

Appendix 4-1 Minutes of Discussion (Outline Design Study)

Preliminary Study for Reconstruction of Iraq (Phase 4)
Outline Design Study

~~Minutes of Discussions between JICA Study Team and Iraqi officials concerning the possibility of diesel power station in Samawah~~

Data:	December 1, 2, and 3, 2004	
Place:	Conference room in Radisson SAS Hotel in Amman	
Participants:	Mohammed Ali Jaber	Assistant Director General, Planning & Study Office, Ministry of Electricity (MoE)
	Hussein Magdem Makhfi	Expert, Dibuty Office, Ministry of Electricity (MoE)
	Qusay Neif Mahammed	Projects Managements, Planning & Study Office, Ministry of Electricity (MoE)
	Saad Rahem	Chief Engineer, Nassiriya Generation Governerate, Muthanna Projects
	Abdul Aziz Jabar	Expert, Ministry of Oil (MoO)
	Mohammad H. Mohammad	Deputy Governor of Muthanna
	Raisan Moteschar Fahad	Governorate Committee, Electrical Department
	Matsushima Noriaki	Nippon Koei
	Wada Masaki	Nippon Koei
	Manita Akihisa	Nippon Koei
	Uematsu Sohei	Nippon Koei
	Rey Yeates	Mott MacDonald

The study team for Preliminary Study for Reconstruction of Iraq (phase 4) had discussions with the above mentioned Iraqi officials concerning the possibility of diesel power station in Samawah.

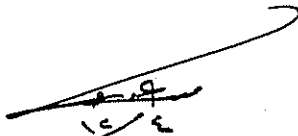
1. Fuel Supply for the Project

(1) Procedure for Securing the Fuel Supply in Iraq

The study team asked how is the official procedure for MoE to obtain a definitive guarantee from MoO, or other relevant authorities, for supplying the fuel for MoE's power station.

MoO stated that, for this Project, the letter issued by MoO on May 10, 2004, which was received by the Japanese Samawah office from MOE on August 17, 2004, is the only one document which secures MoO's commitment for fuel supply to the Project, and no other letter or memorandum will be issued in future. MoO and MoE confirmed that this is the common practice in Iraq.

(2) Fuel Supply from the Samawah Oil Refinery

M. Motar

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MoO confirmed that they are committed to the followings for the fuel supply from the Samawah oil refinery.

- Commencement of fuel oil production: January, 2005
- Supply amount of fuel oil to the Project: 750 m³/day
- Specifications of fuel oil for the Project: as submitted in the previous meeting with the study team for Preliminary Study for Reconstruction of Iraq (Phase 3) in August/September, 2004

(3) Alternative Source for Fuel Oil

The study team pointed out that crude oil is not acceptable for the Project as an alternative fuel, and asked the alternative source and supply method of fuel oil in case the Samawah oil refinery is not available.

MoO stated that in case the Samawah oil refinery is not available, it is possible to supply fuel oil from the existing Nassiriyah oil refinery by road tankers.

(4) Method of Fuel Supply

The study team asked the method of fuel supply from Samawah oil refinery to the diesel power plant in the Project.

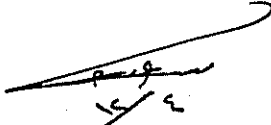
MoO stated that the distance between the proposed Project sites and the Samawah oil refinery is less than 10km and fuel supply by pipeline is technically possible for this distance. MoO also stated that they expect that materials and construction of this pipeline would be included in the Project. MoO confirmed that MoO will be responsible for the land compensation for this pipeline construction work.

2. Location of the Project site

Three locations were proposed as the project site by MOE. MOE stated that the site near the existing Old Samawah substation is the most preferable location due to the following reasons:

- For convenience of management and security reason, it is preferable to locate all power facilities such as substations and power stations within one area.
- The said location is advantageous for easy line connection to the existing Old Samawah substation.
- The distance from the Samawah refinery does not cause any difficulty for fuel transportation by pipeline, even though the distance is the longest among the all alternatives.
- The said area is currently under control by the Ministry of Electricity.
- There exists enough open space at the west and south side of the existing Old Samawah substation, although its north side is blocked by the housing area.

Based on the above, it was mutually agreed that the study team will conduct topographic survey and geological investigation at the site near the Old Samawah substation.

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3. Scale of the Project

The study team asked MOE how the installed capacity of 60 MW was selected for the Project.

MOE stated that;

Load demand for the whole Muthanna province is estimated at 200 MW approximately. Meanwhile, the electric supply from the national grid is assumed at about 50 MW in average, although it fluctuates largely time by time. Even after the CPA's gas turbine plant of 38 MW starts its operation, there will exist a large gap between the load demand and supply. Thus the power of 60MW from the Project will be consumed completely in the province.

4. Number of Units and Unit Capacity

The study team explained, and MOE noted, that the number of units and unit capacity had better be reviewed during this Preliminary Study based on the condition of transportation route, easiness for construction, past achievement of manufacturers, and experiences for generating plants in Iraq.

5. General Layout and Implementation Schedule of the Project

The study team explained that the followings are tentatively assumed:

- The Project area would be as about 100 m x 200 m.
- It will take about 32 months for implementation of the diesel power plant of the Project.

MoE requested that every effort should be made to shorten the period for the Project.

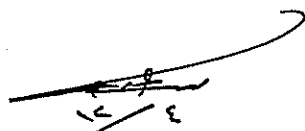
6. Environmental and Social Considerations for the Project

The study team asked the required procedure for environmental and social considerations for construction of the Project.

MoE and the Muthanna Governorate office stated that;

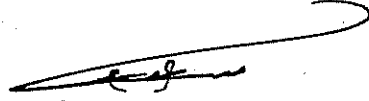
Once MoE determines to construct and operate a new power plant, the Muthanna Governorate office would issue a notice letter to the Ministry of Environment. Upon this letter, the Ministry of Environment would issue a list of requirement for environmental and social consideration for that specific project. Then, MoE would submit an environmental impact assessment report for approval by the Ministry of Environment for implementation of the Project.

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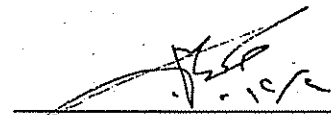
A handwritten signature with a long horizontal stroke and a date '12/8' written below it.



Noriaki Matsushima
Study Team for Preliminary Study
For Reconstruction of Iraq (Phase 4)



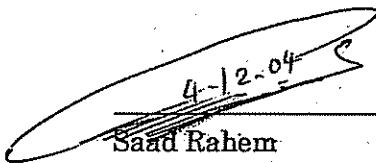
Mohammed Ali Jaber
Assistant Director General
Planning & Study Office
Ministry of Electricity



Hussein Magdem Makhfi
Expert, Dibuty Office
Ministry of Electricity

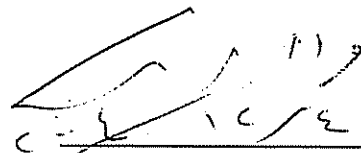


Qusay Neif Mahammed
Projects Managements
Planning & Study Office
Ministry of Electricity



4-12-04

Saad Rahem
Chief Engineer
Nassiriya Generation Governorate
Muthanna Projects

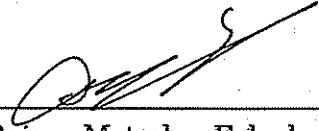


Abdul Aziz Jabar
Expert
Ministry of Oil



Mohammad H. Mohammad
Deputy Governor of Muthanna

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Raisan Moteshar Fahad
Governorate Committee
Electrical Department

Copy to:-

-MOE

-MOO

Minutes of Discussions between JICA Study Team and Iraqi officials concerning the possibility of diesel power station in Samawah

Date:	February 18, 19, and 20, 2005	
Place:	Conference room in Kempinski Hotel in Amman	
Participants:	Mohammed Ali Jaber	Assistant Director General, Planning & Study Office, Ministry of Electricity (MoE)
	Hussein Magdem Makhfi	Expert, Dibuty Office, Ministry of Electricity (MoE)
	Qusay Neif Mahammed	Projects Managements, Planning & Study Office, Ministry of Electricity (MoE)
	Saad Rahem	Chief Engineer, Nassiriya Generation Governorate, Muthanna Projects
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	Mohammad H. Mohammad	Deputy Governor of Muthanna
	Raisan Moteshar Fahad	Governorate Committee, Electrical Department
	Wada Masaki	Nippon Koei
	Manita Akihisa	Nippon Koei
	Fukunaga Jun-ichi	Nippon Koei
	Tokuno Masaru	Nippon Koei
	Yuzurio Susumu	JICA

The study team for Preliminary Study for Reconstruction of Iraq (phase 4) had discussions with the above mentioned Iraqi officials concerning the possibility of diesel power station in Samawah.

1. Letters from Iraqi Authorities

MoE submitted the following letters to the study team during the discussion.

- Muthanna Governor's letter on January 15, 2005 : Attachment -1
- MoE's letter on February 15, 2005 : Attachment -2
- MoE's letter on February 5, 2005 : Attachment -3
- MoO's letter on February 14, 2005 : Attachment -4
- Ministry of Environment's letter on February 7, 2005 : Attachment -5

2. General Schedule of the Preliminary Study

Referring to the letters as seen in Attachment -1 and 2, MoE expressed their wish that the Project would be implemented as soon as possible.

The study team replied that they were conducting the preliminary study to find out if the Project would be possible to be implemented from technical viewpoints. The study team also explained that the preliminary design and cost estimation would be conducted in this study during the coming March and April, 2005, then its result would be presented to MoE around the end of April or beginning of May, 2005.

MoE requested to shorten the study period, and the Muthanna Governorate stated that they would issue a letter to Japanese side for accelerating the study. Upon this, the Study Team replied that it would be difficult to change the above mentioned schedule.

3. Availability of Natural Gas in Samawah

Referring to the MoO's letter as seen in Attachment -4, MoO again confirmed that natural gas will not be available in the foreseeable future for the new power generating units in Samawah.

4. Samawah Diesel Power Plant

(1) Selection of Unit Capacity and Number of Engines

The study team explained that the two options, that is, 15MW x 4sets and 6MW x 10sets, were considered being without clear advantage on the other as seen in the comparative table in Attachment -6. MoE again confirmed that they wished to adopt the 15MW x 4sets option for the reasons of shorter construction period and less maintenance cost. Based on this, it was mutually agreed that the preliminary design and cost estimation would be carried out for the 15MW x 4sets option.

(2) Basic Layout

The study team presented draft layout plans of the diesel power plant for 15MW x 4sets option as seen in Attachment -7, then explained the followings:

- The project area would be as about 310m x 145m.
- The formation height of the plant yard would be as about 8m above sea level.
- Diesel engines would be accommodated in a powerhouse of steel structure, 1st to 4th floor, of which total space would be as about 7,600 m².
- Other major buildings would be; i) administration office of reinforced concrete, 1st floor, of which space would be as about 670 m², ii) crew lodge would be of reinforced concrete, 1st to 2nd floor, of which total space would be as about 460 m², and iii) purifier station would be of steel structure, 1st floor, of which space would be as about 1,060 m².

Both parties confirmed that the preliminary design would be conducted according to these layouts.

(3) Specifications of Diesel Engines and Generating Equipment

The study team presented draft specifications of equipment of the diesel power plant as seen in

Attachment -8, then explained the basic design conditions as followings:

- Diesel Engine: Diesel engine type would not be restricted to either 2-stroke (low speed) or 4-stroke (medium speed), because each of engine type has its merits and demerits. Generating output of diesel engine would be 15MW class as net output under the design temperature (+55°C~-10°C).
- Fuel Oil System: Heavy fuel oil would be used for this project. The capacity of heavy fuel oil storage tank would be 2,000kL (500kL×4sets) in total, taking 7 days storage into consideration.
- Oil Purifier System: Oil purification would be carried out with the double process (H.F.O. purifier system and H.F.O. purifier recirculating system) to remove the sludge and impurities, because the adopted fuel would contain more sludge and impurities such as dust compared with marine diesel oil.
- Cooling System: The radiator system would be used for cooling method of diesel engine. The capacity of scavenging air cooler and cooling water pump would be larger than standard specifications, because the temperature of intake air and cooling water would be rather higher under the condition of annual maximum temperature in Samawah.
- Air Intake System: Oil bath filters would be installed with air intake system in powerhouse to prevent the engine trouble by sandstorm.

Both parties confirmed that the preliminary design would be conducted according to these conditions and specifications.

(4) Basic System Configuration

Regarding basic system configuration of 132 kV and 11 kV switchyard in Samawah Diesel Power Plant, both parties agreed the system as shown in Attachment -9.

(5) Design Conditions and Standard

The International Electrotechnical Commission Standard (IEC) shall be applied to the design of all electrical and electromechanical equipment. In case not covered by IEC, Japanese Industrial Standard (JIS) and the Japanese Electrotechnical Committee (JEC) Standard shall be applied.

(6) Requirement for environmental considerations

Referring to the letter issued by the Ministry of Environment as seen in Attachment -5, MoE explained that the Ministry of Environment had given clearance to build and run the diesel power plant in Samawah provided there would be a complete combustion and a proper management of waste residual oil.

MoE confirmed that there was no numerical standard in relation to SO_x and NO_x in Iraq. They remarked that in this Project a gas emission monitoring system would be required to monitor the status of exhausted gas in regard to complete combustion, and also remarked that high stacks would be

required to achieve gas concentration on ground at the levels specified in the relevant international standard.

5. Samawah Oil Refinery and Fuel Oil Pipeline

(1) Samawah Oil Refinery

MoO remarked that rehabilitation of the Samawah Oil Refinery was still continued, and the commencement of fuel oil production would be at the end of March, 2005. MoO confirmed that they were committed to supply fuel oil of 750 m³/day to the Project.

Referring to the Attachment -4, MoE and MoO confirmed that in case of shutdown of the Samawah Oil Refinery, the fuel oil would be transported from other refineries such as Nassiriya or Najaf by road tanker, and MoE would be responsible for such transportation.

(2) Fuel Oil Pipeline

MoO explained that the existing pipeline which extended from the Samawah Oil Refinery to the north direction was not for the fuel oil transportation purpose. Thus, it was mutually confirmed that construction of new fuel oil pipeline between Samawah Oil Refinery and Samawah Diesel Power Plant including installation of pumping system in the refinery plant should be included in the scope of the Project as seen in Attachment -10. The new pipeline shall be installed in parallel with the existing pipeline.

The study team explained that they would plan to take water for fire fighting for the Project from a water pipeline which was under installation for the purpose of the fire fighting for the Samawah Oil Refinery. MoE replied that they basically agreed to this, and would confirm the site situation.

6. 132 kV Transmission Line and Old Samawah Substation

Regarding 132 kV transmission line between Samawah Diesel Power Plant and Old Samawah Substation, both parties agreed the system as shown in Attachment -9. Both parties also agreed that extension of 132 kV bus in Old Samawah Substation to connect the transmission line should be included in the scope of the Project.

7. Relocation of Existing 132 kV Transmission Line

The study team suggested that MoE would execute relocation of the existing 132 kV transmission line at the construction site in advance for the smooth implementation of the Project. But MoE replied that they wished to include such relocation in the scope of the Japanese side, as they would face difficulty if they procure the materials by themselves.

8. Items to be Executed by Iraqi Authorities

MoE confirmed that the following activities would be conducted by the Iraqi authorities in advance of the construction work:

- Provision of terminal points for public services of water supply, telephone, and power supply at locations adjacent to the Project site
- Survey for land mines and unexploded at the construction site

MoE and MoO confirmed that the all project areas including power plant yard and fuel-oil pipelines were owned by the State, thus there would be no necessity for land acquisition. MoE stated that no further process for permission by Iraqi authorities concerned would be required to implement the Project.

9. Operation and Maintenance

MoE explained that staffs for the plant would be about 70 in total including 28 staffs for operation and 32 staffs for maintenance. Both parties agreed with the training plan for such operation and maintenance staffs as seen in Attachment -11.

10. Issues to which Attention should be Paid

(1) Japan's Procurement Policy in Grant Aid Projects

The study team explained that according to Japan's policy for procurement in grant aid projects, it was necessary to secure competitiveness. Therefore, it would be difficult to adopt specifications that would lead to exclusiveness. In general, such specifications should allow at least three prospective bidders.

(2) Expatriate Supervisors for Installation of Diesel Engines

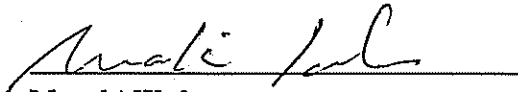
The study team explained that for installation of diesel engines of the scale in this Project, it would be mandatory for site supervision to post staffs from the manufacturer, or experts who were acquainted well and had sufficient experience about installation of the diesel engines produced by the manufacturer. The study team also pointed out that nevertheless the above requirement, currently the Japanese firms were not allowed to dispatch Japanese staffs into Iraq, for security reasons.

(3) Inland Transportation, Security, Insurance

The study team explained that there were still uncertain risks for security issues, and thus measures to hedge such risks should be solved for implementation of the Project.

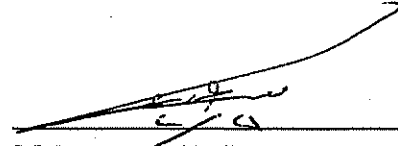
11. Securing Beneficial Effect by the Project for Muthanna / Samawah

MoE confirmed that electricity generated by the power plant of the Project would be exclusively used for power demand in Muthanna / Samawah only. In addition to this, MoE also confirmed that current share of electric supply from other generating plants in the national grid to Muthanna / Samawah would not be changed.



