Initial Environmental Examination

Conversion from 66kV to 132kV Yazman Grid Station along with 132kV Double Circuit Transmission Line

February 2017

PAK: MFF – Power Distribution Enhancement Investment Program (Tranche 3)

Prepared by Multan Electric Power Company, Punjab for the Asian Development Bank.

NOTES

(i) The fiscal year (FY) of the Government of the Islamic Republic of Pakistan and its agencies ends on 30 June.
(ii) In this report "$" refer to US dollars.

This Initial Environmental Examination is a document of the Borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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Re: Fw: MEPCO IEEs for amendment
Safia Shafiq
to:
Liaqat Ali
28/02/2017 02:35 PM
Hide Details
From: Safia Shafiq/Consultants/ADB
To: Liaqat Ali/PRM/ADB@ADB
5 Attachments


IEE MEPCO Yazman GS (Final).docx

IEE MEPCO Walana GS (Final).docx

IEE MEPCO PGEHS GS (Final).pdf

IEE MEPCO Choti GS (Final).docx

IEE MEPCO Buch Villas GS (Final).docx

Thank you Liaqat Sb. I don't think the approval was conveyed to MEPCO and the IEEs disclosed. I have gone through the amended reports and they are fine now. I am attaching the final versions with this email for disclosure.

Regards,

Safia Shafiq
Environment Specialist (Consultant)
Pakistan Resident Mission
Asian Development Bank

Level 8, North Wing, Serena Office Complex,
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-----Liaqat Ali/PRM/ADB wrote: -----

> To: Safia Shafiq/Consultants/ADB@ADB
> From: Liaqat Ali/PRM/ADB
> Date: 02/28/2017 01:42PM
> Subject: Fw: MEPCO IEEs for amendment
>
> Dear Safia:
>
> FYI.
>
> Regards,
> Liaqat Ali, Project Analyst, Pakistan Resident Mission
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>
> ----- Forwarded by Liaqat Ali/PRM/ADB on 28/02/2017 01:42 PM -----
>
> From: Asif Riaz <envsco@yahoo.com>
> To: "sshafiq.consultant@adb.org" <sshafiq.consultant@adb.org>

Cc: "zabbas@adb.org" <zabbas@adb.org>, Jeffrey Bowyer <jeffreybowyer@outlook.com>, "zlei@adb.org" <zlei@adb.org>, "lali@adb.org" <lali@adb.org>, Chief Engineer Development <cedev.mepco@gmail.com>
Date: 20/01/2016 12:55 AM
Subject: Re: MEPCO IEEs for amendment

Respected Madam!

Kindly find attached amended IEE reports of Tranche-3 & 4 (Savings) Subprojects as desired please.

Best Regards:
Syed Asif Riaz

On Tuesday, January 12, 2016 4:28 PM, "sshafiq.consultant@adb.org" <sshafiq.consultant@adb.org> wrote:

Dear Asif,

Attached is the IEE of the Buch Villas GS, which has been reviewed and amended by Atif (SMEC) from the original IEE prepared by MEPCO. However, further amendments are required and I have made track changes in the attached document accordingly. Please revise all the 5 MEPCO IEEs as per the attached IEE and send them to me for disclosure by Monday, January 18.

Regards,

Safia Shafiq
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(See attached file: IEE MEPCO Buch Villas GS (Tr-4) - FMC Reviewed-edit SS - SARS 19-01-2016.docx)(See attached file: IEE MEPCO Choti GS (Tr-4) - FMC Reviewd - SARS 19-01-2016.docx)(See attached file: IEE MEPCO PGEHS GS (Tr-4) - FMC Reviewd - SARS 19-01-2016.pdf)(See attached file: IEE MEPCO Walana GS (Tr-4) - FMC Reviewd - SARS 19-01-2016.docx)(See attached file: IEE MEPCO Yazman GS (Tr-3) - FMC Reviewed - SARS 19-01-2016.docx)

[attachment "IEE MEPCO Buch Villas GS (Tr-4) - FMC Reviewed-edit SS - SARS 19-01-2016.docx" removed by Safia Shafiq/Consultants/ADB]
[attachment "IEE MEPCO Choti GS (Tr-4) - FMC Reviewd - SARS 19-01-2016.docx" removed by

Safia Shafiq/Consultants/ADB]
[attachment "IEE MEPCO PGEHS GS (Tr-4) - FMC Reviewd - SARS 19-01-2016.pdf" removed by Safia Shafiq/Consultants/ADB]
[attachment "IEE MEPCO Walana GS (Tr-4) - FMC Reviewd - SARS 19-01-2016.docx" removed by Safia Shafiq/Consultants/ADB]
[attachment "IEE MEPCO Yazman GS (Tr-3) - FMC Reviewed - SARS 19-01-2016.docx" removed by Safia Shafiq/Consultants/ADB]

Draft Initial Environmental Examination (IEE) Report

Project Number: Tranche-3 Savings
{February 2017}

Islamic Republic of Pakistan: Power Distribution Enhancement Investment Program (Multi-Tranche Financing Facility)

Tranche-III: Conversion from 66KV to 132KV Yazman Grid Station along with 132KV Double Circuit Transmission Line

Prepared by:
Multan Electric Power Company (MEPCO)
Government of Pakistan

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APPENDIXES

ABBREVIATIONS

ADB	Asian Development Bank
COI	Corridor of Influence
CSP	Country Strategy Program
DoF	Department of Forests
DFO	Divisional Forest Officer
DGS	Distribution grid substation
DIZ	Direct Impact Zone
EA	Environmental Assessment
EARF	Environment Assessment Review Framework
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GOP	Government of Pakistan
GIS	Gas Insulated Switchgear
LARP	Land Acquisition and Resettlement Plan
MEPCO	Multan Electric Power Company
Yazman SP	Yazman 132kV grid substation and associated T/Line subproject
LARP	Land Acquisition and Resettlement Plan
Leq	equivalent sound pressure level
MPL	maximum permissible level
NEQS	National Environmental Quality Standards
NGO	Non-Governmental Organization
PC	public consultation
PEPA	Punjab Environmental Protection Agency
PEPAct	Punjab Environment Protection Act 1997 (as regulated and amended)
PPMS	Subproject Performance Monitoring System
REA	Rapid Environmental Assessment
SIA	Social Impact Assessment
S-P	subproject
SR	Sensitive Receiver
TOR	Terms of Reference
TL or T/L	Transmission Line

1. INTRODUCTION

1.1 Overview

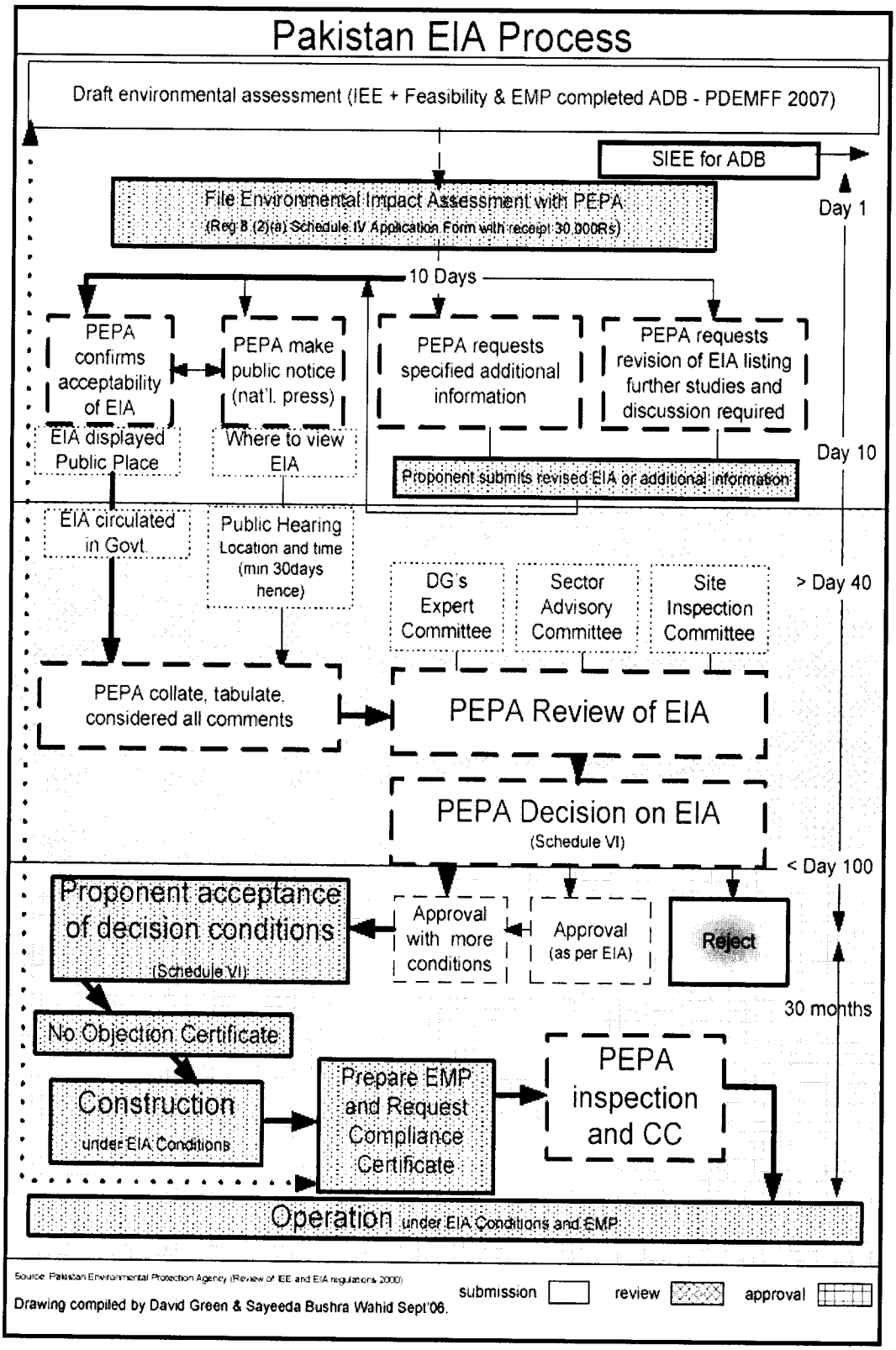
1. This document is the Initial Environmental Examination for the Tranche-3 conversion of 66KV Yazman Grid Station (DGS) to 132KV and construction of 16Km 132KV double circuit feeding transmission line proposed by the Multan Electric Power Company (MEPCO), under the Asian Development Bank (ADB) subproject, Power Distribution and Enhancement Multi-tranche Finance Facility (PDEMFF).

2. Government of Pakistan (GoP) has requested ADB to provide the PDEMFF to facilitate investments in power distribution and development of networks of eight independent distribution companies (DISCOs) that distribute power to end user consumers. The funding from ADB is expected to be released in stages (tranches). The Power Distribution Enhancement (PDE) Investment Program is part of the GoP long term energy security strategy. The proposed ADB intervention will finance new investments in PDE and assist capacity building of sector related agencies. The investment program will cover necessary PDE development activities in secondary transmission / distribution networks of eight DISCOs. The PDEMFF activities conversion of existing grid station that include extension (additional transformers) and augmentation (replacement of transformers with higher capacity) distribution line extensions, new and replacement distribution lines, additional substations, transformer protection and other non-network activities such as automatic meter reading, construction equipment and computerized accounting. New distribution lines to and from various network facilities and some of the above activities will also be included in the later tranches. The proposed PDEMFF facility has been designed to address both investment and institutional aspects in the electrical power sector.

3. This IEE presents the results and conclusions of environmental assessment for the Yazman subproject proposed by MEPCO and are submitted by Pakistan Electric Power Company (PEPCO) on behalf of MEPCO. PEPCO has been nominated by Ministry of Water and Power (MOWP) to act as the Executing Agency (EA) with each DISCO being the Implementing Agency (IA) for work in its own area. PEPCO's role in the processing and implementation of the investment program is that of a coordinator of such activities as preparation of PC-1s and PFRs, monitoring implementation activities; that includes submission of environmental assessments for all subprojects in all tranches of the PDEMFF under ADB operating procedures. An IEE has been carried out to fulfill the requirements of ADB Safeguards Policy Statement 2009. This IEE study report is used

to complete the Summary Initial Environmental Examination (SIEE) for disclosure by ADB if necessary.

4. The environmental assessment requirements of the GoP for grid stations and power distribution subprojects are different to those of ADB. Under GoP regulations, the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations (2000) categorizes development subprojects into two schedules according to their potential environmental impact. The proponents of subprojects that have reasonably foreseeable impacts are required to submit an IEE for their respective subprojects (Schedule I). The proponents of subprojects that have more adverse environmental impacts (Schedule II) are required to submit an environmental impact assessment (EIA). Distribution lines and substations are included under energy subprojects and IEE is required for sub transmission / distribution lines of 11kV and less and large distribution subprojects (Schedule-I). EIA is required by GoP for all subprojects involving sub transmission / distribution lines of 11kV and above and for DGS substations (Schedule II).


Pakistan EIA Process
Draft environmental assessment (IEE + Feasibility & EMP completed ADB - PDEMFF 2007)
SIEE for ADB
File Environmental Impact Assessment with PEPA
(Reg 8 (2)(a) Schedule IV Application Form with receipt 30,000Rs)
Day 1
10 Days
PEPA confirms acceptability of EIA
PEPA make public notice (nat'l. press)
PEPA requests specified additional information
PEPA requests revision of EIA listing further studies and discussion required
EIA displayed Public Place
Where to view EIA
Day 10
Proponent submits revised EIA or additional information
EIA circulated in Govt
Public Hearing Location and time (min 30days hence)
DG's Expert Committee
Sector Advisory Committee
Site Inspection Committee
> Day 40
PEPA collate, tabulate, considered all comments
PEPA Review of EIA
PEPA Decision on EIA
(Schedule VI)
< Day 100
Proponent acceptance of decision conditions
(Schedule VI)
Approval with more conditions
Approval (as per EIA)
Reject
30 months
No Objection Certificate
Construction
under EIA Conditions
Prepare EMP and Request Compliance Certificate
PEPA inspection and CC
Operation under EIA Conditions and EMP
Source: Pakistan Environmental Protection Agency (Review of IEE and EIA regulations 2000)
Drawing compiled by David Green & Sayeeda Bushra Wahid Sept'06.
submission
review
approval

5. Clarification has been sought from Pakistan EPA on the requirements for environmental assessment for certain energy subprojects and for sub transmission / distribution lines. A Framework of Environmental Assessment (FEA) on power extensions and augmentation subprojects was prepared by consultants and submitted to the Pakistan EPA, after hearings with provincial EPAs. In response to the FEA submitted by NTDC to the Pakistan EPA it has been clarified that all proponents must follow section 12 of the Pakistan Environmental Protection Act for all subprojects. Pakistan EPA has also assumed that all proponents will consult with the relevant provincial EPAs (PEPA) and follow their advice. In 2006 Punjab EPA requested disclosure of the scope and extent of each subproject in order that the Director General of PEPA can determine if additional land is required and the need for IEE or EIA. A review of the need for EIA/IEE for submission to GoP is therefore required by the relevant environmental protection agency, in this case the Punjab Environmental Protection Agency.

1.2 Scope of the IEE Study and Personnel

6. The Study Area included the identification of irrigation facilities, water supply, habitable structures, schools, health facilities, hospitals, religious places and sites of heritage or archaeological importance and critical areas (if any) within about 100m of the DGS boundary. The works are generally envisaged to involve construction of the DGS and 16Km transmission line, Construction of the bases, foundation pads and towers to support the distribution line will be carried out also under the same subproject by MEPCO and supervised by the Yazman management.

7. The field studies were undertaken by the subproject's environment team with experience of environmental assessment for power subprojects in Pakistan. Mr. Syed Asif Riaz and Mr. M. Arif conducted preliminary scoping, survey and assessment activities, coordinated the field sampling and analysis, and were also responsible to supervise collation of information and co-ordinate the various public consultation activities.

8. A scoping and field reconnaissance was conducted on the subproject site, during which a Rapid Environmental Assessment was carried out to establish the potential impacts and categorization of subproject activities. The methodology of the IEE study was then elaborated in order to address all interests. Subsequently primary and secondary baseline environmental data was collected from possible sources, and the intensity and likely location of impacts were identified with relation the sensitive receivers; based on the work expected to be carried out. The significance of impacts from construction of the DGS and transmission line was then assessed and, for those

impacts requiring mitigation, measures were proposed to reduce impacts to within acceptable limits.

