



**USAID**  
FROM THE AMERICAN PEOPLE



# ENERGY POLICY PROGRAM

## ENVIRONMENTAL DOCUMENTATION FORM / ENVIRONMENTAL MITIGATION AND MONITORING PLAN - TRANSMISSION ACTIVITIES



May 2014

This report is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of Advanced Engineering Associates International Inc. (AEAI) and do not necessarily reflect the views of USAID or the United States Government (USG).

# ENERGY POLICY PROGRAM

## ENVIRONMENTAL DOCUMENTATION FORM / ENVIRONMENTAL MITIGATION AND MONITORING PLAN - TRANSMISSION ACTIVITIES

Contract No: AID-EPP-I-00-03-00004

Order No: AID-391-TO-12-00002

©USAID Energy Policy Program  
House 4, Street 88, Sector G-6/3  
Ataturk Avenue, Islamabad, Pakistan  
Tel: +92 (51) 835 7072, Fax: +92 (51) 835 7071  
Email: [jhicks@aeai.net](mailto:jhicks@aeai.net)



### DISCLAIMER

The contents of this report are the sole responsibility of AEAI and do not necessarily reflect the views of USAID or the USG.

# Contents

Acronyms.....	iv
Environmental Documentation Form.....	v
1. Introduction.....	8
1.1 Need of the Project.....	8
1.2 Description of the Activities.....	8
1.3 Structure of Report.....	9
1.4 Decommissioning and Disposal of Materials.....	10
1.5 Diary of Activities.....	10
1.6 Study Team.....	11
2. Policy and Statutory Requirements.....	12
2.1 Legislative and Regulatory Framework.....	12
2.1.1 National Requirements.....	12
2.1.2 United States Requirements.....	13
2.1.3 Best Industry Practices for Environmentally Sound Design.....	13
3. Description of the Environment.....	15
3.1 Project Area.....	15
3.1.1 General Characteristics of Project Area.....	15
3.2 Physical Resources.....	15
3.2.1 Topography, Geography, Geology, and Soils.....	15
3.2.2 Climate.....	15
3.2.3 Surface Water.....	15
3.2.4 Air Quality.....	15
3.2.5 Noise and Vibration.....	16
3.3 Ecological Resources.....	16
3.3.1 Wildlife, Fisheries and Aquatic Biology.....	16
3.3.2 Vegetation Cover and Trees.....	16
3.3.3 Protected areas / National Sanctuaries.....	16
3.4 Economic Development.....	16
3.5 Social and Cultural Resources.....	17
3.6 Language.....	17
3.7 Religion.....	18
3.8 Education.....	18
3.9 Sports.....	18

3.10	Project Location Map.....	19
4.	Screening Potential Environmental Impacts and Mitigation Measures .....	23
4.1	Impact Assessment and Mitigation .....	23
4.2	General Approach to Mitigation .....	23
4.3	Cultural Heritage, Mosques, Religious Sites, and Social Infrastructure .....	24
4.4	Potential Environmental Impacts during Design, Construction and Operation Stage .....	24
4.4.1	Social Impacts .....	24
4.4.2	Waste Disposal .....	24
4.4.3	Pollution from Oily Run-off, Fuel Spills and Dangerous Goods .....	24
4.4.4	Cut and Fill and Waste Disposal.....	25
4.4.5	Soil Contamination.....	25
4.4.6	Encroachment, Landscape and Physical Disfiguration .....	25
4.4.7	Trees, Ecology and Protected Areas.....	25
4.4.8	Hydrology, Sedimentation, Soil Erosion.....	25
4.4.9	Air Pollution from Earthworks and Transport.....	25
4.4.10	Noise, Vibration and Blasting.....	26
4.5	National Environmental Quality Standard (NEQS- 2000) .....	26
4.6	Monitoring.....	27
4.7	Training Requirements .....	27
4.8	Occupational Safety Measures.....	27
4.9	Staffing .....	28
4.10	Responsibilities .....	28
4.11	Reporting .....	29
4.12	Budgetary Estimates .....	29
5.	References.....	41
	Annex I: IEE of the Proposed Activity .....	44
	Annex II: Waste Management Companies .....	69
	Annex III: Typical Occupational Health and Safety Procedures .....	73
	Annex IV: Environmental and Social Monitoring Report–Sample.....	104
	Annex V: PCB Test Report.....	110
	Annex VI: Material Safety Data Sheet Transformer Oil.....	112

## List of Tables

Table 1: National Standard on Noise.....	26
Table 2: Estimated Generated Waste from Each Activity .....	30
Table 3: Handling and Storage of Waste.....	32
Table 4: Disposal of Waste .....	34
Table 5: Environmental Mitigation and Monitoring Plan.....	35
Table 6: Proposed Training Program .....	39
Table 7: Indicative Budget for Monitoring and Management Plan.....	39

## List of Figures

Figure 1: Project Location Map .....	20
Figure 2: Satellite Image of the PESCO .....	21
Figure 3: Replacement Activities Pictures.....	22

# Acronyms

\$	US Dollar
AEAI	Advanced Engineering Associates International
CFR	Code for Federal Regulation
EDF	Environmental Documentation Form
EIA	Environmental Impact Assessment
EMMP	Environmental Mitigation and Monitoring Plan
EPA	Environmental Protection Agency
ERR	Environmental Review Report
GOP	Government of Pakistan
HDI	Human Development Index
HSE	Health Safety and Environment
IEE	Initial Environmental Examination
KPK	Khyber Pakhtunkhwa
kV	Kilo Volt
MW	Megawatt
O&M	Operations and Maintenance
OHS	Occupational Health and Safety
PERSUAP	Pesticide Evaluation Report and Safer Use Action Plan
PPE	Personal Protective Equipment
RE	Resident Engineer
SRs	Sensitive Receptors
SWM	Solid Waste Management
USAID	United States Agency for International Development
USG	Government of United States of America
WAPDA	Water and Power Development Authority

# Environmental Documentation Form

## Energy Policy Program (EPP)

*Activity: EPP's Transmission Activities (NTDC, PESCO & Live Line Training)*

### A. Applicant Information

Contractor /Grantee (organization)	AEAI-EPP	Parent grant or project	Energy Policy Program (EPP)
Individual contact and title	Mr. Sadaf Iqbal, (Environmental Expert)	Address, phone and email: House # 04, Street # 88, G-6/3, Islamabad +92 51- 8357072, <a href="mailto:siqbal@ep-ep.com.pk">siqbal@ep-ep.com.pk</a>	
Activity (brief description)	<p>On request of Government of Pakistan (GoP), the Government of United States of America (USG) through United States Agency for International Development (USAID) is considering to fund \$19 million for upgrading, replacing and rehabilitating Transmission Infrastructure by removal of existing bottlenecks, introduction of improved business practices and through provision of various Capacity Building programs. This will add to the reliability and sustainability and enhance the life of transmission system. The activities will be implemented through the USAID Energy Policy Program (EPP).</p> <p>This will add to the reliability and sustainability and enhance the life of the transmission system. The following list encompasses the activities identified for USAID funding under EPP's Transmission Component:</p> <ul style="list-style-type: none"> <li>• PESCO turnaround DISCO Transmission Improvement</li> <li>• Transmission system studies performance improvement</li> <li>• Real Time Digital Simulator (RTDS) for DC and AC transmission system.</li> <li>• NTDC capacity building</li> <li>• Staff training</li> <li>• Live line training at DISCOs</li> </ul>		Amount: <b>USD 19 million</b>
Location of activity:	<b>Transmission Activities under EPP</b>		Start and end date of activity <b>Nov. 2012 – Sep. 2015</b>

## B. Activities, Screening Results, and Recommended Determination

Proposed Sub-activities	Screening result			Recommended Determinations (Complete for all moderate and high-risk activities)		
	Very Low Risk	Moderate Risk	High Risk	No significant adverse impact	With specified mitigation, no significant adverse impact,	Significant Adverse impact
1. Staff Training NPCC	√			√		
2. Live line Training at DISCOs	√			√		
3. Governance	√			√		
4. Power Planning NTDC Capacity Building	√			√		
5. Civil Works	√			√		
6. Procurement of equipment		√			√	
7. Transportation of equipment		√			√	
8. Removal of installed equipment and installation of new equipment		√			√	
9. Repair of existing equipment		√			√	
10. Disposal of waste and replaced material and equipment		√			√	

