

Environment Monitoring Report

Bi-annual Environment Monitoring Report
August 2016

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

Prepared by Hyderabad Electric Supply Company, Sindh 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.

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L2972 PDEIP: BAEMRs (Jan-Jun 2016) of GEPCO, HESCO, IESCO, LESCO approved for disclosure
Safia Shafiq

to:

Liaqat Ali

01/09/2016 12:44 PM

Cc:

Zhang Lei, Ehtesham Z. Khattak, Zehra Abbas, "Jeffrey Bowyer"

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6 Attachments



L2972 LESCO BAEMR (Jan-Jun 2016).doc



L2972 IESCO BAEMR (Jan-Jun 2016).pdf



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L2972 HESCO BAEMR (Jan-Jun 2016).pdf



L2972 PESCO BAEMR (Jan-Jun 2016).doc



L2972 MEPCO BAEMR (Jan-Jun 2016).docx

Dear Liaqat Sb.,

The attached BAEMRs (Jan-Jun 2016) of GEPCO, HESCO, IESCO and LESCO under L2972 PDEIP are approved for disclosure. Please have them uploaded on ADB website and share the weblinks with me.

Thanks and regards,

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Bi – Annual Environmental Monitoring Report

Project Number: 2972 – PK, Tranche – III
[January– June, 2016]

Islamic Republic of Pakistan

Power Distribution Enhancement Investment Project
(PDEIP) – Tranche – III
Multi – Tranche Financing Facility (MFF)

Financed by the ASIAN DEVELOPMENT BANK

Prepared By:

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For Hyderabad Electric Supply Company (HESCO).
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This report does not necessarily reflect the views of ADB or the Government concerned, and ADB and the Government cannot be held liable for its contents.

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ABBREVIATIONS

ADB	Asian Development Bank
E&SS	Environmental and Social Safeguard
EA	Executing Agency
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESM	Environmental & Social Monitor
EPD	Environmental Protection Department
GMD	Chief Engineer Development
GOP	Government of Pakistan
GS	Grid Substation
IA	Implementing Agency
IEE	Initial Environmental Examination
HESCO	Hyderabad Electric Supply Company
kV	Kilo – Volt
MOW&P	Ministry of Water and Power
MFF	Multi – Tranche Financing Facility
NOC	No Objection Certificate
PDEIP	Power Distribution Enhancement Investment Program
PEPA	Pakistan Environmental Protection Act
SEPA	Sindh Environmental Protection Act
PEPCO	Pakistan Electric Power Company
PMU	Project Management Unit
TL	Transmission Line

Part I INTRODUCTION

1.1 HESCO

1. Area Electricity Board (AEB) Hyderabad was one of the eight AEB's constituted through amendments in WAPDA Act during 1981. Later on Government of Pakistan approved revamping of WAPDA power sector in April 1998, resultantly twelve corporate entities were formed, Eight Distribution Companies (DISCOs), one National Transmission and Distribution Company (NTDC) and four Generation Companies (GENCOs). All these companies have been incorporated under Companies Ordinance 1984. Hyderabad Electric Supply Company (HESCO) was formed to take over/acquire all the properties, assets and liabilities of Hyderabad Area Electricity Board owned by Pakistan Water and Power Development Authority (WAPDA). The company was incorporated on 23rd April 1998 and certificate for commencement of business was obtained on 1st July 1998 from NEPRA under section 146(2) of Companies Ordinance 1984. HESCO jurisdiction map is placed as below.



Figure 1: HESCO Jurisdiction Map.

1.2 Directorate of GM (Development) / Project Management Unit (PMU)

2. To carry out and handle investment projects, HESCO has established Project Management Unit (PMU) under the supervision of Chief Engineer (Development). The PMU comprises of 4 sections.
 - i. **Planning Scheduling & Coordination:** To take the responsibilities for (i) identifying and proposing the subprojects to PEPCO / Donor Agency for approval and financing, (ii) Scheduling and Monitoring (iii) preparing the necessary documentation in line with the statutory, corporate and Donor policies including quarterly reports (iv) coordinate with the consultants.
 - ii. **Procurement:** To take care of all responsibilities and tasks related to procurement (goods, works and services) and for the activities related to material planning, preparation of bidding documents according to the requirement of the Donors, getting the evaluation done and for placing the orders after approval of the Donors, inspection and then transportation to the site. Arrange release of material thru CRR Karachi and final delivery to the site.
 - iii. **Project Finance:** They are responsible for taking care of counterpart financing, funds flow arrangements, payments, recording and monitoring of both ADB & WB funds. Also, will establish, monitor and manage the impress account and statement of expenditure (SOE) procedures. Furthermore ensure timely preparation of the annual audited project accounts.
 - iv. **Environment & Social Safeguard:** To take care of all the responsibilities and tasks related to environment, land, and social (including involuntary resettlement and indigenous people) and provide oversight on occupational health, safety and environment safeguards in the working environment.
3. The organizational structure of PMU – HESCO is given below in **Figure-2**

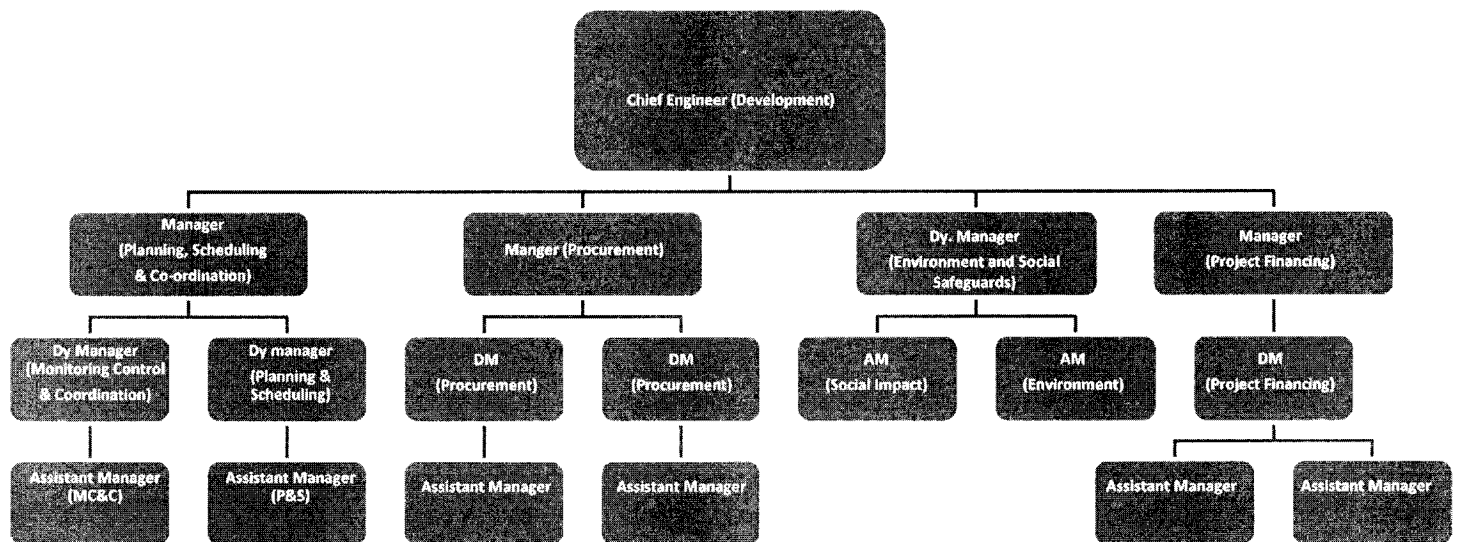


Figure 2: Organizational Structure of PMU - HESCO.