9. Public consultations (PCs) were carried out in August 2015, in line with ADB guidelines. Under ADB requirements the environmental assessment process must also include meaningful public consultation during the completion of the draft IEE. In this IEE the PC process included verbal disclosure of the sub-subproject works as a vehicle for discussion. Consultations were conducted with local families and communities around the Yazman SP site, and along transmission line route, and staff of the subproject management.

2. POLICY AND STATUARY REQUIREMENTS IN PAKISTAN

10. Direct legislation on environmental protection is contained in several statutes, namely the Pakistan Environmental Protection Act (1997) the Forest Act (1927) the Punjab Wildlife Act (1974). In addition the Land Acquisition Act (1894) also provides powers in respect of land acquisition for public purposes. There are also several other items of legislation and regulations which have an indirect bearing on the subproject or general environmental measures.

2.1 Statutory Framework

11. Before the 18th Amendment in Constitution of Pakistan, Environment was Federal subject with the Concurrent list. Pakistan Environment Protection Act, 1997 received the assent of the President on 3 December 1997, and was published in the Gazette of Pakistan, Extraordinary, dated 6 December 1997.

12. This Act was originally in the Federal ambit, however, the subject on which this law was enacted devolved to the provinces by virtue of 18th Amendment in the Constitution, hence it was adapted, with amendments, for the province of the Punjab by the Punjab Environmental Protection (Amendment) Act 2012 (XXXV of 2012).

2.1.1 Punjab Environmental Protection Act, 1997

13. The Punjab Environmental Protection Act, 1997 is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The act is applicable to a wide range of issues and extends to air, water, soil, marine, and noise pollution, as well as to the handling of hazardous wastes. The key features of the law that have a direct bearing on the proposed subproject relate to the requirement for an initial environmental examination (IEE) and environmental impact assessment (EIA) for development subprojects. Section 12(1) requires that: "No proponent of a project shall commence construction or operation unless he has filed with the [Provincial Agency] an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the [Provincial Agency] approval in respect thereof."

2.1.2 Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000

14. The Pakistan Environmental Protection Act, 1997 (PEP Act) provides for two types of

environmental assessments: initial environmental examinations (IEE) and environment impact assessments (EIA). EIAs are carried out for subprojects that have a potentially 'significant' environmental impact, whereas IEEs are conducted for relatively smaller subprojects with a relatively less significant impact. The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2001 (the 'Regulations'), prepared by the EPA under the powers conferred upon it by the PEP Act, categorizes subprojects for IEE and EIA. Schedules I and II, attached to the Regulations, list the subprojects that require IEE and EIA, respectively.

15. The Regulations also provide the necessary details on the preparation, submission, and review of IEEs and EIAs. The following is a brief step-wise description of the approval process:

(i) A subproject is categorized as requiring an IEE or EIA using the two schedules attached to the Regulations.

(ii) An EIA or IEE is conducted as per the requirement and following the EPA guidelines.

(iii) The EIA or IEE is submitted to the concerned provincial EPA if it is located in the provinces or the EPA if it is located in Islamabad and federally administrated areas. The Fee (depending on the cost of the subproject and the type of the report) is submitted along with the document.

(iv) The IEE/EIA is also accompanied by an application in the format prescribed in Schedule IV of the Regulations.

(v) The EPA conducts a preliminary scrutiny and replies within 10 days of the submittal of a report, a) confirming completeness, or b) asking for additional information, if needed, or c) returning the report requiring additional studies, if necessary.

(vi) The EPA is required to make every effort to complete the IEE and EIA review process within 45 and 90 days, respectively, of the issue of confirmation of completeness.

(vii) Then the EPA accords their approval subject to certain conditions:

(viii) Before commencing construction of the subproject, the proponent is required to submit an undertaking accepting the conditions.

(ix) Before commencing operation of the subproject, the proponent is required to obtain from the EPA a written confirmation of compliance with the approval conditions and requirements of the IEE.

(x) An EMP is to be submitted with a request for obtaining confirmation of compliance.

(xi) The EPAs are required to issue confirmation of compliance within 15 days of the receipt of request and complete documentation.

(xii) The IEE/EIA approval is valid for three years from the date of accord.

(xiii) A monitoring report is to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operation.

16. Distribution lines and grid substations of 11 kV and above are included under energy subprojects in Schedule II, under which rules EIA is required by GoP. Initial environment examination (IEE) is required for distribution lines less than 11 kV and large distribution subprojects (Schedule I). A review of the need for EIA/ IEE submission is therefore required by the relevant EPA, in this case the Punjab Environment Protection Agency (EPA) as the proposed subproject will be located in Punjab.

17. There are no formal provisions for the environmental assessment of expanding existing distribution lines and grid substations but Punjab EPA have requested disclosure of the scope and extent of each subproject in order that their Director General can determine if additional land is required and the need for statutory environmental assessment1. The details of this subproject will be forwarded to the Punjab EPA, in order to commence the local statutory environmental assessment process.

4.2.1

4.2.2

2.1.3 National Environmental Quality Standards

18. The National Environmental Quality Standards (NEQS) were first promulgated in 1993 and have been amended in 1995 and 2000. The following standards that are specified in the NEQS may be relevant to the Tranche 3 subprojects:

19. Maximum allowable concentration of pollutants (25 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers)

20. Maximum allowable concentration of pollutants (2 parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.

2.1.4 Other Relevant Laws

21. There are a number of other federal and provincial laws that are important in the

context of environmental management. The main laws potentially affecting subprojects in this MFF are listed below.

22. The Punjab Wildlife Protection Ordinance, 1972 empowers the government to declare certain areas reserved for the protection of wildlife and control activities within in these areas. It also provides protection to endangered species of wildlife. As no activities are planned in these areas, no provision of this law is applicable to the proposed subproject.

23. The Forestry Act, 1927 empowers the government to declare certain areas reserved forest. As no reserved forest exists in the vicinity of the proposed subproject, this law will not affect to the proposed subproject.

24. The Antiquities Act of 1975 ensures the protection of Pakistan's cultural resources. The Act defines 'antiquities' as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, Government of Pakistan, any archaeological discovery made during the course of the subproject.

2.2 Structure of Report

25. This IEE reviews information on existing environmental attributes of the Study Area. Geological, hydrological and ecological features, air quality, noise, water quality, soils, social and economic aspects and cultural resources are included. The report predicts the probable impacts on the environment due to the proposed subproject enhancement and expansion. This IEE also proposes various environmental management measures. Details of all background environmental quality, environmental impact / pollutant generating activities, pollution sources, predicted environmental quality and related aspects have been provided in this report. References are presented as footnotes throughout the text. Following this introduction the report follows ADB guidelines and includes:

- Description of the Subproject
- Description of Environmental and Social Conditions
- Assessment of Environmental Impacts and Mitigation Measures

- Environmental Monitoring Plan
- Public Consultation
- Recommendations and Conclusions

3. DESCRIPTION OF THE PROJECT

3.1 Type of Project

26. The subproject will be the distribution grid station and transmission line. That is, the DGS will require conversion from 66KV to 132KV of Yazman grid station and construction of 16Km double circuit transmission line feed to Yazman. The scope of work includes addition of 2 X 26 MVA, 132/11 kV power transformers and allied equipment and buildings.

3.2 Categorization of the Project

27. Categorization is based on the environmentally most sensitive component of a subproject. The aspects of the subproject with potential for significant environmental impacts need to be assessed in detail and this environmental assessment has therefore focused on the significant impacts possible from the construction activities of the subproject.

28. The site for the DGS, as well as the route of the proposed transmission line, is located in a rural setting, with some minor settlements and other infrastructure around the site. The Yazman SP is categorized as a Category B sub-subproject under ADB requirements and this IEE report is based on that assumption.

3.3 Need for the Project

29. The conditions of the power distribution system in Pakistan are inadequate to meet rapidly growing demand for electrical power. This situation limits national development and economic growth. To cope with the constraints, the existing power distribution infrastructure has to be improved and upgraded. The overall contribution of power infrastructure also requires institutional arrangements and capacity that support strategic management of the sector, and planning and management of investments. Overall the proposed PDEMFF facility has been designed to address both investment and institutional aspects in the electrical power sector.

30. Power demands in the Yazman area of MEPCO jurisdiction have increased rapidly, especially in summer months, so that the existing DGS is unable to cope up with the increasing demands of the domestic, commercial and industrial sectors. Therefore, MEPCO has planned to convert Yazman DGS along with 16Km 132KV transmission line, at a place of existing Yazman DGS. Land for this DGS is already available, so no additional land is needed.

3.4 Location and Scale of Project

31. This IEE has included field reconnaissance of the site and surroundings of the Yazman SP and transmission line ROW.

32. The Yazman subproject will involve the conversion of existing DGS and construction of a 132kV transmission line. The proposed route to the nearest 132kV line appears to be environmentally feasible and technically appropriate and will join the DGS with an existing 132kV line (Bahawalpur-Lal Sohanra transmission line) at about 16Km awy from the Yazman DGS.

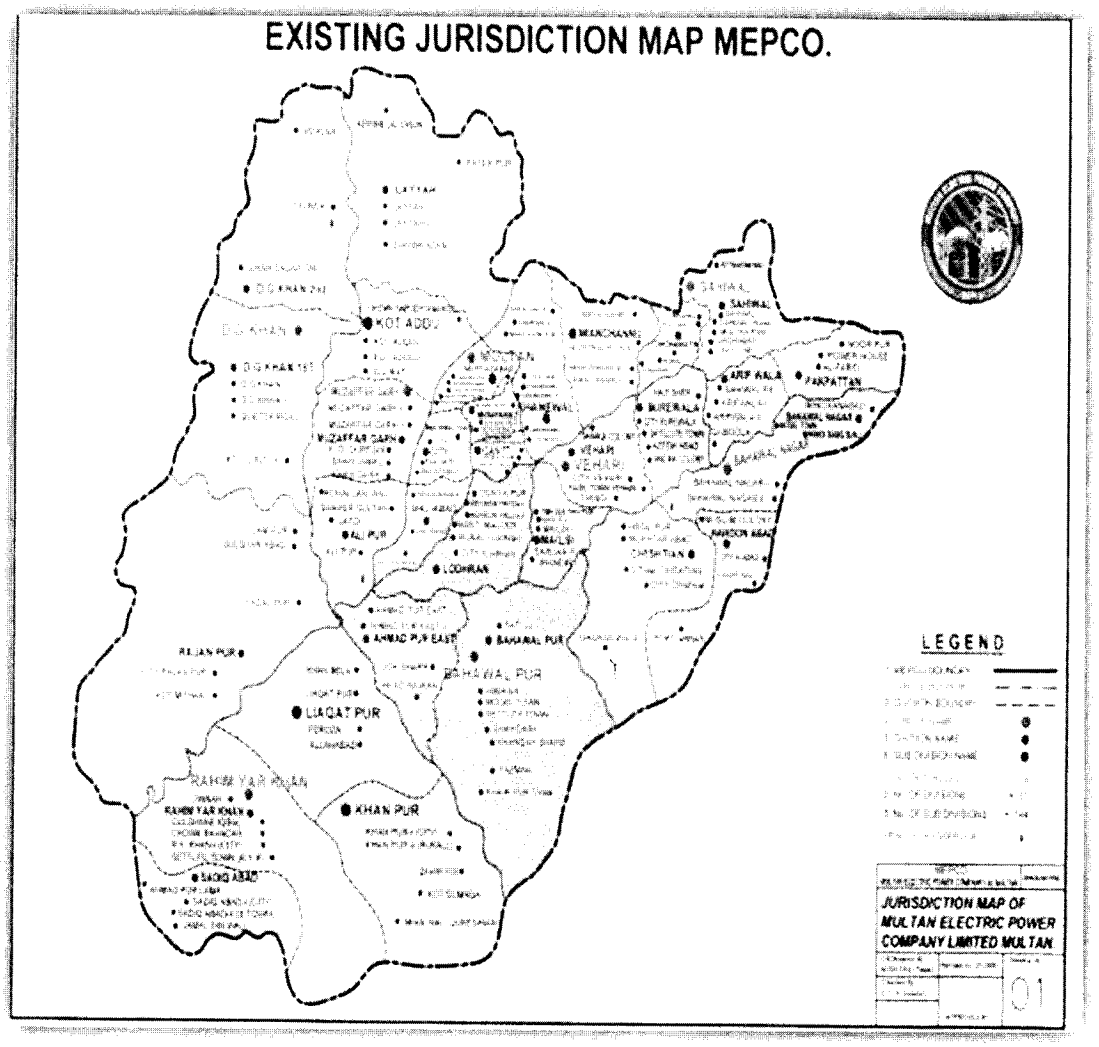


Figure – 1.1: Jurisdiction map of MEPCO

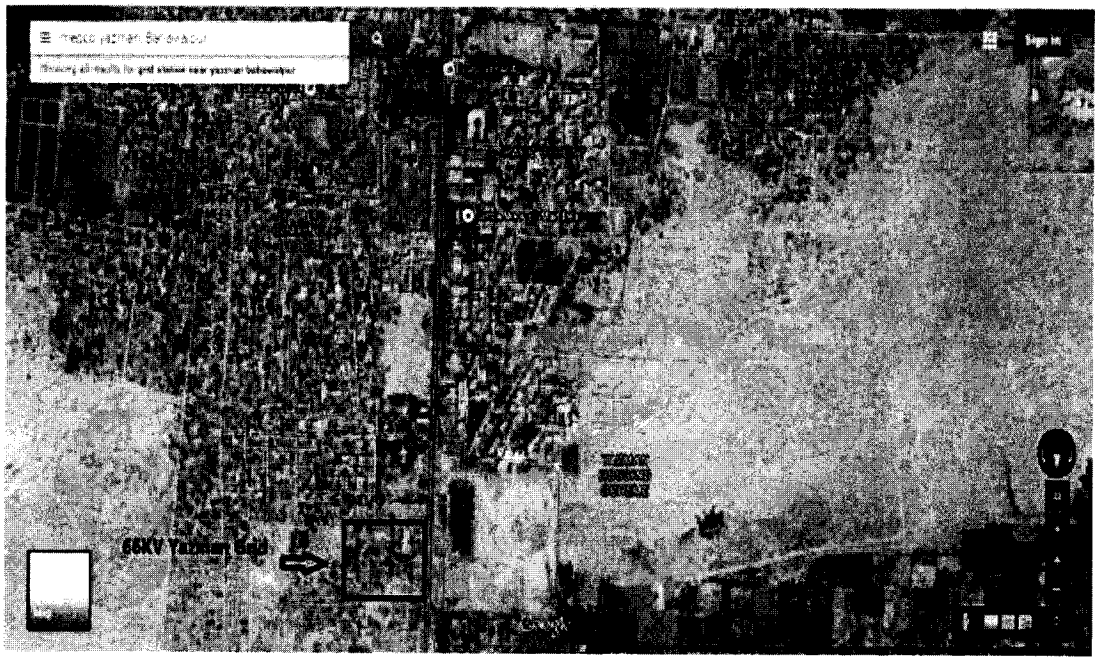


Figure 1.2: Google Earth Map of Yazman Sub Station

33. This IEE has been conducted based on the assumptions available in August 2015 when the preliminary designs for the proposed conversion DGS. The detailed designs are currently being progressed by MEPCO. At this stage, the construction activities under the SP are expected to include the usual localized civil works such as extension of the main yard, including excavation and concreting of foundations for the new transformers, capacitor banks, cable trays and terminal tower (within the DGS compound), installation of the transformers, equipment and fittings, erection of the towers, cabling, construction of the control rooms and installation of allied equipment, and construction of the offices and residences. Impacts from construction of the Yazman SP are envisaged to be minor, since no additional land needs to be acquired for the conversion of DGS and construction of transmission line, the works for the conversion of DGS will be on the existing land owned by MEPCO and works for the transmission line will be mostly on private cultivated land for which compensation for damage to crops and trees will be paid to the affected persons.

34. The connecting line from Yazman SP to the network will involve erection of towers that will be strung with the new proposed transmission line. The designs for the Tranche-3 subprojects will be developed under the subproject support component of the MFF. This IEE, however, is based on the proposed line route survey. The IEE is, therefore is not based on line design which is final (barring any unforeseen occurrence) will only be changed at implementation stage if so warranted by new developments.