## C. Summary of Recommended Determinations

The activity contains:	<i>(equivalent regulation 216 terminology)</i>
<input checked="" type="checkbox"/> Very low risk sub-activities	1. Procurement of equipment 2. Staff training 3. Live line Training 4. Power Planning NTDC Capacity Building 5. Governance Categorical exclusion per 22 CFR 216.2 c(1)(i) and (c)(2)(i)
<input type="checkbox"/> After environmental review, sub-activities determined to have <b>no significant adverse impacts</b>	<i>Negative determination(s)</i>
<input checked="" type="checkbox"/> After environmental review, sub-activities determined to have <b>no significant adverse impacts, given appropriate mitigation and monitoring</b>	1. Transportation of equipment 2. Removal of installed equipment and installation of new equipment 3. Repair of existing equipment 4. Disposal of waste and replaced material and Equipment 6. Civil works Negative determination(s) with conditions per 22 CFR 216.3 (a)(2)(iii)
<input type="checkbox"/> After environmental review, sub-activities determined to have <b>significant adverse impacts</b>	<i>Positive determination(s)</i>

**Confidential information redacted**

# I. Introduction

On request of Government of Pakistan (GoP), the Government of United States of America (USG) through United States Agency for International Development (USAID) is considering to fund \$19 million for upgrading, replacing and rehabilitating Transmission Infrastructure by removal of existing bottlenecks, introduction of improved business practices and through provision of various Capacity Building measures. This will add to the reliability and sustainability and enhance the life of transmission system. The activities will be implemented through the USAID Energy Policy Program (EPP).

This document presents the Environmental Documentation Form (EDF) of EPP's transmission activities. The EDF has been developed by EPP's Environmental and technical team.

## I.1 Need of the Project

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

## I.2 Description of the Activities

In 1998, Pakistan Electric Power Company (PEPCO) was created to manage the unbundling of Water and Power Development Authority (WAPDA)'s assets. They were broadly divided into three sections: a transmission company (NTDC), generation companies (GENCOs) and power distribution companies (DISCOs). The GENCOs and WAPDA sell their electricity to the National Transmission and Despatch Company (NTDC)<sup>1</sup>. This electricity is transmitted downstream to DISCOs, for onward distribution and billing of end consumers covering their respective geographic regions.

National Transmission & Despatch Company (NTDC) Limited was incorporated on November 6, 1998 and started commercial operation on December 24, 1998. It was organized to take over the properties, rights and assets obligations and liabilities of 220 kV and 500 kV grid stations and transmission lines/network owned by WAPDA. NTDC operates and maintains twelve 500 kV and twenty nine 220 kV grid stations, 5,077 km of 500 kV transmission line and 7,956 km of 220 kV transmission lines in Pakistan.

Peshawar Electric Supply Company (PESCO) located in Peshawar provides service of power distribution to over 2.6 million consumers of all civil districts of Khyber Pakhtunkhwa (KPK), Pakistan. PESCO maintains KPK's electricity distribution system via 132, 66, 33 kV sub-transmission lines, sub-stations and 11 kV & 440 V low tension lines with distribution transformers that deliver electricity to commercial and domestic users.

Over the time the Transmission network at both PESCO and NTDC have deteriorated due to lack of maintenance, no investment in network expansions and in augmentations of overloaded installed Infrastructure. The lack of maintenance and poor system operating practices have created serious constrains on the transmission system's ability to safely and effectively move electrical energy from the generation plants to the distribution companies.

---

<sup>1</sup> which acts as a single buyer and is responsible for the entire transmission network

The following activities have been identified for USAID funding under EPP's transmission component:

- I. Turnaround DISCO (PESCO)
  - a. Technical Audit:
  - b. Power Transformer Program:
    - i. Oil Sampling
    - ii. Power Transformer Repair
    - iii. Provision of New Power Transformers
    - iv. Provision of Cooling Fans
  - c. Repair of Transmission Line Towers
  - d. Capacitor Bank Rehabilitation
  - e. Telemetry
  - f. Provision of Circuit Breakers
  - g. Provision of Tools & Plants (T&P)
  - h. Reactive Power Compensation Study
2. National Transmission and Despatch Company (NTDC)
  - a. Provision of Secured Metering System (SMS) Panels
  - b. IT Support for the Extension of SMS to DISCOs
  - c. Repair of Auto Transformers
  - d. Provision of New Auto Transformers
  - e. Provision of Enterprise Resource Planning (ERP) System
  - f. Technical Audit of NTDC Substations
  - g. Trainings at NPCC
3. Live Line Training Program

### 1.3 Structure of Report

This EDF 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 Environmental Review Report (ERR) 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.

## 1.4 Decommissioning and Disposal of Materials

Decommissioning and disposal of discarded material from the project will be recycled and reused within NTDC and PESCO systems. No waste will be generated that can be classified as hazardous and requires special disposal. In case of replacement of any old transformers, circuit breaker, capacitor bank and electric tower, the equipment is not to be disposed-off or discarded and will be recycled and reused within the NTDC and PESCO systems.

As a policy, WAPDA has stopped using transformers that contain PCBs since 1969<sup>2</sup>.

## 1.5 Diary of Activities

Following is a brief description of the work plan followed for the assignment:

*Document Review:* At the start of the assignment, the Environmental Team requested the concerned department for all relevant documents. The available documents were reviewed by the team. From the review, potential environmental, social, waste disposal, and occupational safety issues at each site were identified.

*Site Visit:* Visits to the PESCO and NTDC grid stations, transmission lines and offices were made during March 2014. The activities undertaken during the visits included:

- Meetings with PESCO and NTDC staff:
  - Naushad Ali, Resident Engineer (RE), PESCO
  - Malik Riffat Hussain, Manger P.T.E.S.U, Pakistan WAPDA Foundation
  - Mahar Khalid Mahmood, Director Environment and Social Cell, NTDC
  - Muhammad Shahid Saleem, Assistant Director Environment and Social Cell, NTDC
  - Ifran Hashmi, Production Manager, PEL
  - Atta-ur-Rehman, DG IT, CPPA, NTDC
- Walk through of the grid station and transmission sites to inspect all the equipment and sites where rehabilitation work will be carried out.
- General review of the existing site conditions and Occupational Health and Safety (OHS) practices.
- Review of the detailed plans for the proposed repair and rehabilitation activities.

*Waste Management Plan:* The existing practices of environmentally sound waste management and safe disposal of old equipment and spares is a particular focus of the study. During the site visit and subsequently, an inventory of the waste generated during the rehabilitation and repair activities was compiled.

*Preparation of EDF:* Following the visit, the team prepared the EDF as presented in this report.

EPP's team visited the grid stations and transmission sites, specifically where the repair, rehabilitation and maintenance activities under USAID Energy Policy Program will be performed which include:

- PESCO Turnaround DISCO Transmission Improvement
- Transmission System Studies - Review of NTDC and DISCOs 500,220,132,66 kV Network, Data Collection, Technical Audits and Performance Improvement Action Plan

---

<sup>2</sup> ADB IEE Report (Power Distribution Enhancement MFF Project PESCO Oct. 2012), Annexure V: Transformer Oil PCB Free Test Report

- RTDS for DC and AC Transmission System at NTDC
- Power Planning NTDC Capacity Building
- Staff Training
- Live Line Training at DISCOs

During the visit, the team reviewed the existing site conditions, measures adopted to mitigate environmental impacts, OHS practices, and the associated operational procedures for the site operation. It was observed that the overall Health, Safety and Environment (HSE) situation was miserable. There were no safety signs and the necessary warning in local languages, which can be comprehended by the lower level staff, senior management and anyone working the area. There were obvious signs of oil spills. The fire extinguishing equipment was not properly labeled; with no clear mention of the expiry dates, last refill date and the due date for the refill.

It was observed that none of the staff conducting the operations was wearing the required Personal Protective Equipment (PPE's). No senior management representative was present to monitor the activities, which may lead to risks and increase the chances of errors.