1.3 Environmental & Social Safeguard Section-Project Management Unit

4. The Environmental & Social Safeguard (E&SS) Section of PMU, HESCO provides an overall supervision and advisory services during the Pre - Construction phase, Construction phase & Post - Construction phase of the project. The E&SS also assists and advises GSC Directorate, Construction Directorate and other HESCO departments on overall environmental and social matters. Presently, the E&SS Section has one Environmental and one Social Impact expert under the supervision of a Deputy Manager Environmental and Social Safeguard (E&SS).
5. The organizational structure of E&SS - PMU HESCO is attached as below.

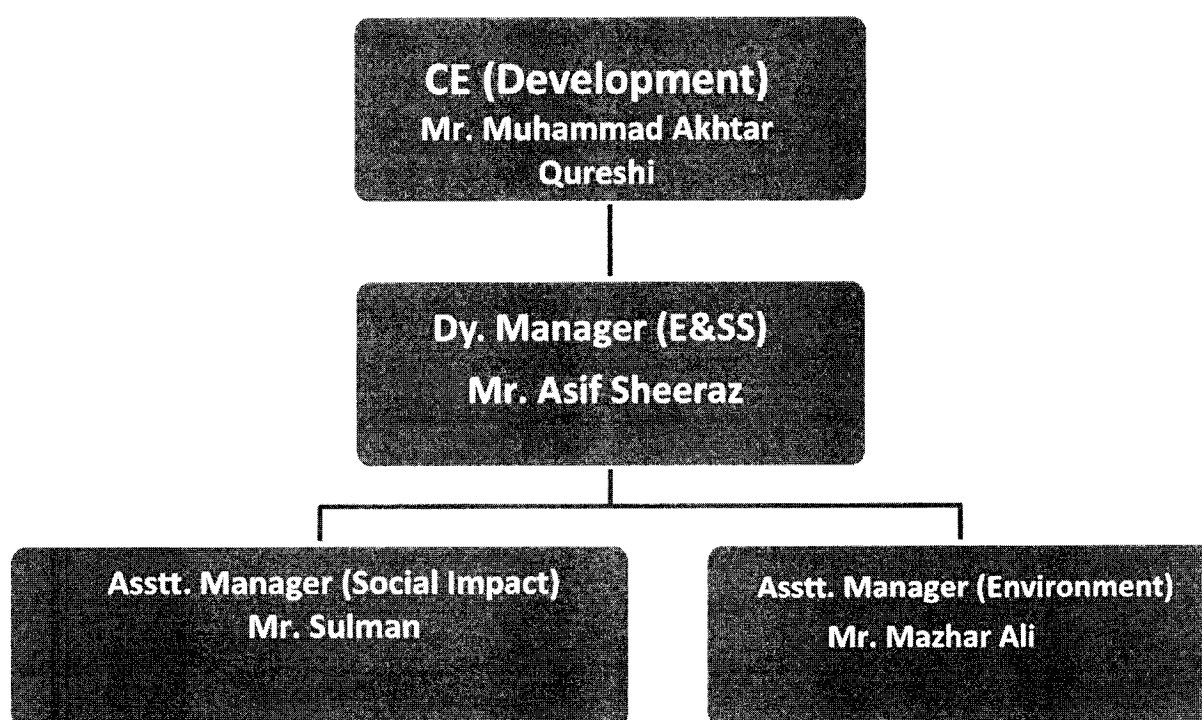


Figure3: Management Structure of E&SS - PMU - HESCO.

1.4 Power Distribution Enhancement Investment Program (PDEIP) – Tranche – III

6. Government of the Islamic Republic of Pakistan (GoP) through Ministry of Water and Power (MOW&P) with assistance of Asian Development Bank (ADB) is implementing the Power Distribution Enhancement Investment Program (PDEIP) under Multi Tranche Financing Facility (MFF). This Program is part of the GoP long term energy security strategy. Pakistan Electric Power Company (PEPCO) has been nominated by Ministry of Water and Power (MOW&P) to act as the Executing Agency (EA) while Hyderabad Electric Supply Company (HESCO) is the Implementing Agency (IA) for execution work in its service area. Program basic information is provided in **Table 1**.

Table 1: Program Basic Information.

The Program	Power Distribution Enhancement Investment Program (PDEIP). Multi – Tranche Financing Facility (MFF).
Subproject	Tranche – III subproject.
Sponsoring Agency	Government of Pakistan. Ministry of Water & Power (MoW&P).
Executing Agency	Pakistan Electric Power Company (PEPCO).
Implement Agency	Hyderabad Electric Supply Company (HESCO).
Type of Financing	Loan amount US \$ 24.50 Million. Loan No. 2972 – PK ; Tranche – III subproject.
Loan Signing Date	September 09, 2013.
Loan Effectiveness Date	December 10, 2013.
Closing Date	January 31, 2018.

Last ADB Review Mission	May, 2016
Focal Person	Chief Engineer (Development), Project Management Unit , Hyderabad Electric Supply Company (HESCO).
Focal Person for Environment & Social Safeguards	Deputy Manager (E&SS), Project Management Unit, Hyderabad Electric Supply Company (HESCO).

7. The Power Distribution Enhancement Investment Program (PDEIP) – Tranche-III is designed to provide grid-connected customers with adequate and reliable supply of electricity. The rehabilitation, augmentation, and expansion of power distribution infrastructure will increase the reliability of supply to residential, agricultural, commercial, and industrial customers across Pakistan. A reliable electricity supply will lead to social and economic benefits and improved conditions for schools, hospitals, and social services, among others.

The main components of the program are given as under:

- Conversion / Up-gradation of Grid Stations
- New Transmission Lines
- New Grid Station

1.5 Objective of the Program (PDEIP)

8. The main objectives of this Investment Program are; (i) improve power distribution infrastructure through system rehabilitation, augmentation and expansion; and relieve the power system from distribution bottlenecks and constraints; (ii) enable

continued operation and maintenance in accordance with best international practices; and (iii) the system will be capable of meeting peak demand, with electricity outages significantly reduced.

1.6 Scope of the Work

9. HESCO Tranche - III subproject includes 03 No. Conversion of Grid Stations (from 66 kilo Voltage Level to 132 kilo Voltage Level) along with associated transmission lines, 02 No. Construction of New Transmission Line, 01 No. Construction of new Grid station, 03 No. Extension of Power Transformers. The detail scope of work of Tranche - II subproject is reproduced below in **Table - 2**.