35. The line design is based on the following parameters

S. No.	Description	Clearance (m)
1	Cultivated land traversed by vehicles	6.7
2	Roads and Streets	7.9
3	Communication and Power lines: Power lines upto 66 KV Power lines upto 33KV	 2.7 2.7
4	Highways	7.9
5	Railroads	7.9
6	Electrified railroad trolley wire	3.85
7	River at high flood	9.1
8	Places accessible to pedestrians only	7.9
9	Building roofs not accessible to people	5.2
10	Top of trees (Orchards)	5
11	Canals	9.1

3.5 Decommissioning and Disposal of Materials

36. Decommissioning and disposal of discarded material the project will be recycled and reused within the PEPCO system. And no waste will be generated that can be classified as hazardous and requiring special disposal.

4. DESCRIPTION OF THE ENVIRONMENT

4.1 Project Area

4.1.1 General Characteristics of Project Area

37. The 132kV DGS will be constructed at about 6 Acres of land in Mouza Yazman (about 46km from Bahawalpur) in Bahawalpur District. The DGS proposed site is located in an agricultural area. There are no fruit or non-fruit trees in the existing DGS conversion site, which would need to be removed.

4.1.2 Affected Administrative Units

38. The proposed transmission line will pass through different villages affecting trees (number shall identify when final line route shall be identified). The area to be affected by the conversion works for the Yazman DGS and associated transmission line falls in District Bahawalpur. Interviews were conducted with the public near the DGS site and transmission line proposed corridor to obtain their views on the subproject and any perceived impacts.

4.2 Physical Resources

4.2.1 Topography, Geography, Geology, and Soils

39. Bahawalpur is located in the southeast of Punjab province, the capital; Bahawalpur City is 889 km from Karachi. The region surrounding Bahawalpur to the west, called the Sindh, is a fertile alluvial tract in the Sutlej River valley that is irrigated by floodwaters, planted with groves of date palms, and thickly populated. The chief crops are wheat, gram, cotton, sugarcane, and dates. Sheep and cattle are raised for export of wool and hides. East of Bahawalpur is the Pat, or Bar, a tract of land considerably higher than the adjoining valley. It is chiefly desert irrigated by the Sutlej inundation canals and yields crops of wheat, cotton, and sugarcane. Farther east, the Rohi, or Cholistan, is a barren desert tract, bounded on the north and west by the Hakra depression with mound ruins of old settlements along its high banks; it is still inhabited by nomads. The principal inhabitants of the region surrounding Bahawalpur are Jat and Baluchi peoples. There are many historical sites in the area, including Uch, southwest of Bahawalpur, an ancient town dating from Indo-Scythian (Yüeh-chih) settlement (c. 128 BC to AD 450). Pop. (1981) City, 180,263; (1981 prelim.) metropolitan area, 695,000.

40. Bahawalpur is also an important agricultural training and educational center. Soap making and cotton ginning are important enterprises; cotton, silk, embroidery, carpets, and extraordinarily delicate pottery are produced. Factories producing cottonseed oil and cottonseed cake were built in the 1970s. It is an important marketing centre for the surrounding areas and is located on the crossroads between Peshawar, Lahore, Quetta and Karachi. Bahawalpur is also known for its distinctly embroidered slippers and shoes and the filigree pottery which is made here.

41. The City is located favorably for commerce, lying at the junction of trade routes from the east, south-east, and south. It is a centre for trade in wheat, cotton, millet, and rice grown in the surrounding region. Dates and mangoes are also grown here. Canals supply water for irrigation. The principal industries are cotton ginning, rice and flour milling, and the hand weaving of textiles. The Biggest and Oldest Ghala Mandi is located in the Yazman Mandi tehsil.

4.2.2 Climate and Hydrology

42. There is no variation of altitude above sea level in the land along the alignment and the short length of the distribution line means no variation of the climate of the sub-project area. The climate at SP is typical of that of the southern Punjab.

43. East of Bahawalpur is the Cholistan Desert which covers an area of about 15,000 km^2 and extends into the Thar Desert of India. The region was once watered by the Hakra River, known as the Saravati in Vedic times. At one time there were 400 forts in the area and archaeological finds around the Derawar Fort, the only place with a perennial waterhole, indicate that it was contemporaneous with the Indus Valley Civilisation. The average annual rainfall is only 12 cm, and the little cultivation there is, is made possible by underground wells, drawn up by the camels. The water is stored in troughs, built by the tribes, between sandhills and din waterholes called tobas. The people are racially similar to those in Rajasthan - tall, with sharp features. They live in large, round, mud and grass huts, usually built on the top of sandhills. On the whole, they are pastoral and nomadic. The main tribes are the Chhachhar, Mehr, Lar, Paryar, Channar, Chandani and Bohar. The forts here were built at 29 km intervals, which probably served as guard posts for the camel caravan routes. There were three rows of these forts. The first line of forts began from Phulra and ended in Lera, the second from Rukhanpur to Islamgarh, and the third from Bilcaner to Kapoo. They are all in ruins now, and you can see that they were built with double walls of gypsum blocks and mud. Some of them date back to 1000 BC, and were destroyed and rebuilt many times.

44. The maximum temperature in summer reaches 52°C. In winter the minimum is 4.5°C. The mean maximum and minimum temperatures in summer for this period are 40.6°C and 27.2°C respectively and in winter 22.3°C and 5.9°C respectively. The summer season starts from April and continues until October.

4.2.3 Groundwater and Water Supply

45. Irrigation is largely dependent on the canals, but tube wells have also been sunk in the areas where water is fit for irrigation. The chemical quality of ground water in the district varies in different areas and at different depths. According to KCP Feasibility Study carried out by WAPDA 2003, Potable water is available in a belt along Shuria Canal. Irrigation supplies are perennial and tube wells have been installed to make up the deficiencies. The strata near the DGS and transmission line are water bearing and alluvial deposits, giving groundwater potential throughout the sub-project area and the water table is about seven to eight metres below the surface. The water table is not seasonal and dug wells do not generally run dry. Groundwater sources exist in the area and there are tube wells within 500 m of the proposed transmission line towers. The local population near most of the DGS and transmission line is generally reliant on supply from tube wells. Piped water supply is available in 23,569 housing units of Bahawalpur. There should be no impact on these sources of water during the construction.

4.2.4 Air Quality

46. Air quality in the sub-project area appears good based on observation during the study period. Domestic sources of air pollution, such as emissions from wood and kerosene burning stoves as well as small diesel standby generators in some households, are well dissipated. There are no other industrial pollution sources present in the vicinity.

47. The other major source of air pollution is dust arising from construction and other ground or soil disturbance. Near the access roads, when vehicles pass, dust levels will increase. The nearby road is paved but dust levels are elevated when vehicles pass intermittently over the roads based on field observations and may be high enough to obscure vision significantly based on observations.

4.2.5 Noise

48. Noise from vehicles and other powered mechanical equipment is intermittent. There are also the occasional calls to prayer from the PA systems at the local mosques but there are no significant disturbances to the quiet rural setting. However the construction

from the proposed power expansion will use powered mechanical equipment. Subjective observations were made of background noise and also of individual vehicle pass by events. Based on professional experience background daytime noise levels are probably well below 55dB(A) L90.

4.3 Ecological Resources

4.3.1 Wildlife, Fisheries and Aquatic Biology

49. There are no areas of wildlife significance near the sub-project area. Pig and hog deer are found in woodland near the river and hares are fairly common. Black and gray partridges are also found. Migratory birds use the Indus valley and in cold weather many varieties of duck and teal visit the district. The Indus contains a variety of fish. In the winter months when the river recedes, fish are caught in greater quantity.

4.3.2 Terrestrial Habitats, Forests and Protected Species

50. The sub-project area, which is dry, is dominated by rural suburbs and with various productive fields of monocultures that now dominate the agro-ecosystems present in the sub-project area. Common floral species with rooted vegetation are also present near most of the water bodies of the area.

51. However there is very little vegetation in the RoW for the line. Just either side of the distribution line alignment semi-natural vegetation consists of the trees and scrub areas that have not been cultivated. Amongst the trees, Jand (Prosopis spicigera) Frash (Tamarix articutlata), Shisham (Dalbergia sisso), Sirin (Albizia lebbek) and Kikar (Accacia arabica) are most common.

52. There is wild growth of mesquite bushes, and some Sirin and Kikar trees in the areas near the works, but natural forest cover in the district has been significantly reduced in the past due to clearance for cultivation.

53. There is a protected forest at Lal Suhanra, about 50km north and that is the nearest and largest in the Bahawalpur district. There are also planted trees along canals and roads. The major trees grown in the forest are Shisham (Dalbergia sissoo), Kikar (Acacia arbica) and Eucalyptus. There are many trees along the RoW but these are on private land. In general permission should be sought from the local tree owners for the felling of any trees. A Land Acquisition and Resettlement plan (LARP) for the SLSP will make provision for compensation of local people for the loss of trees, if needed after detailed study. The works must deal with trees that need to be lopped or removed for safety reasons with the necessary permissions.

4.3.3 Protected Areas / National Sanctuaries

54. In Pakistan there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. One national park Lal Sunhara is 50 km from the sub-project site. This provides excellent feeding, breeding and resting habitats to numerous migratory as well as resident birds. The national park is located on one of the major bird migration routes of the world.

4.4 Economic Development

4.4.1 Agriculture and Industries

Cropping Pattern

55. The main crops in the sub-project area during winter are wheat, gram, barley, oil seeds, Taramira, Sarson and Toria. In summer sugarcane, cotton, Jawar, Bajra and rice are grown.

Horticulture

56. The main fruits grown in the area are date, orange and mango.

Industry

57. There are nine (9) major Industrial units of cotton ginning and pressing, cotton textiles, a cement factory and vegetable oil factory. Bahawalpur is well known for lacquered articles such as wooden/electric lamps, mirror frames, pottery, furniture and several other articles of decoration. There are cotton seed oil factories at 3 km from the DGS.

Transportation and Tourism

58. Bahawalpur is linked with the rest of the country by rail and roads. It lies on the National Indus Highway, which connects Karachi with rest of the country. The district headquarters Bahawalpur is connected with metalled roads to its entire subsidiary headquarters. The eastern and south-eastern belt of the district is comparatively developed with good road transportation. All major villages are connected with the district headquarters through metaled roads.

59. The district is also served by railway line which runs north-south near the main road

of this district. Bahawalpur is connected with rest of the country by air.

60. There are many places of interest which attract tourists. Fort Darawar is one attraction that is situated in the middle of desert Cholistan.

4.4.2 Energy Sources

61. The distribution lines for electrical power run to a main grid sub-station Bahawalpur. The existing 220kV Bahawalpur Grid Station owned by NTDC and 132 KV grid stations owned by MEPCO, transmits power to the load centers.

62. Reserves of fossil fuels are the main sources of energy in Pakistan. In the study area there is no source of hydropower and other energy sources are progressively more common further away from the major towns. The biomass sourcing is concentrated on home garden production of fuel wood, the extraction of wood from forests, woodland, crop plantations and agricultural residues. The other significant energy sources in the area are kerosene and LPG. There are numerous petrol stations and LPG dealers in the district.

4.5 Social and Cultural Resources

4.5.1 Population Communities and Employment

63. The total population of Bahawalpur District was 2,433,092 and in the 1998 Census the population showed the district is predominantly (99%) Muslim. The next higher percentage is of Ahmadis with 0.2%, followed by scheduled castes 0.1%. Other minorities like Christians, Hindu (jati) etc. are small in number. The proportion of population of Muslims in rural and urban areas is over 99%. Ahmadis in urban areas are 0.43 per cent and rural areas 0.16 per cent. Christians are more in urban areas as compared to their proportion in rural areas. Siraiki is the predominant language being spoken in the district, representing 80% of the population, followed by Baluchi spoken by 14%, Urdu 3% and Punjabi 1%. Others speak Sindhi, Pashto, Baravi and Dari.

64. Of the total economically active population 75.2 per cent were registered as employed in 1998. Nearly three-quarters (72.6%) were self employed, 10% were private employees and 6% government employees. Unpaid family helpers were recorded as 10%. The difference in proportions of employed population was significant between the genders in both urban and rural residences.

65. The main occupation of women in rural areas including the sub-project area of Bahawalpur district is house-keeping which includes attending to the cattle, extracting butter and Ghee from milk, weaving and sewing of family clothes. In addition women

generally help the men on farms with the lighter duties like transplanting of seedlings, threshing and winnowing of grains and sometimes they also help in harvesting. In the cities women are housewives or work as professional's doctors, nurses, teaching.

4.5.2 Education and Literacy

66. The literacy ratio in Bahawalpur district increased from 16% in 1981 to 31% in 1998. The literacy ratio for males is 42% and 18% for females. Literacy is much higher in urban areas compared with rural areas for male and female.

5. CULTURAL HERITAGE AND COMMUNITY STRUCTURE

67. There are no officially protected heritage sites or historic, religious or archeologically important sites located in the sub-project works areas. There are no major historic or archaeological features of note but there a few places of worship within about 500 m of the works.

6. SCREENING POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 Subproject Location

6.1.1 Impact Assessment and Mitigation

68. This Tranche-3 subproject will involve conversion of existing 66KV Yazman DGS to 132KV and construction of 16Km transmission line, implying an expansion of facilities, both outside and within the existing boundaries Yazman DGS on land presently occupied by MEPCO. There are few sensitive receivers (SR), including some houses, schools, colleges, factories, which are more than 500 m away from the DGS boundary, and there are no sensitive receivers close to the DGS which could be possibly affected by certain activities of the sub-project works. There are some other sensitive receivers (SR). The transmission line will also cross some roads and a road, canal, and could require the removal of some trees, but there are no other sensitive receivers on its route, which could be affected by the works.

69. The location and scale of the works are very important in predicting the environmental impacts. Therefore, it is essential that a proper analysis is carried out during the subproject planning period. This process of impact prediction is the core of the IEE process and it is critical that the recommendations and mitigation measures are carried out according to, and with reference to the conditions on the ground in the affected areas in the spirit of the environmental assessments process. In this section the potential environmental impacts are reviewed. Where impacts are significant enough to exceed accepted environmental standards, mitigation is proposed in order to reduce residual impact to acceptable levels. In this regard, the impact prediction plays a vital role as these predictions are used for developing mitigation measures and any alternative options, if appropriate. When the detailed designs are completed the impacts and mitigation measures will need to be further reviewed to take account of how the contracts are set up and in the light of any fine tuning of the subproject proposals.

70. The environmental management plan has been reviewed based on the assessment and shall be reviewed in due course at subproject inception and through construction in order to provide a feedback on any significant unpredicted impacts. It is based on the analysis of impacts, primarily to document key environmental issues likely to arise from subproject implementation, to prescribe mitigation measures to be integrated in the subproject design, to design monitoring and evaluation schedules to be implemented during subproject construction and operation, and to estimate costs required for

implementing subproject mitigation measures. The EMP must be reviewed in the subproject inception by the subproject management and approved before any construction activity is initiated, to take account of any subsequent changes and fine tuning of the proposals.

6.2 General Approach to Mitigation

71. Based on professional experience on some projects, contractors have put emphasis on the financial compensation for nuisances. This may be acceptable for some social impacts where evacuation is necessary or where houses have been accidentally damaged, however it is not best international practice to accept payment for environmental impacts. An approach whereby the subproject contractor pays money for nuisances rather than control impacts at source will not be acceptable. This practice should not be allowed and financial compensation shall not be allowed as mitigation for environmental impacts or environmental nuisance.

72. During the preparation for the subproject construction phase the future contractors must be notified and prepared to co-operate with the executing and implementing agencies, subproject management, construction supervising consultants and local population in the mitigation of impacts. Furthermore the contractor must be primed through bidding stages and the contract documentation to implement the EMP in full and be ready to engage or train staff in the management of environmental issues and to audit the effectiveness and review mitigation measures as the subproject proceeds. The effective implementation of the EMP will be audited as part of the loan conditions and the executing agency (MEPCO) must be prepared for this. In this regard the MEPCO must fulfill the requirements of the law and guidance prepared by EPA on the environmental aspects of power subprojects and the recommendations already made for subproject in this IEE and under Pakistan's PEP Act.

73. The location of the residences, mosques, schools, hospitals and civic, cultural and other heritage sites has been reviewed. Residences or schools are close enough to the subproject on which there could be some potential impacts in the construction stage from disturbance and significant noise and dust. This is because the transmission line is very short (only 16Km), and the alignment is along cultivated land and has no human settlements and structures.

74. Work on the tower sites could cause some generation of air borne dust, but any nuisance from this is likely to be very localized and temporary. Other project activities, e.g. movement of heavy vehicles on unpaved tracks during the works, could generate considerable dust. Water is available in the study area, although surplus water may not

always be available to suppress dust at vulnerable locations in the dry season. Therefore as a general approach it is recommended that where works are within 15m of any residential sensitive receivers, the contractor should install segregation between the works and the edge of the sensitive receivers. The segregation should be easily erectable 2.5m high tarpaulin sheet and designed to retain dust and provide a temporary visual barrier to the works. Where dust is the major consideration the barrier can take the form of tarpaulins strung between two poles mounted on a concrete base. These can be moved along from tower base to tower base as the work proceeds.