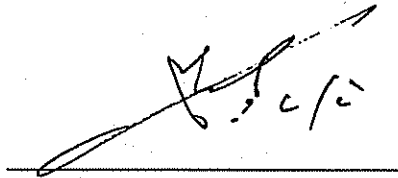
Masaki Wada

Study Team for Preliminary Study
For Reconstruction of Iraq (Phase 4)



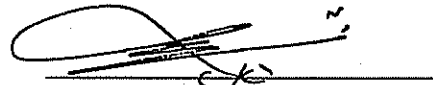
Mohammed Ali Jaber

Assistant Director General
Planning & Study Office
Ministry of Electricity



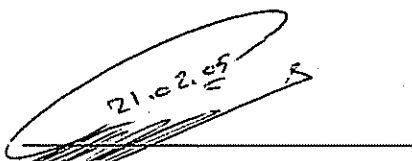
Hussein Magdem Makhfi

Expert, Dibuty Office
Ministry of Electricity



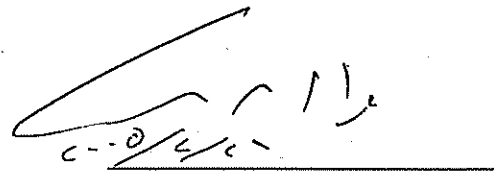
Qusay Neif Mahammed

Projects Managements
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Ministry of Electricity



Saad Rahem

Chief Engineer
Nassiriya Generation Governorate
Muthanna Projects

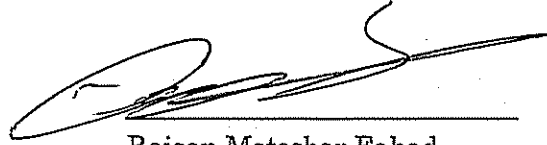


Abdul Aziz Jabar

Expert
Ministry of Oil



Mohammad H. Mohammad
Deputy Governor of Muthanna



Raisan Moteschar Fahad
Governorate Committee
Electrical Department

Copy to:-
-MOE
-MOO

Attachment

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بسم الله الرحمن الرحيم
جمهورية العراق

محافظة المثنى
مكتب المحافظ

إلى / مؤسسة جايا اليابانية
م / إنشاء محطة الكهرباء في المثنى

نهديكم أطيب التحيات

نظرا للنقص الشديد في الطاقة الكهربائية المجهزة إلى محافظتنا فإن المواطنين وبمختلف شرائحهم تتطلع إلى إنشاء محطة توليد كهرباء في المثنى من قبل الجانب الياباني الصديق لتقليل المعاناة من نقص الكهرباء والذي يؤثر على جميع مفاصل الحياة اليومية (الاقتصادية - الاجتماعية - النفسية) ، وزاد الأمل بعد معرفة الناس بالدراسات التي تجرى مع الجانب الياباني حول هذا الخصوص مما جعل جميع أبناء المحافظة فرحين وسعداء بإقامة هذا المشروع الحيوي المهم ، وبذلك تؤكد أهمية أن يرى المواطن شيء قد تحقق على أرض الواقع وبالسرعة الممكنة ، لأن المعاناة وكما يعلم الجميع هي منذ سنين طويلة وأن مشكلة الكهرباء في المثنى لها خصوصية عن باقي مناطق العراق وهي عدم توفر وحدات توليدية خاصة بالمحافظة مما يجعل القطع التام كثير الحدوث . . .

وأن المحافظة على استعداد لتقديم كل ما هو ممكن للجانب الياباني لغرض سرعة البدء بمشروع المحطة المقترحة (4x15 MW) والتي تعمل بالوقود السائل المنتج في مصفى السماوة وأنا على يقين بأن الجانب الياباني الصديق يعي أهمية المشكلة ومدى إيجابية سرعة البدء والتنفيذ للمشروع .

مع الشكر والتقدير

محمد علي حسن الحساني
محافظ المثنى
٢٠٠٥ / ١



نسخة منه إلى /

- مكتب الارتباط لوزارة الخارجية اليابانية - للتفضل بالاطلاع ... مع التقدير .

On the name of God
Republic of Iraq

No.195

Date /15-01-2005

Muthana Government

Governors office

To/JICA organization Japan

Sub/ construction of electric power plant in Al-Muthana

With our best greetings

Due to the severe shortage in electric energy supplying our governorate our citizens all kinds are looking for the construction of generating power plant in Al-Muthana by the friendly Japans side to reduce suffering from shortage of electricity which effect on all levels of daily life (economical, social, cycological). there hope increase where the people knows about the studies which is going a head by the Japanese side in this regard which makes all governorate people feels happy to construct this essential important project, this is why we confirm the importance that the citizens is going to see that something is going to be provided on the ground with the possible speed up as the suffering which is known by everybody was existing before long years and the problem of the electricity in Al-Muthana governorate has something special when compared with other part of Iraq due to known availability of generating units in the governorate which makes total shut down of electricity to be happen. the governorate of Al-Muthana is ready to give any support possible to the Japanese side in order to expedite starting with project with a power plant (4x15 MW)[low speed] which works on the heavy fuel produced by the Samawa refinery and we are sure that the friendly Japanese side understand the problem and to consider how much speeding up to start with project and construction are positive

With our thanks and greeting

Signature

Muhammed Ali Hassan Al-Hassani
Al-Muthana governor

STAMP

Republic of Iraq
Ministry Of Electricity
Dept. of Planning & Studies
No. :
Date : / /2005

بسم الله الرحمن الرحيم



جمهورية العراق
وزارة الكهرباء
دائرة التخطيط والدراسات
العدد : ١٥٤٤
التاريخ : ٢٠٠٥/٤/١٥

الس/ مؤسسة جايا اليابانية

م/ محطة كهرباء السماوة

تحية طيبة...

بالنظر الى النقص الحاد بالطاقة الكهربائية وحاجة محافظة السماوة الملحة نؤيد ماورد في كتاب دائرة انتاج الطاقة الكهربائية العدد ١٧ في ٢٠٠٥/٣/٥ (المرافقة).
راجين اتخاذ الاجراءات السريعة للمباشرة بهذا المشروع في بداية شهر اذار ٢٠٠٥/ وبموجب اللقاءات الحاصلة والمعلومات المتبادلة بخصوص ذلك، علما قد تم تضمين هذا المشروع في خطة وزارتنا مع استعدادنا للتعاون معكم لغرض تذليل كافة العقبات التي تعيق انجاز المشروع.

شاكرين تعاونكم معنا مع التقدير.....

المرفقات

- كتاب دائرة انتاج الطاقة اعلاه.

رعد محسن الحارس
وكيل الوزارة الاقدم

٢٠٠٥/٣/١٥

نسخة منه للس/

- السفارة اليابانية في بغداد ... مع التقدير.
- مكتب الارتباط في وزارة الخارجية اليابانية في محافظة المثنى .. مع التقدير.
- دائرة التخطيط والدراسات/ المشاريع / مع الاوليات.

In the name OF Allah
No. 1545
Date:15-2-2005

To/JICA

Subject / Samawa DG

OUR BEST REGARDS,

according to the shortage that happened in the electricity and the necessary needed for Al-Samawa Governorate we confirm what the official book of department of electricity production numbered 17 at 5/2/2005

Asking you kindly to do the necessary procedures to start with this project in the beginning of march /2005 according to the current meetings and the mutual information regarding this . notifying that this project had been included in our ministry plan with our full desire to cooperate with you to make all the difficulties easy to achieve the implementation of this project .

We thank you for your cooperationwith our appreciation

Raad Muhsen Al-Haris
Senior deputy of the minister
14-2-2004

copy from that book to /liaison office
liaison office in the Japanese ministry of foreign affairs
Dept. of study and planning

Republic Of Iraq
Ministry Of Electricity
Energy Production Office.



جمهورية العراق
وزارة الكهرباء
دائرة إنتاج الطاقة الكهربائية
المشاريع

العدد: ١٤
التاريخ: ٢٠٠٥/٥/٥

ترشيده استهلاك الكهرباء ظاهرة حضرية

إلى /مؤسسة جاياكا اليابانية

م/ محطة كهرباء السماوة التي تعمل بالوقود الثقيل

نؤكد ونؤيد انشاء محطة كهرباء بطاقة سعة ٦٠ ميكاواط (٤ × ١٥ م.و) تعمل بالوقود الثقيل (HFO) في مدينة السماوة وذلك لعدم توفر الغاز في المنطقة في الوقت الحالي والسنوات القادمة وعليه يرجى الاسراع باتخاذ الاجراءات اللازمة للمشروع في بداية انشاء المشروع وكذلك نؤكد لكم ما يلي:

١. الوحدات التوليدية يجب ان تكون من نوع Low Speed Engin.
٢. يجب ان تكون من منشأ ياباني لكفاءة هذه الوحدات.
٣. نؤكد بان مدينة السماوة تقع خارج نطاق الهزات الأرضية.

... مع التقدير

مرعد شلال سعيد
المستشار لشؤون الإنتاج

٢٠٠٥/٢/



نسخة منه إلى:

- السفارة اليابانية في بغداد.
- مكتب الارتباط بوزارة الخارجية اليابانية.
- قسم المشاريع.

No. 107

Date : 5-2-2005

To : JICA

Subject:- Samawa power station work with HFO

We confirm and support establishing 60 MW power station 4 X 15 MW work with HFO in Al-Samawa city because of the non-availability of the gas in the recent time and the coming years and for that reason you have to accelerate the necessary procedures to start doing the project , we also confirm to you the following :-

- 1- Generator Units have to be from the kind of Low Speed Engine
- 2- They should be from Japanese Origin due to the efficiency of such Units .
- 3- We insure that Al-Samawa city is out of earthquakes Zone .

With our Appreciation

Raad Shallal Saeed

The councilor for production affairs

Copy from the book to :

- 1-the Japanese embassy in Baghdad
- 2-the liaison office in the Japanese ministry of affairs
- 3- the project department .

REPUBLIC OF IRAQ
MINISTRY OF OIL
DIRECTORATE OF PLANNING



REF: 140
DATE: 14/2/2005

FAX

TO : JICA Study Team

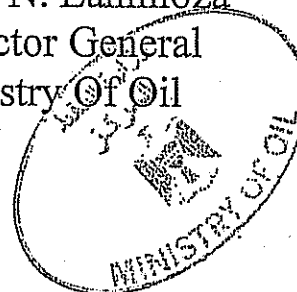
FAX NO.:

SUBJECT: New Power Generation Units In Samawa

In reference to the minutes of meetings held between you and the Iraqi side for the period August 31 to 1st of September 2004 and our letter to the ministry of electricity no.5901 dated 10th May 2004 we like to confirm that natural gas will not be available in the foreseeable future for the new power generating units in Samawa and the fuel available will be fuel oil from Samawa refinery and in case of a shut down of this refinery for any reason fuel oil will be made available from other refineries (e.g Nassiriya ,Najaf) the transportation of the fuel oil in such case will be the responsibility of the ministry of electricity.

Best regards

Nabeil N. Lammoza
Director General
Ministry Of Oil



COPY TO/ -Ministry Of Electricity

Republic Of Iraq
Ministry Of Environment

Administration Affairs Directorate

NO:
DATE: // // 2004



جمهورية العراق
وزارة البيئة
الدائرة الإدارية والقانونية
قسم الخدمات الإدارية
العدد: 108
التاريخ: 2005/2/5

إلى / وزارة الكهرباء

م/ محطة كهرباء السماوة

تهدي هذه الوزارة تحتها
كتابكم ذي العدد 108 في 2005/2/5
لنود إعلامكم بأن وزارتنا لا مانع لديها من استلام محطة كهرباء بسعة 60 ميكاواط
تعمل بالوقود الثقيل (HFO) في مدينة السماوة من قبل الحافط الياباني بقدر تعلق الامر بنا .



دائرة الشؤون الفنية
المدير العام
الدكتور/ عباس ناجي بلاسم

To/ the ministry of Electricity
Sub. / Samawa D.G power station

Greetings

According to your letter no; 108 dated 5/2/2005 we would like to inform you that our ministry has no objection concerning the construction of the 60MW power station running with heavy fuel oil(HFO) in Samawa city by the Japanese side as much as we concern.

With our appreciation□□□□

Department of technical affairs

D.G Dr/ Abbas Nagey Balasim

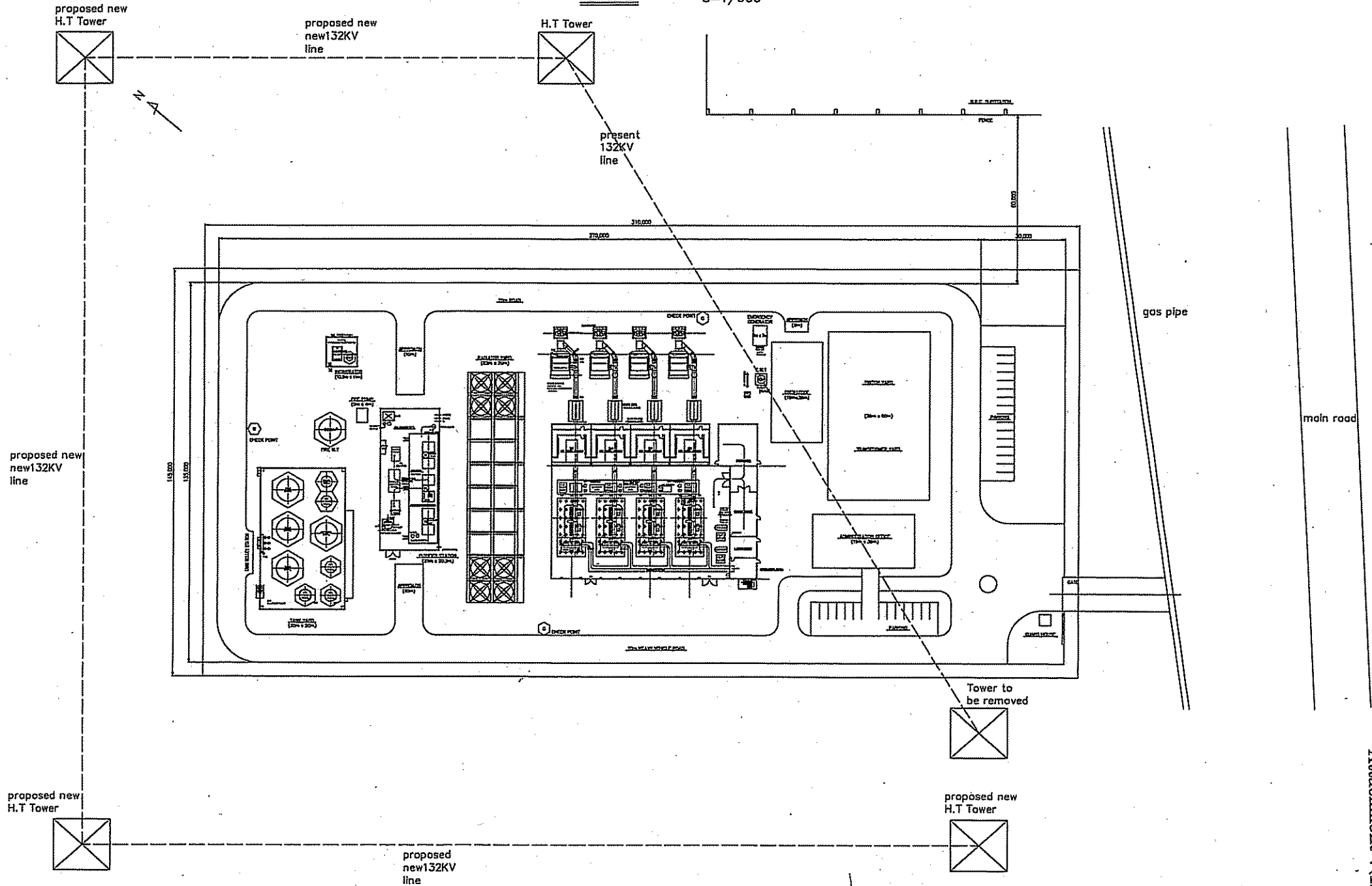
Comparative Table of Diesel Engine Generator (15MW × 4sets and 6MW × 10sets)

	Description	Diesel Engine Generator	
		Case-1: 15MW × 4sets	Case-2: 6MW × 10sets
1	Operation experience in Iraqi	×	△
		—	There are three power station (Erbil, Dohuk, Sulimaenia) of 7.5MW × 4sets of diesel engine generator constructed by UNDP in Iraqi. ※Using oil is marine diesel oil, not fuel oil.
2	Transportation	△	○
		It is necessary to divide the engine for transportation, because the engine size wouldn't clear the regulation of transportation in Kuwait. (limitation of height is 5m from ground level.)	It is possible to transport by one package except some kinds of engine.
3	Construction at Site	×	△
		There are any difficult works at site, especially, assembly of engine, setting of engine generator on the foundation and complicated wiring and piping works. All Japanese manufactures requested to supervise at site by Japanese engineers in their company or foreign engineers who have ability equal to or higher than Japanese engineers.	There is no need to assemble the engine at site. But there are any difficult works same as Case-1. All Japanese manufactures requested to supervise at site by Japanese engineers in their company or foreign engineers who have ability equal to or higher than Japanese engineers.
4	Operation and Maintenance	△	×
		It is need to sufficient skill for operation and maintenance. Maintenance cost is lower than Case-2, because of number of cylinders and units is nearly half of Case-2.	It is need to sufficient skill for operation and maintenance. Maintenance cost is higher than Case-1, because of number of cylinders and units is around double of Case-1.
5	Construction Cost	○	△
6	Construction Period	○	×
		Around 20 months	Around 26 months (it is possible to start operation for 5 unit [30MW] at the stage of around 22 months.)
7	Lower of Generating Output as Maintenance	△	○
		Number of times for periodic inspection of engine is 2 times per year. It is necessary to take 2 weeks for one inspection. Accordingly generating output is 45 MW for 4 months during these maintenance.	Number of times of periodic inspection of engine is same as 15MW engine. Accordingly generating output is 54 MW for 10 months during these maintenance.