The team also visited the waste disposal site, storage area and warehouse<sup>3</sup> at the PESCO grid stations. During the warehouse visit it was observed that all there was a proper record maintained of all the present equipment and previous records as well. The waste material was segregated, and where necessary, was labeled with signs of care or danger, whichever the case may be.

Based on the field visit and desk review, this EDF has been developed.

## 1.6 Study Team

The study team includes the following:

1. Mr. Sadaf Iqbal, Environmental Expert and Team Leader
2. Mr. Moazzam Shafique, Project Technical Assistant

---

<sup>3</sup> The warehouse which will be used for the storage of the replaced equipment/ spares (copper windings, metals and rubber seals, electronic parts etc.)

## 2. Policy and Statutory Requirements

### 2.1 Legislative and Regulatory Framework

#### 2.1.1 National Requirements

The project shall comply with following regulatory and other requirements of Government of Pakistan:

1. Pakistan Environmental Protection Act, 1997 <http://www.environment.gov.pk/act-rules/Brief-PEPA-Act1997.pdf>
2. National Quality Standards Regulation, 2000 <http://www.environment.gov.pk/NEQS/neqs2000.pdf>
3. Self Monitoring and Reporting by Industry Rule, 2001 [http://www.environment.gov.pk/NEQS/selfmon\\_ru01.pdf](http://www.environment.gov.pk/NEQS/selfmon_ru01.pdf)
4. Pakistan IEE/EIA Regulation, 2000 <http://www.environment.gov.pk/act-rules/IEE-EIA-REG.pdf>
5. Hazardous Substances Rules, 2003 [http://www.environment.gov.pk/pro\\_pdf/HAZ-RU03.pdf](http://www.environment.gov.pk/pro_pdf/HAZ-RU03.pdf)
6. Sectoral Guidelines for Environmental Reports—Major Thermal Power Stations, 1997 [http://www.environment.gov.pk/eia\\_pdf/h\\_Power.pdf](http://www.environment.gov.pk/eia_pdf/h_Power.pdf)
7. Draft Guidelines for Solid Waste Management, 2005 <http://www.environment.gov.pk/EA-GLines/SWMGLinesDraft.pdf>
8. Environmental, Health, and Safety General Guidelines in Pakistan is “The Factories Act, 1934 as amended to 1997” <http://www.ilo.org/dyn/natlex/docs/VWEBTEXT/35384/64903/E97PAK01.htm>

The Pakistan Environmental Protection Act 1997 requires that initial environmental examination or environmental impact assessment shall be carried out for every ‘project’. The types of project for which the requirement is applicable are listed in *Pakistan Environmental Protection Agency Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Procedures 2000*. The definition of the project under the law includes both construction of a new project and modification to an existing project. There is no definition in the law on the level of modification which defines the threshold after which the IEE or EIA requirement is applicable on a modification project. However, the practice that is followed is that if the modification results in substantial change in the emission, effluent, waste generation, production, or use of natural resources, the IEE or the EIA, as appropriate shall be carried out. Based on this no IEE or EIA shall be required for the proposed activities under the national law since the proposed activities are designed to restore.

Pakistan Environmental Protection Agency (PAK-EPA) in August 2000 issued "Policy and Procedures for Filing, Review and Approval of Environmental Assessment. Schedules A, B and C define the type of development projects requiring IEE or EIA and Projects not requiring the IEE and EIA respectively”.

EPP Transmissions activities, repair of power transformers & transmission line towers, and installation of new cooling fans, repair of circuit breakers & telemeters at various grid stations of PESCO. Our activities mainly concern removal of network bottlenecks and adding reliability to the transmission grid. In addition to these activities, EPP is looking to enhance human capacity of operation & maintenance crews by providing appropriate trainings and necessary tools (and testing equipment).

As per the above scope of the activity transmission activity falls under schedule C “projects promoting energy efficiency” which, according to local legislation does not requiring the IEE and EIA.

## 2.1.2 United States Requirements

The United States laws require that all activities financed by USAID shall comply with the requirement of the US law 22 CFR 216. The IEE (OAPA Tracking #: OAPA-13-Nov-PAK-0003) for the proposed activities (see Annex I) were prepared by USAID in compliance with this requirement. The EDF is a key tool to implement the recommendations of the IEE.

To promote pesticide safety, the USAID environmental regulations require that for any pesticide, or any chemical that can also be used as pesticide, a Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) shall be prepared. USAID has prepared a program level PERSUAP for its activities in Pakistan. It is unlikely, that the project will require any chemical that is regulated by PERSUAP. If any chemical required by the project falls in the regulated category, management of transmission activities under EPP shall inform USAID. As a policy, WAPDA has stopped using transformers that contain PCBs since 1969<sup>4</sup>.

### 2.1.2.1 Categorical Exclusion

Per the Approved USAID IEE (OAPA Tracking #: OAPA-13-Nov-PAK-0003) Categorical exclusions per 22 CFR 216.2 (C) (2) (i) has determined the action does not have an effect on the natural and physical environment e.g. Research activities, Education, Technical assistance, training programs, controlled experimentation, Analysis, research workshops and meetings, Documents and information transfers.

### 2.1.2.2 Negative Determination with Condition

Per the Approved USAID IEE (OAPA Tracking #: OAPA-13-Nov-PAK-0003) Negative Determination with Condition per 22 CFR 216.3 (a) (2) (iii) A Positive Threshold Decision shall result from a finding that the proposed action will have a significant effect on the environment. An Environmental Impact Statement shall be prepared if required pursuant to 216.7. If an impact statement is not required, an Environmental Assessment will be prepared in accordance with 216.6. The cognizant Bureau or Office will record a Negative Determination if the proposed action will not have a significant effect on the environment.

## 2.1.3 Best Industry Practices for Environmentally Sound Design

The Implementer shall ensure that:

1. All activities including repair and replacement activities will be implemented in accordance with the Pakistani environmental OHS, regulations, standards, norms and guidelines and national obligations under ratified international environmental agreements (see: <http://www.environment.gov.pk>) and in their absence in accordance with the best international practice appropriate to the seismicity levels in Pakistan and in the respective districts; these should be acceptable to USAID.
2. Asia Environmental Guideline at, <http://www.usaid.gov/our-work/environment/compliance/ane/guidelines.htm>;
3. Environmental Guidelines for Small Scale Activities in Africa, 2nd edition as provided at <http://www.encapafrika.org>
4. IFC Environmental, Health and Safety Guidelines as provided <http://www.ifc.org/ifcext/sustainability.nsf/Content/EnvironmentaiGuidelines>

---

<sup>4</sup> ADB IEE Report (Power Distribution Enhancement MFF Project PESCO Oct. 2012), Annexure V: Transformer Oil PCB Free Test Report

5. World Bank 1999 Pollution Prevention and Abatement Handbook as provided at [http://www-wds.worldbank.org/external/default/main?pagePK=64193027&piPK=64187937&theSitePK=523679&menuPK=EI418751O&searchMenuPK=64187283&siteName=WDS&entityID=000094946\\_990409050152283](http://www-wds.worldbank.org/external/default/main?pagePK=64193027&piPK=64187937&theSitePK=523679&menuPK=EI418751O&searchMenuPK=64187283&siteName=WDS&entityID=000094946_990409050152283);
6. EBRD Sub-sectorial Environmental and Social Guidelines <http://www.ebrd.com/about/policies/enviro/sectoral/>;
7. ADB Environmental Guidelines <http://www.adb.org/Water/CFWS/Roadmap-Sectoral-Guidelines.pdf>;
8. World Bank Environmental Assessment Handbook and Updates <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTENVASS/0,,contentMDK:20282864-pagePK:148956-piPK:216618theSitePK:407988,00.html>
9. US Code of Federal Regulations, Occupational Safety and Health Standards, 29 CFR 1910. [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_id=9797&p\\_table=STANDARDS](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9797&p_table=STANDARDS)

## 3. Description of the Environment

### 3.1 Project Area

#### 3.1.1 General Characteristics of Project Area

Most of rehabilitation/repair and civil work will be constructed on PESCO's land. Construction of a new transmission line is not involved in the sub project development, as the work only pertains to rehabilitation and repair of tower and existing transmission lines.