75. Noise from the construction of the towers should not be a major consideration unless very close to schools or hospitals where construction should be avoided at sensitive times. In addition to the physical effect of mitigating dust and noise with barriers installation of such measures should be discussed with the local population and serve as a vehicle for further public consultation at the implementation stage to assist in public relations.

6.2.1 Cultural Heritage, Mosques, Religious Sites, and Social Infrastructure

76. The location of mosques and other cultural and other heritage SR sites has been reviewed There is a mosque within the DGS and there are no other mosques or other religious sites close to the DGS site. The proposed new line will also not affect or disturb any such site.

77. The nearest clinic / hospital is more than 50m from the edge of the Subproject or transmission line route, but the nearest school is at 1 km from the DGS adjacent to the Subproject, and the nearest houses at about 45m from the DGS. The transmission line will also cross some road including the road, and a canal. Apart from these features, there will be sufficient buffer distance between the works and any other SRs, so that no significant impacts should be expected. Public consultation should be undertaken at the implementation stage to ensure nuisances are not allowed to escalate for the SRs close to the DGS sites.

6.3 Potential Environmental Impacts in construction

6.3.1 Encroachment, Landscape and Physical Disfiguration

78. The extent of the proposed power expansion is moderate and should not extend beyond the power corridor (RoW) created by the subproject. No significant landscape impacts are expected from conversion of Yazman grid station from 66KV to 132KV.

6.3.2 Cut and fill and waste disposal

79. Disposal of surplus materials must also be negotiated through local authority approvals prior to the commencement of construction. The Subproject work should not involve any significant cutting and filling but minor excavations (down to 4m) and piling may be required to create the foundations for the new transformers and for some towers (if required). It is envisaged (depending on the mode of contract) that the surface under the towers will need to be scrabbled to remove unstable materials, or to stockpile topsoil.

80. Mitigation measures must focus on the minimization of impacts. In order to allow the proper functioning of the settlement sites (access to villages) during construction it is recommended that consideration be given to erect temporary hoardings immediately adjacent to the nearest houses and shops if they are within 15m of the power distribution line tower construction.

81. If surplus materials arise from the removal of the existing surfaces from specific areas, these should be used elsewhere on the subproject before additional soil, rock, gravel or sand is brought in. The use of immediately available material will generally minimize the need for additional rock based materials extraction from outside.

82. The subproject detailed designers have so far estimated that no substantial additional materials will be required subject to confirmation at the detailed design stage.

83. At this stage no areas require removal of woodland. However if specimen trees of religious plantations are affected the owners should be given the resources and opportunity to reinstate the woodland long term and a plantation compensation plan should be drawn up to replant the woodland/trees. In the event that the land is not suitable for plantation then other areas should be identified to replace the cut trees and sufficient areas should be identified to allow plantation of trees at a rate of say 3:1. The replacement ratio should allow for a high mortality rate among the newly planted trees in the dry environment or otherwise as based on advice from the forest authority.

84. Contractual clauses should be included to require each contractor to produce a materials management plan (one month before construction commences) to identify all sources of cement and aggregates and to balance cut and fill. The plan should clearly state the methods to be employed prior to and during the extraction of materials and all the mitigation measures to be employed to mitigate nuisances to local residents. Financial compensation shall not be allowed as mitigation for environmental impacts or environmental nuisance. Mitigation measures shall seek to control the impacts at source in the first place. The engineer shall be responsible to update the subproject cut and fill estimates and create Materials Master Plan to facilitate materials exchange between the different contract areas along the power line and sub-contractors on the power line and

to provide an overall balance for materials and minimize impacts on local resources.

6.3.3 Trees, Ecology and Protected Areas

85. There are no Reserved or Protected Forests or trees near the DGS site or transmission line alignment. But about fruit and wood trees that need to be removed for clearance on 30m RoW of transmission line. The proposed line will require the installation of towers which will be installed on private cultivated land. The transmission line route will affect mango, pomegranate and trees of Kikar.

86. If for some unforeseen reason or change of alignment, any trees with religious significance or other trees need to be removed, written permission should be obtained from the forest authority and the owner after written justification by MEPCO. Trees shall be planted to replace the lost trees with three trees planted to replace every cut tree (3:1) or more as agreed with the authority.

87. A requirement shall be inserted in the contracts that no trees are to be cut on the Yazman DGS and transmission line site or outside, without the written permission from the supervising consultant who may permit the removal of trees if unavoidable on safety / technical / engineering grounds after written justification by MEPCO and to the satisfaction of the forest authority and the owner.

6.3.4 Hydrology, Sedimentation, Soil Erosion

88. The drainage streams en-route of the subproject should not be impeded by the works. The scale of the works does not warrant hydrological monitoring.

6.3.5 Air Pollution from earthworks and transport

89. The material (cement, sand and aggregate) requirement of a typical 132 kV sub station (about 150 cu m) and a 132 kV transmission tower (4.8 cu m, or 40 bags of cement per tower) are not large. In transmission line construction sand and aggregate are delivered directly to the tower location from the quarry / source, there is no intermediate or bulk storage of these materials. Similarly construction materials for the sub station are stored within the sub station site are scheduled as per the work progress (which is staggered as the buildings which require bulk of the construction materials are built in phases over 6 to 12 months period), which means that at any given point in time the amount of construction material stored is not significant. The quantities of construction material required for a typical sub station or transmission tower are not so large that they potentially represent a traffic hazard , these requirements are time

dispersed in case of sub stations and time and space dispersed in case of transmission lines. The contractor will be, however, required to provide a traffic management plan before commencement of work at site. Field observations indicate that ambient air quality is generally acceptable and that emissions from traffic and other powered mechanical equipment in the area are rapidly dispersed. There will be a few items of powered mechanical equipment to be used in the construction of the distribution line works that may give rise gaseous emissions. However these should be well dissipated. The major sources of complaint will likely be any necessary earthworks and local soil compaction.

90. Earthworks will contribute to increasing dust, and the foundation earthworks for the transformers and the line poles will generate dust and the following mitigation measures are needed:

- Dust suppression facilities (water sprayers / hosepipe) shall be available where earth and cement works are required.
- Areas of construction (especially where the works are within 50m of the SRs) shall be maintained damp by watering the construction area.
- Construction materials (sand, gravel, and rocks) and spoil materials will be transported trucks covered with tarpaulins.
- Storage piles will be at least 30m downwind of the nearest human settlements.
- All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) shall be well maintained and not emit dark, smoky or other emissions in excess of the limits described in the NEQS.

91. The need for large stockpiles should be minimized by careful planning of the supply of materials from controlled sources. Stockpiles should not be located within 50m of schools, hospitals or other public amenities such as wells and pumps and should be covered with tarpaulins when not in use and at the end of the working day to enclose dust.

6.3.6 Noise, Vibration and Blasting

92. It is anticipated that powered mechanical equipment and some local labor with hand tool methods will be used to construct the subproject works. No blasting is anticipated. Powered mechanical equipment can generate significant noise and vibration. The cumulative effects from several machines can be significant. To minimize such impacts, the contractor for subproject should be requested by the construction supervision consultants (engineer) to provide evidence and certification that all equipment to be used

for construction is fitted with the necessary air pollution and noise dampening devices to meet EPA requirements.

Table-6.1: National Environmental Quality Standards for Noise

S No.	Category of Area/Zone	Effective from 1st July, 2010		Effective from 1st July, 2015	
		Limit in dB(A) Leq*			
		Day time	Night time	Day time	Night time
1.	Residential are (A)	65	50	55	45
2.	Commercial area (B)	70	60	65	55
3.	Industrial area (C)	80	75	75	65
4.	Silence zone (D)	55	45	50	45

Note:

- Day time hours: 6 .00 am to 10.00 pm
- Night Time hours: 10.00 pm to 6.00 am
- Silence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts and courts.
- Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.
- dB(A) Leq: time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

93. Noise will be monitored at a distance of 100m from the boundary wall of any residential unit and should follow the NEQS of 45dB (A).

94. Noise from construction of the power distribution lines and improvements to substations is not covered under any regulations however in order to keep in line with best international practice It is recommended that no construction should be allowed during nighttime (9 PM to 6 AM) Any noisy equipment should be located within DGS or as far from SRs as possible to prevent nuisances to dwellings and other structures from operation. However, if the noise still exceeds NEQS then noise barriers will be installed around the equipment to reduce the effects of the noise.

95. Vibration from construction of piles to support pads may be required for some tower construction and may be a significant impact but this should be short duration. Where vibration could become a major consideration (within say 100m of schools, religious premises, hospitals or residences) a building condition survey should take place prior to

construction. The physical effect of piling should be assessed prior to construction and measures should be discussed with the local population as well as timing of the works to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations. At nearby schools, the contractor shall discuss with the school principals the agreed time for operating these machines and completely avoid machine use near schools during examination times, if such a need arises.

6.3.7 Sanitation, Solid Waste Disposal, Communicable Diseases

96. The main issues of concern are uncontrolled or unmanaged disposal of solid and liquid wastes into watercourses and natural drains, improper disposal of storm water and black water and open defecation by construction workers.

97. In order to maintain proper sanitation around construction sites, access to the nearby DGS lavatories should be allowed or provision of temporary toilets should be made. Construction worker camps will not be necessary, based on the scale of the works needed. If for some unforeseen reason a larger workforce is needed any construction camp should not be located in settlement areas or near sensitive water resources and portable lavatories or at least pit latrines should be provided.

98. Wherever water is allowed to accumulate, in temporary drainage facilities, due to improper storm water management, or improper disposal of wastewater generated from the site, it can offer a breeding site for mosquitoes and other insects. Vectors such as mosquitoes may be encountered if open water is allowed to accumulate at the Yazman SP site. Temporary and permanent drainage facilities should therefore be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.

6.4 Potential Environmental Impacts in Operation

6.4.1 Air pollution and noise from the enhanced operations

99. The subproject works will extend the power distribution lines but no houses, mosques or schools will be close to the proposed transmission line in the operational phase. Nevertheless some houses, a school, a hospital and a hostel are close to the DGS. The DGS will be converted at existing DGS and the extended level of operation of the facility is not likely to cause any appreciable increase in the noise level already generated by the existing equipment. However, it is recommended that an acoustical check be made on the detailed design to determine of any noise barriers are required. There should be no source of atmospheric pollution from the subproject. In the operational phase any

nearby industrial facilities with fuel powered mechanical equipment will be the main polluters. All such emissions will be very well dissipated in the open terrain and there will be no cumulative effect from the subproject.

100. Noise impacts from the operation of the DGS equipment should be reviewed at the detailed design stage. The NEQS for noise close to residential areas will be complied with 45 dB(A) Leq (exterior, boundary of DGS).

6.4.2 Pollution from oily run-off, fuel spills and dangerous goods

101. No significant impacts from oily residues such as transformer oil and lubricants are expected to arise in this subproject. However control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some subproject DGS maintenance yards for recycling (dehydrating) oil from breakers. However the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Oily residues and fuel and any contaminated soil residues should be captured at source and refueling and maintenance should take place in dedicated areas away from surface water resources. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority. No significant impacts from oily residues such as transformer oil and lubricants are expected to arise in this subproject. However control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some subproject DGS maintenance yards for recycling (dehydrating) oil from breakers. However the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority. DISCOs are served by the Technical Services Group (TSG), TSG prepare a detailed routine maintenance schedule for each piece of hardware. TSG also supervise and monitors the implementation of this schedule by Grid System Operation (GSO) .Transformer oil has a long life (typically over 15 years, which depends upon the level of load the transformer serves).Oil spills are very rare and are preempted by routine maintenance.TSG and GSO have a written down procedure to deal with oil spills. TSG ensure that the maintenance schedule of each piece of hardware is adhered to. DISCOs have also established a safety unit, which among other tasks , investigates all accidents. Frequency of accidents, on average is about 1 per DISCO per year (based on

last 4 years record), about 60 % of these are non-fatal. Most accidents occur due to staff and supervision negligence. Detailed report of each accident is prepared.

6.4.3 Enhancement

102. Environmental enhancements are not a major consideration within the Yazman subproject site. However it is noted that it is common practice at many such sites to create some local hard and soft landscaping and successful planting of fruit trees and shrubs has been accomplished in many sites. This practice should be encouraged as far as practicable. Other opportunities for enhancements can be assessed prior to construction and proposed enhancements should be discussed with the local population to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations. Trees removed for construction purposes should be replaced as compensation in line with best practice at ratio of three replaced for one removed however additional trees should be planted as enhancements where there is space in the DGS and along the transmission line.

7. INSTITUTIONAL REQUIREMENTS & ENVIRONMENTAL MANAGEMENT PLAN

103. In this section, the mitigation measures that are required for the Yazman SP Tranche-3 subproject, to reduce residual impact to acceptable levels and achieve the expected outcomes of the project, are discussed. The Environmental Management Plan is based on the type, extent and duration of the identified environmental impacts for the Yazman SP Tranche-3 subproject. The EMP has been prepared following best practice and by reference to the ADB Policy Statement 2009.

104. It is important that the recommendations and mitigation measures are carried out according to the spirit of the environmental assessment process and in line with the guidelines. The EMP matrix is presented as Appendix II. The impact prediction has played a vital role in reconfirming typical mitigation measures and in identifying any different approaches based on the feasibility and detailed design assumptions and any alternatives available at this stage.

105. Prior to implementation and construction of the subprojects the EMP shall be amended and reviewed by the MEPCO in due course after detailed designs are complete. Such a review shall be based on reconfirmation and additional information on the assumptions made at this feasibility stage on positioning, alignment, location scale and expected operating conditions of the subprojects. For example, in this case if there are any additional transmission lines or extension of the substation boundaries to be included, the designs may be amended and then the performance and evaluation schedules to be implemented during project construction and operation can be updated and costs estimates can be revised. The IEE and EMP should than be revised on a subproject by subproject basis.

106. The IEE and EMP plan must be reviewed by the project management and approved by the PEPA before any construction activity is initiated. This is also an ADB requirement in order to take account of any sub-sequent changes and fine tuning of the proposals. It is recommended that, before the works contract is worked out in detail and before pre-qualification of contractors, a full extent of the environmental requirements of the project (IEE/EIA and EMP) are included in the bidding documents. Professional experience indicates that past environmental performance of contractors and their awareness of environmentally responsible procurement should also be used as indicator criteria for the prequalification of contractors.

107. The effective implementation of the EMP will be audited as part of the ADB midterm review of loan conditions and the executing agency must prepare for this at the

inception stage.

108. The details of EMP are for the proposed Tranche-3 sub-projects. The EMP matrix will be different for the more complicated sub-station and line projects that involve impacts to land outside the existing sub-stations and for which separate dedicated IEEs and EMPs have been prepared.

109. The impacts have been classified into those relevant to the design/preparation stage, construction stage and operation and maintenance stage. The matrix provides details of the mitigation measures recommended for each of the identified impacts, time span of the implementation of mitigation measures, an analysis of the associated costs and the responsibility of the institution. The institutional responsibility has been specified for the purpose of the implementation and the supervision. The matrix is supplemented with a monitoring plan for the performance indicators. An estimation of the associated costs for the monitoring is given with the plan. The EMP has been prepared following best practice and the ADB Safeguard Policy Statement 2009.

110. MEPCO has engaged an environmental specialist. It is expected that MEPCO will be prepared to engage more support where necessary especially if full scale EIAs are required for some line and substation subprojects, to guide the subsequent formal assessment and submission process under the PEP Act and monitor compliance with the EMP.

111. The appointed environmental staff members will need a good level of awareness and will be responsible for addressing environmental concerns for sub-projects potentially involving hundreds kilometers of distribution lines and DGS. Whereas some of their work may in future be delegated to consultants they will need more training and resources if they are effectively provide quality control and oversight for the EMP implementation. They will require robust support from senior management staff members and the management consultant if they are to address all environmental concerns for the sub-projects effectively. Specific areas for immediate attention are to appoint environmental specialist(s) have them experienced or trained in EMP auditing, environmentally responsible procurement, air, water and noise pollution management and ecological impact mitigation.