Table 2: Detail Scope of Work

No.	Project Component		Amount (Us \$ Mill)
01.	Conversion of Grid stations & allied transmission lines	03 Nos.	8.97
	i. Tando Ghulam Ali		
	ii. Digri		
	iii. Tando Jan Muhammad		
02.	New Grid Station	01 No.	2.23
	i. 132 Kv New Matli Grid Station and allied T/L		
03	Extension of Power Transformers		5.32
	i. 132 Kv Naukot Grid station		
	ii. 220/132 kV Hala Road Grid Station		
	iii. 132 kV Hala Grid Station		
04.	New transmission Line		
	i. 132 kV T.J.Muhammad-Naukot transmission line		
	ii. 132 kV Hala Road-Hala Transmission Line		
Total			16.52

1.7 Present Status of the Project

10. The civil works of Tranche – III Subprojects 04 Nos. have been awarded; the details of work awarded are as below:

No.	Description of Work	Length of T/L (KM)	Awarded to	Contract Signed Date	Completion Date
1.	Conversion of 66 kV Tando Ghulam Ali and allied Transmission Line	30	M/s CCCE-ETERN (JV), China.	07-11-2014	June, 2016
2.	Conversion of 66 kV Digri and allied Transmission Line	31			
3.	Conversion of 66 kV T.J.Muhammad and allied Transmission Line	20			
4	Construction of 132 Kv New Matli and allied Transmission	1.0	M/s Siemens	29-09-2015	January, 2017

11. Following monitoring checklist, proforma and documents handed over to the contractors; EMP check lists are filled during the construction activities and submitted to E&SS Section PMU HESCO,
 - Documentation Requirement as per Contract,
 - Training Plan to be executed by contractor for awareness of its staff,
 - Grievance Redressal Mechanism,
 - Format of On Site Complaint Register,
 - Environment & Social Monitoring Checklists for;
 - a) Contractor Mobilization and Demobilization,
 - b) Contractor's Construction Camp Establishment and Operation,
 - c) Transportation of Equipments and Construction Materials,
 - d) Construction of Grid Station,
 - e) Construction of Transmission Line,
 - f) Social Monitoring and;
 - g) Environment Monitoring Performa.
12. The contractors will carrying-out monitoring of environmental aspects as an integral part of the project which comprises of;
 - Monitoring by Environmental staff of contractor appointed on each active site (s) (Analysis of environmental parameters, checklist filling) and reporting to PMU HESCO.
 - Supervision / Monitoring by Supervision Consultants.
 - Random field visit by PMU (E&SS staff) and reporting.

13. The detailed meetings and training apropos Environment & Social aspects with following Environmental staff of contractor (M/s CCC-ETERN(JV) held on-site and in the PMU HESCO:

Name of Contractor	Name of Person.	Designation.
M/s CCCE-ETERN (JV), China	Mr. Abdul Rahim	ESM-Tando Ghulam Ali Site
M/s CCCE-ETERN (JV), China	Mr. Raza Kerio	ESM-Digri Site
M/s CCCE-ETERN (JV), China	Mr. Toufique Ahmed	ESM-Tando J.Muhammad Site

1.8 Monitoring Indicator of Part - I

Description of Indicator.	Remarks.
1. Construction activities and Project Progress during previous 6 months.	Presently the project is in execution phase.
2. Changes in project organization and Environmental Management Team.	One Deputy Manager (Environment & Social Safeguard), One Assistant Manager (Environment) and One Assistant Manager (Social Impact) are working since March, 2013 in PMU HESCO.
3. Relationships with Contractors	Meeting conducted with representative of contractor M/s CCCE-ETERN (JV) and M/s Siemens regarding their awareness to implement IEE, EMP and LARP during the project activities.

Part II ENVIRONMENTAL MONITORING

2.1 Monitoring

14. Environmental Monitoring of the projects is being carried out by the contractors under the supervision of Environmental and Social Safeguard (E&SS) section PMU, HESCO during the execution phase. Field visits will carried-out by E&SS Section, PMU HESCO for the smooth and effective implantation of EMMP & Monitoring plan as prescribed in approved Environmental Assessment Report.

Part III ENVIRONMENTAL MANAGEMENT

3.1 Compliance Status with Statutory Requirements

15. The loan agreement of the project requires the Implementing Agency (IA) to implement the project in compliance with statutory / regulatory requirements of the country and requirements of ADB Guidelines (May 2003). The detail of environmental & social compliance regarding statutory / regulatory requirements in accordance to ADB & National Law is tabulated below.

No.	Regulatory Requirements.	Status of Compliance.
01.	Preparation of Environmental Assessment Reports.	EIA Prepared.
02.	Clearance from ADB	Clearance given by ADB
03.	Clearance / Obtaining of No Objection Certificate (NOC) from the Provincial Environmental Protection Agency (EPA).	<ul style="list-style-type: none"> ▪ The Public Hearing for all the sub-projects under ADB Tranche-III was held on 30-09-2014 in the committee room of HESCO, Hyderabad. ▪ Approved, NOC attached Annex – III.

3.2 Environment & Social Documents

16. HESCO PDEIP Tranche – III Projects has been classified as *Category B Project* in accordance to ADB Environment Policy (2002) and ADB Environmental Assessment Guidelines (2003). The project falls under Schedule – II of Pakistan Environmental Protection Act (PEPA), 1997, which requires Environmental Impact Assessment (EIA) to be carried out for the project.
17. Initial Environmental Examination (IEE) Reports were prepared by M/s SMEC International Pty. Limited. These reports are available on HESCO website.
19. Under the Pakistan Environmental Protection Act 1997, the project components required preparation of Environmental Impact Assessment (EIA) report instead of IEE. Hence to comply with the regulations and on advice of EPA comprehensive EIA report was prepared by E&SS PMU – HESCO.
20. Being the projects in Sindh province, the EIA report was submitted to Sindh – EPA on February 24, 2014 for issuance of NOC after the approval of CEO, HESCO.
21. The Public Hearing for Tranche-3 Sub-Projects was held on 30-09-2014 in the committee room of HESCO, Hyderabad.
22. NOC has been issued for the sub-projects by Sindh Environmental Protection Agency (Annex – II).
23. Environmental Management Plan (EMP) of Tranche – III subproject has been translated into Urdu and both English & Urdu version have been disclosed.

3.3 EMMP as a part of Bidding Documents.

24. Environmental Management & Mitigation Plan (EMMP) & Monitoring Plan of the approved EIA Reports have been made part of all the bidding documents of civil works of Tranche – II sub projects.

3.4 Clauses in the Bidding Documents.

25. The Clauses included in the bidding documents are;
 1. The Initial Environmental Examination (IEE) and Land Acquisition & Resettlement Plan LARP (s) is the part of the Contract Agreement and the contractors will be responsible for the implementation of the same.
 2. Contractor (s) should also ensure the implementation of Environmental Management Plan (EMP), Land Acquisition & Resettlement Framework (LARF); Land Acquisition & Resettlement Plan (LARPs) prepared for HESCO's Power Distribution Enhancement Investment Project under Asian Development Bank (ADB) financing.
 3. Contractors will strictly follow & ensure the implementation of the works in-accordance with IEE, Land Acquisition & Resettlement Framework (LARF)/ Land Acquisition & Resettlement Plan LARP (s). The WAPDA's Safety Code will also be strictly followed by the Contractors.
 4. Field data collection and their analysis (such as Laboratory [Physical, Chemical, Biological Analysis of Groundwater / Soil /, Surface water / Oil etc.]), will be responsibility of the contractor (s) and proper record should also be maintained & same will be provided to the client (HESCO) accordingly; for these analysis no extra payment will be paid by the client (HESCO) to the contractor (s).
 5. Arranging the Environmental & Social Trainings will also be the responsibility of contractors for which no extra payment will be paid to the contractors. The documentary and photographic record of such trainings should be maintained & provided to the client (HESCO) from time to time.
 6. Implementation of Grievance Redressal Mechanism will be made by the contractors.

