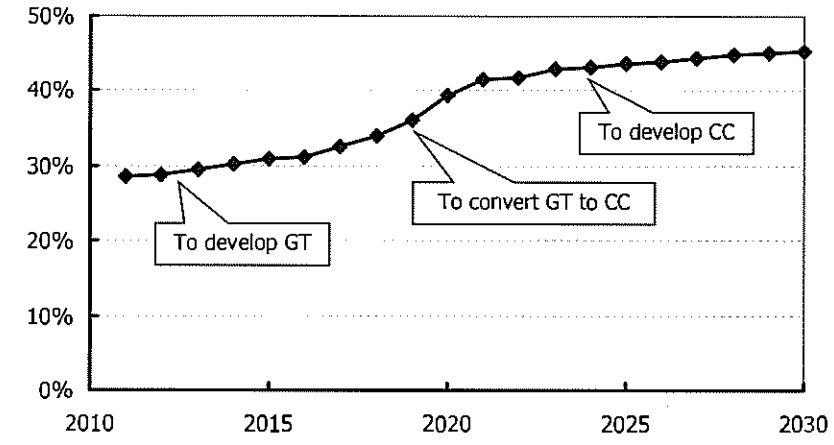
- Reliability target: LOLP=0.3% (LOLE=26hours)
- To develop Gas turbine (GT) in order to eliminate power shortage immediately
- To convert HSD/HFO-fired to Gas-fired
  - To develop gas pipe line network
- To convert GT to Combined cycle (CC) in order to improve efficiency
  - GT 2 units (existing) + ST 1unit (new)

Attachment 1

Relation between Maximum Demand and Installed Capacity



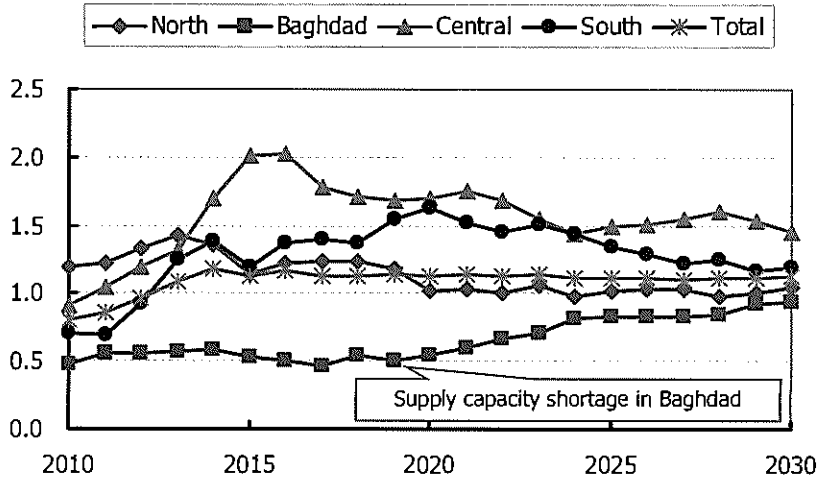
Trend of Thermal Efficiency



Regional Demand (2010)

North	Al Anbar Diyala Nineveh Salah ad Din Kirkuk	373 282 964 436 367	2,422	26.3%
Baghdad	Baghdad	3,002	3,002	32.6%
Central	Babil Al Qadisiyah Karbala Wasit Al Najaf	422 344 300 287 400	1,753	19.0%
South	Missan Basrah Dhi Qar Al Muthana	310 1,045 459 230	2,044	22.2%
Total		9,211	9,211	100%

Region-wise Demand Supply Balance



Comparison among Various Type of TPP

Objective Power Plants for Comparative Survey

		Combined cycle (CC)	Gas turbine (GT)	Steam turbine (ST)
Output		1,300MW	1,132MW	1200MW
		433MW S/S x 3	283MW x 4	600MW x 2
Minimum output		216MW (50% of 1 train)	142MW (50% of 1 GTG)	180MW (30% of 1 unit)
Fuel		Natural gas	Natural gas	Residual oil
Fuel cost (USD/mmBTU)		5	5	16
Construction cost (USD/kW)		744	561	894
O&M cost	Fixed (USD/kW/year)	14.6	43.8	51.2
	Variable (USD/MWh)	3.11	12.4	3.51
Life (years)		25	25	25
Efficiency at rated net output (%)		57.3	38.7	41.0
Forced outage rate (%)		6	33	6
Scheduled outage (days/year/unit)		21	12	34

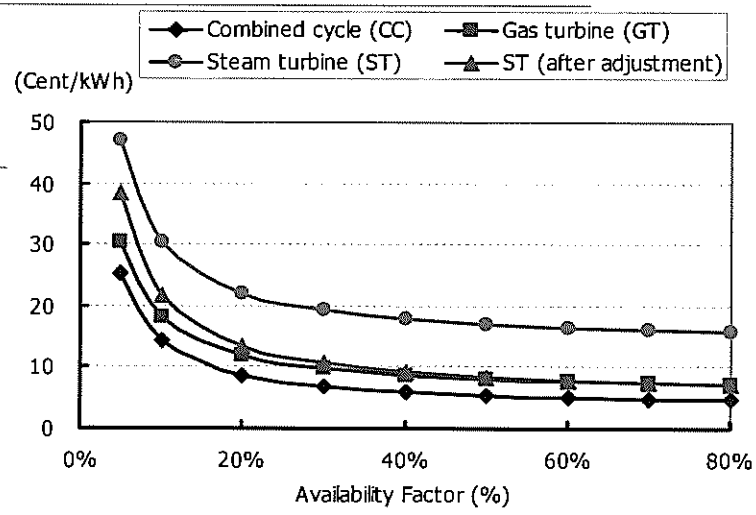
Generating Cost

(Unit: USD/kWh)

		Combined cycle (CC)	Gas turbine (GT)	Steam turbine (ST)
Fixed	Capital	1.2	0.9	1.3
	O&M cost	0.2	0.6	0.7
Variable	O&M cost	0.3	1.2	0.4
	Fuel	3.0	4.4	13.3
Total		4.7	7.2	15.7

(Availability factor: 80%)

Generating Cost



Reliability Level (2020)

	Combined cycle (CC)	Gas turbine (GT)		Steam turbine (ST)
		FOR=33%	FOR=6%	
Forced outage rate (%)	6	33	6	6
Scheduled outage (days/year)	21	12	12	34
LOLE Value (hours/year)	15.8	37.7	14.0	18.3

LOLE value: Number of hours that the supply power cannot satisfy the demand in one year.

Environmental Aspect (CO_2 Emission)

	Combined cycle (CC)	Gas turbine (GT)	Steam turbine (ST)
Fuel	Natural gas	Natural gas	Residual oil
Thermal efficiency	57.3%	38.7%	41.0%
Unit CO_2 emission (ton-C/MWh)	0.096	0.142	0.176

Comprehensive Evaluation

	Combined cycle (CC)	Gas turbine (GT)	Steam turbine (ST)
Economical aspect	Excellent	Moderate	Bad
Reliability level	Excellent	Moderate	Good
Environmental aspect	Excellent	Moderate	Moderate
Comprehensive evaluation	Excellent	Moderate	Moderate

Combined Cycle is most effective among candidates.

Comparison among Various Type of Combined Cycle Plant

Candidate Plans

	Plan A	Plan B	Plan C
Configuration	Single shaft type 1GT + 1ST	Multi shafts type 1 1GT + 1ST	Multi shafts type 2 2GT + 1ST
Generators	433MW S/S x 3 train	283MW GTG x 3 149MW STG x 3	250MW GTG x 4 272MW STG x 2
Total Output	1,300MW	1,297MW	1,544MW

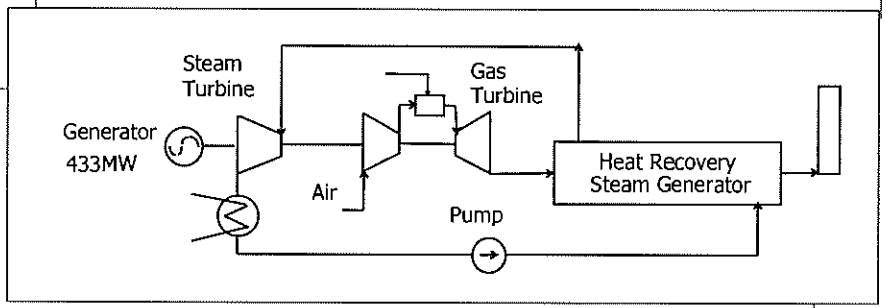
Features of each Plan

		Plan A	Plan B	Plan C	Original (MP)
		Single shaft 1GT + 1ST	Multi shafts 1GT + 1ST	Multi shafts 2GT + 1ST	Multi shafts 2GT + 1ST
Output (Gross)		433MW x 3 1,300MW	432MW x 3 1,297MW	772MW x 2 1,544MW	600MW x 2 1,200MW
Construction cost (USD/kW)		744	799	771	1,045
Construction periods (years)		3	3	3	2.5
O&M cost (USD)	Fixed (/kW/year)	14.6	14.6	14.6	20.4
	Variable (/MWh)	3.11	3.11	3.11	2.6
Life (years)		25	25	25	25
Efficiency (%)		57.3	57.1	56.7	50.1
Forced outage rate (%)		6	6	6	7
Scheduled outage (days/yr)		21	21	21	25

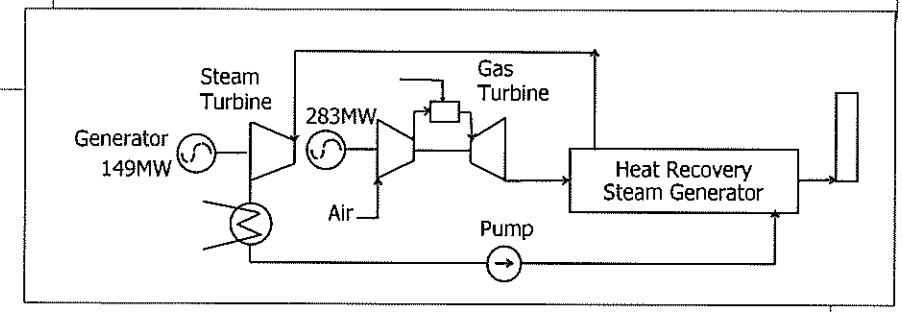
Features of each Plan

	Plan A	Plan B	Plan C	Notes
Shaft Configuration	Single shaft 1GT + 1ST	Multi shafts 1GT + 1ST	Multi shafts 2GT + 1ST	
Plant Performance	A little less efficiency for smaller steam turbine A little better efficiency in partial load	Same to Single Shaft	Base A little higher efficiency for base load operation with larger steam turbine	Difference in efficiencies by shafts configuration is not so large
Foot Print	A little less area for reduced number of generators	A little more area for increased number of generators	Base	Multi shafts give flexibility in equipment layout
Operability	Shorter startup time for smaller steam turbines	Same to Single Shaft	Base	
Simple Cycle Operation	Not applicable	Applicable with bypass dampers and stacks	Same to multi shaft	Bypass damper and stacks need space and cost
Maintenance	Free from inter-shaft interaction in maintenance	Same to Single Shaft	Inter-shaft interaction to be considered in maintenance	
Construction Period	Base	Earlier commissioning if simple cycle applicable	Same to multi shaft	
Grid Compatibility	Potential impact to Grid with larger generators	Smaller generators compatible with weaker grids	Same to multi shaft	Grid analysis required for generators compatibility