112. In order to achieve good compliance with environmental assessment principles the environmental staff for the project implementation team must be actively involved, prior to the outset of the implementation design stage, to ensure compliance with the statutory obligations under the PEP Act. It is also recommended that MEPCO Board allow direct reporting to Board level from the in-house Environmental and Social Cells (ESC). If the ESC requires resources for larger sub-projects then environmental specialist consultants could be appointed through the relevant project implementation

unit to address all environmental aspects in the detailed design. It is recommended that the project management unit (PMU) should liaise directly with the ESC to address all environmental aspects in the detailed design and contracting stages. The environmental staff specialist will:

- Work in the PMU with MEPCO to ensure all statutory environmental submissions under PEP Act and other environmentally related legislation are thoroughly implemented;
- Work in the PMU with MEPCO to ensure all environmental requirements and mitigation measures from the environmental assessment of sub-projects are included in the contract prequalification and bidding documents;
- Work with MEPCO to execute any additional IEE and EIA requirements needed due to fine tuning of the sub-projects and that environmental performance targets are included in the contracts prior to project commencement;
- Work in the PMU with MEPCO to ensure all environmental requirements and mitigation measures from the IEEs and EIAs and environmental performance criteria are incorporated in the sub-project contracts or variations and that the EMP is effectively implemented;
- Work with management (consultants), supervising consultant and contractors to manage and monitor the implementation of the project EMP.
- Work with management to ensure that the Environmental Assessment Review Framework (EARF) is fully applied, adequately resourced and implemented for future Tranches of the PDEMFF.

113. Overall implementation of the EMP will become MEPCO's responsibility. Other parties to be involved in implementing the EMP are as follows:

114. Contractors: responsible for carrying out the contractual obligations and implementing all EMP measures required to mitigate environmental impacts during construction.

115. Other government agencies: such as provincial EPA, Department of Forests, Department of Wildlife Services who will be responsible for monitoring the implementation of environmental conditions and compliance with statutory requirements in their respective areas and local land use groups at the local level.

116. Considering that other government agencies that need to be involved in implementing the EMP, training or harmonization workshops should be conducted for all ESCs in all DISCOS every six months or twice each year, for the first 2 years (and

annually thereafter) to share the monitoring report on the implementation of the EMP in each DISCO and to share lessons learned in the implementation and to achieve a consistent approach decide on remedial actions, if unexpected environmental impacts occur.

117. The monitoring plan is designed and based on the project cycle. During the design stage, the monitoring activities will focus on (i) checking the contractor's bidding documents, particularly to ensure that all necessary environmental requirements have been included; and (ii) checking that the contract documents' references to environmental mitigation measures requirements have been incorporated as part of contractor's assignment and making sure that any advance works are carried out in good time. Where detailed design is required (e.g. for power distribution lines and avoidance of other resources) the inclusion and checking of designs must be carried out. During the construction period, the monitoring activities will focus on ensuring that environmental mitigation measures are implemented, and some performance indicators will be monitored to record the Sub-projects environmental performance and to guide any remedial action to address unexpected impacts. Monitoring activities during project operation will focus on recording environmental performance and proposing remedial actions to address unexpected impacts. The potential to use local community groups contacts for monitoring should be explored as part of the activities in setting up the Environmental and Social Unit which should have regular meetings with the NGOs as a matter of good practice and to discuss matters of mutual concern.

118. At this stage, due to the modest scale of the new power distribution projects and by generally keeping to non-sensitive and non-critical areas the construction and operational impacts will be manageable. No insurmountable impacts are predicted providing that the EMP is implemented to its full extent and required in the contract documents. However experience suggests that some contractors may not be familiar with this approach or may be reluctant to carry out some measures. In order that the contractors are fully aware of the implications of the EMP and to ensure compliance, it is recommended that environmental measures be costed separately in the tender documentation and that payment milestones are linked to environmental performance, vis a vis the carrying out of the EMP.

119. The effective implementation of the EMP will be audited as part of the loan conditions and the executing agency must be prepared for this. In this regard the MEPCO (the IA) must be prepared to guide the design engineers and contractors on the environmental aspects.

8. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

8.1 Approach to Public Consultation

120. The public consultation (PC) process with various stakeholders has been approached so as to involve public and other stakeholders from the earliest stages. Public consultation has taken place during the planning and design and viewpoints of the stakeholders have been taken into account and their concerns and suggestions for possible improvements have been included where appropriate. Much of the PC process to date has revolved around concerns for the mitigation of construction impacts and the possible side effects from the proximity of high voltage power lines and the DGS and its equipment.

121. There is also a requirement for ongoing consultation for land acquisition and resettlement (LARP) and the completion of the Resettlement Plan (RP) is documented separately. It is expected that this process will continue through all stages of the subproject in order to accommodate stakeholders' aspirations and to orient the stakeholders positively towards the project implementation and where possible to harness cooperation over access issues in order to facilitate timely completion.

8.2 Public Consultation Process

122. The public consultation process has commenced in the initial feasibility stages (prior to construction) in order to disclose the project information to the stakeholders and record feedback regarding the proposed project and preferences. The stakeholders involved in the process were the population likely to be impacted along the route of the proposed power lines; the village leaders and school teachers.

123. Prior to the implementation of the consultation, feedback, etc. has been carried out to support this IEE and recorded. The focus of attention has been the population near the proposed transmission line that may be affected by the Subproject. The level of engagement varied from the stakeholder to stakeholder with some registering no major comment but it is noted that none registered any outright opposition to subproject.

124. The disclosure of the enhancement project in advance and subsequent consultation with stake holders has advantages in the environmental assessment and mitigation of impacts. Public consultation can also provide a conduit for the improvement of the project implementation to better serve the stakeholders.

125. The environmental assessment process under the Pakistan Environmental Protection Act only requires the disclosure to the public after the statutory IEE / EIA has

been accepted by the relevant EPA to be in strict adherence to the rules. In this IEE the consultation process was performed to satisfy the ADB requirements.

8.3 Disclosure

MEPCO will disclose this IEE and EMP to all the stakeholders before the commencement of the subproject. The IEE report will be made available to the stakeholders at the site, in accordance with the legislations. In addition, the executive summary of the IEE will be translated into Urdu language, and made available to the affected communities (and also kept at the project sites). This will ensure that the local communities are aware of the project, its key impacts, the mitigation measures and the implementation mechanism. In addition, IEE will also be disclosed through the MEPCO's official website.

8.4 Results of Public Consultation

126. The consultations identified some potential environmental and social impacts and perceptions of the affected communities. MEPCO will make sure that the crop compensation amounts are assessed justly and paid to the affected, at least fifteen days prior to temporary use of land before starting the civil works. The community generally supports the conversion of existing Yazman DGS along with 16Km associated 132kV double circuit transmission line. The local poor people predominantly requested for unskilled and semi-skilled jobs on priority basis with the contractors during implementation of the project. New Land is not acquired and no resettlement is involved in this conversion subproject. However, compensation will be paid to the concerned parties / owners of land under the towers and where the loss of some trees and for damage to crops is expected.

127. On the basis of the consultations so far, it appears that the project will have no insurmountable environmental and social impacts but MEPCO will have to make sure that compensation and assistance amounts are assessed justly and that skilled and unskilled employment should be preferentially given to the AP as far as is reasonably practicable.

8.5 Grievance Redress Mechanism

128. In order to receive and facilitate the resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance an

Environmental Grievance Redress Mechanism (GRM) will be established the project. The mechanism will be used for addressing any complaints that arise during the implementation of projects. In addition, the GRM will include a proactive component whereby at the commencement of construction of each project (prior to mobilization) the community will be formally advised of project implementation details by Environment Specialist of DISCO, Environment Specialist of SMEC, the design and supervision consultant (DSC) and Environmental Specialist of the contractor (designs, scheduled activities, access constraints etc) so that all necessary project information is communicated effectively to the community and their immediate concerns can be addressed. This proactive approach with communities will be pursued throughout the implementation of each project.

129. The GRM will address affected people's concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism will not impede access to the Country's judicial or administrative remedies.

8.6 Redress Committee, Focal Points, Complaints Reporting, Recording and Monitoring

130. The Grievance Redress Mechanism, which will be established at each project level is described below:

131. EA will facilitate the establishment of a Grievance Redress Committee (GRC) and Grievance Focal Points (GFPs) at project location prior to the Contractor's mobilization to site. The functions of the GRC and GFPs are to address concerns and grievances of the local communities and affected parties as necessary.

132. The GRC will comprise representatives from local authorities, affected parties, and other well-reputed persons as mutually agreed with the local authorities and affected persons. It will also comprise the Contractor's Environmental Specialist, SMEC's Environmental Specialist and PIU Safeguards/Environmental specialist. The role of the GRC is to address the Project related grievances of the affected parties that are unable to be resolved satisfactorily through the initial stages of the Grievance Redress Mechanism (GRM).

133. EA will assist affected communities/villages identify local representatives to act as Grievance Focal Points (GFP) for each community/village.

134. GFPs are designated personnel from within the community who will be responsible for i) acting as community representatives in formal meetings between the

project team (contractor, DSC, PIU) and the local community he/she represents and ii) communicating community members' grievances and concerns to the contractor during project implementation. The number of GFPs to be identified for each project will depend on the number and distribution of affected communities.

135. A pre-mobilization public consultation meeting will be convened by the IA Environment Specialist and attended by GFPs, contractor, DSC and other interested parties (e.g. District level representatives, NGOs). The objectives of the meeting will be as follows:

- Introduction of key personnel of each stakeholder including roles and responsibilities,
- Presentation of project information of immediate concern to the communities by the contractor (timing and location of specific construction activities, design issues, access constraints etc.) This will include a brief summary of the EMP – its purpose and implementation arrangements;
- Establishment and clarification of the GRM to be implemented during project implementation including routine (proactive) public relations activities proposed by the project team (contractor, DSC, PIU) to ensure communities are continually advised of project progress and associated constraints throughout project implementation;
- Identification of members of the Grievance Redress Committee (GRC)
- Elicit and address the immediate concerns of the community based on information provided above

136. Following the pre-mobilization public consultation meeting, environmental complaints associated with the construction activity will be routinely handled through the GRM as explained below and shown on Figure 8.1:

3.1 Individuals will lodge their environmental complaint/grievance with their respective community's nominated GFP.

3.2 The GFP will bring the individual's complaint to the attention of the Contractor.

3.3 The Contractor will record the complaint in the onsite Environmental Complaints Register (ECR) in the presence of the GFP.

3.4 The GFP will discuss the complaint with the Contractor and have it resolved;

3.5 If the Contractor does not resolve the complaint within one week, then the GFP will bring the complaint to the attention of the DSC's Environmental Specialist.

The DSC's Environment Specialist will then be responsible for coordinating with the Contractor in solving the issue.

3.6 If the Complaint is not resolved within 2 weeks the GFP will present the complaint to the Grievance Redress Committee (GRC).

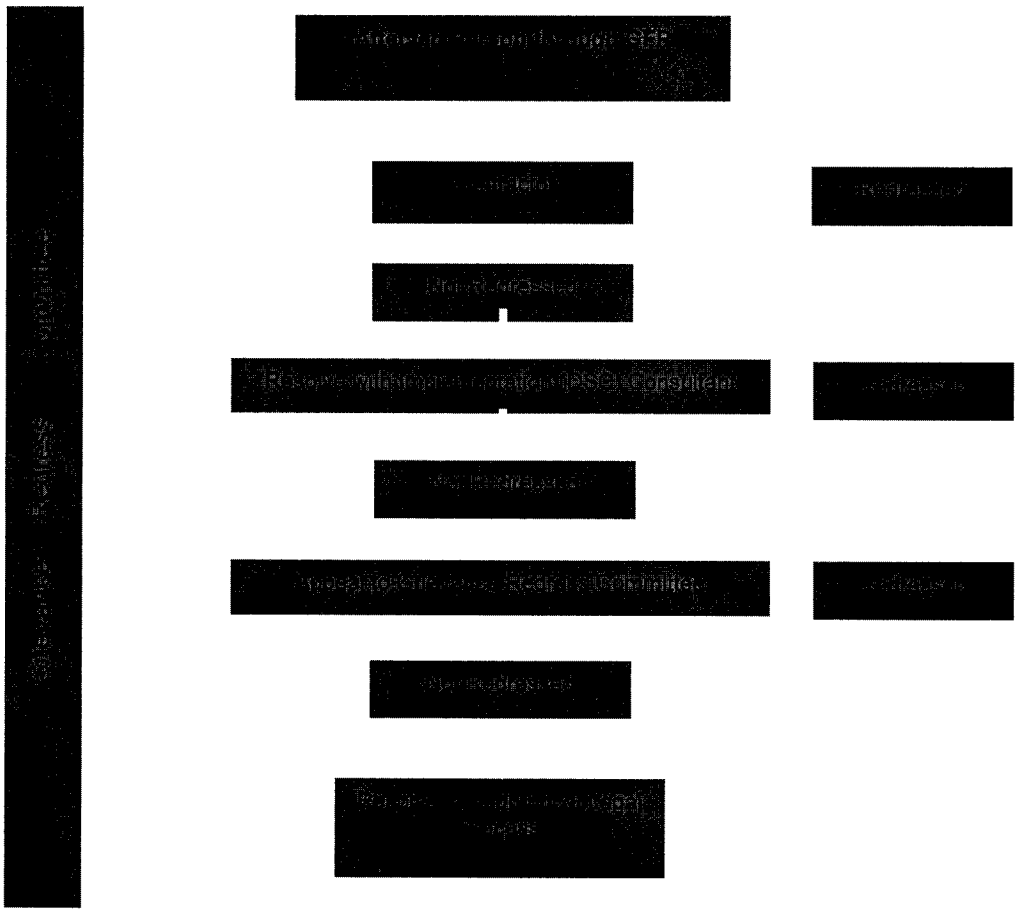
3.7 The GRC will have to resolve the complaint within a period of 2 weeks and the resolved complaint will have to be communicated back to the community. The Contractor will then record the complaint as resolved and closed in the Environmental Complaints Register.

3.8 Should the complaint not be resolved through the GRC, the issue will be adjudicated through local legal processes.

3.9 In parallel to the ECR placed with the Contractor, each GFP will maintain a record of the complaints received and will follow up on their rapid resolution.

3.10 EA will also keep track of the status of all complaints through the Monthly Environmental Monitoring Report submitted by the Contractor to the DSC and will ensure that they are resolved in a timely manner.

Figure 8.1: Grievance Redress Mechanism



9. CONCLUSIONS

9.1 Findings and Recommendations

137. This study was carried out at the planning stage of the project. Primary and secondary data were used to assess the environmental impacts. The potential environmental impacts were assessed in a comprehensive manner. The report has provided a picture of all potential environmental impacts associated with the Project, and recommended suitable mitigation measures.

138. There are some further considerations for the planning stages such as obtaining clearance for the project under the Punjab Environmental Protection Act (1997) but environmental impacts from the power enhancements will mostly take place during the construction stage. There are also some noise impacts and waste management issues for the operational stage that must be addressed in the detailed design and through environmentally responsible procurement. At the detailed design stage the number of and exact locations for transmission tower enhancements may change subject to detailed surveys but the impacts are likely to be broadly similar at most locations and impacts have been reviewed in the environmental impact section of this IEE report.

139. There are a number of key actions required in the detailed design phase. Prior to construction the MEPCO must receive clearance certification from the PEPA and MEPCO must complete an EMP that will be accepted by the PEPA and agreed by the contractor prior to signing the contract. The information provided in this report can form the basis of any further submission to PEPA as required in future.

140. New Land is not acquired and no resettlement is involved. However, damages to crops and trees will be compensated to the AP's and concerned parties, if needed. However, provisions may be made in LARP, based on the proposed alignments these should not be difficult tasks and can be conducted as the detailed designs are worked out and to dovetail with the existing system and minimize adverse impacts and maximize benefits. A social impact assessment and resettlement action plan (LARP) has been completed in tandem with this IEE for the whole subproject. The study has:

(i) Examined and assessed the overall social and poverty profile of the project area on the basis of the primary and secondary data sources and preparation of a socio-economic profile of the project districts.

(ii) Prepared a social and poverty analysis, taking into account socio-economic and poverty status of the project area of influence, including the nature, extent and

determinants of poverty in the project area including assessment. In addition, estimation of the likely socioeconomic and poverty reduction impacts of the project should be included.

(iii) Held consultations with relevant officials from the government and other relevant officials, including consultation with affected communities to assess responses to the project and ascertain the nature and scope of local participation in project planning and implementation.

(iv) Identified, analyzed and, where appropriate, quantified the potential resettlement impacts (minimal) of the proposed Project on the area and the population.