7. In-order to ensure the compliance with proposed mitigation and monitoring measures required under EMP, the contractors will close liaison and coordinate with HESCO Environmental and Social Safeguard Cell.
8. In case of non-compliance with IEE, EMP & LARF/LARP, the work will be stopped and contractors will be liable to pay penalty to be determined/finalized by the Competent Authority of HESCO. Moreover if the Project is being delayed as a result of stoppage due to non observance of EMP & LARF/LARP, the penalty for Liquidated Damages will also be recovered from the contractors along-with aforesaid penalty.
9. The contractors will ensure that all the formalities and compensation necessary for the fulfillment of Land Acquisition and Resettlement Framework (LARF)/ Land Acquisition and Resettlement Plan (LARP) has been fully met before the commencement of physical work at any site of construction.
10. Environmental and Social Monitors (ESM) (at least qualified Graduate Engineer with relevant experience) as per field requirement will be appointed by the contractors.
11. Soft Copy and Hard Copy of the periodic reports regarding compliance of EMP, Land Acquisition and Resettlement Framework (LARF) / Land Acquisition and Resettlement Plan (LARP) on monthly basis or as and when required by the client (HESCO) will be furnished by the contractors.
12. Contractors will ensure compliance with Labor Laws of borrower and pertinent Occupational Health and Safety Regulation.
13. All contractor (s) will,
 - a. Use their best efforts to employ women living in the vicinity of the Project area,
 - b. Disseminate information at worksites on the risks of sexually transmitted diseases and HIV/AIDS for those employed during construction and take measures to protect workers from potential exposure to sexually transmitted diseases,
 - c. Do not differentiate between men and women's wages or benefits for work of equal value,
 - d. Abstain from child labor and
 - e. Contractors are also bound to follow and implement the approval / NOC, issued by Sindh Environmental Protection Agency (SEPA), Karachi.

3.5 Monitoring Indicators of Part – III set by ADB.

Description of Indicator.	Remarks.
EMP and work plans. Report on delivery of documents, required amendments etc.	EMP prepared. No amendments are required.
Site Inspections and audits – summarizes the number and type of site visits.	Site Inspections is being carried out during execution phase of the project.
Non-compliance notices – summarizes the details on the number of notices given out and the issues covered. Summaries the ranking of issues.	Nil.
Corrective action plans - report on timeliness of preparation and completion	Nil.
Consultation and complaints – report on any consultation undertaken and list any complaints received.	<ul style="list-style-type: none"> • Consultation carried out during preparation of Environmental Assessment reports and on regular basis during field visits. • Complaint Registers have been placed all work site / camp site. • No complaints received yet.

Annex – I.**MONITORING DATA**

No.	Description	Status of Compliance
01.	Establishment of PMU in HESCO.	Yes.
02.	Induction of E&SS Section and Staff in PMU.	Yes.
03.	Preparation of Environmental Assessment Reports (EIA Reports).	Yes.
04.	Clearance & approval of IEE / EIA Reports from ADB.	Yes.
05.	Approval of IEE / EIA Reports from CEO, HESCO.	Yes.
06.	Uploading of EIA Reports on HESCO website.	Yes.
07.	Submission to Concerned EPA / EPD.	Yes.
08.	Public Hearing Session.	Public Hearing Session held on September 30, 2014 at Committee Room HESCO, Hyderabad.
09.	Clearance/ obtaining No Objection Certificate (NOC) from the EPA.	NOC issued by SEPA.
10.	Awareness about Environment Aspects.	Yes.
11.	Internal Monitoring & Field Visit.	On going.
12.	EMMP is made part of Bidding Documents	Yes.
13.	Provision made in BOQ of Bidding Documents for Environmental & Social Issues.	Yes.
14.	Status of implementation of EMMP & Monitoring Parameters.	On going.