SAMAWAH NEW POWER PLANT LAY-OUT PLAN

IN SITE

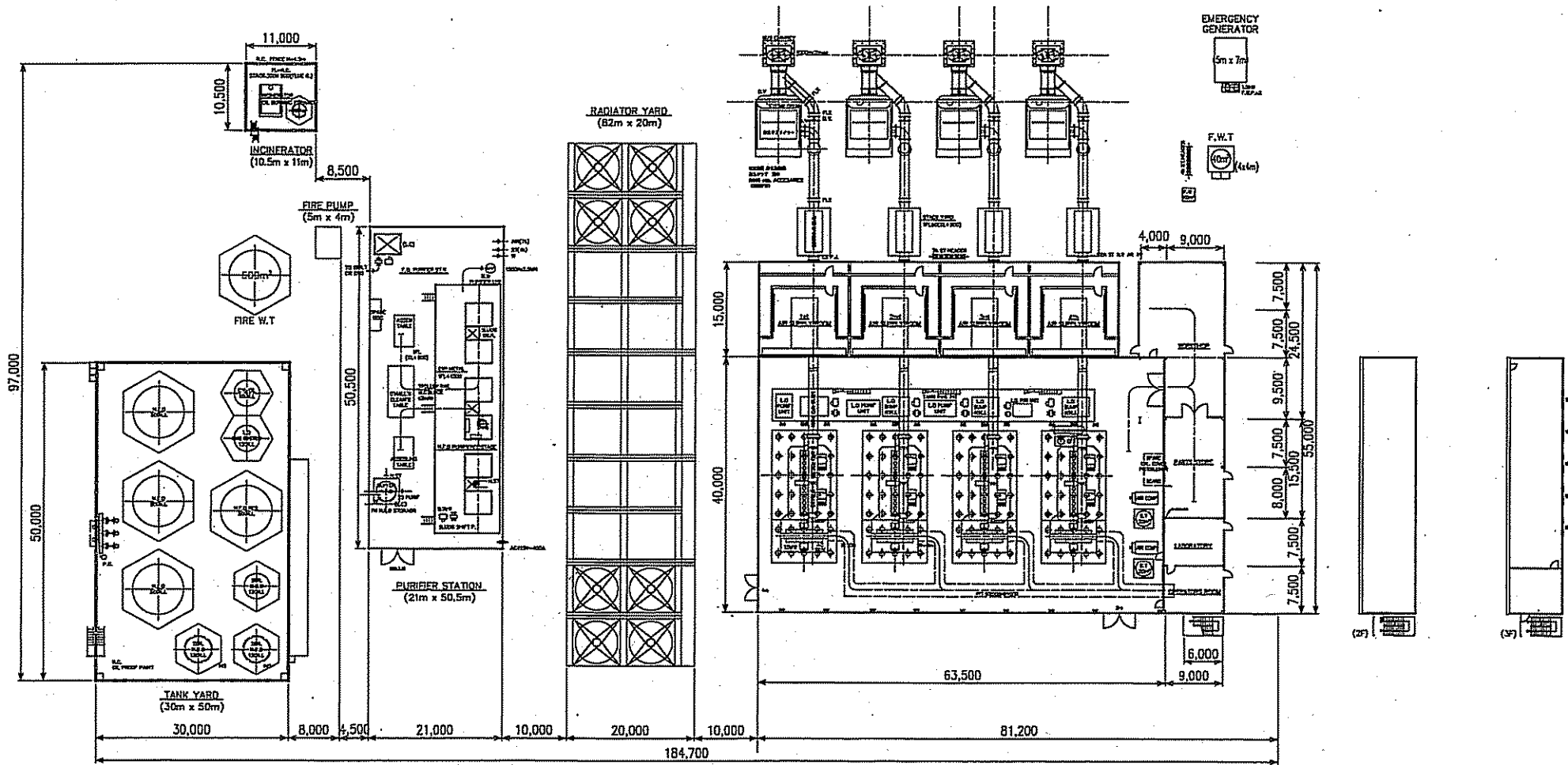
S=1/600



SAMAWAH NEW POWER PLANT LAY-OUT PLAN

IN SITE

S=1/ -



Specifications of Diesel Engine Plant (for 15MW × 4sets)

No.	Category	Specification	Q'ty	Unit	Remarks	
I	1	Mechanical Materials				
		1-1 Diesel Engine	Type: Two or Four-stroke Diesel Engine Output: 15MW Class with Air Cooler, Turbo Charge L.O. Pump, Electric Governor Fuel Oil Specific Gravity=0.957 (at 15.6°C) Sulphur Content=4%, Vanadium=64ppm Pour Point= +25°C, Flash Point= +210°C	4	sets	
		1-2 Foundation Bolt + Setting Plate	R.C.Foundation	4	sets	
	2	Fuel Oil System				
		2-1 H.F.O. Storage Tank	500kL Cylinder Type, Valves, Gauges Maintenance Materials, Steam Heating Pipe (45°C)	4	sets	
		2-2 H.F.O. Service Tank	120KL LC/ALARM, ST Heating Pipe (65°C)	2	sets	
		2-3 H.F.O. Buffer Tank 1	25KL with LC (and ALARM), ST Heating Pipe (75°C)	1	set	
		2-4 H.F.O. Buffer Tank 2 (and Service Tank)	Square Type, 6kL with LC/ALARM, ST Heating Pipe (80~85°C)	1	set	
		2-5 H.F.O Transfer Pump 1	Carry Oil to Storage Tank, Strainer, Valves 100m ³ /H × 3kg/cm ²	1	set	
		2-6 H.F.O Transfer Pump 2	Carry Oil from Storage Tank to Buffer Tank 20m ³ /H, Strainer × 1, 2.5kg/cm ²	2	sets	
	2-7 M.D.O. Storage Tank (and Service Tank)	120KL Cylinder Type, Valves, Gauges Maintenance Materials, ST Heating Pipe 45°C	1	set		
	2-8 M.D.O. Transfer Pump					

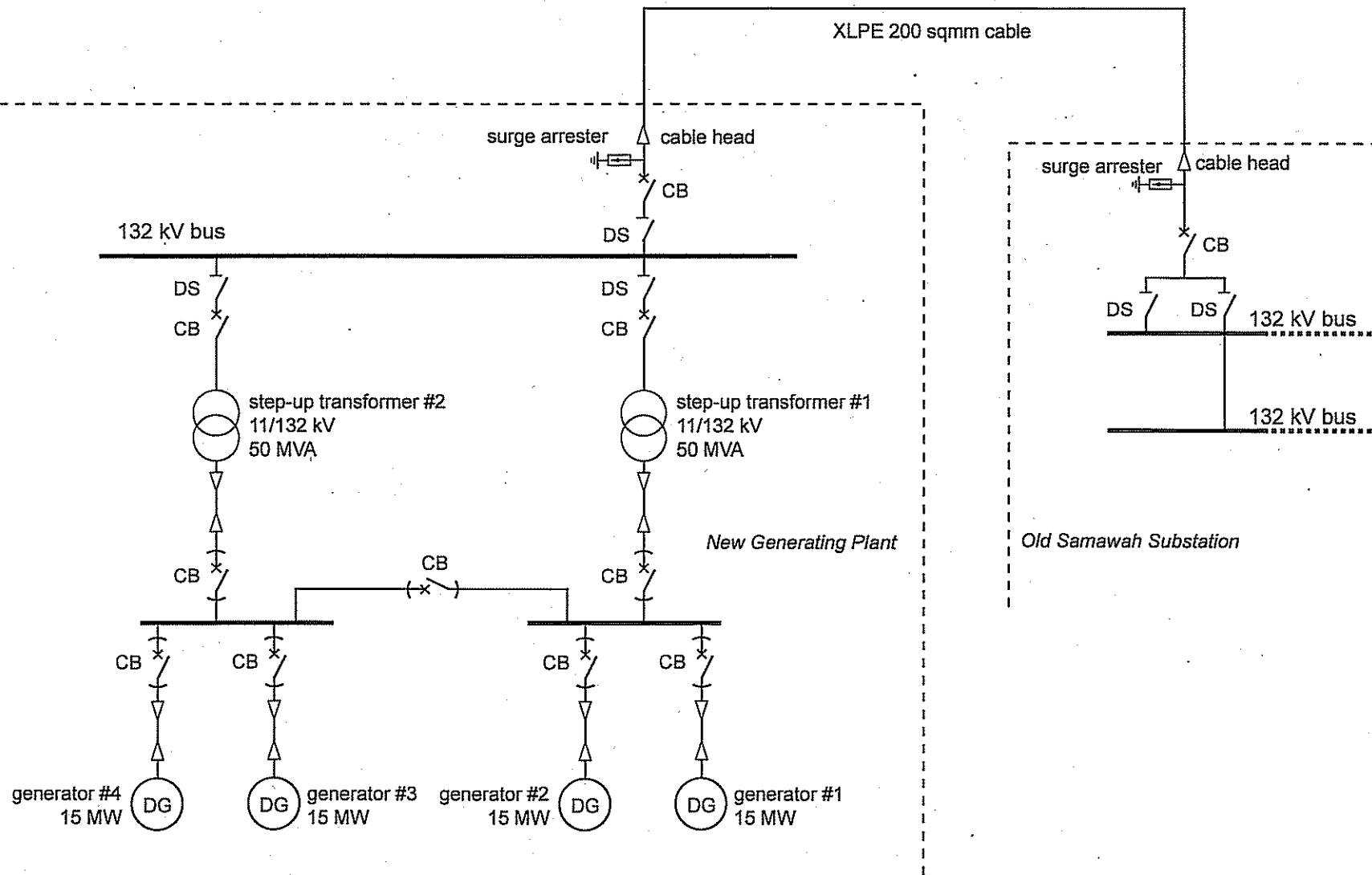
No.	Category	Specification	Q'ty	Unit	Remarks
	2-9 H.F.O. Purifier System	Pump, Motor, Preheater, Control Panel, Sludge Tank, Wiring & Piping, Alarm, Separate Houses for these System, SJ-4000/4000L /H × 6sets, Sludge Tank 5m ³ × 3sets, Sludge Carry Pump 0.7kW, Hot Water Tank: 4m ³ (70~75°C) (1500 φ × 2500H), Working Table (Overhaul & Cleaning) × 3	1	set	
	2-10 H.F.O. Supply Pump	4m ³ /H × 4kg/cm ² , Filter, Flow Meter From H.F.O Service Tank to Engine	4	sets	
	2-11 H.F.O. Injection Booster Pump Unit	Depend on the Manufacture of Diesel Engine	4	sets	
	2-12 H.F.O. Purifier System Recirculating Pump	0.4kW, LC/Start & Stop (Automatic), Filter, Valves, 95°C, 2.5kg/cm ²	2	sets	
	2-13 H.F.O. Drainage Tank	2m ³ , Square Type, Valves, Liquid Level Meter, Heating Pipe	2	sets	
	2-14 Scavenging Drainage Tank	0.2m ³ Valves, Level Meter	4	sets	
	2-15 Scavenging Drainage Pump	2.0m ³ × 3kg/cm ² , Filter	4	sets	
	2-16 Piston Staffing Box (Oil Supply System)	Supplied by manufacture	4	sets	
	2-17 Fuel Oil Flow Meter		4	sets	
	2-18 Fuel Oil Strainer (1st level)		4	sets	
	2-19 Fuel Oil Strainer (2nd level)		4	sets	
	2-20 Fuel Oil Strainer (3rd level)		4	sets	
	2-21 Fuel Oil Adjustment Valve		4	sets	
3	Lubricating Oil System				
	3-1 L.O.Tank (for System Oil)	Cylinder Type, 120KL LC/ALARM, SPOT ST Heating	1	set	
	3-2 L.O.Tank (for Cylinder Oil)	Cylinder Type, 120KL LC/ALARM, SPOT ST Heating	1	set	
	3-3 System Oil Transfer Pump	3.0kg/m ² , 5.0m ³ /H, Filter, LC/Start & Stop (Auto), Valves, Flow Meter	1	set	

No.	Category	Specification	Q'ty	Unit	Remarks	
	3-4	Cylinder Oil Transfer Pump	2.5kg/m ² , 2.0m ³ /H, Filter, L.C/Automatic Starting/Stop, Valves, Flow Meter	1	set	
	3-5	L.O. Sump Tank	40KL, Square Type L.C Valves, Gauges, Alarm, ST, Heating Coil	4	sets	
	3-6	Cylinder Oil Service Tank	0.5m ³ , Filter, Valves, L.C/Start & Stop (Automatic), Alarm	4	sets	
	3-7	L.O.Drainage Tank/Sludge Tank	L.O. Purifier Use 6m ³ , Square Type, Valves, Liquid Level Meter, Heating Pipe (50°C)	4	sets	
	3-8	Engine Cam Shaft L.O. Pump (Driving Oil for Exhaust Valve)	13m ³ /H × 4kg/cm ² , Valves, Filter, Adjustment Valves	4	sets	
	3-9	L.O. Sludge Transfer Pump	from Purifier System to Sludge Tank of Incinerator 0.7kW, 2kg/cm ²	1	set	
	3-10	L.O. Centrifugal Separator	Pump, Motor, Preheater (ST), , Control Panel, Sludge Tank, Wiring/Piping, Valves, Alarm Foundation of Tank and Systems=6m ³ × 4sets, Supply Pump 5m ³ /H × 2kg/cm ² , Sludge Shift Pump × 4sets (0.4kW)	1	set	
	3-11	Engine L.O. Strainer, Self Cleaning Type	370m ³ /H	4	sets	
	3-12	L.O. By-pass for Engine	370m ³ /H	4	sets	
	3-13	L.O.Cooler for Engine	1250kW (Approx. 300kcal/sec) (320m ²)	4	sets	
	3-14	Indication Strainer	370m ³ /H	4	sets	
	3-15	L.O. Relief Valve		4	sets	
	3-16	L.O. Pump for Turbo Charger		8	sets	
	3-17	L.O. Tank for Turbo Charger		8	sets	
	3-18	L.O. Cooler for Turbo Charger		8	sets	
	3-19	L.O. Strainer for Turbo Charger		8	sets	
4	Cooling Water System					
	4-1	Cooling Water Pump (for Low Temperature)	(to be defined later)	4	sets	
	4-2	Cooling Water Pump (for High Temperature)	(to be defined later)	4	sets	
	4-3	Make-up Water System	Service Pump 5m ³ /H × 2sets, Low Water Pump 10m ³ /H × 1, Pressure Water Tank 1m ³ × 1, Double Sand Filter 5m ³ /H × 1set, Double Soft Filter 5m ³ /H × 1set	1	set	

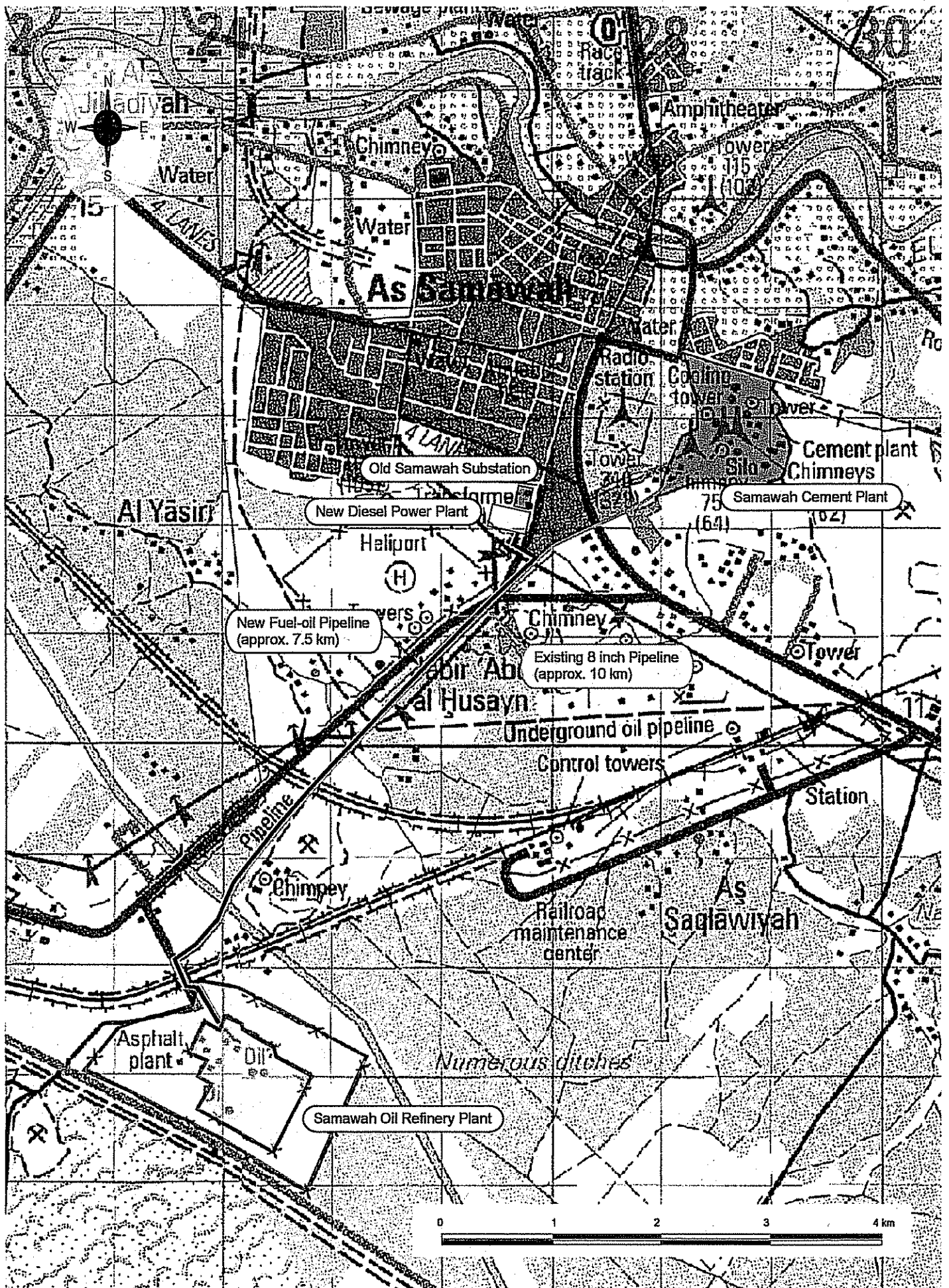
No.	Category	Specification	Q'ty	Unit	Remarks
		4-4 Radiator (for Low Temperature)	4,000kW	1	set
		4-5 Radiator (for High Temperature)	6,700kW	1	set
		4-6 Preheating Pump & HT Heater	12m ³ /H × 2.5m, 150 kW	4	sets
		4-7 Warming Heater (HT Preheater)	150kW	4	sets
		4-8 Cooling Water Tank (for Low Temperature)	5m ³	1	set
		4-9 Cooling Water Tank (for High Temperature)	5m ³	1	set
5	Air Starting System				
		5-1 Starting Air Compressor (Automatic)	100m ³ /H × 25kg/cm ² × 30kW, Cooling Water Type, with Foundation, Safety Valve, Reducting Valve, Alarm	2	sets
		5-2 Air Tank	20m ³ × 25kg/cm ² , Pressure Gauge, Safety Valves, Alarm	2	sets
		5-3 Cont.Air Compressor (Automatic)	Air Tank 4m ³ , Air Cooled Type, 20m ³ /H × 25kg/cm ² 5.5kW, Pressure Control Valve, Safety Valve, Alarm	2	sets
		5-4 Air Filter (for Main Strainer)		4	sets
6	Air Intake and Exhaust Gas System				
		6-1 Exhaust Silencer	2.6m ϕ × 6500L, Less than 70dB	4	sets
		6-2 Exhaust Stack	H=40m, SS+Castable, Separate Stack 6m ϕ × 4m ϕ × 45m	4	sets
		6-3 Intake Silencer, Filter		8	sets
		6-4 Exhaust Gas Steam Generator	Condensate Cooler, Condensate Pump, Supply Water Pump, Heat Exchanger, Circulation Pump, Separate Tank of Oil/Water, Control Panel, Alarm, Pressure Meter, Safety Valve, Steam Separator	4	sets
7	Others				
		7-1 Fire Water Tank	Water Tank(600kL), Valves, Water Level Meter, Pipes, Accessories for Maintenance	1	set
		7-2 Fire Pump System	Fire Fighting Pump, Cart Type (with Hand Cart), Gasoline Engine, 60m ³ /H × 60m, 9kW × 2sets, Hose 50M × 2/set	1	set