141. Baseline monitoring activities should be carried out during project detailed design stage to establish the baseline of parameters for checking during the construction stage. The monitoring schedule recommends monitoring on two occasions at the site location. The results should be integrated with the contract documentation to establish performance action thresholds, pollution limits and contingency plans for the contractor's performance.

142. During the commissioning phase noise monitoring should ensure that statutory requirements have been achieved. Monitoring activities during project operation will focus on periodic recording environmental performance and proposing remedial actions to address any unexpected impacts.

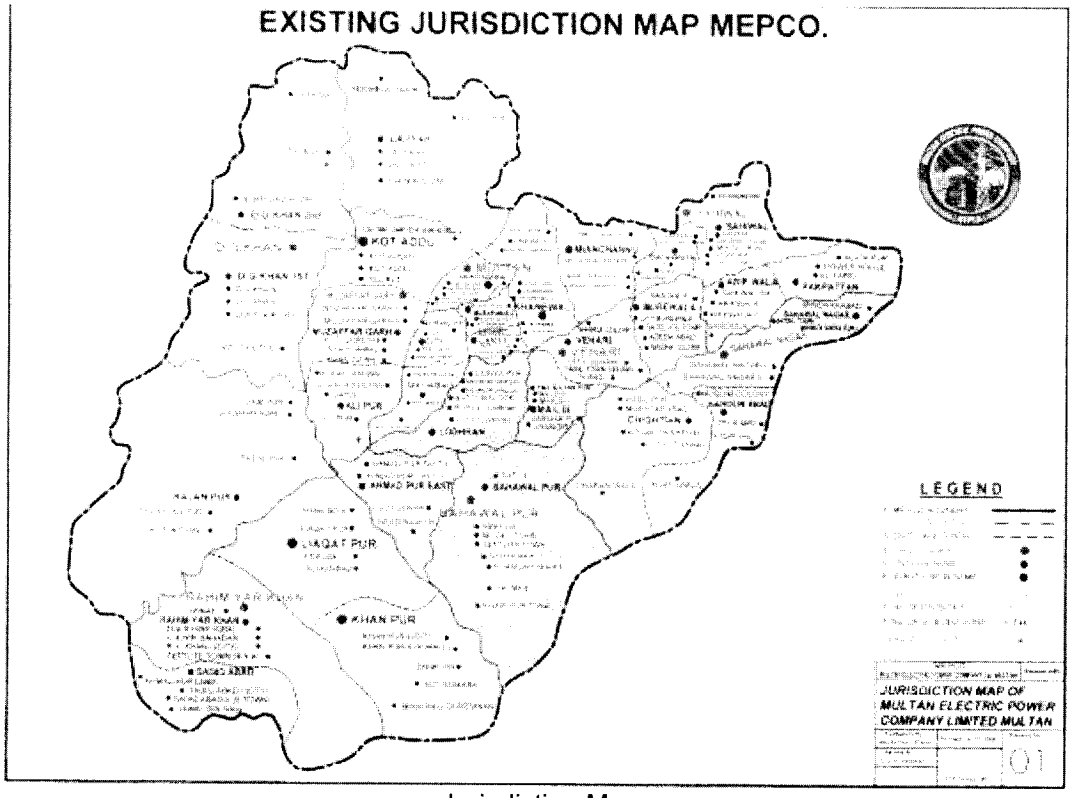
9.2 Summary and Conclusions

143. The conversion from 66KV to 132KV of Yazman DGS along with associated 16Km 132kV transmission line is a feasible and sustainable option from the power transmission, engineering, environmental, and socioeconomic points of view. Implementation of the EMP is required and the environmental impacts associated with the subproject need to be properly mitigated, and the existing institutional arrangements are available. Additional human and financial resources will be required by MEPCO to complete the designs and incorporate the recommendations effectively and efficiently in the contract documents, linked to payment milestones. The proposed mitigation and management plans are practicable but require additional resources.

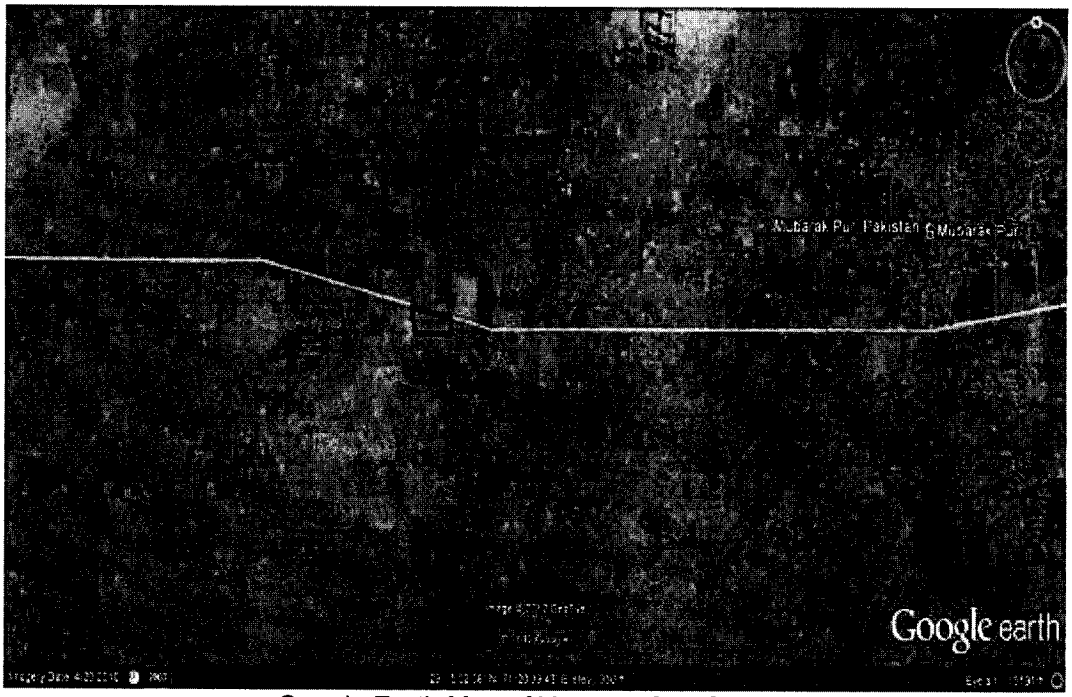
144. This IEE, including the EMP, should be used as a basis for an environmental compliance program and be included as an Appendix to the contract. The EMP shall be reviewed at the detailed design stage. In addition, any subsequent conditions issued by PEPA as part of the environmental clearance should also be included in the environmental compliance program. Therefore, continued monitoring of the

implementation of mitigation measures, the implementation of the environmental conditions for work and environmental clearance, and monitoring of the environmental impact related to the operation of the subproject should be properly carried out and reported at least twice per year as part of the project performance report.

APPENDIX – I: LOCATION MAPS OF PROPOSED SUB STATION



Jurisdiction Map



Google Earth Map of Yazman Sub Station

APPENDIX - II : ENVIRONMENTAL MANAGEMENT PLAN – MATRIX

Environmental concern	*Objectives*	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	*Resp Imp MM*	Resp mon MM
DESIGN STAGE						
1. Flora and Fauna	*To minimize damage to flora and fauna*	*1. Ensure that minimal flora is damaged* *2. Ensure that fauna especially bird nesting's are not damaged*	*Before the commencement of construction activities/during design stage*	*Flora and Fauna sensitive locations*	*CONSULTANT*	*ES MEPCO*
2. Hydrological Impacts	*To minimize hydrological and drainage impacts during constructions.*	*1. Hydrological flow in areas where it is sensitive, such as water courses or bridges and culverts.* *2. Design of adequate major and minor culverts facilities will be completed*	*Before the commencement of construction activities/during design stage*	*If lines or substation are relocated near water courses, culverts or bridges in the design stage reports*	*ES MEPCO with the CONSULTANT (Design Consultant)*	*ES MEPCO*
3. Noise barriers	Ensure cumulative noise impacts are acceptable in construction and operational phase.	1. Conduct detailed acoustic assessment for all residential, school, (other sensitive structures) within 50m of DGS and line. 2. If noise at sensitive receiver exceeds the permissible limit, the construction activities should be mitigated, monitored and controlled. 3. If noise at sensitive receiver exceeds the permissible limit, the design to include acoustic mitigation (noise barrier or relocation of noisy equipment) and monitoring.	1. During detailed design stage. No later than pre-qualification or tender negotiations. 2. Include acoustic specification in the contract.	Noise sensitive locations identified in the IEE/EIA/EMP or as required / approved by PEPA.	*ES MEPCO with the CONSULTANT (Design Consultant)*	ES MEPCO and CONSULTANT
4. Waste disposal	Ensure adequate disposal options for all waste including transformer oil, residually contaminated soils, scrap metal.	1. Create waste management policy and plan to identify sufficient locations for, storage and reuse of transformers and recycling of breaker oils and disposal of transformer oil, residually contaminated soils and scrap metal "cradle to grave". 2. Include in contracts for unit rates for re-measurement for disposal. 3. Designate disposal sites in the contract and cost unit disposal rates accordingly.	1.Prior to detailed design stage no later than pre-qualification or tender negotiations 2. Include in contract.	MEPCO ESU. Locations approved by EPA and MEPCO and local waste disposal authorities.	*ES MEPCO with the CONSULTANT (Design Consultant)*	*ES MEPCO with the CONSULTANT*
5. Temporary drainage and erosion control	Include mitigation in preliminary designs for erosion control and temporary drainage.	1. Identify locations where drainage or irrigation crossing RoW may be affected by works. 2. Include protection works in contract as a payment milestone(s).	During designing stage no later than pre-qualification or tender negotiations.	Locations based on drainage or irrigation crossing RoW near DGS.	*ES MEPCO with the CONSULTANT*	*ES MEPCO with the CONSULTANT*
6. Contract clauses	Ensure requirements and recommendations of environmental assessment are included in the contracts.	1. Include EMP Matrix in tender documentation and make contractors responsible to implement mitigation measures by reference to EIA/IEE in contract. 2. Include preparation of EMP review and method statement WM plan, TD and EC Plan in contract as a payment milestone(s). 3. Require *environmental accident checklist and a list of controlled chemicals / substances to be included in the contractor's work method statement and tender documentation.*	1. During tender preparation. 2. No later than pre-qualification or tender negotiations 3. In bidding documents as evaluation criteria.	Noise sensitive locations identified in the IEE/EIA/EMP or as required / approved by PEPA.	*ES MEPCO with the CONSULTANT*	*ES MEPCO with the CONSULTANT*
CONSTRUCTION STAGE						
1. Hydrology And Drainage Aspects	*To ensure the proper implementation of any requirements mentioned in EPA conditions of approval letter in relation*	*1. Consideration of weather conditions when particular construction activities are undertaken.* *2. Limitations on excavation depths in use of recharge areas for material exploitation or spoil disposal.* *3. Use of landscaping as an integrated component of construction activity*	*Prepare a thorough drainage management plan to be approved by CSC one month prior to a*	*1. Locations of each construction activity to be listed by the CSC engineer.* *2. Special locations are identified on the site by the*	*ES Contractor*	*CONSULTANT and ES MEPCO*

Environmental concern	*Objectives*	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	*Resp Imp MM*	Resp mon MM
	to Hydrology of the project.	*as an erosion control measure.* *4. Minimizing the removal of vegetative cover as much as possible and providing for it s restoration where construction sites have been cleared of such areas.*	*commencement of construction* *Proper timetable prepared in consideration with the climatic conditions of the area, the different construction activities mentioned here to be guided.*	*contractor to minimize disturbances.* *3. A list of locations of irrigation channels / drains to be compiled and included in the contract.*		
2. Orientation for Contractor, and Workers	*To ensure that the CSC contractor and workers understand and have the capacity to ensure the environmental requirements and implementation of mitigation measures.*	*1. MEPCO ESU environmental specialist to monitor and progress all environmental statutory and recommended obligations.* *2 Conduct special briefing for managers and / or on-site training for the contractors and workers on the environmental requirement of the project. Record attendance and achievement test for contractors site agents.* *3. Agreement on critical areas to be considered and necessary mitigation measures, among all parties who are involved in project activities.* *4. Continuous progress review and refresher sessions to be followed.*	*Induction course for all site agents and above including all relevant MEPCO staff / new project staff before commencement of work.* *At early stages of construction for all construction employees as far as reasonably practicable.*	*All staff members in all categories. Monthly induction and six month refresher course as necessary until contractor complies.*	*MEPCO ES, Contractor and CONSULTANT*	*ES MEPCO with the CONSULTANT .*
3. Water quality	*To prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. Ensure adverse impacts on water quality caused by construction activities are minimized.*	*Compile temporary drainage management plan one month before commencement of works.* *1. Proper installation of temporary drainage and erosion control before works within 50m of water bodies.* *2. Proper maintenance and management construction of TD and EC measures, including training of operators and other workers to avoid pollution of water bodies by the considerate operation of construction machinery and equipment.* *3. Storage of lubricants, fuels and other hydrocarbons in self-contained dedicated enclosures >50m away from water bodies.* *4. Proper disposal of solid waste from construction activities.* *5. Cover the construction material and spoil stockpiles with a suitable material to reduce material loss and sedimentation and avoid stockpiling near to water bodies.* *6. Topsoil stripped material shall not be stored where natural drainage will be disrupted.* *7. Borrow sites (if required) should not be close to sources of drinking water.*	*1 month prior to construction.*	*1. 50m from water bodies 2. Relevant locations to be determined in the detailed project design.*	*1.ES Contractor* *2. Contractor has to check water quality and report to MEPCO.*	*CONSULTANT and ES MEPCO review results*
4. Air quality	*To minimize dust effectively and avoid complaints due to the airborne particulate*	*CONTROL ALL DUSTY MATERIALS AT SOURCE.* *1. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations.(Relevant regulations are in the Motor vehicles fitness rules and Road Act).*	*During all construction.*	*1.Construction sites within 100m of sensitive receivers.* *2. A list of locations to be included in contract and other*	*Contractor should maintain acceptable*	*MEPCO ES / CONSULTANT*

Environmental concern	*Objectives*	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	*Resp Imp MM*	Resp mon MM
	matter released to the atmosphere.	*2. Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions.* *3. Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions.* *4. Vehicles transporting soil, sand and other construction materials shall be covered. Limitations to speeds of such vehicles necessary. Transport through densely populated area should be avoided.* *5. To plan to minimize the dust within the vicinity of orchards and fruit farms.* *6. Spraying of bare areas with water.* *7. Concrete plants. to be controlled in line with statutory requirements should not be close to sensitive receptors.*		*sensitive areas identified by the CSC along the ROW during works.*	*standard.* *CONSULTANT to supervise activities.*	
5. Ground Vibration	*To minimize ground vibrations during construction.*	*1. Review requirements for piling and use of powered mechanical equipment within 100m of SRs.* *2. Review conditions of buildings and conduct public consultation with SRs to establish less sensitive time for works involving piling and schedule works accordingly.* *3. Non-percussive piling methods to be used wherever practicable.* *4. Percussive piling shall be conducted in daylight hours.* *5. Hammer- type percussive pile driving operations shall not be allowed at night time.*	*1 month prior to construction.*	*1.Construction sites within 100m of sensitive receivers.* *2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works.*	*Contractor should maintain the acceptable standards* *CONSULTANT to supervise relevant activities.*	*MEPCO ES / SMEC ES*
6. Noise	*To minimize noise increases during construction.*	*1. Review requirements for use of powered mechanical equipment within 100m of SRs.* *2. Conduct public consultation with SRs to establish less sensitive time for works and schedule works accordingly.* *3. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations and with effective silencing apparatus to minimize noise.* *4. Heavy equipment shall be operated only in daylight hours.* *5. Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise.* *7. Well-maintained haulage trucks will be used with speed controls.* *8. Contractor shall take adequate measures to minimize noise nuisance in the vicinity of construction sites by way of adopting available acoustic methods.*	*1 month prior to construction.*	*1.Construction sites within 100m of sensitive receivers.* *2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works.*	*Contractor should maintain the acceptable standards* *CONSULTANT to supervise relevant activities.*	*MEPCO ES / SMEC*
7. Soil Erosion / Surface Run-off	*Prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively.* *To minimize soil erosion due to the construction activities of towers, stringing of conductors and creation of access tracks for project*	*SCHEDULE WORKS IN SENSITIVE AREAS (e.g. NEAR RIVERS) FOR DRY SEASON* *1. In the short-term, temporary drainage and erosion control plan to be presented with tender. Temporary drainage and erosion control plan one month before commencement of works to protect all areas susceptible to erosion. (Permanent drainage works shall be in the final design).* *2. Installation of TD and EC before works construction within 50m of water bodies.* *3. Clearing of green surface cover to be minimized during site preparation.* *5. Meaningful water quality monitoring up and downstream at any tower site during construction within a river or stream bed. Rapid reporting and feedback to CSC.*	*1 month prior to construction because the area can be subject to unseasonal heavy rain Plan before and during construction (cut and fill, land reclamation etc.) while considering the climatic conditions.*	*1. Locations based on history of flooding problems indicated by local authorities.* *2. A list of sensitive areas during construction to be prepared by the detail design consultant in consideration with the cut and fill, land reclamation, borrow areas etc.*	*ES Contractor and CONSULTANT*	*MEPCO ES / SMEC ES*