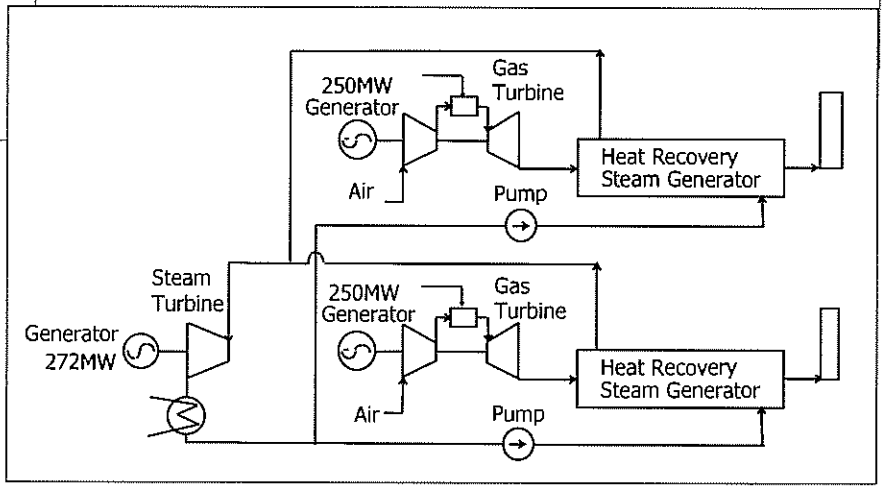
Basic Configuration of Plan A



Basic Configuration of Plan B



Basic Configuration of Plan C



Economic Evaluation - 1

		Plan A	Plan B	Plan C	Original (MP)
		Single shaft 1GT + 1ST	Multi shafts 1GT + 1ST	Multi shafts 2GT + 1ST	Multi shafts 2GT + 1ST
Output (Gross)		433MW x 3 1,300MW	432MW x 3 1,297MW	772MW x 2 1,544MW	600MW x 2 1,200MW
Present value at 2020 (mil. USD)	Fixed cost	35,019	35,071	35,245	35,211
	Fuel cost	45,834	45,842	44,774	46,691
	Total	80,853	80,913	80,019	81,902
	Difference	- 1,049	- 989	- 1,883	Base

Economic Evaluation - 2

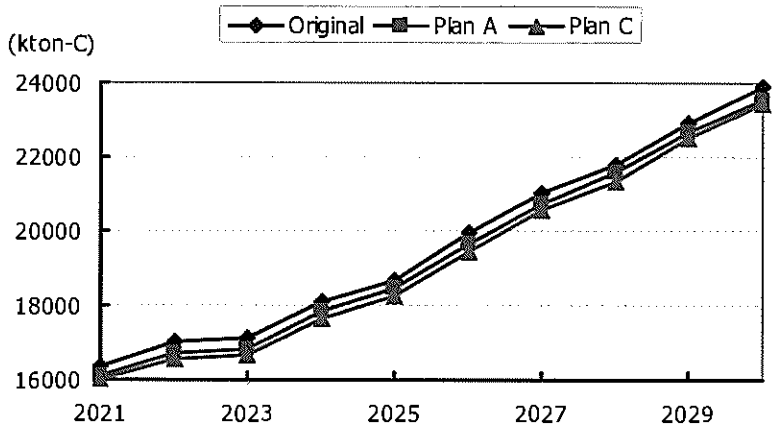
		Plan A1	Plan B2	Plan C
		Single shaft 1GT + 1ST	Multi shafts 1GT + 1ST	Multi shafts 2GT + 1ST
Output		433MW x 3.6 1,544MW	432MW x 3.6 1,544MW	772MW x 2 1,544MW
Present value at 2020 (mil. USD)	Fixed cost	35,213	35,277	35,245
	Fuel cost	44,758	44,764	44,774
	Total	79,971	80,041	80,019
	Difference	- 48	+ 22	Base

Plan A1 is most economical

Reliability

- Almost same
  - same FOR
  - same scheduled outage
- Plan C (2GT+1ST)
  When 1 GT stops, others (1GT+1ST) can generate electricity at almost half output.

CO2 Emission



Conclusion - 1

- Comparison with Plan A and Plan B

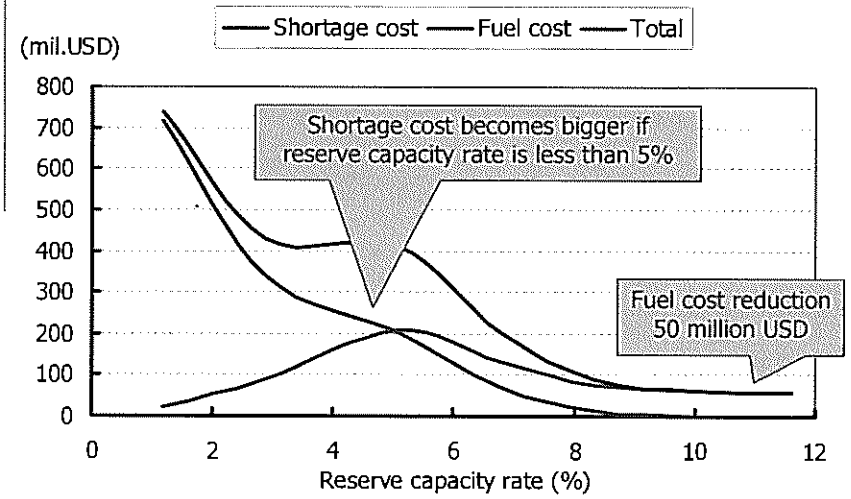
	Plan A				Plan B
	Single shaft 1GT+1ST				Multi shafts 1GT+1ST
Output	433MW x 3 1,300MW		=		432MW x 3 1,297MW
Construction cost (USD/kW)	744	◎	<	○	799
Thermal efficiency	57.3%	◎	>	○	57.1%

- **Plan A** is more effective than Plan B
- On **Plan B**, Power from GT can be available 1 year ahead.

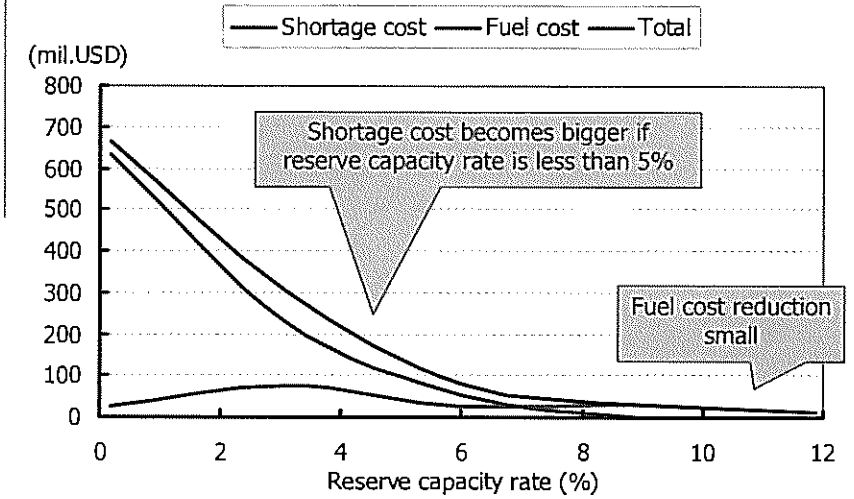
Benefit of Preceding Construction of GT (Plan B)

- Benefit
  - To reduce power shortage (depend on reliability level)
    - Shortage cost = 3 USD/kWh
  - To reduce fuel cost (depend on reliability level, fuel type)
    - HSD = 27 Cent/kWh
    - Crude oil = 16 Cent/kWh
    - Gas GT = 4.4 Cent/kWh

Benefit of Preceding Construction of GT (2016)



Benefit of Preceding Construction of GT (2020)



Conclusion - 2

◈ Comparison with Plan A and Plan C

	Plan A			Plan C	
Configuration	Single shaft 1GT + 1ST			Multi shafts 2GT + 1ST	
Output	433MW x 3 1,300MW	○	<	◎	722MW x 2 1,544MW
Construction cost (USD/kW)	744	◎	<	○	771
Thermal efficiency	57.3%	◎	>	○	56.7%

◈ **Plan C** is more effective than Plan A. (because of 244MW larger output)

◈ **Plan A** is more efficient than Plan C.

Conclusion - 3 (Amount of Fund Needed)

	Plan A	Plan A2	Plan C
Output (Gross)	433MW x 3 1,300MW	433MW x 4 1,732MW	772MW x 2 1,544MW
Construction cost (USD/kW)	744	744	771
Construction cost (million USD)	967	1,289	1,190
IDC (million USD)	132	176	162
Total (million USD)	1,099	1,465	1,352

◈ If more fund (+113 million USD) can de prepared, **Plan A2** (+1 set) is more effective than Plan C.

Conclusion - Summary

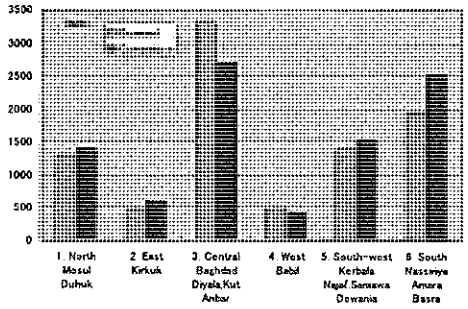
- The system of each Plan can generate electricity at very high thermal efficiency (almost 57%).
  - It is the most desirable selection to develop larger amount of outputs within the amount of the fund.
- Benefit of preceding construction of GT is very large when reserve capacity rate is less then 5%.
  - It is the most desirable to select Multi shaft Plan (Plan B, Plan C) when a continuous power shortage is expected.