### 3.2 Physical Resources

#### 3.2.1 Topography, Geography, Geology, and Soils

KPK Province located in the north-west of the country. No impact is expected on local soils and topography. The soils and subsoil conditions beneath the alignment have not been investigated in detail. In any unexpected event, soft unsuitable soil will have to be removed and replaced with suitable soils and subsequently piled or otherwise made suitable to support the tower/pole construction.

#### 3.2.2 Climate

Geographically the climate of the province could be divided into two zones: the northern one extending from the ranges of the Hindu Kush to the borders of Peshawar basin and the southern one extending from Peshawar to the Derajat Basin. The northern zone is cold and snowy in winters with heavy rainfall and pleasant summers with the exception of Peshawar basin, which is hot in summer and cold in winter. It has moderate rainfall. The southern zone is arid with hot summers and relatively cold winters and scanty rainfall.

Its snow-capped peaks and lush green valleys of unusual beauty have enormous potential for tourism.

#### 3.2.3 Surface Water

##### Irrigation

The irrigation in the project area is mostly dependent on the rivers. The major rivers that irrigate the agricultural land of the project area are that criss-cross the province are the Kabul, Swat, Chitral, Kunar, Siran, Panjkora, Bara, Kurram, Dor, Haroo, Gomal and Zhob with tube wells also used to irrigate the agricultural land.

##### Rivers and Attributes

The major rivers of the project area are that criss-cross the province are the Kabul, Swat, Chitral, Kunar, Siran, Panjkora, Bara, Kurram, Dor, Haroo, Gomal and Zhob.

#### 3.2.4 Air Quality

Air quality in most of the project area appears good based on observation during the study period. Emissions will be controlled at source.. There will be a few items of powered mechanical equipment to be used that may give rise to complaints about dust and other emissions; however, these should be well dissipated. The major sources of complaint will likely be any necessary earthworks and local soil compaction. In comparison, domestic sources of air pollution, such as emissions from wood and kerosene burning stoves as well as from small diesel standby generators in some households, are minor.

### 3.2.5 Noise and Vibration

Noise from vehicles and other powered mechanical equipment in the project area 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. DISCOs have carried out noise level measurements at various sub stations. These were analyzed to calculate Leq values and have resulted in Leq values much below the 85 dBA limit prescribed under the NEQS established by the EPA or the 75 dBA used by DISCOs/NTDC/PEPCO in the equipment specifications. Typical values were: average 46.21 dBA ; high 63.14 dBA and low 34.35 dBA .

## 3.3 Ecological Resources

### 3.3.1 Wildlife, Fisheries and Aquatic Biology

The following aquatic plants, are present : The species were *Alternanthera sessilis* (Linn.) DC., *Azolla pinnata* R. Br., *Bacopa moneiri* (Linn.) Pennell., *Ceratophyllum demersum* Linn., *Eleocharis palustris* (Linn.) R. Brown., *Hydrilla verticillata* Royle., *Marselia quadrifolia* Linn., *Nelumbium nelumbo* (Linn.) Druce., *Nymphoide cristata* (Roxb.) O.Ketze., *Phragmites karka* (Retz.) Trin., *Pistia stratiotes* Linn., *Polygonum barbatum* Linn; *Polygonum flaccidum* Meissn., *Potamogeton crispus* Linn., *Potamogeton nodosus* Poiret, *Spirodela polyrrhiza* (Linn.) Schield, *Typha domenginsis* Pers., *Typha elephantia* Roxb.

### 3.3.2 Vegetation Cover and Trees

The vegetation of the province is composed of shrub jungle with the secondary element of trees and shrubs. The most common plants are *Juniperus squamata*, mulberry and poplars.

There is no wild growth of any bush in the project area. Natural forest cover in the province has been significantly reduced in the past but some of the older clusters of trees are well established and could be considered as semi-naturalized to some extent.

### 3.3.3 Protected areas / National Sanctuaries

In Pakistan, there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. There are no protected areas near the proposed sites.

## 3.4 Economic Development

KPK has the third largest provincial economy in Pakistan. KPK's share of Pakistan's GDP has historically comprised 10.5%, although the province accounts for 11.9% of Pakistan's total population. The part of the economy that KPK dominates is forestry, where its share has historically ranged from a low of 34.9% to a high of 81%, giving an average of 61.56%. Currently, KPK accounts for 10% of Pakistan's GDP, 20% of Pakistan's mining output and, since 1972, it has seen its economy grow in size by 3.6 times. It has the second poorest economy after Balochistan.

After suffering for decades due to the fallout of the Soviet invasion of Afghanistan, today they are again being targeted for a different situation of terrorism.[citation needed]

Agriculture remains important and the main cash crops include wheat, maize, tobacco (in Swabi), rice, sugar beets, as well as fruits are grown in the province.

Some manufacturing and high tech investments in Peshawar have helped improve job prospects for many locals, while trade in the province involves nearly every product. The bazaars in the province are renowned throughout Pakistan. Unemployment has been reduced due to establishment of industrial zones.

### 3.5 Social and Cultural Resources

KPK has the second-lowest Human Development Index (HDI) out of all of Pakistan's provinces, at 0.607. Furthermore, it also continues to have an image problem.

The Awami National Party sought to rename the province "Pakhtunkhwa", which translates to "Land of Pakhtuns" in the Pashto language. This was opposed by some of the non-Pashtuns, and especially by parties such as the Pakistan Muslim League-N (PML-N) and Muttahida Majlis-e-Amal (MMA). The PML-N derives its support in the province from primarily non-Pashtun Hazara regions.

In 2010 the announcement that the province would have a new name led to a wave of protests in the Hazara region. On April 15, 2010 Pakistan's senate officially named the province "Khyber Pakhtunkhwa (KPK)" with 80 senators in favor and 12 opposed.

### 3.6 Language

Languages of KPK Province

- Urdu, the lingua franca being national language is also spoken and understood.
- Pakhto, is the major language, mainly spoken in central districts.
- Hindko, (a Punjabi dialect) is Second Major Language. It is in majority in Hazara Division but also in Peshawar, Kohat and Noshera City centrals
- Saraiki, (a Punjabi dialect) spoken by people in the south specially by people of Districts of DI Khan and Tonk
- Khowar, by people in the north specially in District Chitral
- Standard Punjabi, minority living in the major cities and cantonment areas
- Kohistani, by people from North Malakand and Hazara Divisions
- Gojri minority throughout Northern half of the province.
- Dari/Hazaragi/Farsi/Tajik, varieties of Persian by Afghan refugees
- Other languages include, Kashmiri, Shina, Romani, Burushaski, Wakhi, Balti, Balochi, Brahui, Sindhi and English (official and used in tourism).

The province has an estimated population of about 21 million. The largest ethnic group is the Pashtun, who historically have been living in the areas for centuries. Around 1.5 million Afghan refugees also remain in the province, the majority of whom are Pashtuns followed by Tajiks, Hazaras, and other smaller groups. Despite having lived in the province for over two decades, they are registered as citizens of Afghanistan.

In most rural areas of the centre and south, Pashtun tribes can be found including the Yusufzai, Bangash, Bhattani, Daavi, Khattak, Qazi khail also known as Qaziye Babar, Gandapur, Gharghasht, Marwat, Afridi, Shinwari, Orakzai, Mahsud, Mohmand, Wazir and Bannuchi as well as other tribes of Hazara division\*, Swati, Kakar, Tareen, Jadoon, Tanoli, Gujar, and Mashwani.

There are non-Pashtun tribes including Jat, Mughal, Turks, Karlal, Rajpoot, Dhund Abbasi, Syed, Awan, Kashmiri, Qureshi and Sarrara. The mountainous extreme north includes the Chitral and

Kohistan districts that are home to diverse Dardic ethnic groups such as the Khowar, Kohistani, Shina, Torwali, Kalasha and Kalami.

However in the southernmost district such as Dera Ismail Khan live some of the Baloch tribe: Kori, Buzdar, Kanera, Leghari, Rind and some other sub tribes of Lashari tribe. These Baloch tribes speak Saraiki as their first language. In this southern district, most of its population speaks Saraiki.