Environmental concern	*Objectives*	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	*Resp Imp MM*	Resp mon MM
	vehicles.	*5. Back-fill should be compacted properly in accordance with MEPCO design standards and graded to original contours where possible.* *6. Cut areas should be treated against flow acceleration while filled areas should be carefully designed to avoid improper drainage.* *7. Stockpiles should not be formed within such distances behind excavated or natural slopes that would reduce the stability of the slopes or cause slippage.* *8. Measures shall be taken to prevent ponds of surface water and scouring of slopes. Newly eroded channels shall be backfilled and restored to natural contours.* *9. Contractor should arrange to monitor and adjust working and adopt suitable measures to minimize soil erosion during the construction period. Contractor's TD and EC plan should be endorsed and monitored but CSC after consulting with concerned. authorities.* *10. Replanting trees to be done before the site is vacated and handed back to MEPCO with appropriate trees (other vegetation cover as appropriate) to ensure interception of rainwater and the deceleration of surface run-off.*		*3. Locations of all rivers, streams, culverts, irrigation channels, roads and roads.*		
8. Exploitation, Handling, Transportation and Storage of Construction materials	*To minimize disruption and contamination of the surroundings, minimize and or avoid adverse environ-mental impacts arising out of construction material exploitation, handling, transportation and storage by using sources that comply with EPA license conditions*	*(consider also for future trances if civil works)* *1. Use only EPA licensed sites for raw materials in order to minimize adverse environmental impacts.* *2. Measures to be taken in line with any EPA license conditions, recommendations and approval to be applied to the subproject activities using the licensed source including:* (i) *Conditions that apply for selecting sites for material exploitation.* (ii) *Conditions that apply to timing and use of roads for material transport.* (iii) *Conditions that apply for maintenance of vehicles used in material transport or construction.* (iv) *Conditions that apply for selection of sites for material storage.* (v) *Conditions that apply for aggregate production.* (vi) *Conditions that apply for handling hazardous or dangerous materials such as oil, lubricants and toxic chemicals.*	*month prior to starting of works. Update monthly.*	*1. List of borrow areas to be prepared with tender stage contractors method statement and updated one month prior to construction.* *2.List of routes of transport of construction material is to be prepared for the contract and agreed one month prior to construction.* *3. Map of locations of storage is prepared by the contractor.*	*ES Contractor and SMEC to agree format of reporting*	*MEPCO ES / SMEC ES*
9.Decommision and Waste Management	*Minimize the impacts from the disposal of construction waste.*	*1. Waste management plan to be submitted to the CSC and approved by MEPCO ESU one month prior to starting of works. WMP shall estimate the amounts and types of construction and decommissioning waste to be generated by the project.* *2. Investigate ways and means of reusing/recycling decommissioned material from the project within PEPCO without any residual environmental impact.* *3 Identifying potential safe disposal sites close to the project, or those designated sites in the contract.* *4 Investigating the environmental conditions of the disposal sites and recommendation of most suitable and safest sites.* *5. Piling up of loose material should be done in segregated areas to arrest washing out of soil. Debris shall not be left where it may be carried by water to downstream flood plains, dams, lagoons or other water bodies.* *6. Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations.* *7. Oily wastes must not be burned. Disposal location to be agreed with local authorities/EPA.*	*One month prior to starting of works. Update monthly* *One month prior to starting of works. Update monthly*	*1.Dumping:* *A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement* *A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement (in W M Plan)*	*1.Contractor* *2. SMEC ES and MEPCO ESU should supervise and take action to ensure that contractor's complete relevant activities according to EIA / IEE / EMP requirement & NEQS.*	*MEPCO/ CONSULT ANT*

Environmental concern	*Objectives*	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	*Resp Imp MM*	Resp mon MM
		8. Waste breaker insulating oil to be recycled, reconditioned, or reused at DISCO's facility. *9. Machinery should be properly maintained to minimize oil spill during the construction.* *10. Machinery should be maintained in a dedicated area over drip trays to avoid soil contamination from residual oil spill during maintenance.* *11 Solid waste should be disposed at an approved solid waste facility and not by open burning which is illegal and contrary to good environmental practice.*				
10. Work Camp Operation and Location (if required)	*To ensure that the operation of work camps does not adversely affect the surrounding environment and residents in the area.*	*1. Identify location of work camps in consultation with local authorities. The location shall be subject to approval by the MEPCO. If possible, camps shall not be located near settlements or near drinking water supply intakes.* *2. Cutting of trees shall not b permitted and removal of vegetation shall be minimized.* *3. Water and sanitary facilities (at least pit latrines) shall be provided for employees. Worker camp and latrine sites to be backfilled and marked upon vacation of the sites.* *4. Solid waste and sewage shall be managed according to the national and local regulations. As a rule, solid waste must not be dumped, buried or burned at or near the project site, but shall be disposed of to the nearest sanitary landfill or site having complied with the necessary permits of local authority permission.* *5. The Contractor shall organize and maintain a waste separation, collection and transport system.* *6. The Contractor shall document that all liquid and solid hazardous and non-hazardous waste are separated, collected and disposed of according to the given requirements and regulations.* *7. At the conclusion of the project, all debris and waste shall be removed. All temporary structures, including office buildings, shelters and toilets shall be removed.* *8 Exposed areas shall be planted with suitable vegetation.* *9.MEPCO and Construction Supervising Consultant shall inspect and report that the camp has been vacated and restored to pre-project conditions.*	*UPDATE Once a month*	*Location Map is prepared by the Contractor.*	*Contractor*	*MEPCO ESU / CSC*
11. Loss of Trees and Vegetation Cover of the Areas for Towers and Temporary Work-space	*To avoid negative impacts due to removing of landmark, sentinel and specimen trees as well as green vegetation and surface cover.*	*1. Tree location and condition survey to be completed one month before tender.* *2. The route for the distribution line should be selected so as to prevent the loss or damage to any orchard trees or other trees. Use of higher towers to be preferred to avoid trees cutting.* *3. Clearing of green surface vegetation cover for construction, borrow of soil for development, cutting trees and other important vegetation during construction should be minimized by careful alignment. Written technical Justification for tree felling included in tree survey.* *4. At completion all debris and waste shall be removed and not burned.* *5. The contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes outside immediate work areas. Trees shall not be cut for fuel or works timber.* *6. Land holders will be paid compensation for their standing trees in accordance with prevailing market rates (LARP). The land holders will be allowed to salvage the wood of the affected trees.*	*Route design and site identification (1 & 2) during design stage and other matters during construction of relevant activities*	Tree survey to be completed one month before tender at relevant *Locations with a Map to be compiled prior to tender by the design consultant / MEPCO ESU during detailed design and CSC to update as necessary.*	*SMEC ES and ES Contractor*	*MEPCO ES / SMEC ES*

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp Imp MM	Resp mon MM
		7. The contractor will plant three (3) suitable new trees outside the 30 meter corridor of the transmission line in lieu of one (1) tree removed. 8. Landscaping and road verges to be re-installed on completion. 9. Compensatory planting of trees/shrubs/ornamental plants (at a rate of 3:1) in line with best international practice. 10. After work completion all temporary structures, including office buildings, shelters and toilets shall be removed.				
12. Safety Precautions for the Workers	To ensure safety of workers	1. Providing induction safety training for all staff adequate warning signs in health and safety matters, and require the workers to use the provided safety equipment. 2. Providing workers with skull guard or hard hat and hard toe shoes.	Prior to commencement and during construction	Location to be identified by the CSC with contractor.	ES Contractor	ES MEPCO/ CONSULT ANT
13. Traffic Condition	Minimize disturbance of vehicular traffic and pedestrians during haulage of construction materials and equipment.	1. Submit temporary haul and access routes plan one month prior to start of works. 2. Routes in vicinity of schools and hospitals to be avoided.	Prior to and throughout the construction.	The most important locations to be identified and listed. Relevant plans of the Contractor on traffic arrangements to be made available.	ES Contractor	MEPCO ESU / CSC
14.Social Impacts	To ensure minimum impacts from construction labour force. on public health.	1. Potential for spread of vector borne and communicable diseases from labour camps shall be avoided (worker awareness orientation and appropriate sanitation should be maintained). 2. Complaints of the people on construction nuisance / damage close to ROW to be considered and responded to promptly. 3. Contractor should make alternative arrangements to avoid local community impacts.	Complaints of public to be solved as soon as possible	All subprojects all tranches	ES Contractor ES MEPCO	ES MEPCO
15. Institutional Strengthening and Capacity Building	To ensure that MEPCO officials are trained to understand and to appreciate EMP	Capacity building activities were taken by Environmental Officer in Tranche 1. Environmental Management Unit (EMU) was setup with in MEPCO under Director Operations in Tranche 1. Development of strengthening plan for the EMU should be taken up with resources.	Initiate preconstruction and continue beyond project completion.	Awareness training for all management and senior staff in MEPCO at senior engineer and above in PMU and related units.	MEPCO ESU	MEPCO & ADB
OPERATIONAL STAGE						
1. Air Quality	Minimize air quality impacts	No significant Impacts Tranche 1.Monitor designs and plans for all future tranches.	Operational phase	all subprojects in future tranches	ES MEPCO	MEPCO ESU
2.Noise	Minimize noise impacts	No significant Impacts Tranche 1. Acoustic designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES MEPCO	MEPCO ESU
3. Waste disposal	Minimize improper waste disposal	Continue waste management arrangements in operational phase of all subprojects and MEPCO activities.	Operational phase	all subprojects in future tranches	ES MEPCO	MEPCO ESU
3. Compensatory tree planting	Maintain survival of trees planted	Employ landscaping contractor to monitor, water and feed replacement saplings and replace dead specimens as necessary.	Operational phase	all subprojects in future tranches	ES MEPCO	MEPCO ESU
4.Land slides and soil erosion	Avoid landslips and loss of productive land	No significant Impacts in Tranche 1. Review designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES MEPCO	MEPCO ESU
5. Water quality	Minimize water quality impacts	No significant Impacts in Tranche 1. Review designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES MEPCO	MEPCO ESU
6 Crops and vegetation	Monitor impacts from maintaining tree clearance under transmission lines	Track growth of large trees under the conductors.	Operational phase	all subprojects in future tranches	ES MEPCO	MEPCO ESU

Environmental concern	*Objectives*	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	*Resp Imp MM*	Resp mon MM
7. Social safety Impacts	*Ensure no encroachments / construction under the transmission line. No violation of clearance spaces.*	*Necessary signboards with limits of height clearances to be placed all along the line.* *Identify and prevent any illegal encroachments under the TLs..*	*Operational phase*	*all subprojects in future tranches*	*ES MEPCO*	*MEPCO ESU*

LARP = Land acquisition and resettlement plan. AP = Affected Persons. LAC = Local Authority Council. TD = Temporary drainage. EC = Erosion control. WM = waste management. CSC = Construction supervision consultant or equivalent. TL = Transmission line. GSS = Grid substation NEQS = National Environmental Quality Standards.

APPENDIX – III: MONITORING PLAN FOR PERFORMANCE INDICATORS

Environmental concern	Performance indicator (PI)	Frequency to monitor	Timing to check PI	Locations to implement PI	Responsible to implement PI	Cost of Implementation	Resp PI supervision	Cost of Supervision
DESIGN and PRE-CONSTRUCTION STAGE								
1. Review of EMAP	Environmental Management Action Plan (EMAP) is reviewed	During detailed design (later monthly by Contractor to cover any unidentified impacts)	By completion of detailed design.	All project alignment	Contractor	Initially DISCO'S Cell / later Contractor cost	DISCO'S, ESIC cell / ADB*	ESIC cell staff cost
2. Social Impacts and Resettlement	Inventory of losses, Property acquisition, compensation and resettlement completed to RP requirements.	*Completed prior to commencement of construction*	Before removal of houses and structures.	APs according to RP & LAFC.	DISCO'S Cell	DISCO'S Cell staff cost	DISCO'S /ADB*	ESIC cell staff cost
3. Project disclosure	Design changes notified	During detailed design by Contractor to cover any access roads and alignment changes, additional Villages.	Completion of detailed design.	All project alignment.	Contractor	Contractor cost	DISCO'S & ESIC cell / ADB*	ESIC cell staff cost
4. Environmentally Responsible Procurement. (ERP)	Contract follows ADB Guidelines on ERP. Performance bond. Deposited Contractual clauses include implementation of environmental mitigation measures tied to a *performance bond.*	Once, before Contract is signed.	Before Contract is signed.	Method Statements include resources for mitigation measures.	DISCO'S Project Cell.	Contractor cost	DISCO'S ESIC cell / ADB*.	DISCO'S Cell staff cost
5. Waste disposal	Disposal options for all waste transformer oil, residually contaminated soils, scrap metal agreed with DISCO'S and local authority..	Monthly or as required in waste management plan to identify sufficient locations for, storage and reuse of transformers and recycling of breaker oils and disposal of	1.Prior to detailed design stage no later than pre-qualification or tender negotiations 2. Include in contract.	Locations approved by local waste disposal authorities.	DISCO'S cell with the design consultant.	ESIC cell	ESIC cell	DISCO'S

Environmental concern	Performance indicator (PI)	Frequency to monitor	Timing to check PI	Locations to implement PI	Responsible to implement PI	Cost of Implementation	Resp PI supervision	Cost of Supervision
		transformer oil, residually contaminated soils and scrap metal "cradle to grave". 2. Include in contracts for unit rates for re-measurement for disposal. 3. After agreement with local authority, designate disposal sites in the contract and cost unit disposal rates accordingly.						
6. Noise and air quality mitigation in design.	Design changes included in EIA (supplementary) & EMAP approved by MOEST.	During detailed design by Contractor.	Completion of detailed design.	As defined in EIA (supplementary) & EMAP.	DISCO'S Cell / Contractor	Contractor cost	DISCO'S / /ADB*	DISCO'S Cell staff cost
7. Hydrological Impacts	Temporary Drainage Management plan.	During detailed design by Contractor and monthly to cover any unidentified impacts	One month before commencement of construction	Considered locations to be as identified in the Detailed Drainage Report.	Contractor	Contractor cost	DISCO'S / and DISCO'S Project Cell.	DISCO'S Cell staff cost
9. Temporary drainage and erosion control	Erosion Control and Temporary Drainage completed.	During detailed design updated by Contractor monthly to cover any unidentified impacts.	One month before construction commences.	All stream and river crossings and where slopes indicate erosion will be a problem.	Contractor.	Contractor cost	DISCO'S / and DISCO'S Project Cell.	DISCO'S Cell staff cost
10. Planning construction camps	Use of land agreed with surrounding residents & Villages.	During detailed design updated by Contractor monthly to cover any unidentified impacts.	One month before construction commences.	Locations agreed DISCO'S cell in consultation with community and the Contractor.	Contractor DISCO'S Cell facilitates.	Contractor cost	DISCO'S / and DISCO'S Project Cell.	DISCO'S Cell staff cost
13.Traffic Condition	Temporary Pedestrian and Traffic Management Plan agreed.	During detailed design updated by Contractor monthly to cover any unidentified	One month before construction commences.	Locations agreed with DISCO'S cell in consultation	Contractor	Contractor cost	DISCO'S / and DISCO'S Project Cell.	DISCO'S Cell staff cost