Annex – II.**IMPLEMENTATION REPORT ON EIA / IEE MITIGATION REQUIREMENTS**

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
DESIGN / PRE – CONSTRUCTION STAGE				
Review of EMP.	Ensure EMP sufficient to control impacts and compliance with statutory requirement of EPA.	▪ Ensure proposed live diversions are agreed and included in contract.	Contractor	▪ Complied.
		▪ Ensure final route to be built by contractor is as described in RRP with same land acquisition.		▪ Complied.
		▪ Review EIA and EMP & submit revised REA & environmental assessment in line with ADB Guidelines. Resubmit to Pak-EPA, If required.		▪ Not Required.
Social Impacts and Resettlement.	To ensure that the adverse impacts due to the property acquisition and resettlement are mitigated according to the LARP.	To be completed prior to commencement of construction;	HESCO	▪ Complied.
		▪ Social preparation of the APs to be completed prior to commencement of construction.		▪ Complied, Land acquired.
		▪ Acquisition of lands completed to minimize the uncertainty of people.		▪ Being complied / ongoing as per the rule.
		▪ Completed implementation of LARP to provide compensation and assistance to the APs.		▪ Being complied. Entitlement matrix is being revised as per the ground situation.
Project Disclosure.	Ensure compliance with statutory requirement of EPA.	▪ Design all changes to alignment disclosed to EPA.	HESCO	▪ Complied.
		▪ Ensure all changes to alignment are included in the revised EMP.		▪ N.A.
Environmentally Responsible Procurement.	Ensure environmentally responsible Procurement.	▪ Require in procurement specifications that transformers, transformer oil and other equipment are to be free from PCB and other petroleum fractions that may	E&SS section.	▪ Complied.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
		be injurious to environment or equipment. ▪ Contractual clauses included to tie the implementation of environmental mitigation measures.		▪ Complied.
Waste Disposal.	Ensure adequate disposal options for all waste including transformer oil, residually contaminated soils, and scrap metal.	<ul style="list-style-type: none"> ▪ 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". ▪ Include in contracts for unit rates for re-measurement for disposal. ▪ After agreement with local authority, designate disposal sites in the contract and cost unit disposal rates accordingly. 	E&SS section with the design consultant	<ul style="list-style-type: none"> ▪ Complied. ▪ Considered in the design / drawing of the grid station). ▪ HESCO has the policy of re-use of transformers and recycling of oils. ▪ Not Applicable. ▪ Not required.
Noise and Air Quality Mitigation in Design.	Plan and design to ensure noise impacts are acceptable in	▪ Plan to prevent noise from GS in the operational phase and conduct consultation with affected	E&SS section	▪ Complied.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
	Operational phase.	To determine acceptability criteria for noise.		
		▪ Follow up with detailed acoustic assessment for all residential, school, temple (other sensitive structures) within 50m of GS. Base on measurement of existing equipment noise.		▪ Operation phase requirement
		▪ If noise at sensitive receiver exceeds specific criterion [e.g. Leq55db (A)] include design and installation of acoustic insulation measures to control noise at SRs.		▪ Noise level with in NEQS limit. ▪ Not required.
		▪ Consider solid barrier to attenuate noise at schools and hospitals to below accepted criterion.		▪ Not required.
		▪ Prepare Air Quality and Noise Control plan for construction stage		▪ Complied.
Hydrological Impacts.	To minimize hydrological and drainage impacts during constructions.	▪ Assess expected hydrologic flow in all areas where it is sensitive, such as for irrigated lands taking into account changes due to climate change as predicted by accredited sources such as OECD.	Contractor	▪ Complied. Considered in the design / drawing of the grid station).
		▪ Ensure surface flows are controlled and facilitated through early re-provision of irrigation with appropriate drainage structures in the road base including bridges and culverts.		▪ Complied.
		▪ Prepare Drainage Management Plan, to be completed and approved by HESCO in the Detailed Design at least one month prior to construction.		▪ Complied.
Temporary Drainage and Erosion Control.	1. Prevent runoff and control erosion. 2. Include preliminary designs for Erosion Control in	▪ Identify locations for Erosion Control and Temporary Drainage along all of the line and around GS.	Contractor.	▪ Complied.
		▪ Include designs for EC and TD in contract (s)		▪ Complied.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
	HESCO contract.	<ul style="list-style-type: none"> Agree detailed EC and TD plan with HESCO / E&SS section at least one month prior to construction. 		<ul style="list-style-type: none"> Complied.
Planning Construction Camps and Materials Management.	To plan to minimize the effect of the work camps on the surrounding environment and residents in the area.	<ul style="list-style-type: none"> Plan sites for worker camps and back up areas for stockpiling materials and Equipment in advance. Consult local comity and locate to use waste/barren land and non-agricultural plots. Agree use of land before construction commences reconfirmed by the Contractor and agreed HESCO / E&SS section at least one month prior to construction. 	Contractor.	<ul style="list-style-type: none"> Complied. Worker Camps are established with-in the existing grid stations of HESCO Material is also stocked in the available space within the grid stations and properly fenced.
Traffic Condition.	Plan to minimize disturbance of traffic.	<ul style="list-style-type: none"> Avoiding blocking existing roads and other access near the works route during construction. 	E&SS section.	<ul style="list-style-type: none"> Properly ensured.
Institutional Strengthening and Capacity Building.	Prepare E&SS section for implementation of EMP.	<ul style="list-style-type: none"> Develop strengthening plan for the environmental management by E&SS Section the Project rolls out. Increase staffing of HESCO PMU. Train E&SS section officials to apply the EMP and to evaluate the environmental requirements and contractors' mitigation measures. 	HESCO	<ul style="list-style-type: none"> HESCO is committed to be environment and customer friendly. Necessary trainings are provided to E&SS section PMU.
Prepare Contractors for Implementation of EMP.	Full and effective implementation of environmental mitigation measures.	<ul style="list-style-type: none"> Prepare contractors to co-operate with the executing agency, project management, supervising consultants and local population in the mitigation of impacts. Include the approved EIA and the EMP in the contract documentation. Contracts PMUst require implementation of the EMP Contractor to engage capable and trained environmental management staff to audit the effectiveness and 	E&SS section.	<ul style="list-style-type: none"> Ongoing. Included and being ensured. Ongoing.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
		review mitigation measures as project proceeds.		
		▪ The effective implementation of the EMP audited as part of the loan.		▪ Ongoing.
		▪ HESCO to prepare resources to fulfill the requirements of the EMP and EPA		▪ Ensured
CONSTRUCTION STAGE				
Orientation for Contractor, and Workers.	To ensure that the Contractor, subcontractors and workers understand and have the capacity to ensure that the environmental requirements for mitigation measures are implemented.	▪ Conducting special briefing and / or on-site training for the contractors and workers on the environmental requirement of the project. Record attendance and achievement.	E&SS section and Contractor and record details	▪ Complied and ongoing.
		▪ Conducting special briefing and training for Contractor on the environmental requirement of the project. Record attendance and achievement.		▪ Ongoing
		▪ Agreement on critical areas to be considered and necessary mitigation measures, among all parties who are involved in project activities.		▪ Being ensured.
		▪ Periodic progress review sessions to be conducted every six months		▪ Ongoing.
Plans to Control Environmental and Associated Impacts.	Avoid impacts from unplanned activities by penalizing contractors for not committing to properly planning works.	▪ Drainage Management Plan.	Contractor	▪ Included in drawings
		▪ Temporary Pedestrian and Traffic Management Plan.		▪ Adopted where required.
		▪ Erosion Control and Temporary Drainage Plan.		▪ Ongoing.
		▪ Materials Management Plan.		▪ Ongoing.
		▪ Waste Management Plan.		▪ Ongoing.
		▪ Noise and Dust Control Plan.		▪ Ongoing.
		▪ Safety Plan.		▪ Ongoing.
		▪ Agreed schedule of costs for environmental mitigation measures		▪ Agreed in BOQ of Bidding Document.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
Water Quality.	To prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively.	<ul style="list-style-type: none"> Proper construction of TD and EC measures, maintenance and management including training of operators and other workers to avoid pollution of water bodies by the considerate operation of construction machinery and equipment and reporting and feedback by E&SS section. 	Contractor	<ul style="list-style-type: none"> Ongoing.
		<ul style="list-style-type: none"> Storage of lubricants, fuels and other hydrocarbons in self-contained dedicated enclosures >50m away from water bodies. 		<ul style="list-style-type: none"> Properly ensured.
		<ul style="list-style-type: none"> No stockpiles next to water bodies. 		<ul style="list-style-type: none"> Ensured.
		<ul style="list-style-type: none"> Proper disposal of solid waste from construction activities & worker camps. 		<ul style="list-style-type: none"> Ensured. Solid waste is disposed through Municipal administration.
		<ul style="list-style-type: none"> Borrow sites should not be close to sources of drinking water. 		<ul style="list-style-type: none"> Ensured.
Water Resources.	To minimize impacts on local water supply caused by construction activities are minimized.	<ul style="list-style-type: none"> Availability of water will be assessed to evaluate the impact on community resources. 	Contractor	<ul style="list-style-type: none"> Being ensured. Till now there has been no issue regarding un-availability of water due to the project activities.
		<ul style="list-style-type: none"> Project water will be obtained without depleting local village supplies 		<ul style="list-style-type: none"> Properly ensured.
		<ul style="list-style-type: none"> Camps will be located at least 100m away from the nearest local settlement. 		<ul style="list-style-type: none"> Camps are located within the existing grid stations of HESCO having separate boundary walls and away from settlements.
		<ul style="list-style-type: none"> The contractors will be required to maintain close liaison with local communities to ensure that any potential conflicts related to common resource utilization for project purposes are resolved quickly. 		<ul style="list-style-type: none"> Ensured both by the contractor and HESCO engineers.
		<ul style="list-style-type: none"> Guidelines will be established to minimize the wastage of water during construction operations and at campsites. 		<ul style="list-style-type: none"> Care is done to minimize water wastage.
Spoil disposal and construction	To minimize the environmental	<ul style="list-style-type: none"> Implement Waste Management Plan. 	Contractor.	<ul style="list-style-type: none"> Implementation ensured.
		<ul style="list-style-type: none"> Confirm conditions and safety of 		<ul style="list-style-type: none"> Ensured.