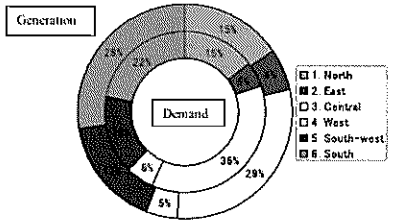
Thank you for your kind attention

Power Network System

Existing Power Network System

1. Regional demand and supply balance

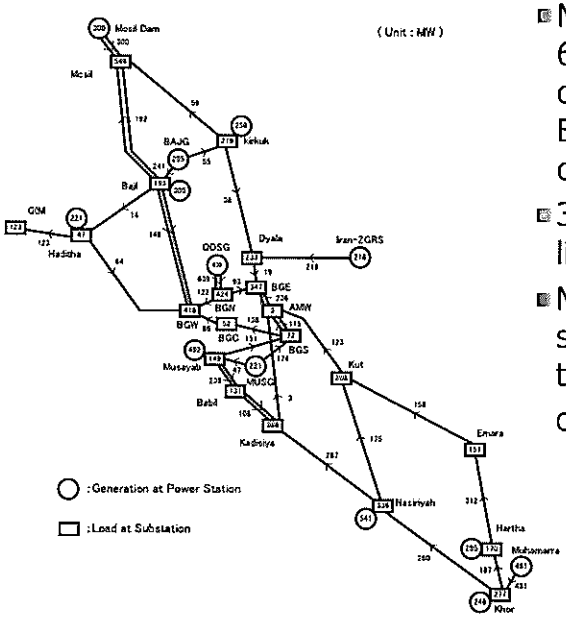




- Central region: Demend 36%, Generation 29%
- South region: Demend 22%, Generation 28%

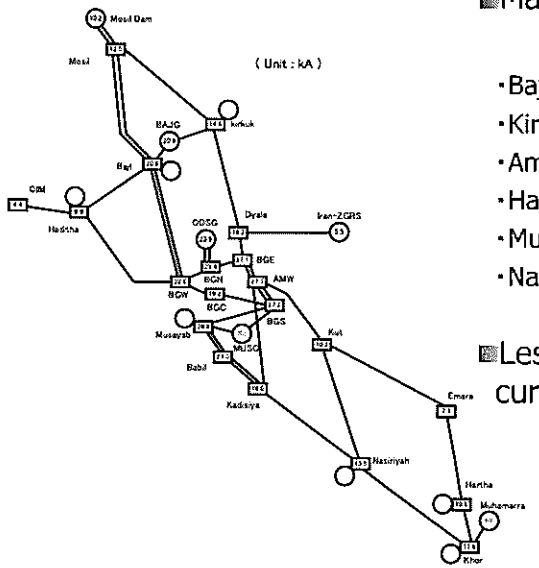
- Power is transmitted from South to Central region

2. Power flow



- Max. power flow 639MW (320MW per circuit) in Qudis-Baghdad North with 2 circuits
- 312MW in Hartha-Emar line with 1 circuit
- Max. 320MW is much smaller than transmission capacity of 950MW

3. Fault current

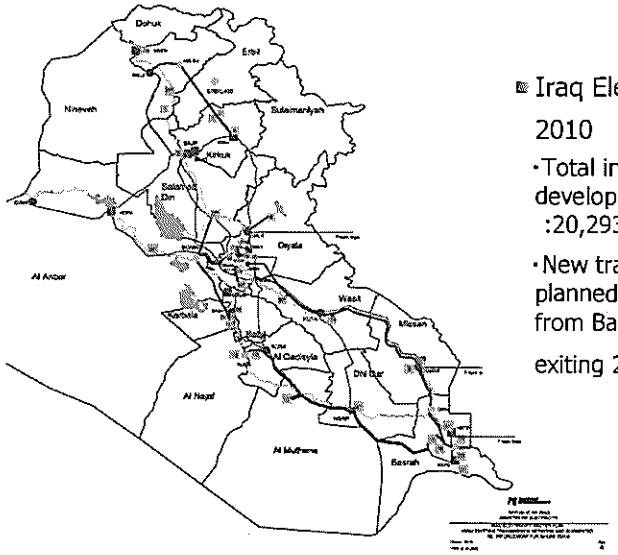


- Max. fault current in each region
  - Baji in Northern : 20.8kA
  - Kirkuk in Eastern : 14.4kA
  - Amen in Central : 27.7kA
  - Haditha in Western : 9.9kA
  - Musayab in South-west : 26.8kA
  - Nasiriyah in Southern : 13.5kA
- Less than rated breaking current of CB 40kA or 31.5kA

Attachment 7

Power Network SystemExpansion Plan

1. Review of Power Network Expansion Plan



- Iraq Electricity Master Plan Dec. 2010
  - ・Total installed capacity to be developed from 2010 to 2015 :20,293MW
  - ・New transmission lines are planned to expand, these lines run from Basra to Baghdad along with exiting 2 routes of 400kV lines

1. Review of Power Network Expansion Plan (400kV Line Reinforcement Requirement)

(km)

Specification	Capacity per circuit (MVA)	2010	2011	2012	2013	2014	2015	Total
1 circuit, 4 conductors	>2000	0	0	220	0	0	0	220
2 circuits, 4 conductors	>2000	0	0	0	0	0	230	230
1 circuit, 2 conductors	1000	0	0	663	0	0	0	663
2 circuits, 2 conductors	1000	0	0	46	0	0	0	46
Total								1,159

- ◆Total expansion length : 1,159km
- ◆New type of transmission lines to enhance transmission capacity up to more than 2,000MVA by doubling number of conductors from 2 to 4 and also increasing number of circuits from 1 to 2

1. Review of Power Network Expansion Plan

Expansion plan revised by MOE (only a fraction)

From	To	Length (km)	No. of conductors	No. of circuits	Capacity (MVA)	Completion year
Gayarra	Mosul4	104	2	2	1,000	2012
Shat al-basra	Emara4	150	2	1	1,000	2014
Samawa	Kadissiya4	104	4	1	2,774	2013
Samawa	Nasiriyah thermal	100	2	1	1,000	2013
Samawa	Nasiriyah g.p.s	100	2	2	1,000	2014
Dewaniya	Kadissiya4	12	2	2	1,000	2013
Emara	Qurna	80	2	1	1,000	
Nasiriyah g.p.s	Rumaila	145	2	1	1,000	2015
Nasiriyah g.p.s	Kadissiya4	176	2	1	1,000	2015
Bgc4	Baghdad north west	40	2	1	1,000	
Total Length (km)	4,889km (3,691km: completion year indicated, 1,198km: not indicated)					

- ◆Total expansion length is 4,889km, 3,691km out of that will be expanded by 2015
- ◆This length is more than triple of 1,159km planned in the Electricity Master Plan
- ◆Two or three circuits transmission lines will be constructed in parallel with the both existing eastern route and western route of transmission lines

2. Status of Power Flow of 400kV System with New South TPP

- ◆ Condition of power flow analysis
  - ・Target year : 2016 ・Demand : 17,229MW
  - ・Supply : power development plan revised by MOE

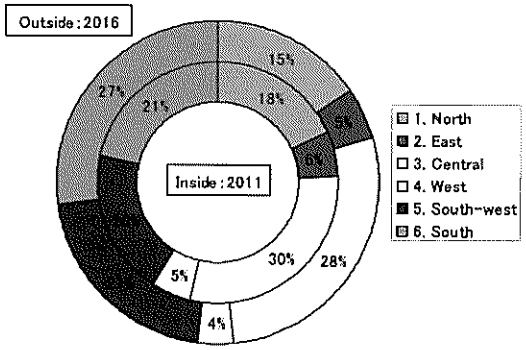
    Emara 125MW x 4units, Nasiriyah ext. 125MW x 4 units are assumed as different projects from this large scale TPP in the south.

Plant Name	Unit Capacity (MW)	Number of Units	Plant Name	Unit Capacity (MW)	Number of Units
Nenawa	125	6	Wassit-2	610	2
Akaz	125	2	Baiji	160	6
Al-Khairat	125	10	Dibis	160	2
Kerbala	125	2	Taza	270	1
Al Haydriya	125	4	Saddr	160	2
Al-Quds	125	4	Rumaila	270	5
Taji	40	4	Al Dywaniya	125	4
Al Bazarkan	60	2	Al Nasiriyah	125	4
Hilla	125	2	Al Samawa	125	4
Najibiya	125	4	Emara	125	4
Wassit-1	330	4	Shat Al Basra	125	10
Total Installed Capacity			13,540MW		

2. Status of Power Flow of 400kV System with New South TPP

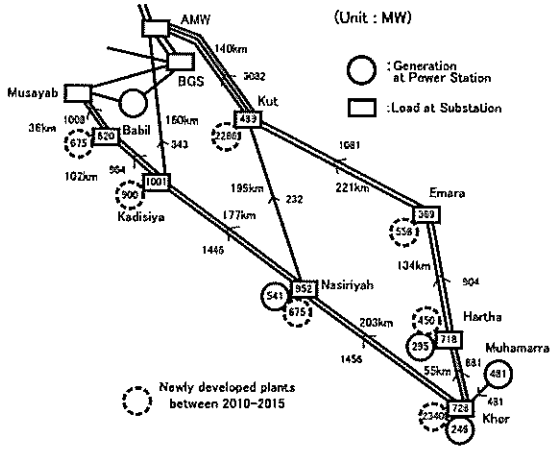
◆ Condition of power flow analysis

- Share of supply capacity in Central region decreases from 30% in 2011 to 28% in 2016, one in South area increases from 21% to 27%.
- Central region will further depend on power supply from the Southern.



2. Status of Power Flow of 400kV System with New South TPP

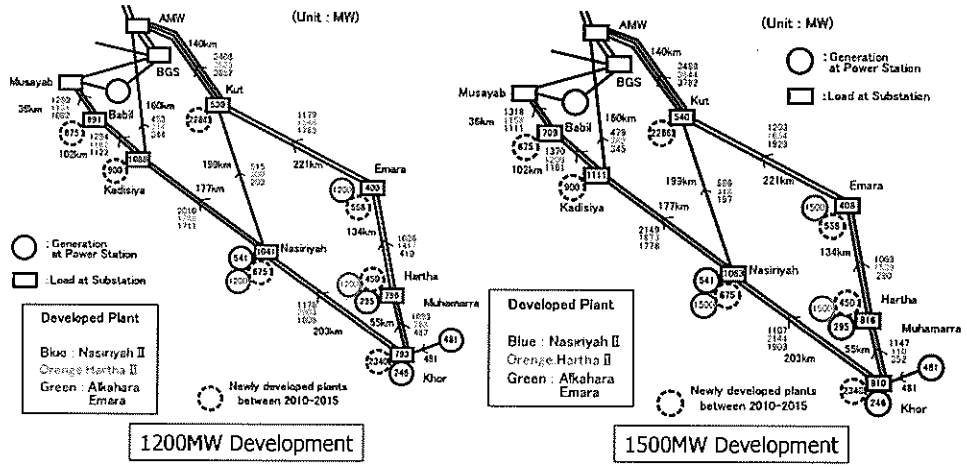
◆ Power flow analysis results



Power Flow Without Development of Candidate Site in 2016

2. Status of Power Flow of 400kV System with New South TPP

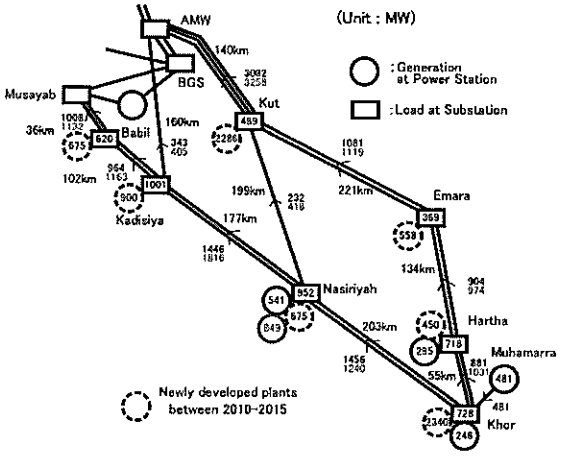
◆ Power flow analysis results



Power Flow With Development of Candidate Project in 2016

2. Status of Power Flow of 400kV System with New South TPP

◆ Power flow analysis results



Power Flow With Development of Candidate Project in 2016

3. Necessity of Expansion of Transmission Facilities for New TPP

Prioritization among candidate sites

Incremental Power Flow × Line Length

Line section	Length (km)	Incremental power flow × Length (MW·km)					
		1200MW			1500MW		
		Nasiriyah	Hartha	Emara	Nasiriyah	Hartha	Emara
AMW—Kut	140	45,640	61,740	79,800	56,840	78,680	98,000
AMW—Kadisiya	160	17,600	4,960	160	21,760	6,240	320
Musayab—Babil	36	9,072	4,428	3,024	11,160	5,400	3,708
Babil—Kadisiya	102	33,660	20,196	16,116	41,412	24,990	20,094
Kut—Emara	221	21,658	102,765	151,164	26,962	126,633	187,408
Kut—Nasiriyah	199	56,317	13,532		70,446	17,114	
Kadisiya—Nasiriyah	177	100,359	61,065	47,436	124,962	76,110	59,295
Emara—Hartha	134	17,688	68,742		22,110	85,090	
Hartha—Khor	55	11,660			14,630		
Nasiriyah—Khor	203		111,041	71,659		139,664	90,741
Total (MW·km)		313,654	448,469	369,359	390,282	559,921	459,566
Rank order		1	3	2	1	3	2

Nasiriyah II nearest Baghdad has priority
from the viewpoints of additional transmission cost.