No.	Category	Specification	Q'ty	Unit	Remarks
	7-3	Waste Oil Incinerator (Steam Generator for Cold Start)	1	set	
	7-4	Hot Water Tank	1	set	
II	8	Generating System (Incl. Substation)		set	
	8-1	Generator	4	sets	
	8-2	Main Transformer	2	sets	
	8-3	Station Service Transformer	2	sets	
	8-4	Switchgear	2	sets	
	8-5	Generator Breaker Panel	4	sets	
	8-6	Main Tr. Secondary Breaker Panel	2	sets	
	8-7	S. Tr. Switchboard	2	sets	
	8-8	132 kV Switch Panel	2	sets	
	8-9	Exciter Panel	4	sets	
	8-10	Automatic Synchronizing Panel	1	set	
	8-11	Control Panel for Generator	1	set	
	8-12	Feeder Control Panel	1	set	
	8-13	Neutral Grounding Panel	1	set	
	8-14	Surge Absorber Panel	1	set	
	8-15	Low Voltage Enclosed Switchboard	1	set	
	8-16	Control Center	1	set	
	8-17	DC Power Panel	1	set	
	8-18	Auxiliary Mortar	1	set	
	8-19	Fire Alarm System	1	set	

No.	Category		Specification	Q'ty	Unit	Remarks
9	Emergency Generating System					
		9-1	Emergency Generator	1	set	Generating Output: 250~300kW Voltage: 415V Marine Diesel Oil, Radiator Type, with Tank
10	Others					
		10-1	Wiring and Piping Work	1	set	



Attachment-9 Proposed System Configuration



Attachment-10 Fuel Oil Pipeline

Training Plan for O&M

Training plan for O&M is consisted of the following 3 stages:

- Stage-I: Basic education
- Stage-II: Training at manufacturer's factory
- Stage-III: Training at site

i) Stage-I: Basic education training

Training Place - Iraq

Subjected Trainee – All staffs for operation and maintenance

Contents of Education

- a) Basic technical knowledge of DGP
- b) Particulars of DGP
- c) Operation method of DGP
- d) Maintenance method of DGP

ii) Stage-II: Training at manufacturer's factory and existing DGP

Training Place – Manufacturer's factory and existing DGP

Subjected Trainee – Representative staffs for operation and maintenance

Training Factory

- a) Diesel Engine Manufacturer
- b) Purifier Manufacturer
- c) Electrical Equipment and Control Manufacturer
- d) Steam Boiler Manufacturer

iii) Stage-III: Training at site

Training Place – Project site in Samawah

Subjected Trainee – All staffs for operation and maintenance

Contents of Training

- a) On-the-job Training during installation works
- b) Attendance to commissioning tests

Appendix 4-2 Minutes of Discussion (Explanation of Draft Report)

Preliminary Study for Reconstruction of Iraq (Phase 4)
Outline Design Study

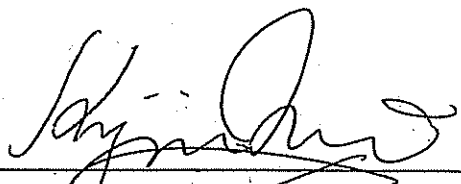
Minutes of Discussions
on the Preliminary Study (Outline Design Study) on the Project for
Construction of Diesel Power Station in Samawah
in Iraq
(Explanation on Outline Design)

In December 2004 and February 2005, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Study Team for the Preliminary Study (Outline Design Study) (hereinafter referred to as "the Study") on the Project for Construction of Diesel Power Station in Samawah in Iraq (hereinafter referred to as "the Project") to Jordan, and through discussions, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

The Iraqi side and the Japanese side have met during the period from May 9 to 10, 2005. The participants of both sides are listed in the attached attendance list. In this meeting, the Japanese side presented the draft of Outline Study Report on the Project.

As a result of discussions, both sides confirmed the items described on the attached sheets.

Amman, May 11, 2005

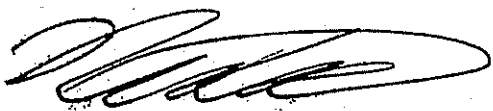


Kyojin Mima
Leader
Draft Report Explanation Team
Japan International Cooperation Agency

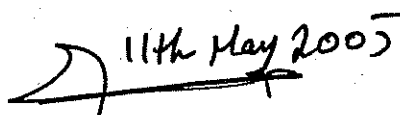


Muhammed Ali Hassani
Governor
Al-Muthana Governorate

Witness;

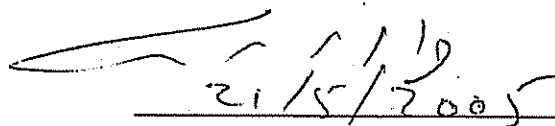


Hideo Suzuki
Director, Grant Aid Division
Economic Cooperation Bureau
Ministry of Foreign Affairs



11th May 2005

Moayed Al-Maayouf
Director General
Planning & Studies Office
Ministry of Electricity



21/5/2005

Abdul Aziz Jabar
Expert
Ministry of Oil

ATTACHMENT

1- Name of the Project

Both sides confirmed that the name of the Project should be "the Project for Construction of Diesel Power Station in Samawah."

2- Components of the Project

The Iraqi side agreed and accepted the components of the Project explained by the Team. Details are shown in Annex-1.

3- Project Site and Layout Plan

The Project site including the fuel oil pipeline from the Samawah Oil Refinery to the site and layout plan for the Diesel Power Station are shown in Annex-2 and 3 respectively.

4- Organizations concerned in Iraqi side

- a- The Responsible and Coordinating organization is the Ministry of Electricity (MoE).
 - b- The Responsible Organization for making available the necessary fuel oil for the operation of the Diesel Power Station is the Ministry of Oil (MoO), it is also Coordinating Agency for the fuel oil pipeline.
 - c- The Responsible Agency for security is Al-Muthanna Governorate.
- The organization charts of MoE, MoO and Al-Muthanna Governorate are shown in Annex-4 to 6.

5- Undertakings to be borne by the Iraqi side

- a- Both sides confirmed that the undertakings concerned the Project shown in Annex-7 should be borne by the Iraqi side.
- b- The Iraqi side should conduct survey for landmines and unexploded ordnances (UXOs) at the Project site including the site for pipeline and issue the certificate of completion of the survey to the Japanese side within five (5) months from the signature of the Exchange of Letters.
- c- The Iraqi side will be responsible for ensuring the safety of all persons, goods and materials related to the Project by taking all necessary measures including patrolling and holding road inspections around the Project site during construction period. In addition to the above, the Iraqi side should take measures necessary for ensuring smooth implementation of the Project requested by relevant parties involved in the Project.

6- Tender and contract


The Japanese side reconfirmed that confirmation of approval of the Iraqi side will be requested for the tender documents and tender evaluation report.

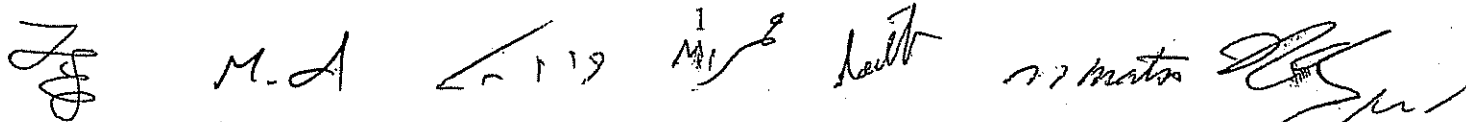
7- Schedule of the Study

JICA will complete the final report taking into considerations the relevant issues shown in 8- Other Relevant Issues and send it to the Iraqi side by the end of June 2005.

8-Technical Comparison

- a- The Governor of Al-Muthana requested and expressed his preference to go for 2-stroke low speed engine for the benefit of all Al-Muthana Governorate.
- b- Both sides discussed the technical comparison of the 2-stroke (low speed) engine and 4-stroke (medium speed) engine based on the Comparative Table of Diesel Engine (Low Speed & High Speed) shown in Annex-8A

 c- According to the Iraqi side request, Japanese side has submitted revised comparison table (Annex-8B)



based on the following;

- i) Availability of each type of diesel engine
- ii) Revision to the Comparison table to be direct comparison by 15 MW.

d- According to the request of Iraqi side, the Japanese side gave further explanation and illustration (Annex-9) to show the possible chance of participation in both 2-stroke and 4-stroke diesel engine from the Japanese companies. The Japanese side explained that according to Japan's policy for procurement in grant aid projects, it was necessary to ensure competitiveness of the tender.

e- As a conclusion of the above discussions, both sides agreed that the diesel engine type should not be restricted to either 2-stroke (low speed) or 4-stroke (medium speed).

f- Both sides agreed to put down during detailed design, tender documents and tender evaluation the principle and method of evaluation for both types and specify the range of the speed engine respectively.

9- Other Relevant Issues

a- Handover of each component

Both sides confirmed that the Project should be divided into twelve (12) portions as per Annex-10 and each portion would be handed over after completion of the commissioning inspection respectively taking into consideration the integrity and functioning of whole Project.

b- Warranty against defects

The Japanese side explained that the warranty against defects should be excluded from the tender documents and contract form of the Project and the Iraqi side understood that it would be difficult for the Japanese firms/manufacturers to include the clause without dispatching Japanese supervisors/engineers during construction from the technical viewpoints.

In compensation for that, the Iraqi side proposed to include the reliability run for each diesel engine unit from 72 hours to at least one (1) month in the tender documents to detect initial defects caused by miss-erection, miss-matching of equipment. The Japanese side accepted the proposal.

c- Implementation schedule (Table 2-12 of the draft report)

The Iraqi side strongly requested to shorten the implementing schedule for both detailed design stage and construction stage as much as possible. The Iraqi side also mentioned that reducing the execution period as much as possible is essential for the Project and that should be discussed during the detailed design stage.

d- Fuel oil pipeline

Both sides confirmed that the fuel pipeline between the Project site and Samawah Oil Refinery should be installed in underground due to security reason.

e- Other technical matters

Both sides confirmed the technical specifications/matters on the other components as per Annex-11.

f- Configuration of the budget of the Project

The Japanese side explained and Iraqi side understood the configuration of the budget of the Project and concept of the "provisional sum" as shown in Annex-12.

g- JICS participant has submitted the "Outline of Bilateral Grant Aid for the Reconstruction of Iraq by the Government of Japan" as per Annex-13. In this outline flowchart, the main steps and milestones of the implementation of the Project were indicated. The time schedule of the above flowchart is in synchronization with the implementation schedule stated in 9-c above.

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ATTENDANCE LIST

JAPANESE SIDE:

	Name	Title & Organization
1	Mr. Hideo Suzuki	Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs (MOFA)
2	Mr. Kyojin Mima	Group Director, Project Management Group I, Grant Aid Management Department, JICA
3	Mr. Hiroyuki Hayashi	Transportation and Electric Power Team, Project Management Group I, Grant Aid Management Department,
4	Mr. Noriaki Matsushima	Nippon Koei Co., Ltd.
5	Mr. Masaki Wada	ditto
6	Mr. Akihisa Manita	ditto
7	Mr. Yoshikazu Yamada	Director General, Project Management Department, Japan International Cooperation System (JICS)
8	Mr. Mitsuhiro Kohno	Counsellor, Embassy of Japan
9	Mr. Hisatoshi Okubo	Representative, Iraq Unit, JICA Jordan Office
10	Mr. Susumu Yuzurio	Assistant Representative, Iraq Unit, JICA Jordan Office

IRAQI SIDE:

	Name	Title & Organization
1	Mr. Muhammed Ali Hassani	Governor, Al-Muthana Govenorate
2	Dr. Moayed Al-Maayouf	Director General of Planning & Studies Office, Ministry of Electricity
3	Mr. Emil K. Hanna	Expert, Planning & Studies Office, MoE
4	Eng. Laith Hamid	Head of Projects Department, MoE
5	Mr. Hisham Jassam	Engineer, Middle Production, MoE
6	Mr. Anmar Anwor Abdul	Engineer, Middle Production, MoE
7	Mr. Saad Rahem	Chief Engineer, Nassiriyah Generation Governorate
8	Mr. Abdul Aziz Jabar	Expert, Ministry of Oil (MoO)
9	Mr. Fahem Mahmoud	Manager, Directorate of Al-Muthana Electricity Distribution

BR

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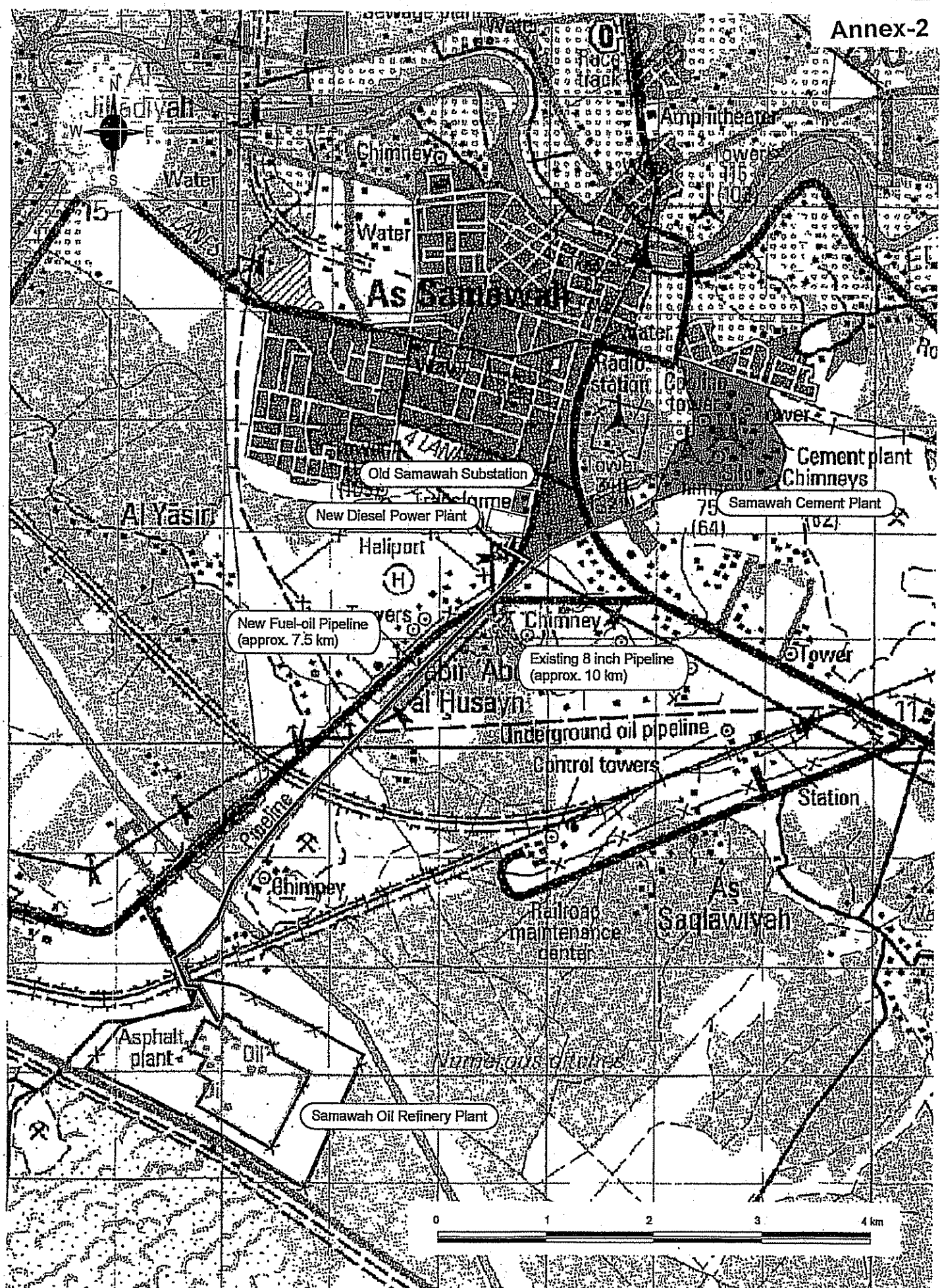
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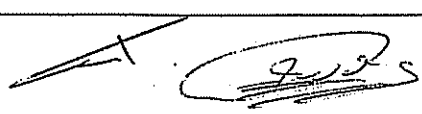
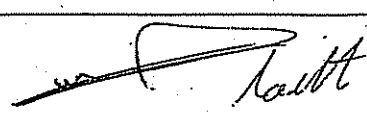
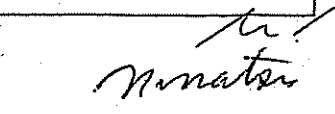
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Components of the Project