### 3.7 Religion

Most of the inhabitants of KPK profess Islam, with a Sunni majority and significant minorities of Shias, Ismailis, and Ahmadis. Many of the Kalasha of Southern Chitral still retain their ancient Animist/Shamanist religion.

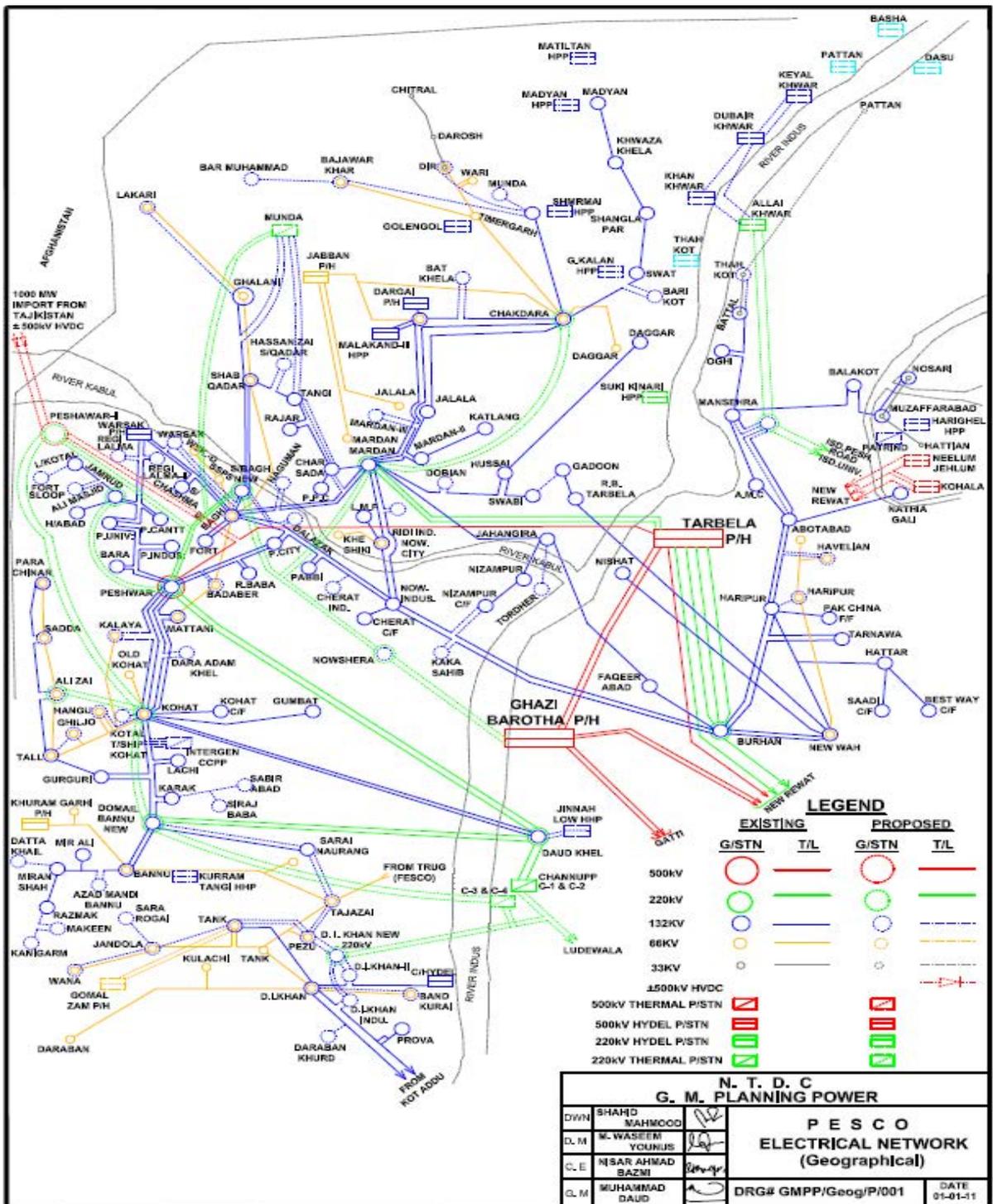
### 3.8 Education

Abbottabad is the only city in KPK with higher literacy rate in province and also in Pakistan, The trend towards higher education is rapidly increasing in the province and the Pakhtunkhwa is home to Pakistan's foremost engineering university (Ghulam Ishaq Khan Institute of Engineering Sciences and Technology), which is in Topi, a town in Swabi district. The University of Peshawar is also a notable institution of higher learning. The Frontier Post is perhaps the province's best-known newspaper and addresses many of the issues facing the population.

### 3.9 Sports

Cricket is the main sport played in KPK. It has created world-class sportsmen like Shahid Khan Afridi, Younus Khan. Besides producing cricket players, Pakhtunkhwa has the honour of being the birthplace of many world-class squash players, including greats like Jansher Khan and Jahangir Khan.