4. Cost Estimate of Expanded Transmission Facilities

- Development capacity : Large 1200MW or 1500MW
- Transmission cap. Of Existing 400kV line : 950MW

Transmission line with large capacity more than 2000MW will be necessary

Estimated construction cost with large cap. : 600,000 USD/km
(Exiting line : 400,000 USD/km)

- Estimated Cost for necessary line for Nasiriyah II : 200 million USD
  (600,000 USD/km × 337km)
- This line is not exclusively used for the Nasiriyah II power plant, therefore, it can be said that the cost to be incurred should be an allocated cost

Progress of Nasiriyah II F/S site survey

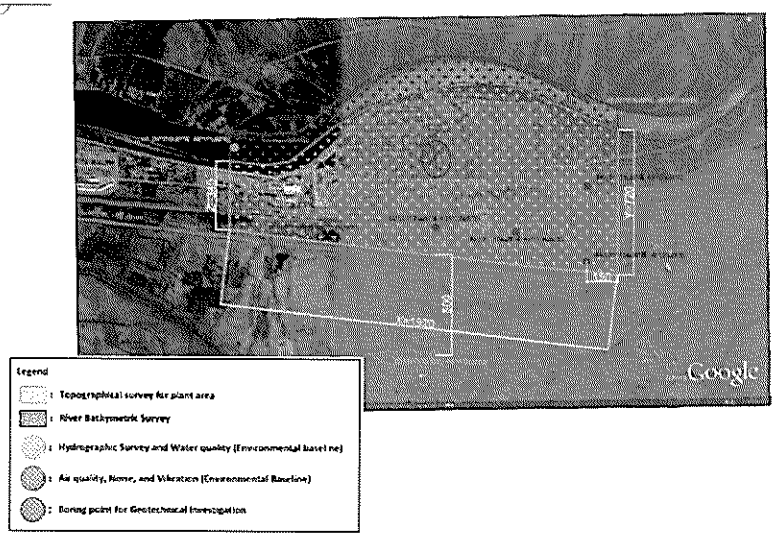
October 2011

Tokyo Electric Power Services Co., Ltd.
Tokyo Engineering Corporation
Mitsubishi Heavy Industries, Ltd.
UNITED Engineering Corporation
Mitsui & Co., Ltd.

Power Plant Site Survey (Nasiriyah II)

- Scope of Work
  - Reconnaissance
  - Topographical survey
  - River Bathymetric survey
  - Hydrographic survey
    - a) Historical hydrographic data collection and analysis
    - b) Hydrographic survey
  - Environmental Baseline survey
    - a) Ambient Air quality
    - b) Ambient water quality
    - c) Noise
    - d) Vibration
  - Geological Investigation
    - Borehole drilling
    - Standard Penetration Test (SPT)

Topographical & Bathymetric Survey Areas and Deployment of Borehole Drillings



Progress of Nasiriyah II F/S site survey

(09.10.2011)

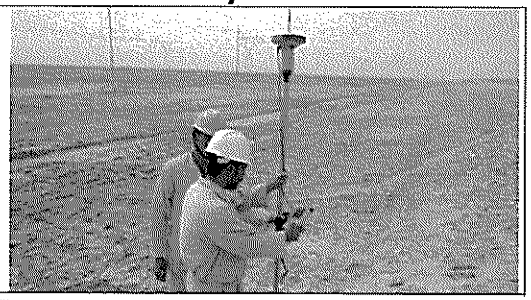
	Task	Progress	Expected field Completion data
1	Reconnaissance	40% of site work	19.10.2011
2	Topographic Survey	80% of plane area 20% of plant area	19.10.2011
3	River Bathymetric Survey	40% of site work	19.10.2011
4	Hydrographic Survey	100% of site work	Done
5	Environmental Baseline Survey	100% of site work	Done
6	Geotechnical Investigation	40% of site work	14.10.2011

On 26th September, Start site survey (environmental baseline survey)

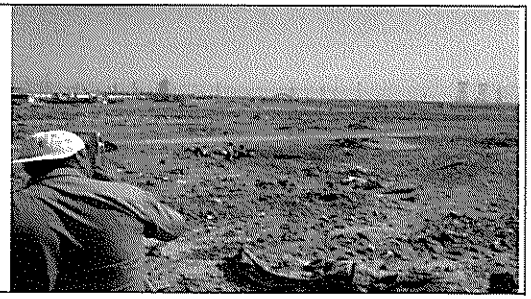
Attachment 3

Topographic survey

Topographic survey of plane area

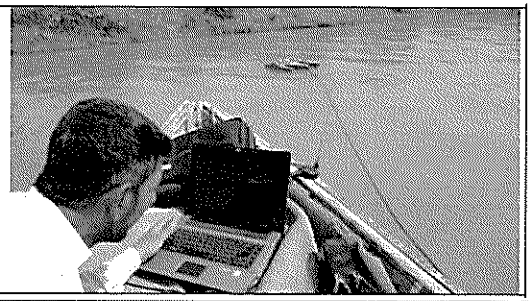


Total station and survey team surveying the plane area in front of existing power plant

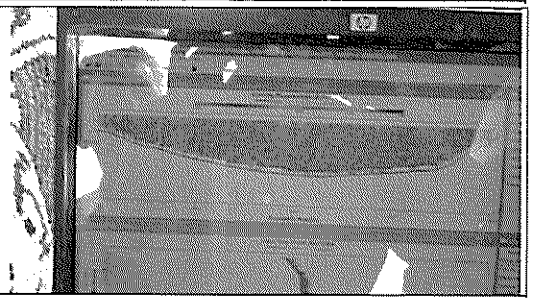


River Bathymetric Survey

Surveying of river between H1 and H2 using River Surveyor



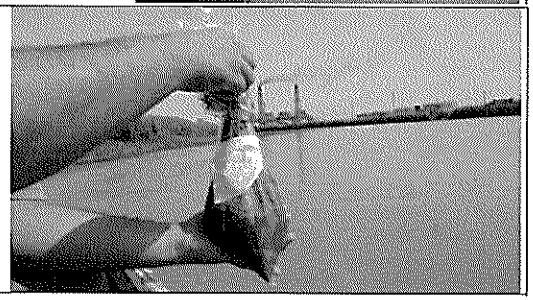
River profile generated by the River surveyor system for area between H1 and H2



Hydrographic Survey

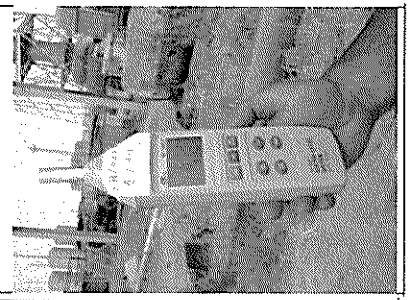
Collecting of water samples at H2, 20 cm depth sample is shown in the photo

Riverbed soil sample collection for material analysis



Environmental Baseline Survey

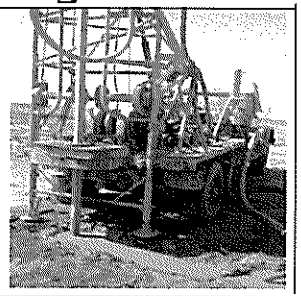
Measurement of Noise level at E1 during Day time



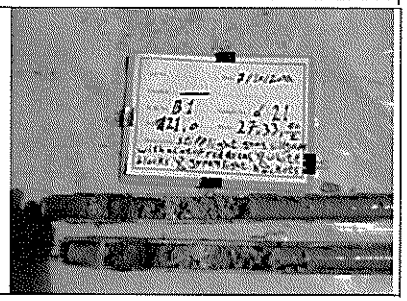
Survey team Escorted by police convoy during the overnight measurements at E2 location outside Nassiriya plant boundaries

Geotechnical Investigation

Drilling Machine in operation at B1



SPT sample obtained at B1 at 21 meters depth



Attachment 4

Republic of Iraq Ministry of Iraq
Planning and Studies Department

Ref. : TD10/2062 Date: 11/10/2011

Deputy Minister, Mr. Adel Hameed

Best regards,

Subject: Nassirieh II Gas Power Plant

Reference the Minutes of meetings that were held at Amman by MOE team members and Japanese team for the "Preparatory Study for the Development of Southern Large Scale thermal Power Plant in Iraq" and we would like to inform the local consultants specialized for study the Environmental Impact Assessment.

Names:

1. Thi Qar University : Engineering Faculty – Consulting Office
2. Baghdad University : Engineering Faculty – Consulting Office
3. Mustansirieh University: Engineering Faculty – Consulting Office
4. Baghdad University: Faculty of Science – Baghdad University
5. Scientific and Technology University: Consulting Office
6. Anbar University- Engineering Faculty – Consulting Office
7. University of Technology: Consulting Office
8. Babel University: Engineering Faculty: Consulting Office

Kindly invite these offices for direct appointment for submission of their offers.

With Appreciation.

Dr. Qussay Abdul Sattar
General Manager
10/10/2011

Cc
Planning and Studies Department/Assistant/Renewable Energy Department/with priorities.

جمهورية العراق
وزارة الكهرباء
دائرة التخطيط والدراسات

REPUBLIC OF IRAQ
MINISTRYOF ELECTRICITY
Planning & Studies Office

No. :
Date : / / 2011

وزارة الكهرباء

العدد : ت د / ١٠ / ٢٦٠٦٢
التاريخ : ١١ / ١٠ / ٢٠١١

السيد مستشار الوزير / الاستاذ عادل حميد المحترم

تحية طيبة ..

م / محطة الناصرية الغازية -٢

اشارة الى محاضر الاجتماعات التي عقدت في عمان – الاردن ،من قبل فريق عمل الوزارة المعني بالتعاون مع الجانب الياباني لاعداد دراسة الجدوى الخاصة بمشروع انشاء محطة الناصرية الغازية -٢ .

ادناه أسماء المكاتب الاستشارية التخصيصية المؤهلة لانجاز دراسة تقفي الأثر البيئي Environmental Impact Assessment .

أسماء المكاتب الاستشارية :

١- المكتب الاستشاري – كلية الهندسة – جامعة ذي قار
٢- المكتب الاستشاري – كلية الهندسة – جامعة بغداد
٣- المكتب الاستشاري – كلية الهندسة – الجامعة المستنصرية
٤- المكتب الاستشاري – كلية العلوم – جامعة بغداد
٥- المكتب الاستشاري – وزارة العلوم والتكنولوجيا
٦- المكتب الاستشاري – كلية الهندسة – جامعة الأنبار
٧- المكتب الاستشاري – الجامعة التكنولوجية
٨- المكتب الاستشاري – كلية الهندسة – جامعة بابل

يرجى تفضلكم بالاطلاع والتنسيب بدعوة هذه المكاتب دعوة مباشرة للمشاركة وتقديم عروضها الخاصة بانجاز الدراسة اعلاه . مع التقديـر .