No.	Item	Specifications	Q'ty	Unit	Remark
Mechanical Facilities	Diesel Engine	2-stroke or 4-stroke Engine Using oil: Heavy Fuel Oil	4	sets	
	Fuel Oil System				
	HFO Storage Tank	500 k L, Cylindrical Type	4	sets	
	HFO Service Tank	120kL, LC(Level Control)/Alarm	2	sets	
	MDO Storage Tank	120kL, Cylindrical Type	1	set	
	HFO Oil Purification System	Pumps, Mortars, Tanks, Duplex Type	1	set	
	Lubricating Oil (LO) System				
	LO Tank	Tanks for System Oil and Cylinder Oil (each 120 kL)	2	sets	
	LO Sump tank	Square Type	4	sets	
	L.O. Centrifugal Separator	Pumps, Mortars, Tanks	1	set	
	Cooling Water System				
	Cooling Water Pump	For High and Low Temperature	4	sets	
	Make-up Water System)	Pumps, Heaters	1	set	
	Radiator	For high and Low Temperature	1	set	
	Air Compressor System				
	Air Compressor for Starting	Air Compressor, Starting Air Tank	2	sets	
	Air Intake and Exhaust Gas System				
	Exhaust Stack	H=40m	4	sets	
	Exhaust Silencer	Less than 70dB	8	sets	
Intake Silencer	Filter	4	sets		
Electrical Facilities	Generator	11kV, 50HZ, 3Phases	4	sets	
	Main Transformer	3 Phases, 50 HZ, 11kV/132kV, 50MVA	2	sets	
	132KV Switchgear	Circuit breaker, Disconnecting Switch, CT, PT	1	set	
	Protection and Operation Panel	Operation Panel for Generator and Switchgear, Various Protection Panel	1	set	
Building and Civil Facilities	Power House	Steel structure	1	set	
	Other Buildings	Office Crew Lodge, Guard, Oil Purification room, Parking, etc.	1	set	
	Road in the Yard	Width 10m	1	set	
	Drainage System in the yard	Drain, Oil Separator	1	set	
	Boundary Fence		1	set	
132 KV Connecting Cable	132kV Connecting Cable (from Power Station to Substation)	XLPE, Length=200m, Single Core	1	set	
Additional Equipment in Existing Substation	132 kV Switchgear	Circuit breaker, Disconnecting Switch, CT, PT	1	set	
	Protection and Operation Panel	Operation Panel for Switchgear	1	set	
	Bus Conductor	CU Cable 500 mm ² , Length=100m	1	set	
	Gantry for Bus Bay	Single Bus, H=8m	1	set	
Pipeline	Pipeline	Carbon Steel Pipe, 4 inch ϕ	1	set	
	Pump (refinery side)	37.5kVA \times 2	1	set	
	Generator (ditto)	50kVA \times 2	1	set	
Relocation of the existing transmission line	Tower (New)	SS14 Tower, H30m \times 3sets.	1	set	
	132kV Transmission Line (2 circuits)	ACSR 240 mm ² (3 \times 800m)	1	set	

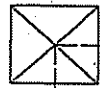


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SR

proposed new H.T Tower



proposed new new132KV line

H.T Tower



Existing 132KV line

OLD SAUWAH STATION

new road

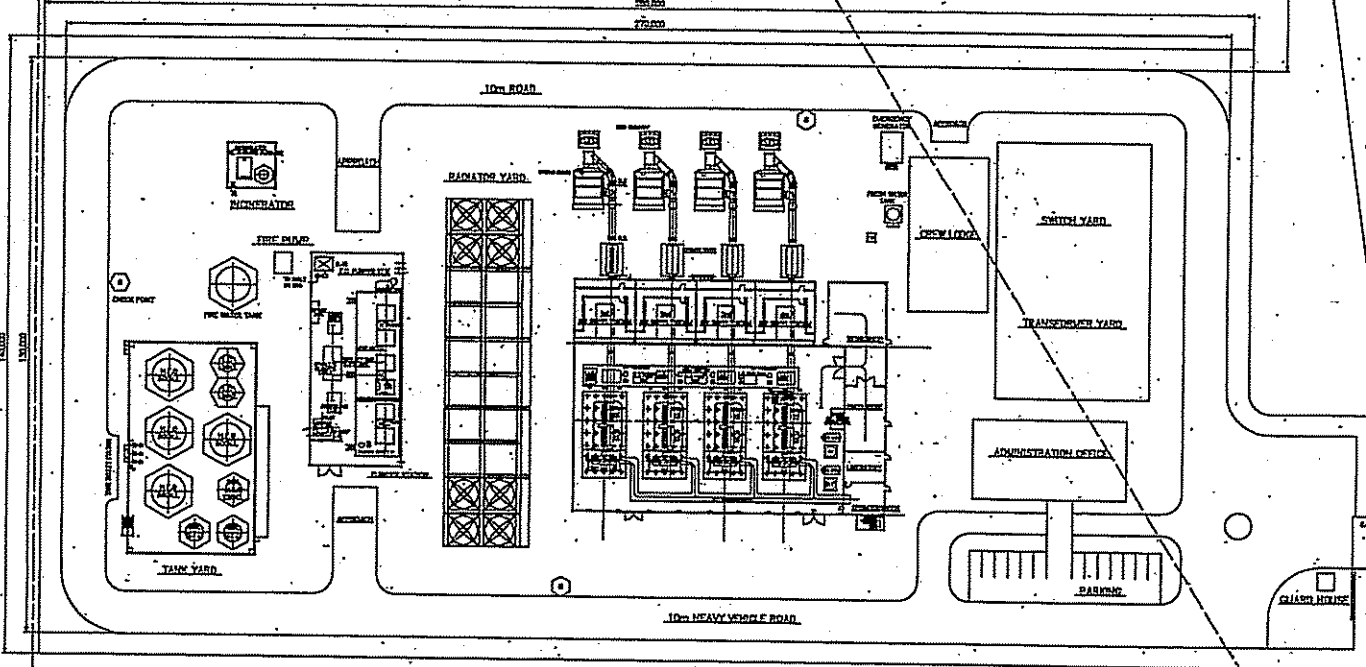


ROAD

gas pipe

main road

proposed new new132KV line

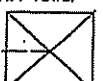


Tower to be removed

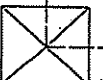


new road

proposed new H.T Tower



proposed new H.T Tower

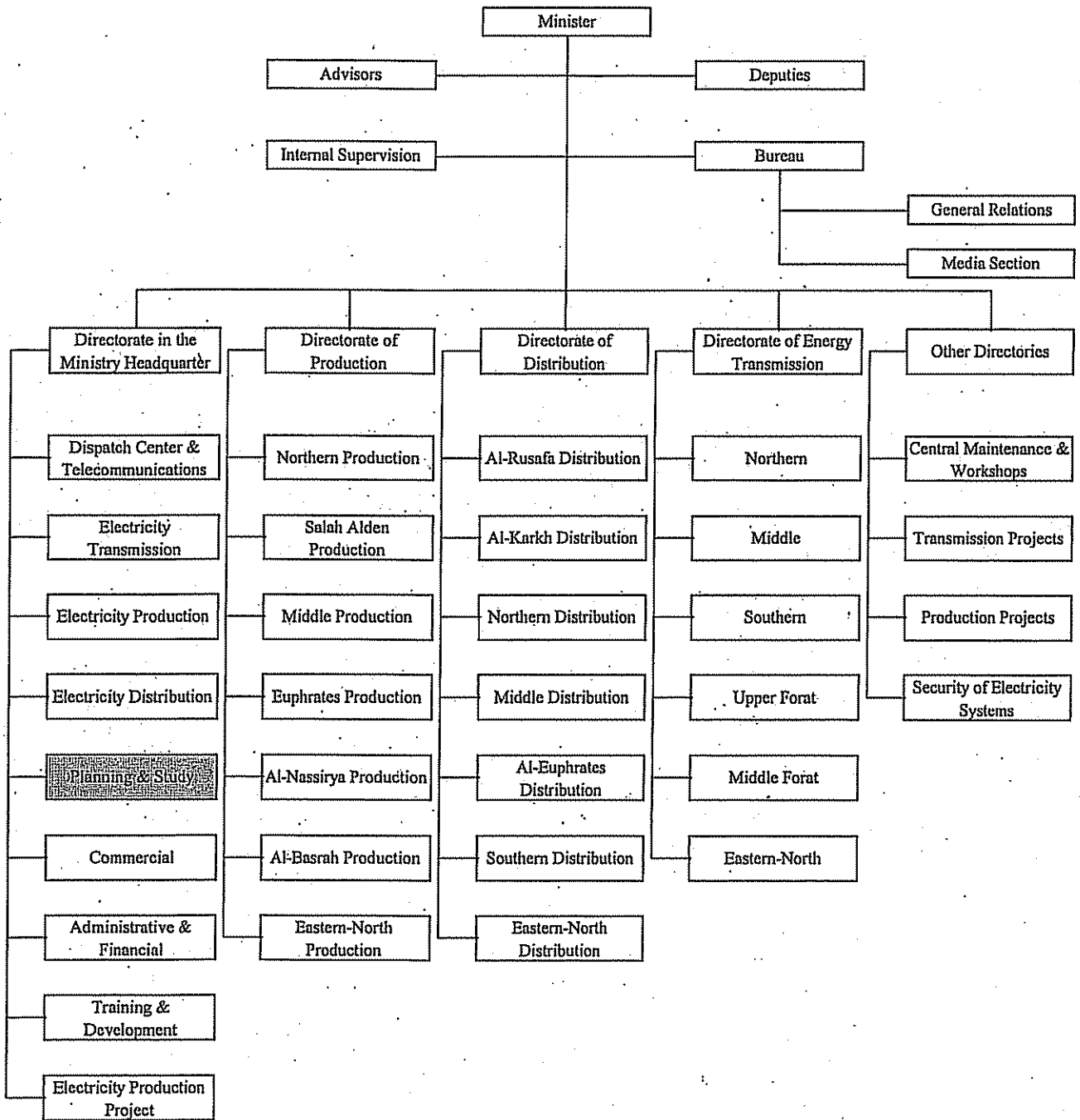


proposed new132KV line

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Annex-3

GENEREL ARRANGEMENT DRAING



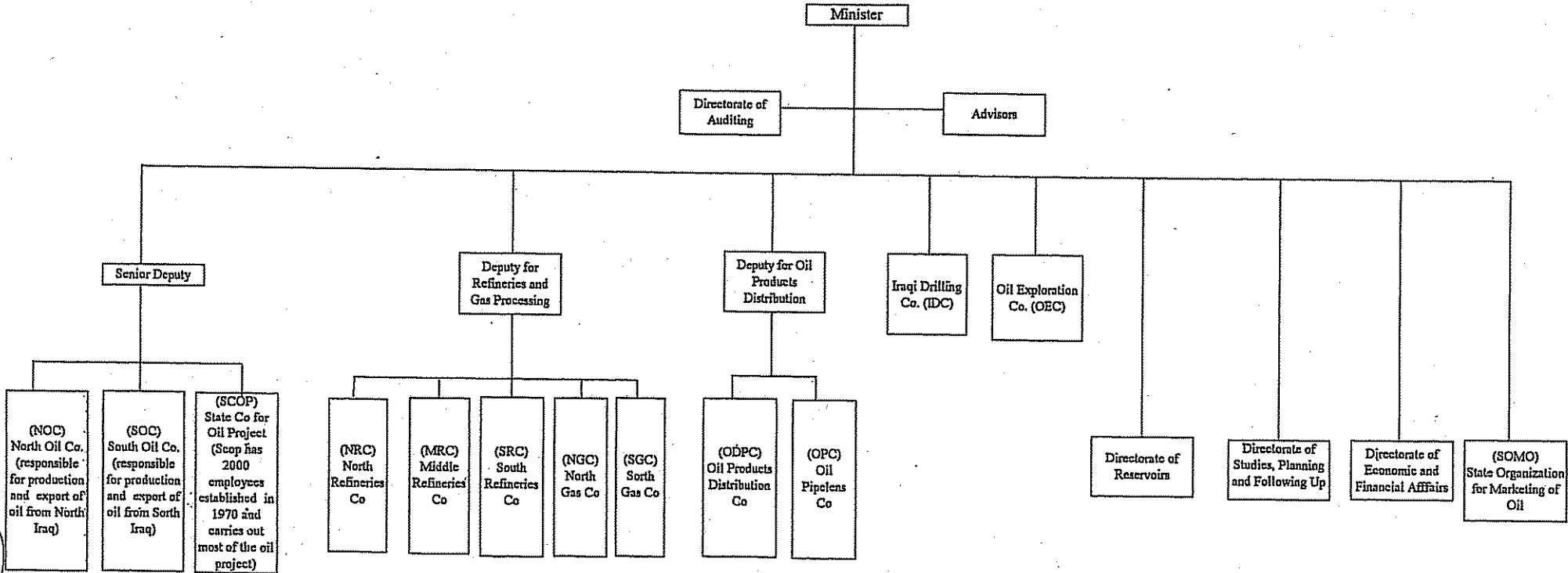
Organization of MoE

(18)

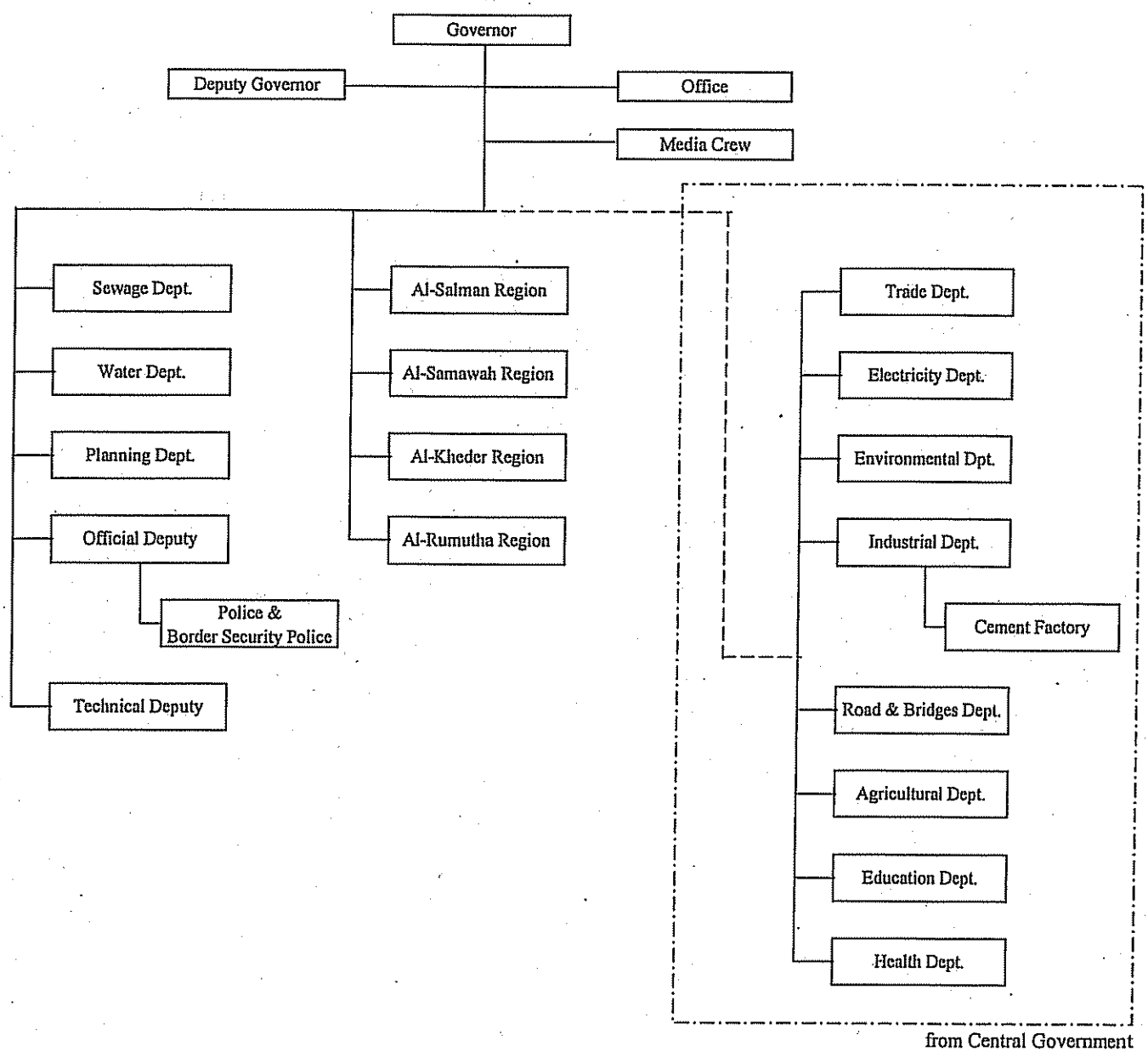
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Organization of MoO



Organization of Muthanna Governorate

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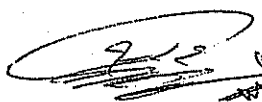
Undertaking to be done by Iraqi side

Items to be executed by the Iraq authorities in case that a grant aid project from Japan is executed are as follows:

- (a) Assisting customs clearance at ports of entry into Iraq
- (b) Getting clearance from relevant authorities which may be necessary within Iraq for the execution of the Project
- (c) Allowing Japanese nationals and other nationals involved in the Project entry into Iraq
- (d) Exempting customs duties, internal taxes and other fiscal levies which may be imposed in Iraq with respect to the supply of products and services under the Project
- (e) Exempting Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Iraq
- (f) Permitting contractors to utilize non-Iraqi insurance companies as necessary
- (g) Acquisition of land necessary for the project
- (h) The Iraqi side should conduct survey for landmines and unexploded ordinances (UXOs) at the Project site including the site for pipeline and issue the certificate of completion of the survey to the Japanese side within five (5) months from the signature of the Exchange of Letters.
- (i) The Iraqi side will be responsible for ensuring the safety of all persons, goods and materials related to the Project by taking all necessary measures including patrolling and holding road inspections around the Project site during construction period. In addition to the above, the Iraqi side should take measures necessary for ensuring smooth implementation of the Project requested by relevant parties involved in the Project.
- (j) Providing terminal points for public services, such as water supply, telephone, electricity

⑧







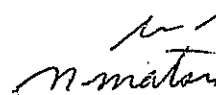


Table 4-2. Comparative Table of Diesel Engine (Low Speed & Medium Speed)

No.	Item	Low Speed (2-stroke) Engine	Medium Speed (4-stroke) Engine
1	Stroke	There are 2-stroke (compression and combustion) per a rotation of crank shaft.	There are 4-stroke (inhalation, compression, combustion and exhausting) per two rotation of crank shaft.
2	Usable Oil	It is possible to use the H.F.O including extremely poor-quality oil.	It is possible to use the H.F.O including poor-quality oil.
3	Lowering Rate of Generating Output (at air temperature 55°C)	Approx. 3%	Approx. 4%
4	Cooling System	Large	Small
5	Dimension (Incl. Auxiliary System)	Large 2.0~2.5	Small 1.0
6	Dimension (Engine Foundation)	Large Vibration of engine is larger than medium speed engine.	Small -
7	Weight (Engine Body)	Large 2.0	Small 1.0
8	Price (Incl. Auxiliary System)	High 1.2~1.5	Low 1.0
9	Life Time (Past Record)	More than 30 years	More than 30 years
10	Supply Experiences as Land Type Power Plant (using oil is H.F.O.)	Around 100 units	Around 3,000 units
11	O/M	1) Difficulty of Operation	No difference (Both engines have any experiences of operation at developing country)
		2) Service Network	Few (difficult to arrange the spare parts)
		3) Maintenance Frequency	Few (the number of combustion is fewer than medium speed engine)
		4) Difficulty of Maintenance	Regular inspection is easier than medium speed, because the number of cylinder is fewer. But, it is difficult to repair as breakdown and to overhaul of engine, because the length of cylinder is longer and heavier than medium speed engine.
		5) Maintenance Cost	Cost of regular inspection is lower than medium speed engine, but cost of repair as breakdown and overhaul of engine is higher. ※If the engines are normal operated for 30 years, the maintenance cost of both engines is almost same.
12	Conversion to Gas Fuel in the Future	Possible (Both engines have supply record)	
13	Others	(1) Unit generating capacity is max. 80 MW.	(1) Unit generating capacity is max. 21 MW.
		(2) Load following capability is not adapted.	(2) Load following capability is adapted.