Environmental concern	Performance indicator (PI)	Frequency to monitor	Timing to check PI	Locations to implement PI	Responsible to implement PI	Cost of Implementation	Resp PI supervision	Cost of Supervision
		impacts.		with community and the Contractor.				
15. Institutional strengthening and capacity building	1. Strengthening plan agreed for DISCO'S cell. 2. International environment specialist (IES) 3. Increase staffing of DISCO'S Cell. 4. Train DISCO'S Cell officials.	1. Once, 2. Once 3. Ongoing 4. Ongoing	1. As soon as practicable 2, 3, 4. No later than one month before Contract award.	Throughout the project	DISCO'S Project Cell.	DISCO'S Cell staff cost	DISCO'S / and /ADB*.	/ADB cost of IES & support for 1 month ***US$25,000***
CONSTRUCTION STAGE								
1.Orientation for Contractor, and Workers	1. Contractor agreed to provide training to professional staff and workers. 2. Special briefing and training for Contractor completed. 3. Periodic progress review sessions.	1. Once 2. Ongoing 3. Ongoing	1. Before contract is signed 2. Before construction areas are opened up 3. Every six months	All BOT staff members in all categories. monthly induction and six month refresher course	Contractor with IES assistance and record details.	Contractor cost	DISCO'S and DISCO'S to observe and record success	DISCO'S Cell staff cost
2. Plans to control environmental impacts	1. Drainage Management plan 2. Temp. Pedestrian & Traffic Management plan, 3. Erosion Control & Temp. Drainage plan 4. Materials Management plan, 5. Waste Management plan; 6. Noise and Dust Control plan, 7. Safety Plan 8. Agreed schedule of costs for environmental mitigation.{*N.B. Forest Clearance and Compensatory Planting plan is prepared by*	Deliverable in final form to DISCO'S cell one month before construction commences for any given stretch.	One month before construction commences.	All of DISCO'S alignment.	Contractor	Contractor cost	DISCO'S Project Cell.	DISCO'S Cell staff cost

Environmental concern	Performance indicator (PI)	Frequency to monitor	Timing to check PI	Locations to implement PI	Responsible to implement PI	Cost of Implementation	Resp PI supervision	Cost of Supervision
	DISCO'S cell}							
5. Water quality	Meaningful water quality monitoring up and downstream during construction within 100m of rivers. Rapid reporting and feedback by DISCO'S.	Once (line item when opening up construction near water bodies).	During detailed design by Contractor and update to cover any unidentified impacts.	Locations to be provided with the detailed designs including all bridges during construction within 100m of rivers	Independent experienced laboratory.	Contractor cost	DISCO'S / DISCO'S Cell.	DISCO'S Cell staff cost
6. Water Resources	1. Availability of water acceptable to community. No complaints. 2. Guidelines established to minimize the water wastage during construction operations and at worker camps.	1. Monthly 2. Monthly	Prior to submission of progress reports.	All local water supply resources and rivers.	Contractor	Contractor cost	DISCO'S and DISCO'S Cell	DISCO'S Cell staff cost
8. Spoil disposal and construction waste disposal	1. Use of land agreed with surrounding residents & Villages. 2. Waste Management Plan implemented. 3 No open burning	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	DISCO'S and DISCO'S Cell	DISCO'S Cell staff cost
10. Noise	Noise mitigation measures implemented in line with guidelines for noise reduction from ISO/TR11688-1:1995(E)	Monthly (line item when opening up construction).	Maximum allowable noise levels are 45dB(A)L_{EQ}.	All DISCO'S alignment.	Contractor should maintain the accepted standards	Contractor cost	DISCO'S / DISCO'S Project Cell will monitor sample activities.	DISCO'S Cell staff cost
11. Air quality	Noise and dust control plan implemented.	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	DISCO'S and DISCO'S Cell	DISCO'S Cell staff cost
13..Soil Contamination	Contractors workforce to instructed and train handling of chemicals	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	DISCO'S and DISCO'S Cell	DISCO'S Cell staff cost
14. Work Camp Location and Operation	1. Use of land agreed with surrounding residents & Villages. 2. Waste Management	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	DISCO'S and DISCO'S Cell	DISCO'S Cell staff cost

Environmental concern	Performance indicator (PI)	Frequency to monitor	Timing to check PI	Locations to implement PI	Responsible to implement PI	Cost of Implementation	Resp PI supervision	Cost of Supervision
	Plan implemented. 3 No open burning							
19. Safety Precautions for Workers	Safety Plan submitted	Once (update monthly as necessary)	One month before construction and update quarterly.	All DISCO'S alignment.	Contractor.	Contractor cost	*DISCO'S /* (ESIC cell to actively supervise and enforce.	DISCO'S Cell staff cost
20. Social Impacts	1. Local labour is used and workforce 2. Local educated people for office work. 3. Complaints on construction nuisance damages close to ROW are responded to promptly by the Contractor. 4. Quarterly meetings with local VILLAGE for liaison purposes to monitor complaints.	Monthly (line item when opening up construction).	During construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	DISCO'S and DISCO'S Cell	DISCO'S Cell staff cost
21. Enhancements	Contractor has included for some enhancements in detailed designs Including planting of trees in addition to bioengineering such as in median	Once (update monthly as necessary)	One month before construction and update quarterly.	All DISCO'S alignment.	Contractor.	Contractor cost	*DISCO'S /* (DISCO'S Cell to actively supervise and enforce.	DISCO'S Cell staff cost
OPERATIONAL STAGE								DISCO'S Cell staff cost
1. Air Quality	*1. Roadworthiness of vehicles on DISCO'S.* *2. Monitor NO_2 and PM_{10} as indicators.*	*1. Roadworthiness of vehicles on DISCO'S Daily during operations* *2. Yearly intervals for 3 years after opening for reassurance.*	*During operation.*	5 locations on DISCO'S alignment nearest settlements.	Contractor	Contractor cost	DISCO'S / and ESIC Cell	DISCO'S Cell staff cost
2. crops and vegetation	1. Follow up on Tree Clearance and Compensatory Planting Plan. 2. Records on survival of planted trees. 3. The compensatory	1) Quarterly 2) Quarterly 3) Quarterly 4) Quarterly	1) Throughout project 2) Each of three years after initial planting. 3) Continuous for three years after	All DISCO'S alignment.	Contractor	ESIC Cell	DISCO'S	MOFSC and DISCO'S Cell staff cost.

Environmental concern	Performance indicator (PI)	Frequency to monitor	Timing to check PI	Locations to implement PI	Responsible to implement PI	Cost of Implementation	Resp PI supervision	Cost of Supervision
	planting maintained 4. Audited report by ESIC cell for on site and off-site compensatory planting.		project completion 4) For four years after initial clearance of the forest.					

Note: LAFC = Land Acquisition Compensation Fixation Committee. DDS=Detailed design stage. Based on EIA/IEE reports to be revised at DDS, RAP, SIA and other engineering considerations may change, EIA=environmental impact Assessment. EMP=, Environmental Management Action Plan = Environmental Management Plan, EPA= Environmental Protection Agency, TD = Temporary drainage. EC = Erosion control. NGO = Non-Government Organization.
ADB * = ADB checks that processes have been completed and signed off by DISCO'S before moving to construction stage.

APPENDIX – IV: MONITORING PLAN (INSTITUTIONAL ARRANGEMENTS)

DISCO'S have established the Environmental and Social Impacts Cell (ESIC) manned by two professionals and support staff. The DISCO'S instructional arrangement with respect to social and environmental monitoring and implementation is presented as follows:

INSTITUTIONAL ARRANGEMENTS

The institutional arrangements of planning and management of the Power Distribution Enhancement Program (or the ADB-funded Power Distribution Enhancement MFF Project) are described as follows:

Pakistan Electric Power Company (PEPCO)

The Project Management Unit (PMU), PEPCO is the focal organization based in Lahore responsible for the Power Distribution Enhancement Program, for keeping liaison with the Government of Pakistan and Asian Development Bank (ADB) on behalf of all the DISCOs, and taking care of disbursement of funds (including ADB loan) and technical assistance through Consultants to, and coordination of the Program planning and management activities of the DISCOs.

List of Distribution Companies (DISCOs)

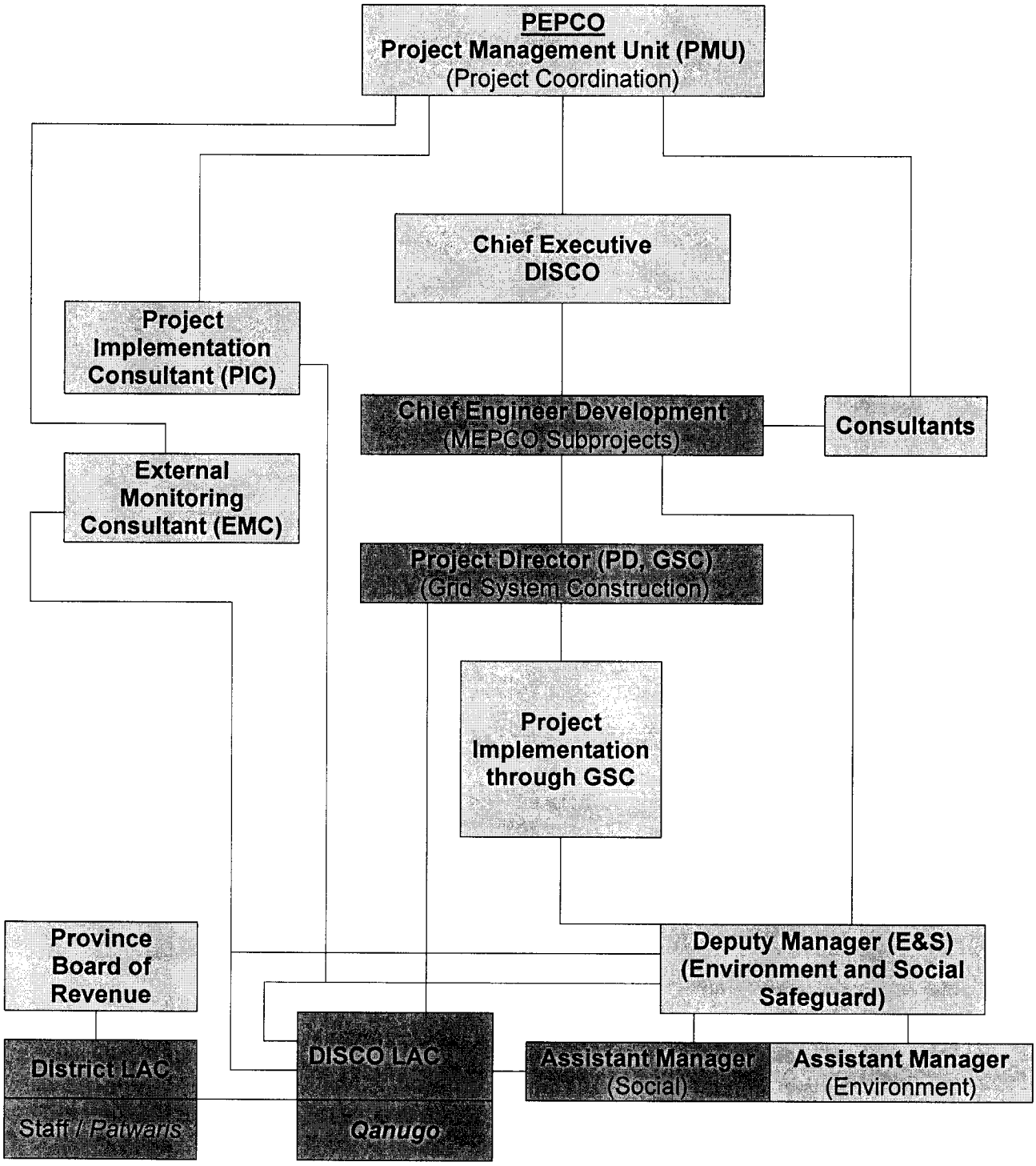
The DISCOs included in the ADB-funded MFF Project (the Program) are:

(1) PESCO: Peshawar Electric Supply Company, Peshawar, NWFP;
(2) IESCO: Islamabad Electric Supply Company, Islamabad;
(3) GEPCO: Gujranwala Electric Power Company, Gujranwala, Punjab;
(4) LESCO: Lahore Electric Supply Company, Lahore, Punjab;
(5) FESCO: Faisalabad Electric Supply Company, Faisalabad, Punjab;
(6) MEPCO: Multan Electric Power Company, Multan, Punjab;
(7) QESCO: Quetta Electric Supply Company, Quetta, Baluchistan; and,
(8) HESCO: Hyderabad Electric Supply Company, Hyderabad, Sindh.

Technical Assistance (Consultants)

PMU, PEPCO provides technical assistance to all the eight DISCOs through the consultants, based in Lahore:

Organization for LARP Planning, Implementation and Monitoring



Distribution Companies (DISCOs)

DISCO as the implementing agency (IA) bears the overall responsibility for the preparation, implementation and financing of all tasks set out in this LARP, as well as inter-agency coordination required for the implementation of the Subprojects. As such, it takes care of the preparation/updating and implementation of the LARPs and DDRs, and internal monitoring and evaluation activities.

Planning & Engineering Directorate

The **P&E Directorate** is responsible for preparation of PC-1s, for preparation of load forecasts and feeder analysis. The division is responsible for preparation of the Energy Loss Reduction (ELR) work orders. Formerly subproject preparation and keeping liaison with the Government of Pakistan and Asian Development Bank (ADB), as the donor of this MFF Project had also been the responsibility of this division. But lately the activity has been shifted to the Office of Chief Engineer Development.

Chief Engineer Development

The former **Projects Division** has now been named as the **Office of Chief Engineer Development (CE (Dev))**, is responsible for the overall planning, management and coordination of the approved Subprojects. The OCED is currently being assisted by the PPTA Consultants (including the Resettlement Experts responsible for LARP/DDR preparation), in preparing the identified Subprojects in line with the ADB Policies, and obtaining approval from the donor ADB. Its major functions include keeping regular liaison with ADB and relevant departments of the federal, provincial and district governments, preparation, updating and implementation of the LARPs and the related monitoring and evaluation activities.

The OCED contains a specially created cell to take care of the safeguards related activities, namely, the **Environmental and Social Cell (ESC),** headed by a Deputy Manager, and assisted by two Assistant Managers, Environment and Social, respectively. The Assistant Manager Social is responsible for the preparation/updating, implementation and internal monitoring of the Subproject LARPs, with assistance from DISCO LAC and PIC Resettlement Expert.

The Scope of Work to be handled by the ESC far exceeds the physical and professional ability and capabilities of the incumbents. To support the ESC, to carry out its responsibilities, a Monitoring Consultant should be hired. A Project Implementation Consultant (IC) should also be hired who will also have social and environmental experts to assist MEPCO in revising and updating the LARP as and when required, and then in implementation of the LARP. The Consultants will be provided full logistic support (including office space and field transport) by the DISCO.

Project Director (GSC)

The **Project Director (GSC)** is responsible for implementing the approved Subprojects, including construction/improvement of grid stations and transmission lines. This office is headed by the **Project Director (GSC)**, and it will establish Project Implementation Units (PIUs), comprising Engineers and *Patwaris*, at the respective towns of each Subproject. The PD GSC has an in-house Land Acquisition Collector (LAC) to take care of the land acquisition and resettlement activities.

The DISCO LAC, along with field *Patwaris*, in addition to implementation of the LARP activities, will provide in-field assistance to the Resettlement Experts of ESIC and PIC in updating, revision and internal monitoring of the LARPs. He normally works as an independent entity, but in case of local needs like price updating, grievance redress, etc., may involve the local Union Councils and other leaders at the local levels, and/or the District LACs and Province Board of Revenue for addressing broader level matters and resolving permanent Land Acquisition issues (not applicable to this Subproject). He will be provided technical assistance by the Resettlement Experts included in both ESIC and PIC teams.

District Government

The district government have jurisdiction for land administration, valuation and acquisition. At the provincial level these functions rest on the Province Board of Revenue while at the district level they rest on the District Land Acquisition Collector (District LAC). Within LAC office the *Patwari* (land records clerk), carry out specific roles such as titles identification and verification required by the MEPCO LAC.

Responsibility for Internal and External Monitoring

Land acquisition and resettlement tasks under the Program will be subjected to both internal and external monitoring. Internal monitoring will be conducted by ESC, assisted by DISCO LAC and PIC Resettlement Expert. The external monitoring responsibilities will be assigned to an External Monitoring Consultant (EMC) to be engaged by PMU, PEPCO according to the Terms of Reference (TOR) that have been approved by ADB.

Summary of Estimated Costs for EMP

Implementation for Tranche-IV

Activities	Description	Estimated Cost	
		Pak. Rs.	**US $**
Monitoring activities	As detailed under EMP	8312500	87,500
Mitigation measures	As prescribed under EMP and IEE	2850000	30,000
Capacity building Program	Training for Staff & Management	2185000	23,000
Transport	1 dedicated vehicle years	1784100	18,780
Contingency	Contingency	722000	7,600
Total		**15,853,600**	**1,66,880**

1 US$ = 95 Pak. Rupees

APPENDIX – V: PHOTOGRAPHIC PROFILE