الدكتور قصي عبد الستار
المدير العام
٢٠١١/١٠/١٠

د/ دائرة م العقود ... [illegible]

نسخة منه الى/
- دائرة التخطيط والدراسات / المعاون / قسم الطاقات المتجددة / مع الاوليات

وارد [illegible] ١٠/١١

ابتسام ١٠/١٠/٢٠١١ (محطة الناصرية الغازية)

The Preparation Study for Development of Southern Large Scale Thermal Power Plant in Iraq

Study on Environmental and Social Considerations Terms of Reference (TOR)

1. Institutional Structure of the Study on Environmental and Social Considerations

The institutional structure of the Study on Environmental and Social Considerations (SESC) is shown as Figure 1.

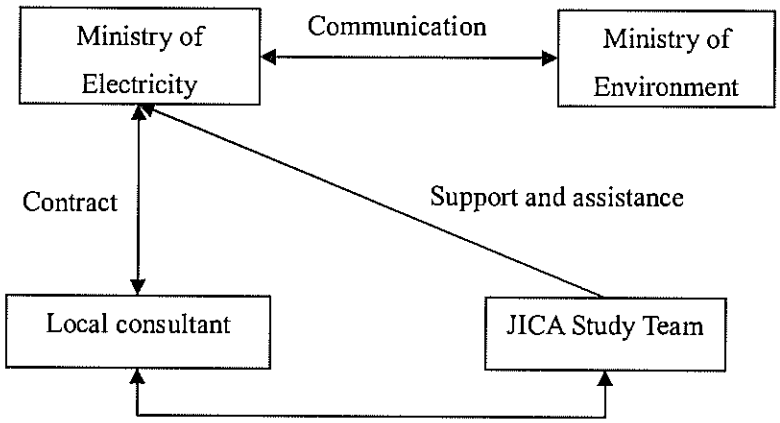


Figure 1. Institutional Structure

Ministry of Electricity (MOE) takes overall responsibility for the SESC in close communication with the Ministry of Environment (MOEN). The Local Consultant (LC) is employed by MOE and is responsible for conducting the SESC, writing and editing an Environmental Impact Assessment (EIA) Report and reporting to MOE. The JICA Study Team assists MOE and the LC to conduct the SESC, of which tasks include collecting some baseline data and writing some parts of the EIA Report. Detailed tasks of each team are described in "4. Tasks of each team".

2. Scope and Period of the SESC

2.1 Scope of the SESC

The main purpose of the SESC of the Project is to formulate an EIA Report of the Feasibility Study (F/S) site for the Project. The SESC has the following four main components:

1) Collecting information on the Social environment conditions around the F/S site.

2) Reviewing EIA procedure in Iraq

- To review the existing studies for confirming compliance status of environmental and social considerations for the Project, and highlighting items, which require additional considerations accordance to "JBIC Guidelines for Confirmation of Environmental and Social Considerations".
- To confirm the existing national EIA procedure, and to formulate the EIA Report and to conduct stakeholder meetings concerning the EIA.

3) Assessing environmental impacts

- To assess the negative impacts induced by the Project.
- To propose mitigation measures to avoid and minimize the impacts.

4) Preparing the "JICA Environmental Checklist and "Monitoring Sheet" for the Project.

The SESC shall cover the F/S site and its surrounding area. MOE and LC should consult with the Provincial MOEN about the extent of the area for the SESC. Figure 2 shows the F/S site.

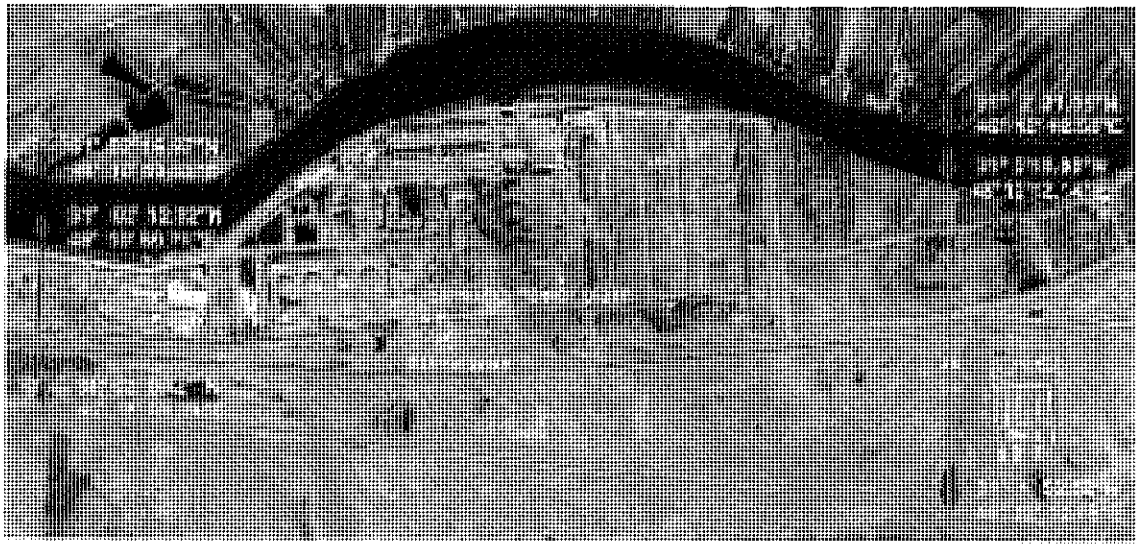


Figure 2. F/S site for Nasiriyah II Thermal Plant

2.2 Period of the SESC

The entire period of the ESC is from 1 November 2011 to 15 March 2011.

3. Scope of the SESC

The SESC specifically aims;

- To assist the Ministry of Electricity to conduct a stakeholder meetings (i.e. public consultation) on the EIA of the F/S site;
- To conduct study on the F/S site to collect more detailed data on the social environment in and around the F/S site;
- To assess the potential impacts that might be generated during the construction and operation phases of the Project;
- To formulate necessary mitigation measures against the potential negative impacts due to the project implementation to avoid and minimize them;
- To prepare an environmental monitoring plan so that MOE can prevent environmental negative impacts and take necessary actions during the project implementation; and,
- To formulate the EIA Report, this should be adequate to obtain an environmental approval from the Government of Iraq.

4. Tasks of each team

4.1 Ministry of Electricity

MOE is responsible for smooth implementation of the SESC and has the following tasks;

- To employ a local consultant according to Iraq laws to conduct the SESC;
- To coordinate other two teams namely, the LC and the JICA Study Team;
- To collaborate with MOEN to conduct the SESC;
- To conduct two public consultation meetings to explain the Project and Environmental and Social Considerations to the relevant people and organizations around the F/S site;
- To check the contents of the EIA Report; and
- To submit the EIA Report to MOEN to obtain an environmental approval for the Project.

4.2. Local consultant

LC is responsible for conducting the SESC and has the following tasks;

- To confirm the latest legal framework of EIA system in Iraq and its procedure;
- To facilitate meetings between MOE and the Provincial Office of MOEN;
- To conduct an social environmental survey around the F/S site;
- To assess the potential impacts that might be generated during the construction and

operation phases of the Project;

- To formulate necessary mitigation measures against the potential negative impacts due to the project implementation to avoid and minimize them;
- To assist MOE to conduct two public consultation meetings for the Project;
- To write some parts of the Report and hand them over to the JICA Study Team to check the contents;
- To check the contents of some parts of the Report which are written by the JICA Study Team;
- To formulate a draft EIA Report for the final check by MOE; and
- To reflect comments from MOE and to formulate the final EIA Report for the submission to MOE.

4.3. JICA Study Team

The JICA Study Team assists MOE and the LC to conduct the SESC and has the following tasks;

- To write some parts of the EIA Report by utilizing data collected and hand them over to the LC for their scrutiny;
- To comment on the parts of the EIA Report written by the LC;
- To communicate with MOE for smooth implementation of the SESC; and,
- To assist the LC and MOE to formulate the "JICA Environmental Checklist (Appendix 1)" and "Monitoring Sheet (Appendix 2)" for the Project

Responsible parts of the EIA Report for the LC and the JICA Study Team are described in "5. Contents of the SESC – 5.1 Contents of the EIA Report".

5. Contents of the SESC

5.1 Contents of the EIA Report

The Contents of the EIA Report with responsible teams (LC and JICA Study Team) are described in Table 1 from the next page.

Table 1 Contents of the EIA Report with responsible teams (LC and JICA Study Team)

No	Title	Description	Sub-title	Responsible team	
				LC	JICA Study Team
1	Executive Summary	Concisely discusses significant findings and recommended actions.		MAIN AUTHOR	Checks the contents.
2	Introduction	Concisely introduces the Project and the Report		MAIN AUTHOR	Checks the contents.
3	Policy, legal and administrative framework	Discusses the policy, legal and administrative framework within which the EIA study is to be carried out.		Checks the contents	MAIN AUTHOR
4	Project description	Describes the Project and its geographic, ecological, social and temporal context, including any off-site investments that may be required.		Checks the contents	MAIN AUTHOR
5	Approach and Methodology	Describes the EIA methodology briefly.		MAIN AUTHOR	Checks the contents.
6	Baseline data	Describes relevant physical, biological and socio-economic conditions, including all changes anticipated before the project commences. Additionally, takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about the Project.	6.1. General description of the environments of Iraq	Checks the contents	MAIN AUTHOR
			6.2. Description of the	-Natural and social	-Natural and social

No	Title	Description	Sub-title	Responsible team	
				LC	JICA Study Team
			environments around the site (Physical, natural and social environments)	environment: MAIN AUTHOR -Physical environment (water, air, noise and vibration): checks the contents	environment: Checks the contents -Physical environment (water, air, noise and vibration): MAIN AUTHOR
			6.3. Simulation of emissions (SOx and NOx)	MAIN AUTHOR Conducts the simulation	Checks the contents
7	Analysis of alternatives	Systematically compares feasible alternatives to the proposed project site, technology, design and operation including the "without project" situation in terms of their potential environmental impacts. For each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where		Checks the contents	MAIN AUTHOR Zero option, site selection and selection

No	Title	Description	Sub-title	Responsible team	
				LC	JICA Study Team
		feasible. States the basis for selecting the particular project design proposed and offers justification for recommended emission levels and approaches to pollution prevention and abatement.			of equipment and system
8	Environmental Impacts	Predicts and assesses the project's likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any negative environmental impacts that cannot be mitigated. Explores opportunities for environmental enhancement. Identifies and estimates the extent and quality of available data, essential data gaps and uncertainties associated with predictions, and specifies topics that do not require further attention.		MAIN AUTHOR	Checks the contents
9	Environmental Management Plan (EMP)	Describes mitigation, monitoring and institutional measures (including their rough budgets) to be taken during construction and operation to eliminate adverse impacts, offset them, or reduce them to acceptable levels.		MAIN AUTHOR	Checks the contents
10	Consultation	Record of consultation meetings, including consultations for obtaining the informed views of the affected people, local non-governmental organizations (NGOs) and regulatory agencies.		MAIN AUTHOR	Checks the contents
11	Conclusions	Describes the conclusions and recommendations derived from the discussions in the previous chapters. This chapter also describes a		MAIN AUTHOR	Checks the contents

No	Title	Description	Sub-title	Responsible team	
				LC	JICA Study Team
		future schedule of the EMP according to the implementation schedule of the Project. It shall include review of the EMP, employment of staff for EMP implementation, periodical monitoring reports and other exercise.			