Comparative Table of 15. MW Diesel Engine (Low Speed & Medium Speed)

No.	Item	Low Speed (2-stroke) Engine	Medium Speed (4-stroke) Engine
1	Stroke	There are 2-stroke (compression and combustion) per a rotation of crank shaft.	There are 4-stroke (inhalation, compression, combustion and exhausting) per two rotation of crank shaft.
2	Usable Oil	It is possible to use the H.F.O including extremely poor-quality oil.	It is possible to use the H.F.O including poor-quality oil.
3	Lowering Rate of Generating Output (at air temperature 55°C)	Approx. 3%	Approx. 4%
4	Cooling System	Large	Small
5	Dimension (Incl. Auxiliary System)	Large 2.0~2.5	Small 1.0
6	Dimension (Engine Foundation)	Large Vibration of engine is larger than medium speed engine.	Small -
7	Weight (Engine Body)	Large 2.0	Small 1.0
8	Life Time (Past Record)	More than 30 years	More than 30 years
9	Supply Experiences of 15 MW class as Land Type Power Plant (using oil is H.F.O.)	Around 20 units	Around 500 units
10	O/M	1) Difficulty of Operation	No difference (Both engines have any experiences of operation at developing country)
		2) Service Network	Few (difficult to arrange the spare parts) / Many
		3) Maintenance Frequency	Few (the number of combustion is fewer than medium speed engine) / More than low engine
		4) Difficulty of Maintenance	Regular inspection is easier than medium speed, because the number of cylinder is fewer. But, it is difficult to repair as breakdown and to overhaul of engine, because the length of cylinder is longer and heavier than medium speed engine. / Regular inspection is more difficult than low speed, because the number of cylinder is more. But, it is easy to repair as breakdown and to overhaul of engine, because the length of cylinder is shorter and lighter than low speed engine.
		5) Maintenance Cost	Cost of regular inspection is lower than medium speed engine, but cost of repair as breakdown and overhaul of engine is higher. ※If the engines are normal operated for 30 years, the maintenance cost of both engines is almost same. / Cost of regular inspection is higher than low speed engine, but cost of repair as breakdown and overhaul of engine is lower.
11	Availability	328 (365-37) days/year/unit	
12	Conversion to Gas Fuel in the Future	Possible (Both engines have supply record)	
13	Other	Load following capability is not adapted.	Load following capability is adapted.

Survey Result on Diesel Engine Manufacturers in Japan

Japanese Manufacturer	Experience of 15 MW		Expected Participation in the Project
	2-stroke	4-stroke	
A	○(51MW)	×	○
B	×	×	×
C	×	○(15 MW)	○
D	-	○(21 MW)	×
E	-	×	×

Note: X: experience with smaller engines than 15 MW
 -: not produce

Component Division Plan for Partial Taking Over

ID	Component	Details	Conditions for T/O	Timing of T/O after award of the contract
1	Relocation of Existing Transmission Line	Construction of the new supporting structures for transmission, Removal and lay of conductor	After completion of inspection for transmission line	about 8 months
2	Various Tank Facilities	Oil tanks in tank yard (total 9), Tank for fire fighting (x1)	After completion of construction & inspection for all tanks	about 16 months
3	Oil Pipe Line	Construction of oil pipe line (about 8 km), Installation of the pumps in Samawah oil refinery	After confirmation of oil transfer from oil refinery to new power station	about 16 months
4	Office		After completion of interior finishing	about 17 months
5	Crew Lodge		After completion of interior finishing	about 17 months
6	Diesel Engine Generator – Unit No.1	Engine, Generator, Incidental facilities	After commissioning test as whole generating system of unit No.1 (grounding resistance test, dielectric strength test, governor test, interlock test and load test, etc)	about 18 months
7	Radiators, Oil Purification System, Other Mechanical and Electrical Facilities in Power Station	Radiator facilities, Oil Purification facilities, Various pumps (for fuel oil, cooling water, and sludge, etc.), Air compressor, Intake and exhaust facilities, Incinerator for waste oil	After commissioning test of unit No.1 (enforcement of inspection for each facility as commissioning test of unit No.1)	about 18 months
8	132 kV Switchgear in the Old Samawah Substation	Step-up transformer, 132kV Switchgear and conductor, Expansion of bus facilities (incl. gantry) in Old Samawah substation	After commissioning test of unit No.1 (enforcement of inspection for transmission as commissioning test for unit No.1)	about 18 months
9	Power House	Power House, Various control and operation panels	After commissioning test of unit No.1 and completion of interior finishing	about 18 months
10	Diesel Engine Generator – Unit No.2	Engine, Generator, Incidental facilities	After commissioning test as whole generating system of unit No.2	about 19 months
11	Diesel Engine Generator – Unit No.3	Ditto	After commissioning test as whole generating system of unit No.3	about 20 months
12	Diesel Engine Generator – Unit No.4	Ditto	After commissioning test as whole generating system of unit No.4	about 21 months

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Specifications of Diesel Engine Generating Plant (for 15 MW x 4 sets)

	Category	Specification	Q'ty	Unit	Remarks
1	Diesel Engine Generator				
	1-1 Diesel Engine	Type: Two or Four-stroke Diesel Engine Output: 15MW Class (Unit generating output should be guaranteed on condition that maximum ambient temperature is 55°C.) Heavy Fuel Oil Specific Gravity=0.957 (at 15.6°C) Sulfur Content=4%, Vanadium=64ppm Pour Point=+25°C, Flash Point=+210°C	4	sets	
	1-2 Generator	Horizontal shaft, revolving field, air cooled, compound winding, 3-phase AC synchronous generator, 11kV, 50HZ, 3Phase	4	sets	
	1-3 Foundation Bolt +Setting Plate	R.C.Foundation	4	sets	
2	Fuel Oil System				
	2-1 H.F.O. Storage Tank	500kL Cylinder Type, Valves, Gauges Steam Heating Pipe (45°C)	4	sets	
	2-2 H.F.O. Service Tank	LC/ALARM, ST Heating Pipe (65°C)	2	sets	
	2-3 H.F.O. Buffer Tank 1	LC (and ALARM), ST Heating Pipe (75°C)	1	set	
	2-4 H.F.O. Buffer Tank 2 (and Service Tank)	Square Type with LC/ALARM, ST Heating Pipe (80~85°C)	1	set	
	2-5 H.F.O Transfer Pump 1	Carry Oil to Storage Tank, Strainer, Valves 100m ³ /H × 3kg/cm ²	1	set	
	2-6 H.F.O Transfer Pump 2	Carry Oil from Storage Tank to Buffer Tank 20m ³ /H, Strainer × 1, 2.5kg/cm ²	2	sets	
	2-7 M.D.O. Storage Tank (and Service Tank)	120KL Cylinder Type, Valves, Gauges Maintenance Materials, ST Heating Pipe 45°C	1	set	
	2-8 M.D.O. Transfer Pump		2	sets	

	Category	Specification	Q'ty	Unit	Remarks	
	2-9	H.F.O. Purifier System	Pump × 3, Motor × 3, Preheater × 3, Control Panel × 1, Sludge Tank × 1, Sludge Carry Pump × 2, Hot Water Tank × 1, Working Table (Overhaul & Cleaning) × 3	2	sets	
	2-10	H.F.O. Supply Pump	Filter, Flow Meter From H.F.O Service Tank to Engine	4	sets	
	2-11	H.F.O. Injection Booster Pump Unit	Depend on the Manufacture of Diesel Engine	4	sets	
	2-12	H.F.O. Purifier System Recirculating Pump	L.C/Start & Stop (Automatic), Filter, Valves	2	sets	
	2-13	H.F.O. Drainage Tank	Square Type, Valves, Liquid Level Meter, Heating Pipe	2	sets	
	2-14	Scavenging Drainage Tank	Valves, Level Meter	4	sets	
	2-15	Scavenging Drainage Pump	Filter	4	sets	
	2-16	Piston Staffing Box (Oil Supply System)		4	sets	2-stroke engine only
	2-17	Fuel Oil Flow Meter		4	sets	
	2-18	Fuel Oil Strainer (1st level)		4	sets	
	2-19	Fuel Oil Strainer (2nd level)		4	sets	
	2-20	Fuel Oil Strainer (3rd level)		4	sets	
	2-21	Fuel Oil Adjustment Valve	Viscosity Control Equipment	4	sets	
3	Lubricating Oil System					
	3-1	L.O.Tank (for System Oil)	Cylinder Type, 120KL LC/ALARM, SPOT ST Heating	1	set	※ L.O. tank (for system oil) is required 2 sets for 4-stroke engine.
	3-2	L.O.Tank (for Cylinder Oil) ※ only for 2-stroke engine	Cylinder Type, 120KL LC/ALARM, SPOT ST Heating	1	set	
	3-3	System Oil Transfer Pump	Filter, L.C/Start & Stop (Auto), Valves, Flow Meter	1	set	
	3-4	Cylinder Oil Transfer Pump	Filter, L.C/Automatic Starting/Stop, Valves, Flow Meter	1	set	
	3-5	L.O. Sump Tank	Square Type LC Valves, Gauges, Alarm, Heating Coil	4	sets	

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Category		Specification	Q'ty	Unit	Remarks	
	3-6	Cylinder Oil Service Tank	Filter, Valves, LC/Start & Stop (Automatic), Alarm	4	sets	
	3-7	L.O.Drainage Tank/Sludge Tank	Square Type, Valves, Liquid Level Meter, Heating Pipe (50°C)	4	sets	
	3-8	Engine Cam Shaft L.O. Pump (Driving Oil for Exhaust Valve)	Valves, Filter, Adjustment Valves	4	sets	
	3-9	L.O. Sludge Transfer Pump	from Purifier System to Sludge Tank of Incinerator	1	set	
	3-10	L.O. Centrifugal Separator	Pump, Motor, Preheater (ST), , Control Panel, Sludge Tank, Wiring/Piping, Valves, Alarm Foundation of Tank and Systems, Supply Pump , Sludge Shift Pump	4	set	
	3-11	Engine L.O. Strainer, Self Cleaning Type		4	sets	
	3-12	L.O. By-pass for Engine		4	sets	
	3-13	L.O.Cooler for Engine		4	sets	
	3-14	Indication Strainer		4	sets	
	3-15	L.O. Relief Valve		4	sets	
	3-16	L.O. Pump for Turbo Charger		8	sets	
	3-17	L.O. Tank for Turbo Charger		8	sets	
	3-18	L.O. Cooler for Turbo Charger		8	sets	
3-19	L.O. Strainer for Turbo Charger		8	sets		
4	Cooling Water System					
	4-1	Cooling Water Pump (for Low Temperature)		4	sets	
	4-2	Cooling Water Pump (for High Temperature)		4	sets	
	4-3	Make-up Water System	Service Pump , Raw Water Pump, Pressure Water Tank, Double Sand Filter, Double Soft Filter	1	set	
	4-4	Radiator (for Low Temperature)		1	set	
	4-5	Radiator (for High Temperature)		1	set	

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Category		Specification	Q'ty	Unit	Remarks	
	4-6	Preheating Pump & HT Heater	4	sets		
	4-7	Warming Heater (HT Preheater)	4	sets		
	4-8	Cooling Water Tank (for Low Temperature)	1	set		
	4-9	Cooling Water Tank (for High Temperature)	1	set		
5	Air Starting System					
	5-1	Starting Air Compressor (Automatic)	Cooling Water Type, with Foundation, Safety Valve, Reducing Valve, Alarm	2	sets	
	5-2	Air Tank	Pressure Gauge, Safety Valves, Alarm	2	sets	
	5-3	Cont. Air Compressor (Automatic)	Air Tank, Air Cooled Type, Pressure Control Valve, Safety Valve, Alarm	2	sets	
	5-4	Air Filter (for Main Strainer)		4	sets	
6	Air Intake and Exhaust Gas System					
	6-1	Exhaust Silencer	Less than 70dB	4	sets	
	6-2	Exhaust Stack	Separate Stack	4	sets	
	6-3	Intake Silencer, Filter		8	sets	
	6-4	Exhaust Gas Steam Generator	Condensate Cooler, Condensate Pump, Supply Water Pump, Heat Exchanger, Circulation Pump, Separate Tank of Oil/Water, Control Panel, Alarm, Pressure Meter, Safety Valve, Steam Separator	4	sets	
7	132 kV Switchyard in DG Plant					
	7-1	Step-up transformers	3 phase, 50HZ, 11/132kV, 50MVA	2	sets	
	7-2	Cable heads	Single phase	3	sets	
	7-3	120 kV Surge arresters	Single phase, 120 kV, 10 kA	9	sets	
	7-4	145 kV circuit breakers	3 phase, 40 kA, 1600 A	3	sets	
	7-5	145 kV disconnectors with earthing switch	3 phase, 40 kA, 1600 A	3	sets	
	7-6	145 kV current transformers	Single phase, 600-1200/1A, 3 cores	6	sets	
	7-7	145 kV current transformers	Single phase, 1500/1A, 3 cores	3	sets	
	7-8	145 kV voltage transformer	Single phase, 100 VA, class 0.5/3	3	sets	

		Category	Specification	Q'ty	Unit	Remarks
		7-9	Gantry for 132 kV busbay	for single bus, 8m height	2	sets
		7-10	132 kV bus conductor	Cu 500 sqmm (100 m), with insulator sets	1	lot
8	MV & LV switchgear and Control Panel	8-1	11 kV generator panel		4	sets
		8-2	11 kV main TR secondary panel		2	sets
		8-3	11 kV Aux. TR panel		2	sets
		8-4	11 kV bus-tie panel		1	set
		8-5	Auxiliary transformers	3 phase, 50HZ, 11/0.4kV, 250kVA, indoor	2	sets
		8-6	132 kV control and protection panel		1	set
		8-7	Exciter Panel		4	sets
		8-8	Automatic Synchronizing Panel		1	set
		8-9	Control Panel for Generator		1	set
		8-10	Feeder Control Panel		1	set
		8-11	Neutral Grounding Panel		1	set
		8-12	Surge Absorber Panel		1	set
		8-13	Low Voltage Enclosed Switchboard		1	set
		8-14	Control Center		1	set
		8-15	DC Power Panel		1	set
		8-16	Auxiliary Mortar		1	set
		8-17	Fire Alarm System		1	set
9	Switchyard in Old Samawah S/S	9-1	Cable heads	Single phase	3	sets
		9-2	120 kV Surge arresters	Single phase, 120 kV, 10 kA	3	sets
		9-3	145 kV circuit breakers	3 phase, 40 kA, 1600 A	1	set
		9-4	145 kV disconnectors with earthing switch	3 phase, 40 kA, 1600 A	2	set
		9-5	145 kV current transformers	Single phase, 1500/1A, 3 cores	3	sets
		9-6	Gantry for 132 kV busbay	for single bus, 8m height	2	sets
		9-7	132 kV bus conductor	Cu 500 sqmm (100 m), with insulator sets	1	lot
		9-8	Protection and control panel		1	set
10	132 kV XLPE Cable between DG Plant and S/S	10-1	132 kV XLPE 240 sqmm cable	approx. 200 m, single core, with accessories	1	set

	Category	Specification	Q'ty	Unit	Remarks	
11	Relocation of 132 kV Transmission Line	11-1 Supports (towers)	Heavy angle tower (SS14), approx 30m height	3	sets	
		11-2 132 kV power conductors	ACSR LARK (240 sqmm) (approx. 3x800m)	1	lot	
		11-3 Overhead earthing wire	GSW 50 sqmm, single (approx. 1x800m)	1	lot	
		11-4 Insulator sets	tension insulator sets with necessary hardware	1	lot	
12	Fuel Oil Pipe-line between Oil Refinery and DG Plant	12-1 Carbon steel pipe	4-inch dia	7.5	km	Oil heating system is required at the oil refinery by Iraqi side to keep the oil temperature more than 40°C.
		12-2 Pumps at Oil Refinery	37.5 kVA	2	sets	
		12-3 Generators at Oil Refinery	50 kVA	2	sets	
13	Others	13-1 Fire Water Tank	Water Tank, Valves, Water Level Meter, Pipes, Accessories for Maintenance	1	set	
		13-2 Fire Pump System	Fire Fighting Pump, Cart Type (with Hand Cart), Gasoline Engine	1	set	
		13-3 Waste Oil Incinerator (Steam Generator for Cold Start)	Steam Boiler (with Tank), Steam Dram, Water Supply System, Safety Valve, Gauge, Burner Fan, Ventilation Fan, Stack (with Arrester), Tank, Fire Extinguisher, Water/Steam Pipes, Power Source and Control Panel	1	set	
		13-4 Hot Water Tank	SUS TANK, ST, Heating Coil (with Pressure Pump)	1	set	
		13-5 Emergency Generator	Generating Output: 250~300kW Voltage: 415V Marine Diesel Oil, Radiator Type, with Tank	1	set	

Comparative Table of Main Component's Specifications for Low & Medium Speed Engine

No.	Category	Required Specifications	Low Speed Engine (2-stroke)	Medium Speed Engine (4-stroke)
1	Diesel Engine Generator	1.1 Unit generating output is 15MW class. (Unit generating output should be guaranteed on condition that maximum ambient temperature is 55°C.)	16,580 kW (=less than 45 °C) 16,080 kW (=55 °C) ※1	17,025 kW (=less than 45 °C) 16,340 kW (=55 °C) ※2
		1.2 The following heavy fuel oil should be used for normal operation of engine. •Specific Gravity=0.957 (at 15.6°C) •Sulfur Content=4%, Vanadium=64ppm •Pour Point=+25°C, Flash Point=+210°C	Possible	Possible
		1.3 Land transport regulation (H=5m) should be cleared.	Possible (to be divided the engine body)	Possible (to be divided partially)
4	Cooling Water System	4.1 Cooling water pump (for low temperature)	Approx. 500 m ³ /h ※1	Approx. 380 m ³ /h ※2
		4.2 Cooling water pump (for high temperature)	Approx. 300 m ³ /h ※1	Approx. 220 m ³ /h ※2

※1: example by one low speed engine manufacturer

※2: example by one medium speed engine manufacturer

Technical Matters

1. Water Source for Fire Fighting

Water for fire fighting system for the Project is planned to be taken from a pipeline which is under installation for the Samawah Oil Refinery. Branch for divergence shall be provided on such pipeline at the nearest point from the power station site by MoE. Additional pipeline will be extended up to the power station as the scope of this Project.