### 3.10 Project Location Map



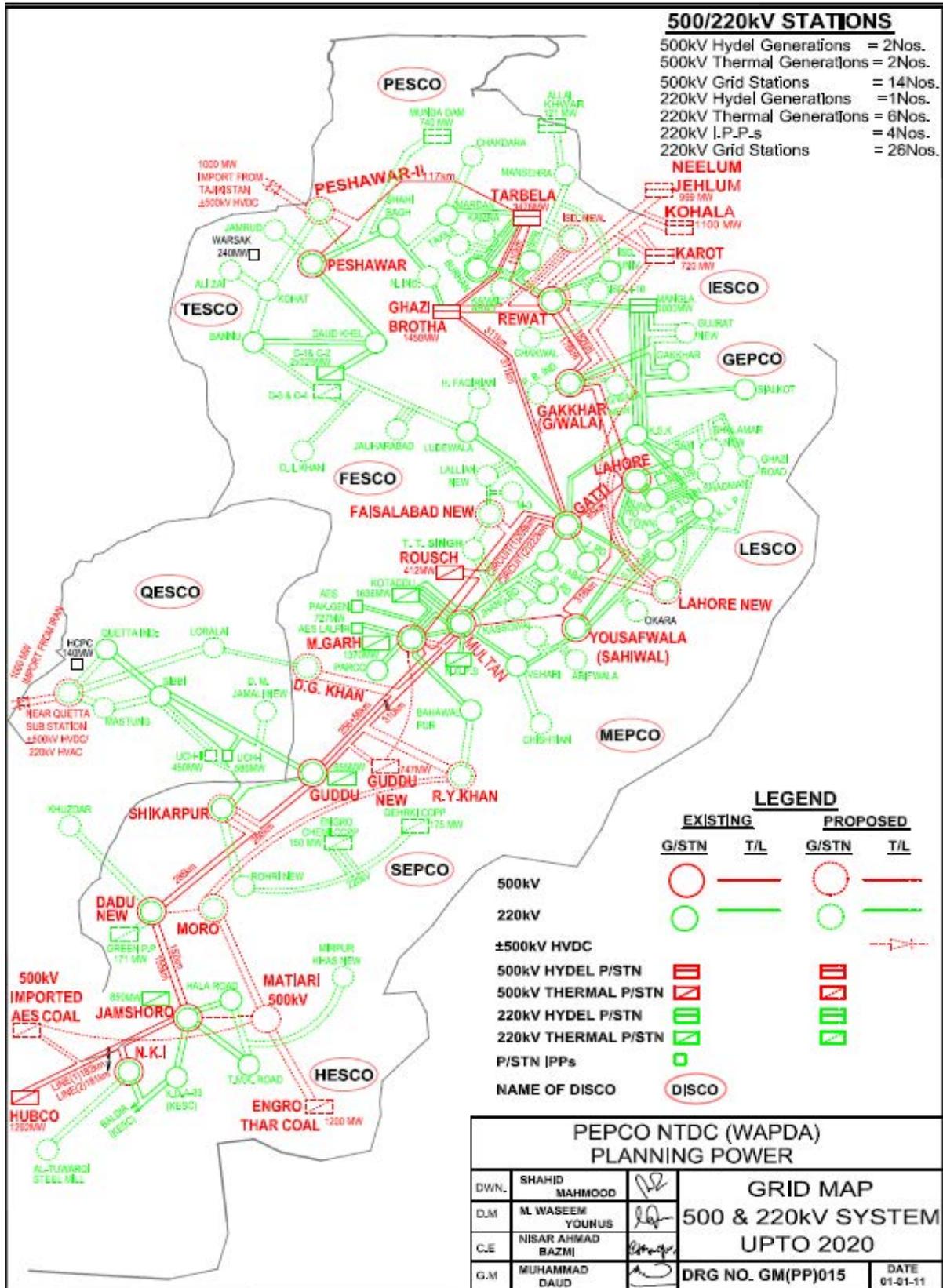


Figure 1: Project Location Map

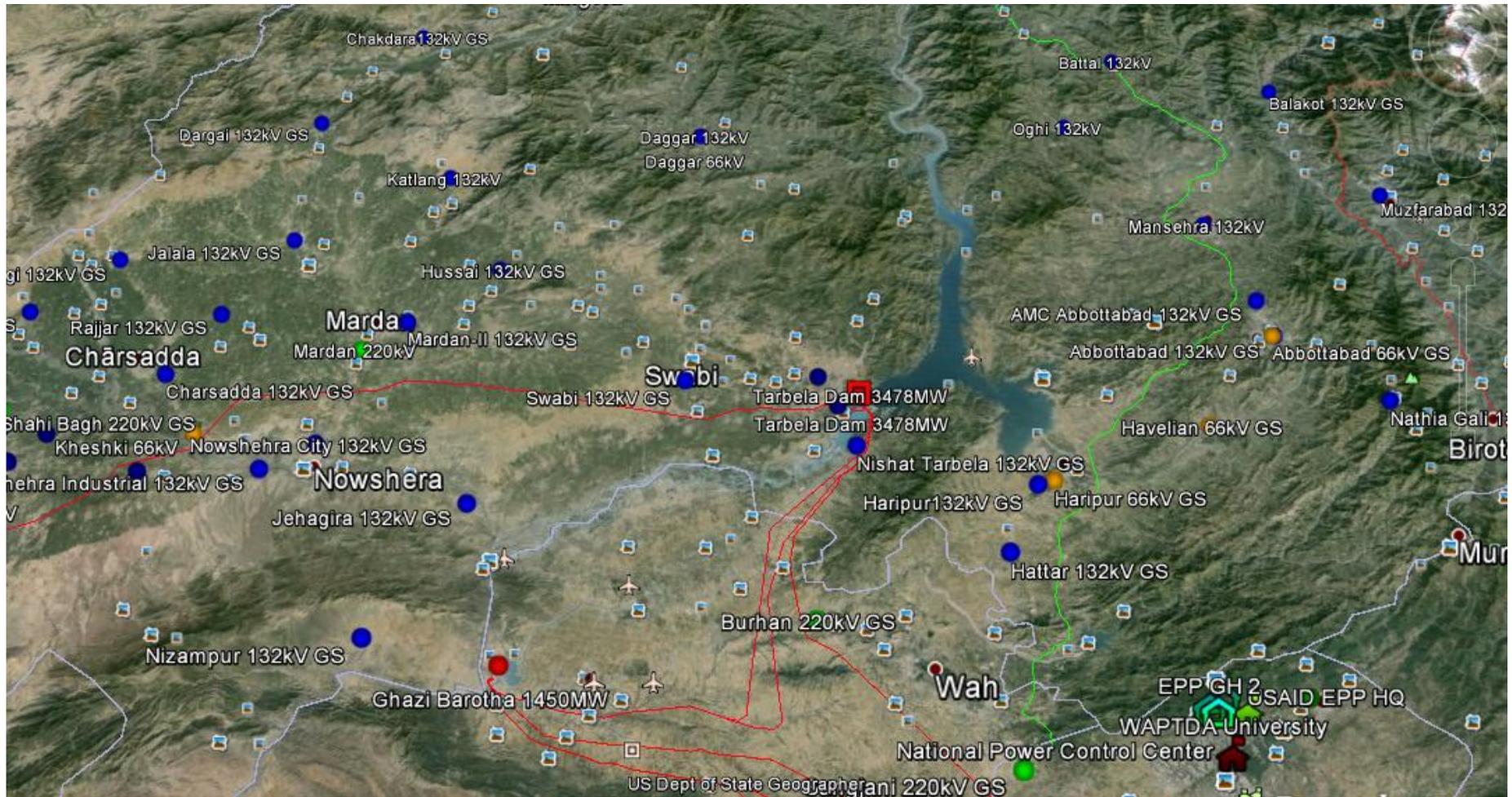


Figure 2: Satellite Image of the PESCO



Transformer in Need of Repair



Fire Extinguisher in Grid Station



Safety Manual of WAPDA



Capacitor Bank in Need of Repair



Cooling Fans to be Replaced



Damage Electric Tower to be Repaired

Figure 3: Replacement Activities Pictures

# 4. Screening Potential Environmental Impacts and Mitigation Measures

## 4.1 Impact Assessment and Mitigation

EPP's transmission activities will involve the minor construction of damaged towers and base for capacitor banks. There are no sensitive receivers close to the construction activity that could be possibly affected by the proposed activities. All the activities will take place at approved PESCO and NTDC sites.

The location and scale of the works are very important in predicting the environmental impacts. This process of impact prediction is the core of the EDF/EMMP process and it is critical that the recommendations and mitigation measures are carried out with reference to the conditions on the ground in the affected areas in the spirit of the environmental assessment 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 and achieve the expected outcomes of the project being implemented. Therefore, it is essential that a proper analysis is carried out during the project planning period. In this regard, the impact prediction plays a vital role as these predictions are used for developing adequate mitigation measures and any alternative options, if appropriate.

## 4.2 General Approach to Mitigation

Based on 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 the best international practice to accept payment for environmental impacts. An approach whereby the subproject contractor pays money for nuisances rather than control the impacts at source will not be acceptable. This practice will not be allowed and financial compensation shall not be allowed as mitigation for environmental impacts or environmental nuisance(s).

During the preparation for the construction activities of the proposed project, the future contractors must be notified and prepared to co-operate with the executing agency and local communities during the mitigation of impacts. Furthermore, the contractor must be primed through bidding stages and the contract documentation to implement the EDF in full and be ready to engage trained environmental management staff to audit the effectiveness and review mitigation measures as the project proceeds. The effective implementation of the EDF will be audited and the executing agency (PESCO and NTDC) must be prepared for this. In this regard, PESCO and NTDC must fulfill the requirements of the law and guidance prepared by EPA on the environmental aspects of power projects and the recommendations already made for the proposed activities.

No residences or schools are in the immediate vicinity of the project locations and thus no potential impacts during the construction and operational stage from disturbance and significant noise and dust are expected.

Certain construction activity could cause 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/tractor trolley 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 will install segregation between the works and the edge of the sensitive receivers.

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

### 4.3 Cultural Heritage, Mosques, Religious Sites, and Social Infrastructure

There are no mosques or other religious sites close to the site. The nearest clinic / hospital is more than 500m from the edge of the subproject. Apart from these features, there will be sufficient buffer distance between the works and any other Sensitive Receptors (SRs), thus no significant impacts are expected. In the proposed project development, no families will be relocated. No cultural and archeological site is located near the proposed project sites.

### 4.4 Potential Environmental Impacts during Design, Construction and Operation Stage

#### 4.4.1 Social Impacts

PESCO and NTDC will select site locations that will not affect any public built-in property or house.

#### 4.4.2 Waste Disposal

Suitable locations will be identified for disposal of transformer oil, unsuitable soils and scrap metal. Disposal sites in contracts and cost unit disposal rates will be designated accordingly.

PESCO and NTDC shall ensure that any residual oily waste and other contaminated waste generated in the construction and operational phase is disposed in line with provincial EPA and local authority requirements. With the proper implementation of appropriate waste disposal protocols, there will be no residual risk due to improper waste disposal.