5.2 Contents of a social environmental survey around the F/S site

The LC conducts a social environmental survey around the F/S site as part of "6. Baseline data – 6.2 Description of the environments around the site" of the EIA Report described above. The survey items are described in Table 2.

Table 2 Items for the social environmental survey around the F/S site

Survey item	Contents
Demographic status	➢ statistic data on population
Land use	➢ current use pattern ➢ land use plan
Regional economy	➢ development plan ➢ status of employment ➢ current status of other industries (e.g. agriculture and fisheries) in the area
Utilization of river	➢ transportation, fisheries and others ➢ issue on water right
Status of infrastructure (status and their locations from the site)	➢ roads, bridges, railway ➢ public infrastructure such as hospitals and schools
Solid waste management	➢ responsible body in the province and the city ➢ current status of dumping site(s) ➢ current waste management treatment system (non-hazardous and hazardous wastes) of the existing Nasiriyah Thermal Plant and other industrial plants

5.3 Simulation of emissions

The LC conducts a simulation of emissions from the proposed thermal plant as part of "6. Baseline data – 6.3. Simulation of emissions (SOx and NOx) " of the EIA Report described above. The data for the simulation will be provided by the JICA Study Team by the end of November 2011.

5.4 Environmental impacts

The LC assesses the extent/significance of anticipated impacts that might be likely generated during both the construction and operation stages of the Project. The impacts shall be estimated quantitatively by using the baseline information. Table 3 (page 11) is a draft scoping table of the Project. The LC checks the contents of the table and revises it if necessary. Based on the revised table, the LC conducts the assessment.

If no impact is expected, its reason should be clearly described using the Project description and baseline data; why no impact is expected.

Cumulative impacts

Since the F/S site is part of the existing power plant, the cumulative impacts caused by the proposed and existing plants are carefully assessed and mitigated.

Table 3 Scoping (DRAFT) for the F/S site

			Construction Stage	Operation Stage
Environmental Pollution	1	Air pollution	✓ Temporally air pollution is expected by construction heavy vehicles and other equipment. Dust from soil needs to be considered.	✓ Emission from the thermal plant is expected.
	2	Water pollution	✓ Water pollution is expected from construction heavy vehicles, equipment, workshops and workers quarters.	✓ Water pollution is expected from the thermal plant.
	3	Solid waste	✓ Construction wastes are expected.	✓ Wastes are expected from the thermal plant.
	4	Noise/Vibration	✓ Noise and vibration are expected from construction heavy vehicles, equipment, and workshops.	✓ Noise and vibration are expected especially from the generators.
	5	Odor		
Natural Environment	6	Climate		
	7	Hydrology		
	8	Flood		
	9	Underground water		
	10	Ground subsidence		
	11	Soil erosion	✓ During the construction, soil erosion by wind is expected.	
	12	Protected areas		

			Construction Stage	Operation Stage
	13	Terrestrial ecosystems		
	14	River ecosystems	✓ If the intake needs to be extended to the middle of the river, disturbance is expected.	
	15	Endangered species		
	16	Global warming		✓ CO_2 emission increases.
Social Environment	17	Involuntary resettlement		
	18	Employment/livelihood	✓✓ For the construction works, many workers are expected to be employed.	
	19	Local economy	✓✓ For the construction works, many workers are expected to be employed.	✓ The thermal plant can give positive impact to the local economy.
	20	Land utilization		
	21	Social infrastructure/service facilities	✓ A road runs through the proposed site, and it needs to be diverted. Road works need to be carefully planned to give least negative impacts to the local people. Locations of hospitals and schools need to be checked. If they are close to the site, appropriate mitigation measures should be taken.	
	22	River traffic		✓(?) If there is river transportation, the intake may give negative impact to the traffic in dry season.

			Construction Stage	Operation Stage
	23	Land traffic	✓ See the "21 Social infrastructure/service facilities".	
	24	Sanitation	✓ Water pollution is expected from workers quarter.	
	25	Risks for infectious diseases such as HIV/AIDS	✓ There is a risk that immigrants for the construction works may bring in these infectious diseases.	
	26	Local custom		
	27	Burden on socially vulnerable groups		
	28	Uneven distribution of benefits and losses		
	29	Utilization /Right of water, including groundwater		✓(?) The water right of the river needs to be checked..
	30	Cultural heritage		
	31	Landscape		✓ The thermal plant gives negative to the landscape.
	32	Accident	✓ Road accidents need to be avoided by appropriate measures. Accidents at the construction site may be expected, and safety procedures should be employed.	✓ Accidents at the thermal plant may be expected, and safety procedures should be employed.

✓✓: Big impact is expected. ✓Some impact is expected. No mark: No impact. (?) needs more investigation.

5.5 Environmental management plan

The LC describes mitigation, monitoring and institutional measures (including their rough budgets) to be taken during construction and operation to eliminate adverse impacts, offset them, or reduce them to acceptable levels. In particular, it describes institutional organization for environmental management during construction and operation stages. In the Report, it is required to show organizational chart and responsibilities and tasks of division/staff.

5. 6 Public consultation meetings

The LC is responsible for assisting MOE to conduct two public meetings as part of "8. Consultation" of the EIA Report described above. The 1st meeting shall be held before commencing the SESC to explain the Project and the rough contents of the SESC, and the 2nd meeting shall be held after the Draft EIA Report is completed to explain the results of SESC such as the expected impacts and their mitigation measures, and monitoring plan.

Their venue, participants, contents will be decided in close consultation with MOE and MOEN. The LC is required to facilitate the process with MOE and MOEN.

The Minutes of Meeting should be attached to the EIA Report. They should contain the following contents;

- Dates and places of consultation
- Total number of attendance of consultation
- Types of participants (e.g. local residents, local authorities, councilor, etc.)
- How and why the participants are selected
- Contents of the explanations (materials shown or distributed to the participants should be attached to the EIA Report)
- Opinions/comments expressed by the participants, and the answer of MOE
- Reflection of the comments to the Project; this section can be described in the following table.

Table 4 Reflection of the comments to the Project

	Commenter	Comments/Opinions	Responses to the Comments	Reflection of the comments to the project
1.				
2.				
3.				
4.				

5.				

6. Reporting and Reports

The LC reports the progress status of the SESC once a week to MOE, and MOE informs it to the JICA Study Team.

The LC is required to submit the products as listed below.

- Progress report of the SECS
- Draft EIA report
- Final EIA report with necessary data as appendices

All products shall be written in English with adequate proof reading, and be written by MS Word in A4 size paper. The font shall be Times New Roman in the size of 11 with adequate space. The LC submits them in both hard copy and digital formatted copy.

Whenever datum (or data) from other sources are used in the Report, adequate citation is required. Photographs from internet are not allowed to used in the Report since it is against the international law on intellectual property right.

6. Schedule of the SESC

Table 5 and Figure 3 shows the schedule of the SESC.

Table 5 Schedule of the SESC

Month	MOE	LC	JICA Study Team
October, 2011	- By the end of October, MOE employs the LC		- By the end of October, it submits the Project Profile to MOE
November, 2011	- 1st public consultation meeting	- 1st public consultation meeting - Survey on social environment of F/S site - Submission of Progress Report to	

Month	MOE	LC	JICA Study Team
	- 3rd Mission	MOE (by 15/Nov/2011, before the 3rd Mission)	- It submits the Interim Report including part of EIA Report at the 3rd Mission
December, 2011		- It submits the comments on the Interim Report to MOE and the JICA Study Team. - It conducts the SESC especially on impact assessment, and formulates the 1st Draft EIA Report. - It submits the 1st Draft EIA Report by 25/ Dec/2011 to MOE and the JICA Study Team.	- It submits comments on Progress Report to MOE and the LC in early December.
January, 2012	- 4th Mission	- It formulates the Draft EIA Report, and submits it to MOE & JICA Study Team by 15/Jan/2012.	- It submits comments on the 1st Draft EIA Report to MOE and the LC by 10/Jan/2012. - 4th Mission
February, 2012	- 2nd Public consultation meeting	- 2nd Public consultation meeting	- It submits the comments on the Draft

Month	MOE	LC	JICA Study Team
		- It reflects the comments to the EIA Report, and submits it to MOE and the JICA Study Team by the end of February 2012.	EIA Report to MOE and the LC in early February.
March, 2012	- It confirms the contents of the EIA Report, and submits it to MOEN by the end of March 2012.		

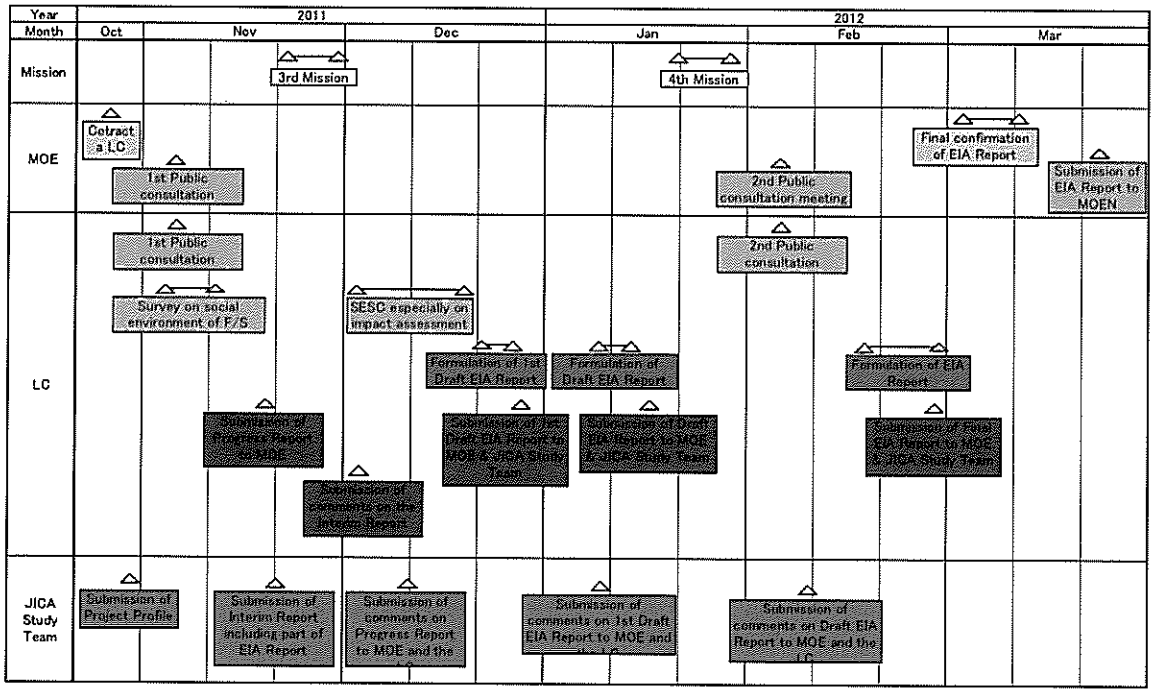


Figure 3 Schedule of the SESC

(End of the document)