2. Fuel Pipeline

The following specifications of oil pipeline facilities are designed based on the oil temperature of 40°C.

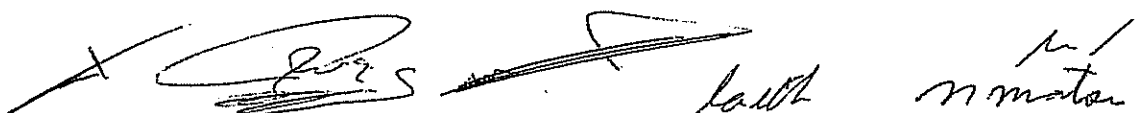
1. Carbon Steel Pipe : 4-inch dia.
2. Pumps at Oil Refinery : 75 kVA (2 x 37.5 kVA)
3. Generator at Oil Refinery : 100 kVA (2 x 50 kVA)

Heavy fuel oil temperature is required to maintain at more than 40°C for smooth oil flow in pipeline ,although flow point of heavy fuel oil is +25°C.

Accordingly, heating system which can keep the oil temperature more than 40°C shall be prepared by Iraqi side at the oil refinery.

The pipeline is constructed under the ground.

(8)

The bottom of the page contains several handwritten signatures and initials. From left to right, there is a signature that appears to be 'A. J. ...', followed by another signature, and then the initials 'L. H. H.' and 'M. M. M.'.

[FORM B]

TENDER PRICE SCHEDULE

(Item)	(Japanese Yen)
A. Equipment Price	_____
B. Installation Work Price	_____
Total Tender Price (A. + B.)	_____
C. Inland Transportation and Security Price	<u>XXX,XXX,XXX</u> (ceiling amount)
D. Provisional Sum (xx % of (A. + B. + C.))	_____

(Signature)
(Name of the Signer)
(Title of the Signer)
(Name of the Tenderer)

Equipment from Japan shall include marine transportation and insurance to unloading port(s).

FB



Bilateral Grant Aid for the Reconstruction of IRAQ

OUTLINE OF BILATERAL GRANT AID FOR THE RECONSTRUCTION OF IRAQ BY THE GOVERNMENT OF JAPAN

I. Project Planning

1. Project Finding & Building

- 1) Project Finding & Screening
- 2) Preliminary Survey by JICA through Japanese Consultant
- 3) Basic Estimation of Project Cost based on JICA's Preliminary Survey
- 4) Reporting to Japan's Gov't



2. Approval of the Project & Budget Allocation

- 1) Draft Reporting and Approvals by Iraqi Side
- 2) Examination of the Project by Japan's Gov't
- 3) Approval of the Project Outline by Japan's Gov't
- 4) Allocation of Budget for the Project



II. Document Preparation for the Project and Design of the Project

3. Exchange of Letter

- 1) Letter Exchange between Japan's Gov't and Iraqi Gov't (Ministry of Foreign Affairs : MoFA) (coordinated by
- 2) Banking Arrangement between Iraqi Gov't and a Bank in Japan
- 3) Notification of Open Account by Iraqi Gov't to Japan's Gov't



4. Agent Agreement

- 1) Agent Agreement between Iraqi Gov't and JICS
- 2) Payment Order to a Bank through JICS



5. Consulting Agreement

- 1) Recommendation of the Consultant by MoFA to Iraqi Gov't and JICS
- 2) Consulting Agreement between the Consultant and JICS on behalf of Iraqi Gov't



6. Detailed Design of the Project by the Consultant consulted with the Iraqi-side

- 1) Kick-off Meeting among all of concerned organizations related with the Project
- 2) Detailed Design of the Project (Survey, Collecting and Analyzing data/information)
- 3) Preparation of Technical Specification of the Products, and Tender/Procurement Conditions by the Consultant
- 4) Determination of Tender and Procurement conditions for the Project
- 5) Confirmation of the Project-Details with Iraqi Gov't and MoFA through JICA and JICS
- 6) Confirmation of the Ceiling Price for the Tender



III. Tender and Contract

7. Tendering & Purchase Contract

- 1) Tender Notice
- 2) Distribution of Tender Documents
- 3) Tender Opening & Evaluation
- 4) Reporting to Japan's Gov't and Iraqi Gov't on the Tender result for Confirmation
- 5) Conclusion of Contract with Successful tenderer by JICS on behalf of Iraqi Gov't



IV. Delivery and Installation

8. Manufacturing & Transportation

- 1) Manufacturing of the Products
- 2) Inspection of the Products
- 3) Shipment of the Products
- 4) Transportation of the Products to Iraq



9. Installation & Hand-Over of the Products

- 1) Installation of the Products
- 2) Final Inspection of the Installed Products
- 3) Hand-over of the Products to Iraqi-side

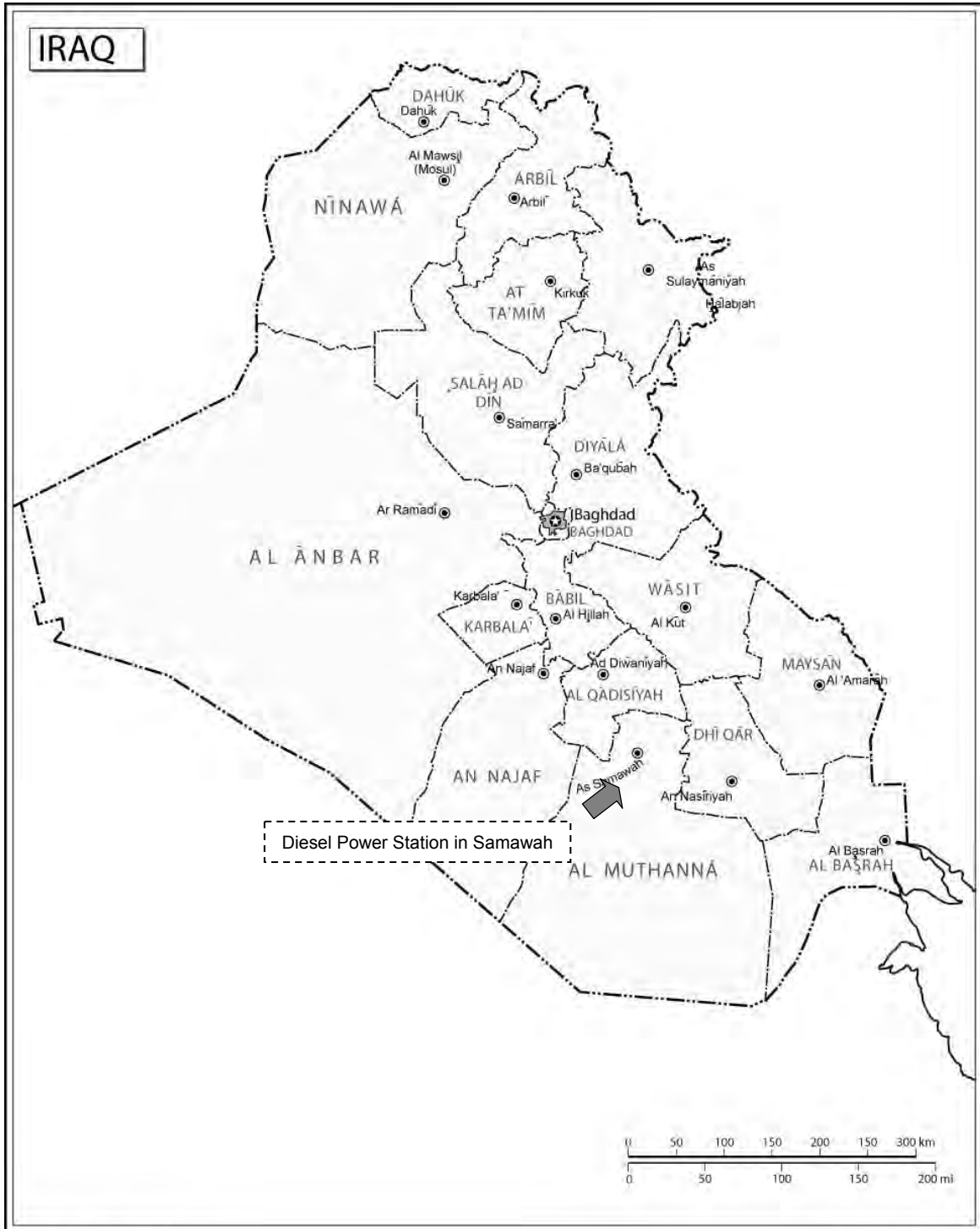
Japan International Cooperation System (JICS)

Project Profile (Project Summary)

Sector	Electricity
Project Name	The Project for Construction of Diesel Power Station in Samawah
Background (current state, necessity of immediate action & the needs)	<p>In Iraq, improvement of power supply condition is an urgent issue, and the same situation is also taking place in Samawah, Muthanna governorate which are the important areas for Japan's assisting in the reconstruction of Iraq.</p> <p>According to the Ministry of Electricity (MOE) of Iraq, the peak power demand in the coming summer in 2005 is estimated at 7,750 MW in power output basis. Meanwhile, power supply capacity, which once dropped to 3,300 MW as of summer in 2003 due to destruction during the Gulf War, lack of maintenance and spare parts during the subsequent economic sanctions and also damage as a consequence of the war in Iraq, recovered up to 5,100 MW in 2004. Still there is a shortage of 2,650 MW to balance the peak power demand in the coming summer in 2005.</p> <p>In southern Iraq, the peak power demand amounts to 1,445 MW, but the actual power supply capacity only attains 915MW. Accordingly there exists power shortage of about 530 MW.</p> <p>According to the Muthanna governorate, there exists the peak power demand of about 200MW in the whole governorate, but only about 40 to 50 MW is actually provided.</p> <p>Against the background of the said situation, the Iraqi side, especially Muthanna governorate, repeatedly requested Japan to realize a large-scale assistance in the power sector.</p>
Counterpart and Coordinating Agencies	Ministry of Electricity (MOE) of Iraq
Description of the Assistance	<ul style="list-style-type: none"> - Construction of a new power plant (output of 60 MW). - Installation of 132kV interconnecting facilities and additional electrical equipment in Old Samawah substation. - Construction of fuel pipeline which is connected between new power station and Samawah oil refinery. - Relocation of existing 132kV transmission line. - Training for operation and maintenance.
Project Site	See attachment
Effectiveness/Benefit (beneficiary)	<p>1) Benefited area: City of Samawah and the surrounding area By commissioning of the power station in the Project, power supply capacity to Muthanna governorate will be raised up to 100 to 110 MW, from current 40 to 50 MW, and will meet more than half of the current power demand.</p> <p>2) Benefited population: about 100,000 to 120,000 people (about 20,000 households) (Assumptions)</p> <ul style="list-style-type: none"> • Capacity of power plant: 60MW (15MW * 4 diesel engine generators) • Electricity consumption per household: 3kW • Number of persons in a household: 5 to 6 • Number of households to which electricity is provided: <ul style="list-style-type: none"> - 60,000kW / 3kW / household = 20,000 households - 100,000 to 120,000 people (= 20,000 households * 5 to 6 persons/household)
Presumed Project Period	20 months
Presumed Contract Manner (competitive bid, nominated contract)	Competitive bidding
Expected Transit Method	Separate lading is expected. The transportation from Japan for this site is generally made via Jordan or via Kuwait. To measure the transportation risk, war insurances and security force costs will be required additionally.

Necessity of the Installation of Machinery	Required
•Profile of Engineer responsible for the installation (nationality & capability)	Installation of large-scale diesel engine generators involves complex operations such as erection of divided engines after transportation, securing accuracy in installation on the foundation, and complicated wiring and piping. Error or mistake in such operation will lead to possibility of not only equipment damage but also occurrence of accidents. Therefore, the installation work must be supervised by the Japanese manufacturer's expert, or experts from the third country who have sufficient knowledge and experience similar to the manufacturer's expert.
Operation and Maintenance (O&M) Structure	Ministry of Electricity has the power generation division and the power transmission division. Under these divisions, regional institutions are positioned in northern, central, and southern Iraq. The organization has actually performed operation and maintenance works for thermal power plants such as steam turbine or gas turbine. However, as there is no experience for the large-scale diesel power station in Iraq, training of O&M staffs and establishment of management structure is important.
•Necessity of O&M Training	Required
•Contents of Training	To ensure successful project implementation as well as subsequent operation and maintenance works, the manufacturer of the power plants is required to provide training both in Japan and Iraq.
•Other remarks regarding O&M	It is suggested that MoE will employ O&M staffs who have sufficient experiences in marine diesel engine.
Involvement of Other Donors	CPA has constructed a 38MW gas turbine power plant in Old Samawah substation. However, there is no commitment to supply fuel gas by the Ministry of Oil (MoO), thus the plant is not yet operated.
Other Considerations (environment, gender, etc)	The Project is located in a vast empty area beside the existing substation, and it is judged that the impact to the environment is small.

Location of Project Site



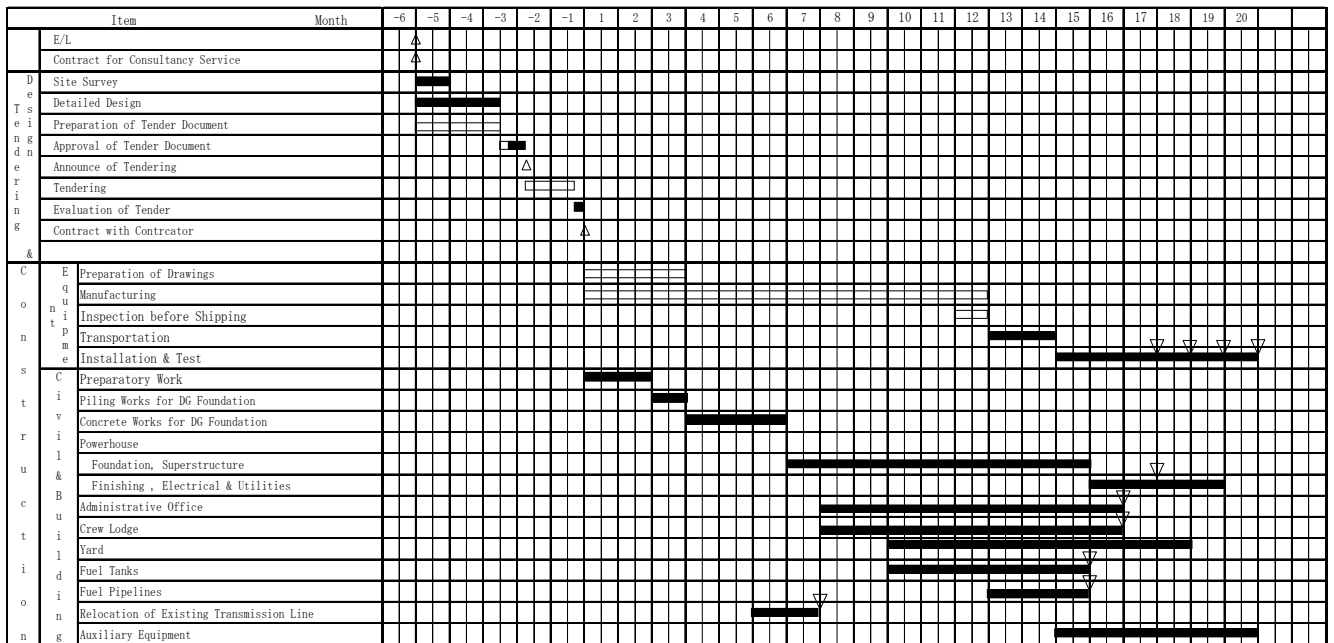
Summary of Project Cost

(Unit: 1,000 Yen)

Item		Cost Estimate
Equipment and Installation Work		8,435,150
	1. Equipment, including Marine Transportation	5,317,358
	2. Installation Work	3,117,792
Consulting Services and Procurement Management		668,216
Inland Transportation and Security		1,784,769
Provisional Sum *		1,813,743
Total		12,701,878

* Provisional Sum is secured for unforeseen circumstances during the project implementation, and approval by the Government of Japan in advance is required before use.

Project Implementation Schedule



■ Site
 □ Home (Japan)

Appendix 6-1 Soil Survey Data

Record of Test Results

ABBREVIATIONS

U	Undisturbed Sample.
D	Disturbed Sample.
SS	Samples From Standard Split Spoon
SPT (N-Value)	Standard Penetration Test Value.
CPT	Dynamic Cone Penetration Test
W.T.	Water Table.
M.C.	Moisture Content.
L.L.	Liquid Limit.
P.L.	Plastic Limit.
P.I.	Plasticity Index.
L.S.	Linear Shrinkage.
C.I.	Consistency Index.
GS	Specific Gravity.
Uni. Class	Unified Soil Classification System.
γ_{wet}	Natural Unit Weight.
γ_{dry}	Dry Unit Weight.
Qu	Unconfined Compressive Strength.
C	Cohesion in kN/m^2 .
ϕ	Angle of Internal Friction.
e_o	Initial Void Ratio.
Cc	Compression Index.
Cr	Swelling Index.
Cv	Coefficient of Consolidation.
Pc	Preconsolidation Pressure.
Po	Overburden Pressure.
Ps	Swelling Pressure.
C.P. %	Collapse Potential.
K	Coefficient of Permeability.
SO ₃ %	Sulphate Content
ORG. %	Organic Matter.
T.S.S %	Total Soluble Salts.
CL %	Chloride Content.
PH	Acidity or Alkalinity.
GYP. %	Gypsum Content.