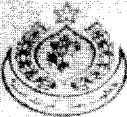
Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility	Remarks
waste disposal	impacts arising from generation of spoil waste, reuse where possible and provide adequate disposal options for unsuitable soils.	<ul style="list-style-type: none"> proposed disposal sites. Confirm amounts of surplus rock based materials that can be reused in the project or by other interested parties for public projects. Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations. Waste oil must not be burned. – Oil and solid waste disposal location to be agreed with HESCO and local authority. Open burning is contrary to good environmental practice and will not be allowed. 		<ul style="list-style-type: none"> Ongoing. Being ensured and complied. Waste oil is not burned, stored in drums and recycled. Open burning is prohibited.
Noise	To minimize noise level increases and ground vibrations during construction operations.	<ul style="list-style-type: none"> Install, maintain and monitor all requisite mitigation as per contract all transformers and machinery shall be fitted with acoustic insulation. Hammer-type pile driving operations shall be avoided during night-time. Well-maintained haulage trucks will be used with speed controls. 	Contractor.	<ul style="list-style-type: none"> Ongoing and insured. No night time activities allowed. Ongoing.
Air quality	To minimize effectively and avoid complaints due to the airborne particulate matter released to the atmosphere.	<ul style="list-style-type: none"> Control all dusty materials at source. Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions. Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions. 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. 	Contractor.	<ul style="list-style-type: none"> Properly ensured. Ensured wherever and whenever required. Care is taken. Complied.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility	Remarks
		<ul style="list-style-type: none"> Spray bare ground areas with water. 		<ul style="list-style-type: none"> Dust generating bare grounds are sprayed with water.
Soil Contamination	Avoid soil contamination	<ul style="list-style-type: none"> Contractors to instruct and train workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination. 	Contractor	<ul style="list-style-type: none"> Necessary trainings to the workforce is given.
		<ul style="list-style-type: none"> Accidentally spills on open ground including the top 2cm of any contaminated soil shall be disposed of as chemical waste to a disposal site acceptable to the local authority / Community. 		<ul style="list-style-type: none"> To be insured in case of accidental spills.
Work Camp Location and Operation	To ensure that the operation of work camps does not adversely affect the surrounding environment and residents in the area.	<ul style="list-style-type: none"> Confirm location of work camps in consultation with HESCO and local Authorities. Location subject to approval by the HESCO. If possible, camps shall not be located near settlements or near 	Contractor	<ul style="list-style-type: none"> Properly ensured and complied as per requirement.
		<ul style="list-style-type: none"> Water and sanitary facilities shall be provided for workers and employees. 		<ul style="list-style-type: none"> Water is ensured to be available to workers as well as sanitation facilities.
		<ul style="list-style-type: none"> 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 site approved by the local authority. 		<ul style="list-style-type: none"> Solid waste is collected in drums and given to municipal administrations for disposal. Sewage is carried through the available system within the grid stations, otherwise, soakage pits and septic tanks have been provided.
		<ul style="list-style-type: none"> Portable lavatories or at least pit latrines will be installed and HESCO and open defecation shall be discouraged and prevented by keeping lavatory facilities 		<ul style="list-style-type: none"> Ensured as elaborated above.
		<ul style="list-style-type: none"> 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. 		<ul style="list-style-type: none"> Being ensured.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
		<ul style="list-style-type: none"> At the conclusion of the project, all debris and waste shall be removed. All temporary structures, including shelters and toilets shall be removed. 		<ul style="list-style-type: none"> Agreed and will be ensured.
		<ul style="list-style-type: none"> Exposed areas shall be planted with suitable vegetation. 		<ul style="list-style-type: none"> Agreed and will be ensured.
		<ul style="list-style-type: none"> The E&SS section shall inspect and report that the camp has been vacated and restored to pre-project conditions as far as is reasonably practicable. 		<ul style="list-style-type: none"> Agreed and will be ensured.
Safety Precautions for Workers	To ensure physical safety of workers.	<ul style="list-style-type: none"> Establish all relevant safety measures as required by law and good engineering practices. 	Contractor	<ul style="list-style-type: none"> Contractors are bound to ensure safety of workers as per bid clauses.
		<ul style="list-style-type: none"> Providing adequate warning signs. 		<ul style="list-style-type: none"> Warning signs are provided.
		<ul style="list-style-type: none"> Providing every worker with skull guard or hard hat and safety shoes. 		<ul style="list-style-type: none"> Ensured and ongoing
		<ul style="list-style-type: none"> The Contractor shall instruct his workers in health and safety matters, and require the workers to use the provided safety equipment. 		<ul style="list-style-type: none"> Being ensured on routine basis.
Social Impacts	<p>To engage local workforce and community in the HESCO Project.</p> <p>To encourage local support for the project.</p> <p>To ensure minimum impacts to people living close to the ROW.</p>	<ul style="list-style-type: none"> Use local labour as far as possible for manual work. 	Contractor	<ul style="list-style-type: none"> The contractors have their own labour, however, when opportunity arises, local labour will be utilized.
		<ul style="list-style-type: none"> Use local educated people for clerical and office work where possible. 		<ul style="list-style-type: none"> Same as above.
		<ul style="list-style-type: none"> Encourage monitoring of the project by local village groups. 		<ul style="list-style-type: none"> To be encouraged.
		<ul style="list-style-type: none"> Claims/complaints of the people on construction nuisance/damages close to ROW to be considered and responded to promptly by the Contractor and monitored by HESCO. 		<ul style="list-style-type: none"> Complaint registers have been placed at project sites and also liaison is maintained with locals.
		<ul style="list-style-type: none"> Set up or maintain local communication lines via landline or satellite phone. 		<ul style="list-style-type: none"> Properly maintained.

Environmental Concern	Objectives	Mitigation Measures Recommended	Implementation Responsibility.	Remarks.
Enhancements	To make environmental enhancements	<ul style="list-style-type: none">▪ Include planting of trees in addition to those removed such as under lines for visual interest and amenity.	Contractor	In progress.

Reference No: EPA/2014/03/06/EIA/06



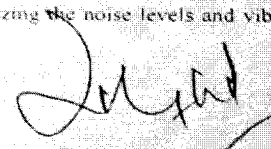
ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF SINDH
 Plot # ST-2/1, Sector 23, K1A, Karachi-74600
 Ph: 5055950, 5055955, 5055937
 5055932, 5055945, 5055921
 epasindh@cyber.net.pk
 Facsimile: 5055940

Dated: 23rd December, 2014

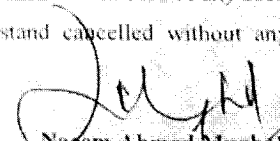
SUBJECT: * DECISION ON ENVIRONMENTAL IMPACT ASSESSMENT (EIA) *

1.	Name and Address of Proponent	Chief Engineer(Dev), PMU M/s Hyderabad Electric Supply Company
2.	Description of Projects	Sub-Projects under Asian Development Bank(ADB) Tranche-III of HESCO
3.	Location of Projects	The Project will cover T.M Khan, Hyderabad, Mirpurkhas, Badin and Nanani Districts of Sindh
4.	Date of Filing of EIA	24-02-2014
5.	After careful review of the Environmental Impact Assessment (EIA) report the Environmental Protection Agency (EPA), Sindh, has decided to accord its approval subject to the following conditions:-	

- (i) The Hyderabad Electric Supply Company hereinafter referred as proponent will comply Environmental Quality Standards in force for air emissions from the project site and Right of Way (RoW).
- (ii) Noise level- shall be implemented in order to minimize noise impact of the proposed project.
- (iii) Mitigation measures recommended in the EIA report must be strictly adhered to minimize any negative environmental effect on the natural ecology of the project area.
- (iv) Fuels, oils and other hazardous substances will be handled and stored accordingly to standard safety practices outlined in respective material safety data sheets (MSDS).
- (v) Engineering design of the vibration and sound producing equipment such as generators, compressors and other machineries together with housing of such units be kept in soundproof enclosures with right location design of these units shall be adopted as an effective in minimizing the noise levels and vibration impact.


 Always Remember - Reuse, Reduce & Recycle

- (vi) Emergency response or contingency plan for any accident / incident on the Grid station site should be developed before the operational phase of the project. The same shall be furnished to the EPA within thirty days for approval. Failing which the Grid station shall not be made operative.
 - (vii) A complete code of Health, Safety and Environment (HSE) shall be developed, which should include efficient parameters at specific work place. For this purpose HSE setup should be established and supervised by a designated HSE officer at the senior level with sufficient administrative and technical authority to perform the designated functions. Proponent will make sure that the operating instructions and emergency actions are made available to every worker labor commensurate at the site.
 - (viii) Sludge generated from the fuel storage tanks will be collected, transported and disposed off in environmentally safe manner. Details of standard operating procedure for disposal of oily sludge will be submitted to the EPA.
6. This approval and any considerations thereof shall be treated as null and void if the conditions mentioned in para-5 above, are not complied with.
 7. The proponent shall be liable for compliance of EIA/IEE Regulations, which direct for condition for approval, confirmation of compliance, entry, inspection and monitoring.
 8. This approval does not absolve the proponent of the duty to obtain any other approval or consent that may be required under any law in force.
 9. The approval is accorded only for the project activity described in the EIA Report. Proponent shall submit separate EIA or IEE as required under regulation for any enhancement or change in the design of project.
 10. Implementation Report of all the mitigation measures and EMP laid down in the EIA report shall be ensure by HESCO. No violation of any regulations, rules, instruction and provision of SEP Act, 2014, shall be made and in case of any such violation of the rules/laws in the approval shall stand cancelled without any further notice.