Appendix 1

JICA Environmental Check List for Thermal Power Plant

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) (b) (c) (d)	(a) (b) (c) (d)
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as	(a) (b)	(a) (b)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		local residents) been reflected to the project design?		
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a)	(a)
2 Pollution Control	(1) Air Quality	(a) Do air pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust emitted by the power plant operations comply with the country's emission standards? Is there a possibility that air pollutants emitted from the project will cause areas that do not comply with the country's ambient air quality standards? Are any mitigating measures taken? (b) In the case of coal-fired power plants, is there a possibility that fugitive dust from the coal piles, coal handling facilities, and dust from the coal ash disposal sites will cause air pollution? Are adequate measures taken to prevent the air pollution?	(a) (b)	(a) (b)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2) Water Quality	(a) Do effluents including thermal effluents from the power plant comply with the country's effluent standards? Is there a possibility that the effluents from the project will cause areas that do not comply with the country's ambient water quality standards or cause any significant temperature rise in the receiving waters? (b) In the case of coal-fired power plants, do leachates from the coal piles and coal ash disposal sites comply with the country's effluent standards? (c) Are adequate measures taken to prevent contamination of surface water, soil, groundwater, and seawater by the effluents?	(a) (b) (c)	(a) (b) (c)
	(3) Wastes	(a) Are wastes, (such as waste oils, and waste chemical agents), coal ash, and by-product gypsum from flue gas desulfurization generated by the power plant operations properly treated and disposed of in accordance with the country's regulations?	(a)	(a)
2 Pollution	(4) Noise and Vibration	(a) Do noise and vibrations comply with the country's standards?	(a)	(a)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
Control	(5) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a)	(a)
	(6) Odor	(a) Are there any odor sources? Are adequate odor control measures taken?	(a)	(a)
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a)	(a)
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will	(a) (b) (c) (d) (e)	(a) (b) (c) (d) (e)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms? (e) Is there a possibility that discharge of thermal effluents, intake of a large volume of cooling water or discharge of leachates will adversely affect the ecosystem of surrounding water areas?		
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?(d) Are the compensations going to be paid prior to the resettlement?(e) Are the compensation policies prepared in document?(f) Does the resettlement plan pay particular attention to	(a)(b)(c)(d)(e)(f)(g)(h)(i)(j)	(a)(b)(c)(d)(e)(f)(g)(h)(i)(j)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?(g) Are agreements with the affected people obtained prior to resettlement?(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?(i) Are any plans developed to monitor the impacts of resettlement?(j) Is the grievance redress mechanism established?		
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Is sufficient infrastructure (e.g., hospitals, schools, and roads) available for the project implementation? If the existing infrastructure is insufficient, are any plans developed to construct new infrastructure or improve the existing infrastructure? (c) Is there a possibility that large vehicles traffic for transportation of materials, such as raw materials and	(a) (b) (c) (d) (e)	(a) (b) (c) (d) (e)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		products will have impacts on traffic in the surrounding areas, impede the movement of inhabitants, and any cause risks to pedestrians? (d) Is there a possibility that diseases, including infectious diseases, such as HIV, will be brought due to the immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? (e) Is there a possibility that the amount of water used (e.g., surface water, groundwater) and discharge of thermal effluents by the project will adversely affect existing water uses and uses of water areas (especially fishery)?		
4 Social Environment	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a)	(a)
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a)	(a)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) (b)	(a) (b)
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that	(a) (b) (c) (d)	(a) (b) (c) (d)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		security guards involved in the project not to violate safety of other individuals involved, or local residents?		
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce the impacts?(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce the impacts?	(a)(b)(c)	(a)(b)(c)
	(2) Accident Prevention Measures	(a) In the case of coal-fired power plants, are adequate measures planned to prevent spontaneous combustion at the coal piles (e.g., sprinkler systems)?	(a)	(a)
	(3) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate	(a) (b) (c) (d)	(a) (b) (c) (d)

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?		
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of electric transmission lines and/or electric distribution facilities). (b) Where necessary, pertinent items described in the Ports and Harbors checklist should also be checked (e.g., projects including construction of port and harbor facilities).	(a) (b)	(a) (b)
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, and global warming).	(a)	(a)

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are requested to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

Appendix 2

JICA MONITORING FORM

-If environmental reviews indicate the need of monitoring by JICA, JICA undertakes monitoring for necessary items that are decided by environmental reviews. JICA undertakes monitoring based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

-When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during Report Period
ex.) Responses/Actions to Comments and Guidance from Government Authorities	

2. Mitigation Measures

- Air Quality (Emission Gas / Ambient Air Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
SO_2						
NO_2						
CO						
O_3						
Soot and dust						
SPM						
Dust						

- Water Quality (Effluent/Wastewater/Ambient Water Quality)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH						
SS (Suspended Solid)						
BOD/COD						
DO						
Total Nitrogen						
Total Phosphorus						
Heavy Metals						
Hydrocarbons / Mineral Oils						
Phenols						
Cyanide						
Temperature						

- Waste

Monitoring Item	Monitoring Results during Report Period

- Noise / Vibration

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level						

Vibration level						

- Odor

Monitoring Item	Monitoring Results during Report Period

3. Natural Environment

- Ecosystem

Monitoring Item	Monitoring Results during Report Period
ex.) Negative effects/Actions to Valuable species	

4. Social Environment

- Resettlement

Monitoring Item	Monitoring Results during Report Period

- Living / Livelihood

Monitoring Item	Monitoring Results during Report Period

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	Expert of Economic / Financial Analysis & Structure for Project Implementation				
	Study on Business Plan				
1	**Structure for Project Implementation of the Power Plant**				
	Referring to the past similar projects such as Al-Musayab Thermal Power Station, we would like to acquire the following information or data.				
1.1	Procedures and Milestones in Iraq Required for Completion of the Power-plant Construction	Done	20-Oct	Mr. Mahdi Jasim	Mr. Mahdi Jasim advised FS team in due course if any modification is necessary for the following procedure up to MOE's official announcement for project bidding: 1) Identification of the project is prepared by MOE/Planning & Studies Office and it has to be confirmation by Minister of Electricity; 2) With project identification, MOE will obtain permission for the selected site for a new power plant from Ministry of Environment and also Ministry of Antiques and Tourism. 3) With permission for site, MOE will obtain confirmation budget from Ministry of Finance and also Ministry of Planning; 4) EIA shall be conducted by the consultant selected by MOE; 5) Project announcement is made officially by MOE and bidding procedure will start.
	What activities do you anticipate consuming long time? We recognize the following as a necessary milestone to the Iraqi side (Owner) before the Power-plant construction, and describe our expecting their time-schedule. - Approval of EIA issuing the certificate: March, 2012 (the starting point: S/P)? - Publication of the Project by Iraqi Ministry of Electricity (MOE): April, 2012 (in 1 month from S/P)? - Settlement of Project budget: October, 2012 (in 7 months from S/P)? - Formation of the Project team: November, 2012 (in 8 months from S/P)? - Conclusion of Yen-loan Agreement (L/A): January, 2013 (in 10 months from S/P)? - Conclusion of Agreement of Project-management Consulting (PMC): February, 2013 (in 11 months from S/P)? - Hire of the consultants for the Owner's activities: March, 2013 (in 12 months from S/P)? - Commencement of the consulting activities: April, 2013 (in 13 months from S/P)? - Award of the EPC Contract: March, 2014 (in 24 months from S/P)? Please make comment on our expecting time if you have any.	Done	20-Oct	Mr. Mahdi Jasim	Mr. Mahdi Jasim advised FS team as follows: 1) EIA will be approved issuing the certificate: March, 2012 2) The Project was officially announced for the stakeholder meeting. 3) Total budget and schedule will be reported to Ministry of Planning, according to the final report of this study. In order to set the annual budget, MOE will make an annual allocation out of the total budget together with adjusting the amount to the other projects, then to deduct annually the amount from the total one. 4) The project team was already formed.
1.2	Government Offices / Agencies Related to the Completion				
(1)	The project team expected to be formed in Iraqi Ministry of Electricity (MOE)* and the team members, and functions and authority thereof		By Jul 25	Mr. Mahdi Jasim	- Planning & Studies Office in MOE/HQ is responsible for developing the project and making decision to proceed for implementation or not. Once it is decided that project should be implemented, then Project Directorate (not in MOE/HQ) under Minister's Deputy for Projects is responsible for the project afterwards such as bidding procedure. - Organization chart for MOE/HQ is received, *however, Organization chart for the whole MOE including other Directorates such as Project Directorates is required.* - Project team for each specific project is formed as if it is a independent department in the Regional Office under DG of Production Project of the Project Directorate.
**	We desire to acquire the organization chart of the related offices / agencies of the central and of the provincial, respectively, showing the numbers of the members.		By Jul 25	Mr. Mahdi Jasim	*- Organization chart of the related offices / agencies of the central and of the provincial, respectively, showing the numbers of the members.*
	(1)-1. How many persons will form the project team?	Done	20-Oct	Mr. Mahdi Jasim	The number of the project-team members is 10 at present and will be increased approximately to 30.

Attachment 6

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	(1)-2. What functions are expected to provide the project team with? Our expecting functions are as follows: - To manage the power-plant construction, in the field of mechanical facilities, electrical facilities, electrical transmission, instruments and control, fuel-related facilities, water-related facilities, etc. - To conserve the environment - To coordinate the Project with the stakeholders in the area - To plan the electric generation, the operation and maintenance activities in the Power Plant We would like to obtain the organization charts of your indicating steam- and gas-power plants of the existing ones.	Done	By Oct 21	Mr. Mouafaq Y. Aziz	The organization chart of the project team was provided to the study team.
	(1)-3. Will the provincial government and the Ministry of Environment (MoEn) send some persons to assign them as team members?	Done	20-Oct	Mr. Mahdi Jasim	The project-team members will not include persons from the other ministry or local-government staffs; however, such ministry or local governments will follow requests from MOE.
(2)	The departments / sections of the MoEn in charge of environmental and social consideration, and functions and authority thereof				
	The EIA should be approved also by the Provincial Government in view of the social consideration?	Done	20-Oct	Mr. Mahdi Jasim	The EIA be approved also by the Provincial Government in view of the social consideration.
(3)	The departments / sections of Iraqi Ministries of Finance and of Planning and Development Cooperation to handle the ODA Loan for the Project				
	Repayment for the Yean loan will be carried out by the Debit Management Office of MOF. Resources of repayment for the ODA are the National Treasury of the MOF or the budget allocated to MOE for the repayment? MOE or the Power Plant has any obligation to repay the loan for MOF?	Done	20-Oct	Mr. Mahdi Jasim	Repayment for the Yean loan will be carried out by the Debit Management Office of MOF. Resources of repayment for the ODA are the budget allocated to MOE. (MOE has obligation to repay the loan for MOF)
1.3	Training for the Operation and Maintenance of the Plant	Done	21-Oct	Mr. Mahdi Jasim	There are 4 MOE's Training Center in Baghdad, Nasyria, Babal and Mosul) and they are under Training and Development Office of MOE/HQ. Training program at the Training Center may not cover the necessary training program for big-scale combined cycle gas turbine. Meanwhile, MOE is now developing a new training program using simulator for GE gas turbine. Such a new program is not available at present.
2	**Economic / Financial Analysis**				
2.1	Iraqi Data / Information to Calculate the Project Cash-flow				
	Note: The calculation of the cash flow would be made with use of the US$ unit.				
(4)	Preoperational Cost to Be Born by the Iraqi Side Required Before the Plant Operation				
	Can we consider that the following are the principal activities born a large amount of money in the Preoperational Cost? Please list the other costs required in addition to them if any. - Consultant fee to monitor the EPC activities. - Manpower cost for the Project team - Costs for making oversea-training of project members - Costs for the Test Run of the Power Plant	Done	21-Oct	Mr. Mahdi Jasim	Mr. Mahdi Jasim advised FS team as follows: - Consultant fee to monitor the EPC activities is expected to be supported by ODA - Manpower cost for the Project team is of MOE's budget and is a part from the Project. - Installation of a new simulator in the Nasyria training center will be requested as a part of ODA.. - Additional activities of EIA, if any, may be requested for ODA. - Monitoring activities by EIA will be made with MOE's budget. - Costs for making oversea-training of project members may be considered to be a part of ODA. - Costs for the Test Run of the Power Plant may be considered to be a part of ODA.