#### 4.4.3 Pollution from Oily Run-off, Fuel Spills and Dangerous Goods

No significant impacts from oily residues such as transformer oil and lubricants are expected to arise in this subproject. However, control measures will be conducted 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 of maintenance yards for recycling (dehydrating) oil from breakers. However, the areas upon which these recycling facilities are located have no dedicated drainage that can capture run-off. Oily residues and fuel and any contaminated soil residues will be captured at source and refueling and maintenance will take place in dedicated areas away from surface water resources. Contaminated residues and waste oily residues will be disposed at a site agreed with the local authority. No significant impacts from oily residue 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.

DISCOs are served by NTDC's Technical Services Group (TSG). TSG prepares a detailed routine maintenance schedule for each piece of hardware, and supervises and monitors the implementation of the 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 any potential oil spills.

#### 4.4.4 Cut and Fill and Waste Disposal

Disposal of surplus materials must also be negotiated through local authority approvals prior to the commencement of construction. The proposed project development work shall not involve any significant cutting and filling but minor excavations (down to 4m) and piling may be required to create the foundations for the damage towers.

Mitigation measures must focus on the minimization of impacts. If surplus materials arise from the removal of the existing surfaces from specific areas, these will be used elsewhere on the subproject before additional soil, rock, gravel or sand is brought in.

At this stage, no areas require removal of woodland. However, if any plantations are affected, the owners will be provided resources to reinstate the woodland in the long term and a plantation compensation plan will be drawn up to replant the woodland/trees. In the event that the land is not suitable for plantation, then other areas will be identified to replace the cut trees and sufficient areas will be identified to allow plantation of trees at a rate of 3:1. The replacement ratio will 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.

Contractual clauses will 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 will 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.

#### 4.4.5 Soil Contamination

The containment and bunds under all newly installed transformers will be designed to retain all transformer oil contents. Contingency measures will be developed to recondition or dispose of any oil released during an emergency.

#### 4.4.6 Encroachment, Landscape and Physical Disfiguration

The extent of the proposed transmission activities under EPP is moderate and these activities are only concerned with the repairing, rehabilitation and replacement of the existing equipment. No significant landscape impacts are expected from minor construction.

#### 4.4.7 Trees, Ecology and Protected Areas

There is no Reserve or Protected Forests or trees near the sites. In case of removal of trees on private land during the works, written permission will be sought.

If for some unforeseen reason, any trees with religious significance or other trees need to be removed, written permission will be obtained from the forest authority and the owner after written justification by PESCO. 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.

#### 4.4.8 Hydrology, Sedimentation, Soil Erosion

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

#### 4.4.9 Air Pollution from Earthworks and Transport

The material (cement, sand and aggregate) for the construction of transmission activity are stored within the designated site. The quantities of construction material required are not so large that they

potentially represent a traffic hazard. 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. The major sources of complaint will likely be any necessary earthworks and local soil compaction.

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 kept damp by watering the construction area.

Construction materials (sand, gravel, and rocks) and spoil materials will be transported via trucks covered with tarpaulins.

The need for large stockpiles shall be minimized by careful planning of the supply of materials from controlled sources. Stockpiles will not be located within 50m of schools, hospitals or other public amenities such as wells and pumps and will be covered with tarpaulins when not in use and at the end of the working day to enclose dust. Storage piles will be at least 30m downwind of the nearest human settlements. 100. All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) shall be well maintained and will not emit dark, smoky or other emissions in excess of the limits described in the NEQS.

#### 4.4.10 Noise, Vibration and Blasting

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.

### 4.5 National Environmental Quality Standard (NEQS- 2000)

Table I: National Standard on Noise

S. No.	Category of Area	Standard Up to 30th June 1997 Limits in dB(A)		Standard from 1st July 1997 Limits in dB(A)	
A	Residential Area	65	50	55	45
B	Commercial Area	70	60	65	55
C	Industrial Area	80	75	75	65
D	Silence Zone	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.

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).

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 Transmission activity 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.

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.

## 4.6 Monitoring

The above mentioned environmental aspects have been assessed and mitigation measures for potential adverse impacts identified during this study. In order to ensure that the proposed mitigation measures are implemented, the monitoring requirements including indicators and specific requirements are listed in Table 6. The overall responsibility of EDF/EMMP's monitoring rests with PESCO and NTDC Management. This monitoring arrangement can be carried out either by using the existing staff with requisite expertise or a dedicated HSE supervisor may be hired in case of time and/or capacity constraints.

## 4.7 Training Requirements

Trainings will be required in the following areas for implementation of the EDF:

1. Occupational Health and Safety: All concerned staff shall be provided training in use of PPE. Training may also be required in confined space identification and entry procedure. External sources may be needed for providing of these training. At later stage this training can be provided internally.
2. HSE Audit: Relevant PESCO and NTDC staff will require training in HSE audit and inspection. External sources may be needed for providing of these training.
3. Waste Management and Handling: The relevant staff will require training in waste management and handling. This training can be provided internally.

An indicative environmental training program is provided in training program table which will be finalized before the commencement of the project.

## 4.8 Occupational Safety Measures

Lack of appropriate occupation health and safety measures practice is a key area of concern identified. Recommendations have been provided in the Section 3 and Section 4 of this report. It is recommended that an appropriate HSE management system shall be developed. It should include:

- HSE Policy
- Occupational health and safety management measures
- Use of personal protection equipment
- Trainings requirement and management
- Documented procedures
- Monitoring and audit, and

- Reporting.

Although the development of such a system is beyond the scope of the present project, some standard procedures relevant to the present project are provided in Annex III for reference.

## 4.9 Staffing

For the environmental performance during the project execution, the primary responsibilities will be assumed by the highest ranking officer at grid station. He will be assisted by the Head of Maintenance on all environment and safety-related matters. On behalf of the contractors, the main responsibility for all matters pertaining to environment will be that of the Head of the company or the Chief Engineer/Resident Engineers.

The PESCO and NTDC management will appoint or designate a dedicated HSE supervisor, who will be responsible for ensuring compliance with the EDF/EMMP and waste management during the project activities. He will also be responsible for the training of the project related personnel in all aspects of the EMMP.

The total staff associated with the implementation of EDF/EMMP may be between three to five people including one HSE supervisor and one or two sanitary workers. The number of sanitary workers may vary depending on workload of the project related activities undertaken at a time.

## 4.10 Responsibilities

The following are the key responsibilities of PESCO and NTDC, management and staff, in the context of this EDF:

1. Ensure that the repair and rehabilitation work is carried out in accordance with this EDF and the corresponding IEE
2. Ensure that all resources are made available to implement the provisions of the EDF.
3. Maintain appropriate records (checklist, receipts, inspection reports, audit reports, monitoring data) to demonstrate that the EDF is implemented
4. Prepare a brief monitoring report and submit to the USAID once every three months. The report shall summarize the following:
  - a. Activities carried out
  - b. Waste generated and handled
  - c. Inspections carried out
  - d. Status of implementation
  - e. Occupational safety and health and environmental issues that were raised and resolved
  - f. Pending issue
  - g. Occupational safety and health and environmental related incidents
5. In case of any accident involving occupational safety issue or environmental issue (accidental release of pollutant) report the incident to USAID within 48 hours of the incident.
6. In case of any change in implementation plans, reevaluate the occupational safety, health and relevant environmental issues and modify the EDF accordingly. The EDF shall be submitted to USAID for approval.

- a. A proposed format for the inspection and monitoring of the project activities has been presented in Annex IV.

## 4.11 Reporting

An effective mechanism for storing and communicating of HSE related information during the project is required. The head of the company or the Chief Executive through his designated HSE supervisor shall undertake the following activities in this regard:

- Precisely record and maintain all HSE related information generated during the project.
- Regularly visit the waste disposal sites and take pictures to verify that the mitigations are being done.
- Process the information to produce monthly reports.
- Submit the HSE reports to USAID and other stakeholders upon completion of each quarter
- Provide information and answer to any queries on HSE related matter of the project from USAID and other stakeholders.
- Develop and submit a final HSE report of the project to state the overall compliance of the requirements of this EDF.
- Monitoring checklist and audit report shall be included with monthly reports.
- The monthly report shall also include information about the status of project activities. Information shall be provided, if no activities undertaken during a month.
- Also appoint an unbiased inspector to verify that the mitigations are being done on site.