Naeem Ahmed Mughal
Director General

Annex IV

PHOTOGRAPHS



Awareness session on site at 132 Kv Grid station T.G.Ali



Usage of PPE's during Construction at 132 Kv GS T.J.Muhammad



First Aid Box at 132 Kv Grid station Digri



Fire Extinguisher at 132 Kv Grid station T.G.Ali

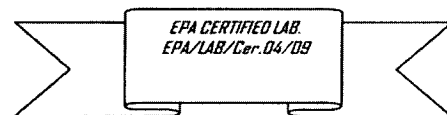
PHYSICAL PROGRESS

Sr. No.	Name of Sub-project	Construction of Grid station (Switch yard, control room) Percentage %	Total No. Of Locations (Towers)	No. Tower Foundations Concerted	No. Towers Erected
1	Construction of 132 Kv Grid Station Tando Ghulam Ali and Allied Transmission Line	85 %	102	84	79
2	Construction of 132 Kv Grid Station Digri and Allied Transmission Line	90%	98	81	79
3	Construction of 132 Kv Grid Station Tando Jan Muhammad and Allied Transmission Line	85%	54	31	0

AIR AND WATER ANALYSIS REPORTS



Environmental Research Center
Department of Earth & Environmental Sciences
Bahria University Karachi Campus



Lab. Rpt. Rf No.: 12254/ACC/ERCBUKC/2016

Invoice/ Bill No.: 7926/TBS/ERCBUKC/2016

Reporting date: 29-February-2016

Report to: M/s Construction Project Management
132KV, Grid Station, Tando Ghulam Ali,
Sindh-Pakistan.

sampling date: 27-February-2016

sampling time: 1430 hrs PST (+5GMT)

sample receiving date (at ERC): 27-February-2016

sample receiving time (at ERC): 2000 hrs PST (+5GMT)

Attention: Mr. Asif Butt/Consultant CPM
Tel. # (+92) 0334 5899635

Page: 1 of 1

Sample ID: Ambient Air- 132KV Grid
Sample Description: Ambient Air Quality Monitoring- 132KV Grid Tando Ghulam Ali
Sample Type: Air/ Composite Samples
Sample Collected/Submitted by: Environmental Research Center's (ERC) Representative
Process Descriptions: Mentioned below
Analyte Descriptions: National Ambient Air Quality Standards (NAAQS) Parameters

ANALYTICAL TEST REPORT

Sr #	Parameters/ Analytes Description	NAAQS Limits ¹	Units	Results		
				Minimum	Maximum	Average
1	Sulphur Dioxide (SO ₂)	120.0	µg/m ³ / 24 hrs	1.0	4.0	2.0
2	Nitrogen Oxide (NO)	40.0	µg/m ³ / 24 hrs	13.0	22.0	18.0
3	Oxides of Nitrogen (NO ₂)	80.0	µg/m ³ / 24 hrs	23.0	38.0	29.0
4	Carbon Mono Oxide (CO)	5.0	mg/m ³ / 8 hrs	1.0	2.0	1.4
5	Suspended Particulate Matters (SPM)	500.0	µg/m ³ / 24 hrs	36.0	87.0	57.0
6	Particulate Matter (PM ₁₀)	150.0	µg/m ³ / 24 hrs	21.0	37.0	29.0
7	Particulate Matter (PM _{2.5})	35.0	µg/m ³ / 24 hrs	11.0	19.0	14.0
7	Ozone (O ₃)	130.0	µg/m ³ / 24 hrs	17.0	25.0	21.0

¹ * NAAQS= National Ambient Air Quality Standards (The Gazette of Pakistan Registered No. M-30/L-7646, Part-II, pg-3205-06, Nov. 26, 2010).

Comments: Tested analyte concentrations meets the NEQS limits.

Sample Analyzed by: Mr. Muhammad Ghufuran

Name of Scientific Officer/AP: Mr. Mughal Sharif

Signature of Incharge of the Environmental Lab: _____

Name: Dr. Yasmin Nergis

Environmental Research Centre
Bahria University Karachi Campus
Dated: 29-2-16

Terms & Condition:

- Report is valid for current batch (sample).
- This Report is not valid for any other certification/ publication or judicial purposes.

The remaining portion of the sample (s) will be discard after seven (7) days unless otherwise instructed.



Environmental Research Center
Department of Earth & Environmental Sciences
Bahria University Karachi Campus

EPA CERTIFIED LAB.
EPA/LAB/Cer.04/09

Lab. Rpt. Rf. No.: 12253/ACC/ERCBUKC/2016
Invoice/ Bill No.: 7926/TBS/ERCBUKC/2016

Reporting date: 29-February-2016

Report to: M/s Abdullah Construction Company
132KV, Grid Station, Digree,
Sindh-Pakistan.

sampling date: 27-February-2016
sampling time: 1330 hrs PST (+5GMT)
sample receiving date (at ERC): 27-February-2016
sample receiving time (at ERC): 2000 hrs PST (+5GMT)

Attention: Mr. Asif Butt/Consultant ACC
Tel. # (+92) 0334 5899635

Page: 1 of 1

Sample ID: Ambient Air- 132KV Grid
Sample Description: Ambient Air Quality Monitoring- 132KV Grid Digree
Sample Type: Air/ Composite Samples
Sample Collected/Submitted by: Environmental Research Center's (ERC) Representative
Process Descriptions: Mentioned below
Analyte Descriptions: National Ambient Air Quality Standards (NAAQS) Parameters

ANALYTICAL TEST REPORT

Sr #	Parameters/ Analytes Description	NAAQS Limits* ¹	Units	Results		
				Minimum	Maximum	Average
1	Sulphur Dioxide (SO ₂)	120.0	µg/m ³ / 24 hrs	0.83	1.0	0.93
2	Nitrogen Oxide (NO)	40.0	µg/m ³ / 24 hrs	0.75	1.0	0.91
3	Oxides of Nitrogen (NO ₂)	80.0	µg/m ³ / 24 hrs	47.0	79.0	71.0
4	Carbon Mono Oxide (CO)	5.0	mg/m ³ / 8 hrs	0.6	1.0	0.8
5	Suspended Particulate Matters (SPM)	500.0	µg/m ³ / 24 hrs	40.0	81.0	63.0
6	Particulate Matter (PM _{10µ})	150.0	µg/m ³ / 24 hrs	18.0	29.0	24.0
7	Particulate Matter (PM _{2.5µ})	35.0	µg/m ³ / 24 hrs	7.0	13.0	9.0
7	Ozone (O ₃)	130.0	µg/m ³ / 24 hrs	5.0	8.0	7.0

* NAAQS= National Ambient Air Quality Standards (The Gazette of Pakistan) Registered No. M-30/L-7646, Part-II, pg-3205-06, Nov. 26, 2010

Comments: Tested analyte concentrations meets the NEQS limits.