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
(6)	Electricity Sales Price to Be Set by the Iraqi Authority at the Project-battery Limit	Done	21-Oct	Mr. Mahdi Jasim	*MOE advised that the current tariff for electricity is as follows:* *1) Domestic, Commercial, Governmental* - 1 - 1000 Kwh: ID 20/Kwh (= 1.66 cent/Kwh) - 1001 - 2000 Kwh: ID 50/Kwh (= 4.16 cent/Kwh) - 2001 - 3000 Kwh: ID 80/Kwh (= 6.66 cent/Kwh) - 3001 - 4000 Kwh: ID 100/Kwh (= 8.33 cent/Kwh) - 4000 & more Kwh: ID 135/Kwh (= 11.25 cent/Kwh) 2) Industrial and Agricultural - Flat rate ID 120/Kwh (= 10 cent/Kwh) The Iraq team handed over the table listing expected tariff to be adopted from the year 2013.
	(6)-1 Can we recognize the Power Plant as a non-profit center? (Here the Power Plant receives the necessary cost under allocating a budget by the MOE head office and then the Power Plant has not necessity to make profit in the electrical generation)	Done	21-Oct	Mr. Mahdi Jasim	The project does not have revenues. The tariff bill is collected by MOE's staffs as a revenue to MOE.
	(6)-2 Or as a profit center, the electricity sales price will be set by the Iraqi Authority at the Project-battery Limit? This price does not mean the user's tariff but means the sales price to the Authority or the MOE head office. And any financial performance of the Power Plant will be accessed by the MOE head office?	Done	21-Oct	Mr. Mahdi Jasim	See (6)-1.
	(6)-3 The Power Plant has any goals in its operation, such as KPI (Key Performance Indicators)? - Annual volume of electric generation - Cost reduction or a rate of consuming the budget	Done	21-Oct	Mr. Mahdi Jasim	Mr. Mahdi Jasim advised FS team as follows: The following will be checked by MOE/HQ at the end of every fiscal year: - Annual volume of electric generation - Cost reduction or a rate of consuming the budget The study team will present and recommend an idea on KPI (Key Performance Indicators) to the Iraq team.
(7)	Transmission Loss Anticipated	Done	21-Oct	Mr. Mahdi Jasim	MOE advised as follows: - Loss from transmission: 10% (counting technical reason and un-technical reason) - Loss from distribution: 25%
(8)	Cost for Purchasing Fuel at the Plant				
(9)	An allowance and wages per year for a Plant employee who is classified into a manager class and the others		Jul 20	Mr. Mahdi Jasim	the wages per month for all employees in power station (steam 1,710,639,000 ID) and (gas 365,252,000ID) and the capacity for steam (400MW), gas (498MW)
	(9)-1 Your indicating figures of 1,186 persons for the Steam Power Plant and 302 persons for the Gas Power Plant seem much larger than those in Japan. We would like to learn the numbers of consisting members per each department listed below of the existing plants of your indicating both steam-power plant and gas-power plant. We would like to estimate appropriate figures for the new Power Plant.		Jul 31	Mr. Mahdi Jasim	the wages per month per person in average for power station (steam 1,442,360 ID) and (gas 1,209,444 ID) and the capacity for steam (400MW), gas (498MW), the no. of manpower in this power station (steam 1,186) gas (302)
	Example: Organization System of Power Plant 1. Electricity Generation Division 1-1. Operation Department (Dept.) 1-2. Maintenance Dept. 1-3. Computer Information Dept. 1-4. Communication System Dept. 1-5. Safety / Inspection Dept. 1-6. Training Dept. 1-7 Fuel Dept. 2. Administration Division 2-1. Accounting Dept. 2-2. Economic Dept. 2-3. Capital Investment Dept. 2-4. Administration Dept. 2-5. Legal Dept. 2-6. Personnel Dept.	Done	21-Oct	Mr. Mahdi Jasim	The study team received the table listing the number of employees of the existing steam plant. The study team will present a typical number for CCGT power plant, taking consideration of the situation of Iraq.

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
	9-2) Why is the figure of 1,186 persons for the Steam Power Plant about four times as large as the 302 persons for the Gas Power Plant? The difference comes from the figures of the boiler maintenance department, the hot water department, the chemical department, etc.?				
(10)	Insurance costs of an operation cost (We would get data on how many percent of the EPC cost in the precedent case)	Done	21-Oct	Mr. Mahdi Jasim	The study team will assume insurance costs according to its previous experience.
(11)	Other Operating Costs including environment-preservation costs, and consumable costs if necessary.	Done	21-Oct	Mr. Mahdi Jasim	The study team will assume and calculate such operating costs according to its previous experience.
(12)	Tax rates and the Life Period (we assume the rates at zero because we regard the Plant as an institution under MOE. The life period is not considered because the tax calculation is not necessary)	Done	21-Oct	Mr. Mahdi Jasim	In general, all the tax in Iraq is expected to be exempted since the Project is supported by ODA. The study team will check the import tax, and then will calculate it, if any. It is not necessary for the study team to consider the other taxes and the life periods.
2.2	Items to Be Considered for the Economic Analysis				
(1)	Resettlement Costs (We regard that the costs be indicated by the Authority)	Done	21-Oct	Mr. Mahdi Jasim	Resettlement costs is not necessary to consider for the project according to the current circumstances.
(2)	Land-related Cost (We assume that the land for the Plant, the transformer substation, the transmission tower for the Project be owned by MOE)	Done	21-Oct	Mr. Mahdi Jasim	Land-related costs may be free because the land for a new power plant belongs to MOE, or MOF.
(3)	Land-related Costs such as Right of Way, for laying of transmission line, fuel pipeline and water pipeline (The costs are not considered in the Study)	Done	21-Oct	Mr. Mahdi Jasim	Cost of Right of Way is not included in this Feasibility Study because it is MOE's responsibility to secure the required land for power plant, transmission line and water pipeline/canal. Fuel pipeline construction is the responsibility of MOO.
(4)	Beneficiary Area and Population				
	- Area and Population to be benefitted by the Project	Done	21-Oct	Mr. Mahdi Jasim	The study team will assume and make the calculation, considering that the generated electricity will be transmitted to the national grid and will be consumed in southern area
	- Electric Power to be consumed per household in the area	Done	21-Oct	Mr. Mahdi Jasim	
	- Average number of persons per household in the area	Done	21-Oct	Mr. Mahdi Jasim	
	- GDP to be generated in the area	Done	21-Oct	Mr. Mahdi Jasim	
3	**Setting of the Operation and Effect Indicators**				
(1)	Circumstances of the Electricity Utilities in the Southern Region, in view of functions, organization, institutions and financial states	Done	21-Oct	Mr. Mahdi Jasim	Mr. Mahdi Jasim advised the FS team as follows: - In Iraq the whole power plants have an actual production of 7,000 MW in total while its nameplate capacity in total is 14,000 MW, which means the operating rate is 50% in average. In the Nasyria region, the steam plant generates 500 MW though its nameplate one is 800 MW. - Operation data on the generation, the fuel consumption, etc. are reported to 1) Regional General Directorate, Generation Office of MOE, MOE's Deputy Minister, then to the Minister, 2) National Dispatch Center (NDC) which controls operation of all the power plants, in parallel to 1) - In the case where troubles occur, the technical report including the counter-measures will be sent as mentioned in the above paragraph. - Technical staffs will be assigned utilizing the existing experienced ones instead of hiring new ones. - MOE has its own regulations for HSE to keep health of the staffs, to keep safety at workplace and to conserve the environments. MOE will make monitoring activities. - The Electricity Law is under negotiation and will be approved by the Cabinet and the Parliament. The power plant does not have a legal
(2)	Trends and forecasting of the number of power users (residence, commercial and industry)	Done	21-Oct	Mr. Mahdi Jasim	The study team will assume and make the calculation, considering that the generated electricity will be transmitted to the national grid and will be consumed in southern area.

No.	Necessary Data for the Study Documents or Reports	Check	Date	From Whom	Notes
(3)	Trends and forecasting of the electricity tariff	Done	21-Oct	Mr. Mahdi Jasim	The Iraq team handed over the table listing expected tariff to be adopted from the year 2013.
(4)	Trends and forecasting of the population in the transmission-targeted area	Done	21-Oct	Mr. Mahdi Jasim	The study team will assume and make the calculation, considering that the generated electricity will be transmitted to the national grid and will be consumed in southern area.

Attachment 7

Translation

To : Government of Japan

Subject : Gratitude and Appreciation of Japanese Government and Population

We, surrounding tribes of Nassirieh, offer our gratitude and appreciation for the Japanese Government for their continuous support to the disastrous Iraqi people.

Their support and back up to Iraqi people has continued throughout their willingness to establish Electrical Generation Power Plant at Nassirieh, Country of Ur Civilization.

We, therefore, appreciate the Japanese efforts to strengthen the ties between Japan and Iraq.

1) Sheikh
   Hameed Karim Ojail Tweili
   HUSSAINAT TRIBE CHIEF

2) Sheikh
   Ali Mohmamed Munshed
   GHAZA TRIBES CHIEF

3) Sheikh
   Adnan Bader Kate' AL Batty
   ZAIRAJ TRIBES CHIEF

Date : 11th October, 2011

Endorsed by :
Thi Qar Governorate Council Member
Assitant of Technical Affairs

الى/ حكومة اليابان الصديقه

م/ شكر وتقدير لحكومة وشعب اليابان

نحن شيوخ العشائر المحيطه بمدينة الناصريه نتقدم بالشكر الجزيل والعرفان لحكومة وشعب اليابان الصديق على دعمهما المتواصل للشعب العراقي المنكوب واسهامهما الكبير في تجاوز معاناته من خلال نياتهما الطيبه في انشاء محطة توليد كهرباء سعة ١٠٠٠ ميكاواط في مدينة الناصريه موطن اور مهد الحضارات .

ولا يسعنا الا ان نسجل اعتزازنا وتقديرنا العا ليين للجهود العظيمه التي سوف تبذل من قبل الحكومه اليابانيه والتي سوف تزيد من اواصر الاخوه والروابط المتينه بين الشعبين العراقي واليابابي .

الشيخ
حميد كريم عجيل التويلي
شيخ عشائر الحسينات

الشيخ
علي محمد المنشد
شيخ عشائر الغزي

الشيخ
عدنان بدر كاطع البطي
شيخ عشائر الزيرج

٢٠١١ / ١٠ / ١١

شهادة على توقيع
شيوخ العشائر

عضو مجلس محافظة ذي قار