RECORD OF TEST RESULTS

B.H.No.:-1

Samples		Type	Depth of Sample		M.C %	Index Property			Particle size distribution & Hydrometer analysis				GS	SPT "N" val.	Symbol	Description of Soil	Chemical Tests					
Field No.	Lab No.		From m.	To m.		LL %	P.I %	L.sh %	Clay %	Silt %	Sand %	Gravel %					SO ₃ %	ORG %	GYP %	CaCO ₃ %	PH	CL %
Borehole No. 1																						
1	3537	D	0.0	1.5	25	38	19	10					-	CL	Brown lean clay	0.82	0.69			8.42	1.3	
2	3538	U	1.5	2.0						(5	90	5	0)	-	CL	Top: do(medium)						
3	3539	SS	2.0	2.5										17	ML	Bot: brown silt						
4	3540	SS	3.5	4.0						(-29-		71	0)	24	SM	Do(very stiff)	0.39					0.48
5	3541	SS	5.0	5.5		44	23			(3	41	56	0)	48	CL	Top:hard brown lean clay						
6	3542	SS	7.0	7.5											SM	Bot: dense grey silty sand						
7	3543	SS	9.0	9.5						(-17-		83	0)	53	SM	Do(very dense)						
8	3544	SS	11.0	11.5										45	SM	Dense grey silty sand	0.2				8.74	1.14
9	3545	SS	13.0	13.5						(-37-		63	0)	41	SM	Do						
10	3546	SS	15.5	16.0						(14	83	3	0)	98/10"	SM	Top: do(very dense)						
11	3579	Water sample												50/4"	CL-ML	Bot: hard silty clay	0.53				8.6	
Depth of ground water = 1.5 m. below N.G.S																						
																0.02				7.98	0.04	



RECORD OF TEST RESULTS

B.H.No.:-2

Samples		Type	Depth of Sample		M.C %	Index Property			Particle size distribution & Hydrometer analysis				GS	SPT "N" val.	Symbol	Description of Soil	Chemical Tests					
Field No.	Lab No.		From m.	To m.		L.L %	P.I %	L.sh %	Clay %	Silt %	Sand %	Gravel %					SO ₃ %	ORG %	GYP %	CaCO ₃ %	PH	CL %
Borehole No. 2																						
1	3547	D	0.0	1.5	25				(10	64	19	7)		—	CL-ML	Brown silty clay with sand	1.53	1.12			8.56	1.87
2	3548	U	1.5	2.0					(7	79	14	0)		—	CL-ML ML	Top: do Bott: brown silt						
3	3549	SS	2.0	2.5										20	ML/SM	Medium grey sandy silt to silty sand	0.31					
4	3550	SS	3.5	4.0					(1	58	41	0)		24	ML/SM	Do						
5	3551	SS	5.5	6.0										49	ML/SM	Do(dense)	0.1				8.68	0.62
6	3552	SS	7.5	8.0					(1	54	45	0)		54	ML/SM	Do(very dense)						
7	3553	SS	9.5	10.0										50	ML/SM	Do(dense)						
8	3554	SS	11.5	12.0					(-22-		78	0)		48	SM	Dense grey silty sand	0.15					0.43
9	3555	SS	13.5	14.0										63	SM	Do(very dense)						
10	3556	SS	15.5	16.0			58	30						50/5"	SM CH	Top: do Bott: hard green fat clay						
Depth of ground water = 1.52 m. below N.G.S																						



RECORD OF TEST RESULTS

B.H.No.:-3,4

Samples		Type	Depth of Sample		M.C %	Index Property			Particle size distribution & Hydrometer analysis				GS	SPT "N" val.	Symbol	Description of Soil	Chemical Tests					
Field No.	Lab No.		From m.	To m.		LL %	P.I %	L.sh %	Clay %	Silt %	Sand %	Gravel %					SO ₃ %	ORG %	GYP %	CaCO ₃ %	PH	CL %
Borehole No. 3																						
1	3557	D	0.0	1.0	20	51	24	14	(27	67	6	0)	-	CL	Brown lean clay	0.13	0.65	8.56	2.08			
2	3558	U	1.0	1.5					-	CH	Very stiff brown fat clay											
3	3559	SS	1.5	2.0					(19	76	5	0)	20	CL	Very stiff brown lean clay	0.1				0.8		
4	3560	SS	3.0	3.5					22	ML/SM	Medium brown sandy silt to silty sand											
5	3561	SS	5.0	5.5							58	SM	Very dense grey silty sand	0.18	8.74	0.53						
6	3562	SS	7.0	7.5					(-18-	82	0)	54	SM	Do								
7	3563	SS	9.5	10.0					50	SM	Do(dense)											
Depth of ground water = 1.55 m. below N.G.S																						
Borehole No. 4																						
1	3564	D	0.0	1.0	19	43	22	11	(32	59	9	0)	-	CL	Brown lean clay	0.93	1.12	8.46	1.69			
2	3565	U	1.0	1.5					-	CL	Do(very stiff)											
3	3566	SS	1.5	2.0					(28	69	3	0)	15	CL	Do(stiff)	0.45				8.74	0.66	
4	3567	U	3.0	3.5					(-17-	83	0)	-	SM	Brown silty sand								
5	3568	SS	3.5	4.0					(33	62	5	0)	23	CL	Top: very stiff brown lean clay							
6	3569	SS	5.5	6.0					(-3-	97	0)	48	SP	Bolt: medium grey silty sand								
7	3570	SS	7.5	8.0					56	SM	Very dense grey silty sand											
8	3571	SS	9.5	10.0					(-23-	77	0)	50	SM	Do(dense)	0.1	0.51						
Depth of ground water = 1.48 m. below N.G.S																						



RECORD OF TEST RESULTS

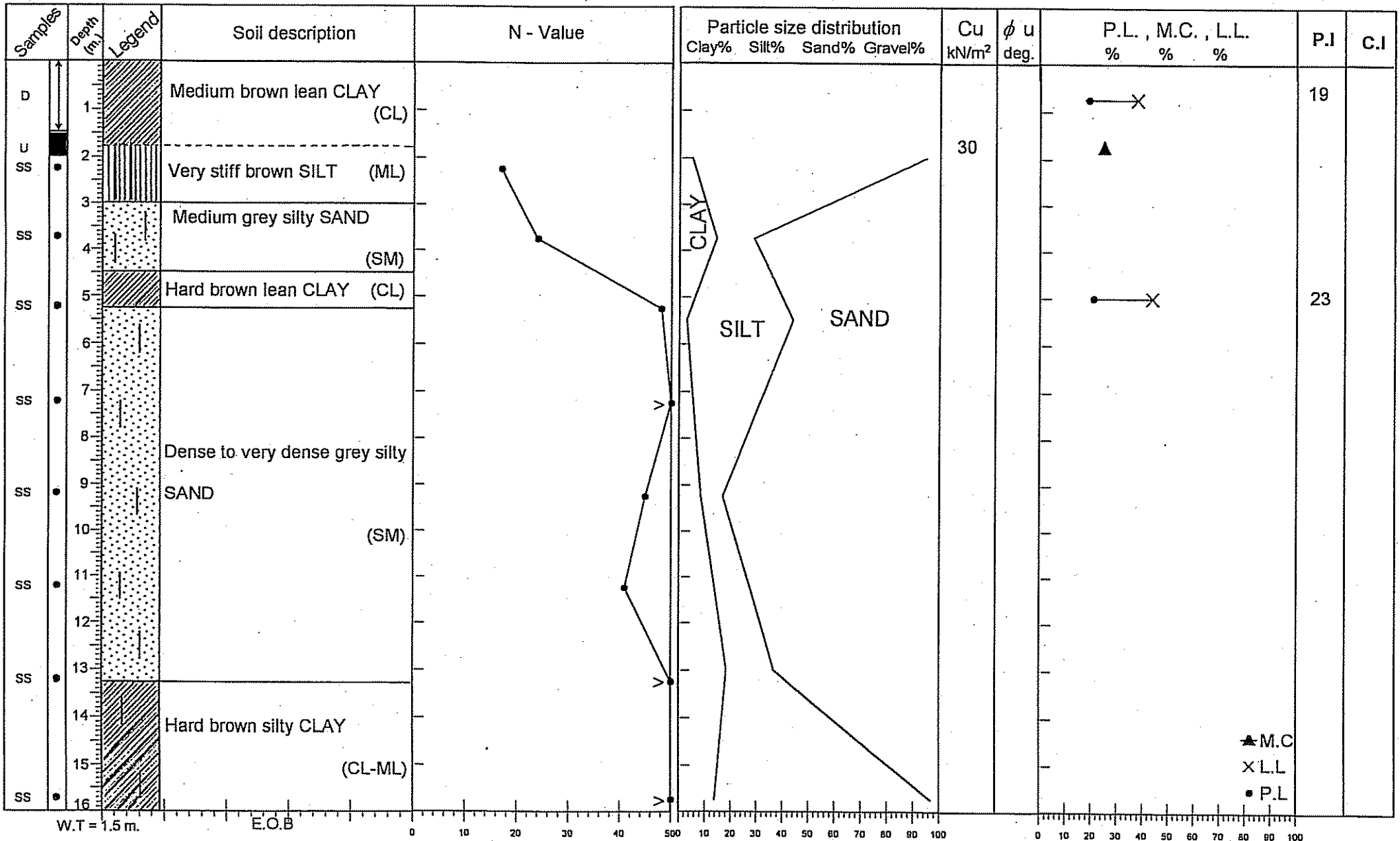
B.H.No.:-5

Samples		Type	Depth of Sample		M.C %	Index Property			Particle size distribution & Hydrometer analysis				GS	SPT "N" val.	Symbol	Description of Soil	Chemical Tests						
Field No.	Lab No.		From m.	To m.		LL %	P.I %	L.sh %	Clay %	Silt %	Sand %	Gravel %					SO ₃ %	ORG %	GYP %	CaCO ₃ %	PH	CL %	
Borehole No. 5																							
1	3572	D	0.0	1.0	32	46	24	12						-	CL	Brown lean clay	0.99	1.12			8.41	1.69	
2	3573	U	1.0	1.5											-	CL	Do						
3	3574	SS	1.5	2.0		50	27								24	CH	Very stiff brown fat clay						
4	3575	SS	3.5	4.0					(5	64	31	0)			58	ML/SM	Very dense grey sandy silt to silty sand	0.35				8.5	1.35
5	3576	SS	5.5	6.0											45	SM	Dense grey silty sand						
6	3577	SS	7.5	8.0					(0	46	54	0)			55	SM	Do(very dense)	0.1					0.98
7	3578	SS	9.5	10.0					(-28-		72	0)			65	SM	Do						
8	3580	Water sample															0.01				7.99	0.08	
Depth of ground water = 1.5 m. below N.G.S																							

Borelogs

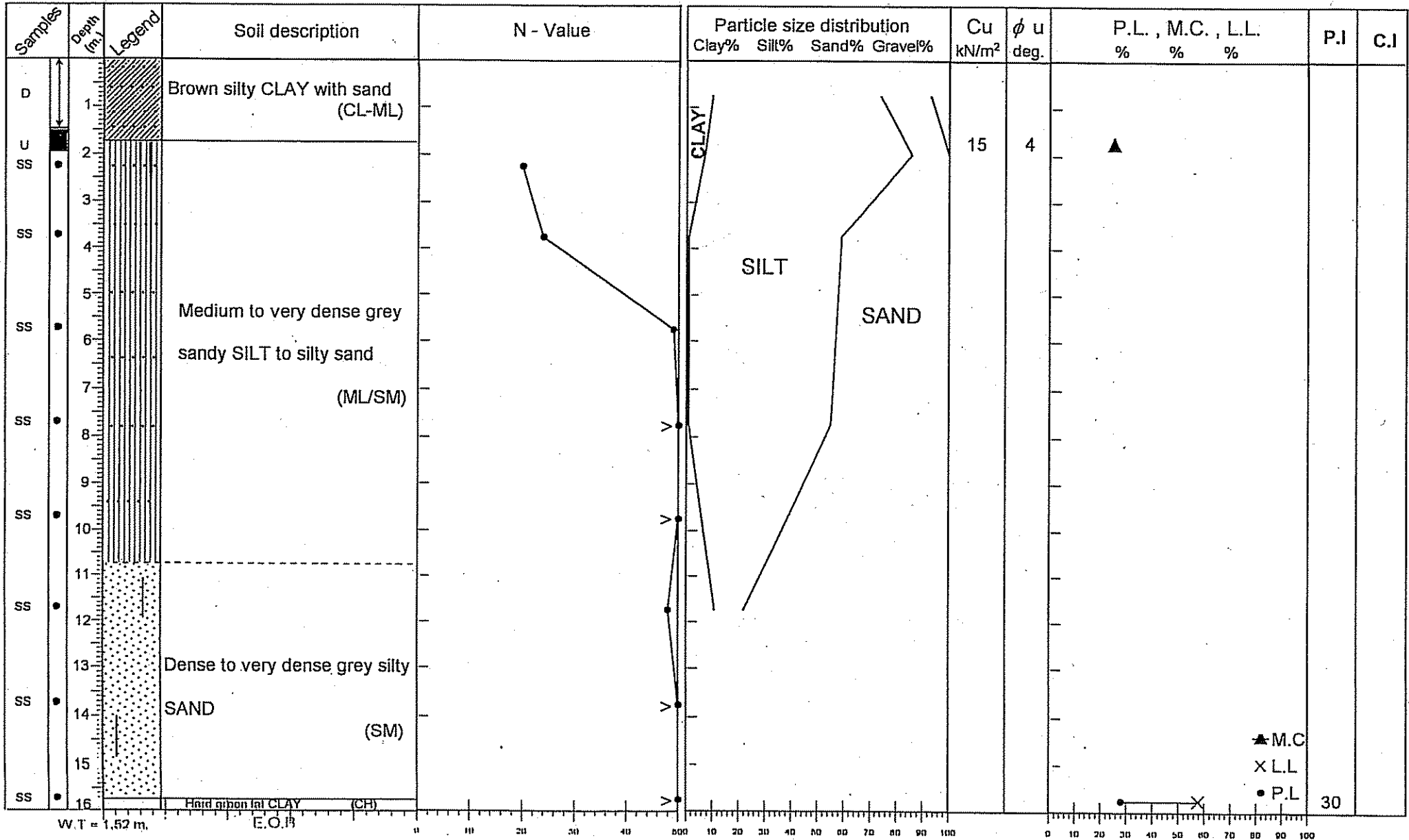


BOREHOLE LOG



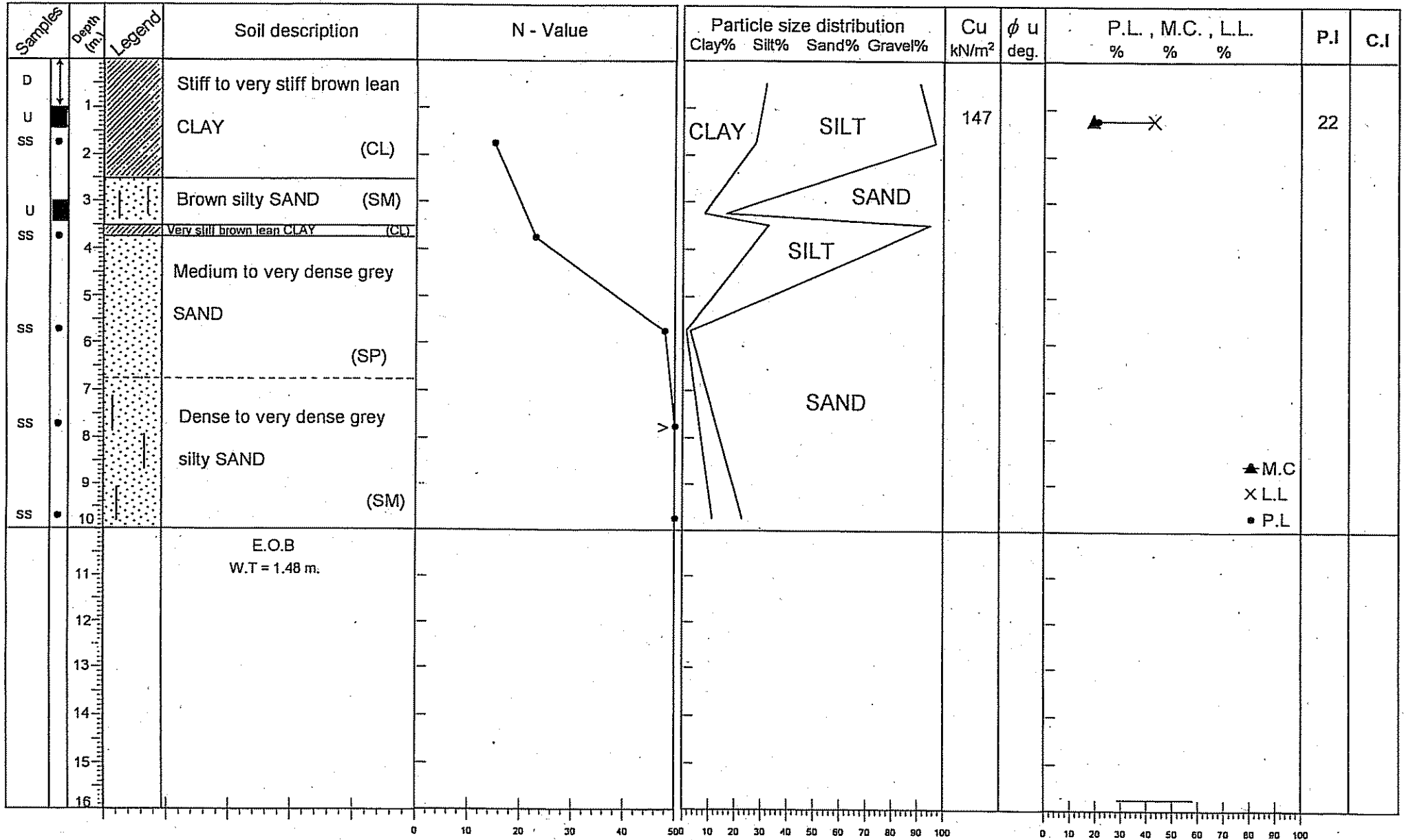


BOREHOLE LOG





BOREHOLE LOG



▲ M.C
× L.L
• P.L



BOREHOLE LOG