Sample Analyzed by: Mr. Muhammad Ghufraan

Name of Scientific Officer/AP: Mr. Mughal Sharif

Signature of Incharge of the Environmental Lab:

Environmental Research Centre
Bahria University Karachi Campus
Dated: 29-2-16

Name: Dr. Yasmin Nergis

Terms & Condition

- Report is valid for current batch (sample)
- This Report is not valid for any other certification/ publication or judicial purposes.

The remaining portion of the sample (s) will be discarded after seven (7) days unless otherwise instructed.

13- National Stadium Road, Karachi-75260 (PAKISTAN), Tel. #: (+9221) 99240002-6 (Ext. 329) Fax #: (+9221) 99240351
URL: www.bukc.bahria.edu.pk, Email: ercbu@bimcs.edu.pk



Environmental Research Center
Department of Earth & Environmental Sciences
Bahria University Karachi Campus



Lab. Rpt. Rf. No.: 12252/U&C/ERCBUKC/2016
Invoice/ Bill No.: 7965/TBS/ERCBUKC/2016

Reporting date: 29-February-2016

Report to: M/s Usman & Company
132KV, Grid Station, Tando Jan-
Muhammad, Sindh-Pakistan.

sampling date: 27-February-2016
sampling time: 1230 hrs PST (-5GMT)
sample receiving date (at ERC): 27-February-2016
sample receiving time (at ERC): 2000 hrs PST (-5GMT)

Attention: Mr. Asif Butt/Consultant Usman & Co.
Tel. # (+92) 0334 5899635

Page: 1 of 1

Sample ID.: Ambient Air- 132KV Grid
Sample Description: Ambient Air Quality Monitoring- 132KV Grid Tando Jan Muhammad
Sample Type: Air/ Composite Samples
Sample Collected/Submitted by: Environmental Research Center's (ERC) Representative
Process Descriptions: Mentioned below
Analyte Descriptions: National Ambient Air Quality Standards (NAAQS) Parameters

ANALYTICAL TEST REPORT

Sr #	Parameters/ Analytes Description	NAAQS Limits ¹	Units	Results		
				Minimum	Maximum	Average
1	Sulphur Dioxide (SO ₂)	120.0	µg/m ³ / 24 hrs	0.52	1.0	0.66
2	Nitrogen Oxide (NO)	40.0	µg/m ³ / 24 hrs	0.47	1.0	0.72
3	Oxides of Nitrogen (NO ₂)	80.0	µg/m ³ / 24 hrs	22.8	78.0	71.0
4	Carbon Mono Oxide (CO)	5.0	mg/m ³ / 8 hrs	BDL	BDL	BDL
5	Suspended Particulate Matters (SPM)	500.0	µg/m ³ / 24 hrs	99.0	124.0	106.0
6	Particulate Matter (PM _{10p})	150.0	µg/m ³ / 24 hrs	37.0	67.0	49.0
7	Particulate Matter (PM _{2.5p})	35.0	µg/m ³ / 24 hrs	9.0	21.0	17.0
7	Ozone (O ₃)	130.0	µg/m ³ / 24 hrs	8.0	13.0	10.0

¹ NAAQS- National Ambient Air Quality Standards (The Gazette of Pakistan) Registered No. M-30/L-7646, Part-II, pg-3201-06, Nov. 26, 2010
Comments: Tested analyte concentration meets the NEQS limits.

Sample Analyzed by: Mr. Muhammad Ghufraan *M. Ghufraan*

Name of Scientific Officer/AP: Mr. Mughal Sharif *M. Mughal Sharif*

Signature of Incharge of the Environmental Lab:

Name: Dr. Yasmin Nergis

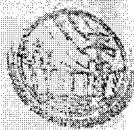
Y. Nergis
Environmental Research
Bahria University Karachi
Dated: 29-02-16

Notes & Comments:

Report is valid for current batch (sample)

This Report is not valid for any other certification/ publication or judicial purposes.

National Stadium Road, Karachi-75260 (PAKISTAN), Tel. #: (+9221) 99240002-6 (Ext. 329) Fax #: (+9221) 99240351
URL: www.bukc.bahria.edu.pk, Email: ercbu@bimex.edu.pk



PAKISTAN WATER AND POWER DEVELOPMENT BOARD
SOILS MONITORING ORGANIZATION HYDERABAD
SUMMARY OF WATER QUALITY ANALYSIS

Ref: <u>Ref Environment Engineer</u>				Sample Collected By: <u>Contractor</u>														
Sr. No.	Lab. No.	Date	Source	Depth	MILLIEQUIVALENTS PER LITRE								TDS ppm	EC μ S/cm	pH	RSC Meq/L	SAR	Remarks
					Ca	Mg	Na	HCO ₃	Cl	SO ₄	Total							
				Time run							Cations	Anions						
1	01	21 ⁰⁴ / ₁₆	ground		1.1	2.3	7.3	0.9	4.1	5.7	10.7	10.7	605	175	7.4	-	5.6	Usable
2	Tando Feroz																	water
3	132-KV Grid																	
4	Station																	
5																		

Sr. No.	Sample	EC	TDS/PPM	P.H	RSC	SAR
1	Ground	175	605	7.4	-	5.6
2	Water					
3						
4						
5	Water Sample					

RSC: Residual Sodium Carbonate (—)

SAR: Sodium Absorption Ratio (5.6)

WATER QUALITY

Usable TDS/PPM - 0 1000 (PPM)

Marginal " 1000 2000 (PPM)

Hazards " >2000 (PPM)

[Signature]

Water & Soil WAPDA
Laboratory SMO, Hyderabad

PAKISTAN RAILWAY AND POWER DEVELOPMENT AUTHORITY
SCARPS MONITORING ORGANIZATION

Summary of Water Analysis Results

Longman

No.	Loc.	Milliequivalents per Liter										Total		Hardness	pH
		Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SO ₄	NO ₃	F	Calcium	Magnesium		
1	Longman	14.0	15.0	52.4	—	—	8.0	25.0	48.4	—	—	81.4	81.4	—	7.1

Water

No.	Loc.	EC	TDS	Hardness	Alkalinity	Corrosivity	Remarks
1	Longman	4475	4475	4475	4475	4475	Highly Corrosive

As per Test water is highly corrosive.
Drinking & Not for Cattle Feed



PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
SCARPS MONITORING ORGANIZATION HYDERABAD
SUMMARY OF WATER QUALITY ANALYSIS

Ref: Environment Engineer

Water Sample Collected by: [Signature]

Ref:		Sample Collected By:																	
Sr. No.	Lab. No.	Date	Source	Depth	MILLIEQUIVALENTS PER LITRE								TDS ppm	EC μ S/cm	pH	RSC Meq/L	SAR	Remarks	
					Ca	Mg	Na	HCO ₃	Cl	SO ₄	Total								
				Time run							Cations	Anions							
1	01	30 ³ / ₁₆	Tank	1	1.8	0.7	2.7	1.3	1.5	2.8	5.6	5.6	313	505	6.7	-	2.6	water	
2			water															water	
3			Tando Ghadam																
4			Ali																
5			KV-132 Grid Station																

Sr. No.	Sample	E.C	TDS/PPM	P.H	RSC	SAR
1	water	505	313	6.7	-	2.6
2	as per Test water is usable					
3	for Drinking / construction					
4	Above Test value only for					
5	Monthly					

RSC: Residual Sodium Carbonate (—)

SAR: Sodium Absorption Ratio (2.6)

WATER Quality

Usable TDS/PPM - 0 1000 (PPM) ✓

Marginal " 1000 2000 (PPM)

Hazards " > 2000 (PPM)

[Signature]

Water & Soil WAPDA
Laboratory SMO, Hyderabad