## 4.12 Budgetary Estimates

The budgetary requirements for implementation of the EDF cannot be fully monetized. Whereas, PESCO and NTDC have some internal systems, the actual budget would depend on whether the new systems are developed to cater for the project. However an indicative budget has been developed and shown in Budget table, the total financial impact for the implementation of this EDF is estimated to be PKR 2,020,000. The major components of the budget include salaries for the HSE personnel, capacity building, and purchasing of HSE related equipment.

Table 2: Estimated Generated Waste from Each Activity

Item #	List	Activity	Estimated Generated Waste								Remarks/Comments	
			Solid						Liquid	Gases		
			Iron (kg)	Copper (kg)	Other Metals (kg)	Plastic (kg)	Wood, Cloth and Packaging (kg)	Electronics (kg)	Oil (l)	Air Emissions		
1	Power Transformer Program	Concerns provision of new and repair of Power Transformers, provision of Power Transformer Cooling Fans and testing of Transformer oil.		500	500			100		50,000		The re-generation plants can purify oil and the oil can be used for an indefinite period
2	Repair of Transmission Line Towers	Repair of the damaged Transmission Line Towers found in PESCO's Transmission Grid.			25,000							The activity is concerned with changing the deformed steel braces with the new ones. At certain sites, additional civil work will be required to strengthen the foundations or constructing the retaining boundary walls.
3	Provision of 132 kV Circuit Breakers	Activity aims at replacing damaged/missing/bypassed Circuit Breakers at various Grid Stations in PESCO.			150			70		105		The damaged, mostly old oil operated, circuit breakers will be replaced with new SF6 breakers. Activity requires building foundations for proper erection of the breakers.

Item #	List	Activity	Estimated Generated Waste								Remarks/Comments	
			Solid					Liquid	Gases			
			Iron (kg)	Copper (kg)	Other Metals (kg)	Plastic (kg)	Wood, Cloth and Packaging (kg)	Electronics (kg)	Oil (l)	Air Emissions		
4	Rehabilitation of 132 kV Capacitor Bank Cells	Replacement of damaged Capacitor Cells with the new ones. The provision of new cells would help making Capacitor Banks functional.			500		100			500		New cells are being provided. The older functional cells will be used as spares whereas the damaged cells will be replaced with the new ones.
5	Telemetry System for PESCO	This network management system will help PESCO better manage their load demands and better plan load shedding schedules.					10					New system is provided to PESCO. Previously PESCO did not have any similar system installed in their network.
6	Provision of RTDS to NTDC	The system will help study and plan future network expansions.					10					New system is being provided. NTDC does not have any RTDS like system for now.
7	IT Support for the extension of Secured Metering System (SMS) to DISCOs	Improvement and up gradation of the SMS. Servers, display portals and UPS etc. should be provided to NTDC for system expansion.		30	30		5		50			The system will replace the old outdated components like servers, monitors etc.
		<b>Overall</b>	<b>0</b>	<b>530</b>	<b>26,180</b>	<b>0</b>	<b>295</b>	<b>50</b>	<b>50,605</b>	<b>0</b>		

Table 3: Handling and Storage of Waste

Waste Category	Associated Hazard	Recommended Handling and Disposal
Iron	<ul style="list-style-type: none"> <li>Sharp edged metal from cuttings can cause cuts and bruises at any stage of handling or disposal</li> <li>All the waste generated from the transmission activities if left unattended or in the passage ways of the may pose threat to the safety of the staff and hamper the movement of the workers</li> </ul>	<ul style="list-style-type: none"> <li>While handling sharp edged metals protective leather gloves shall be used</li> <li>After dismantling, all parts and machines shall be dispatched from site to storage yard as soon as possible, preferably on the same day</li> <li>In the store yard all waste shall be properly marked and segregated. A clear passage way marked by lines on the ground shall be left for walking of staff. No waste shall be stored within the passage way.</li> <li>Sharp edged metal shall not be left unattended at any time. It shall be moved to storage yard immediately after removal. In the storage yard, the storage area for such metal shall be cordoned off using clearly visible tapes.</li> </ul>
Copper	<ul style="list-style-type: none"> <li>All the waste generated from the transmission activities if left unattended or in the passage ways of the may pose threat to the safety of the staff and hamper the movement of the workers</li> </ul>	<ul style="list-style-type: none"> <li>While handling sharp edged metals protective leather gloves shall be used</li> <li>All parts and machines after dismantling shall be dispatched from site to store yard as soon as possible, preferably on the same day</li> <li>In the store yard all waste shall be properly marked and segregated. A clear passage way marked by lines on the ground shall be left for walking of staff. No waste shall be stored within the passage way.</li> <li>Sharp edged metal shall not be left unattended at any time. It shall be moved to storage yard immediately after removal. In the storage yard, the storage area for such metal shall be cordoned off using clearly visible tapes.</li> </ul>
Other Metals	<ul style="list-style-type: none"> <li>As the nature of such waste is not clearly established it is possible that the waste may contain heavy metal. Unless otherwise established through tests or known composition of waste, all such waste material shall be treated as hazardous and treated accordingly*</li> </ul>	<ul style="list-style-type: none"> <li>The waste shall be segregated from other waste and shall be clearly marked with a proper hazard sign.</li> <li>Before final disposal, any potentially hazardous substance identified and disposed-off accordingly.</li> </ul>

Waste Category	Associated Hazard	Recommended Handling and Disposal
Oils	<ul style="list-style-type: none"> <li>• Spills and leaks will contaminate the soil and potentially water resources</li> <li>• Oil on floor poses tripping hazard to the workers</li> </ul>	<ul style="list-style-type: none"> <li>• Test for the PCB*</li> <li>• (Oil is PCB free report is attached Annex V)</li> <li>• To the extent possible any oil or grease in the equipment to be replaced shall be removed before dismantling of the equipment</li> <li>• All effort shall be made to avoid spilling the oil on the floor</li> <li>• Any spillage shall be removed immediately. For this purpose, spill control kits shall be made available near the work areas.</li> <li>• Waste oil shall be stored in leak proof containers</li> <li>• Oil shall be stored in designated and clearly marked areas. The oil storage area shall be lined with impervious flooring</li> <li>• The area shall be away from direct heat and fire source</li> <li>• The oil storage area shall have dykes constructed around it to control accidental leakages and spills</li> </ul>
Plastic	<ul style="list-style-type: none"> <li>• Nuisance and littering</li> <li>• Open air burning may affect in local air quality</li> </ul>	<ul style="list-style-type: none"> <li>• All type of plastic shall be collected and stored in separate bins marked for this purpose</li> <li>• Plastic waste shall not be burned in open air or disposed of by dumping in the areas surrounding the grid station site</li> </ul>
Wood, Clothing and Packaging Material	<ul style="list-style-type: none"> <li>• Wood may contain nails that may injure the staff</li> <li>• Nuisance and littering</li> <li>• Open air burning may affect in local air quality</li> <li>• Oil stained gloves and cleaning clothes may cause contamination of water if they are dumped in water bodies.</li> </ul>	<ul style="list-style-type: none"> <li>• Nails shall be removed from the wood</li> <li>• All type of waste shall be collected and stored in separate bins marked for this purpose</li> <li>• Waste shall not be burned in open air or disposed of by dumping in the areas surrounding the grid stations site</li> </ul>
Electronic and Circuit boards	<ul style="list-style-type: none"> <li>• Some of devices and equipment may contain toxic material. These can be a health hazard if opened in the open area.</li> </ul>	<ul style="list-style-type: none"> <li>• The equipment shall be opened only under a qualified person. Any potentially hazardous material shall be identified prior to dismantling and appropriate safety measures shall be taken.</li> </ul>
Air Emission	<ul style="list-style-type: none"> <li>• Can affect the respiratory systems</li> </ul>	<ul style="list-style-type: none"> <li>• Standard protective equipment including eye protective glass, gloves and mask shall be used</li> </ul>

Table 4: Disposal of Waste

Waste Category	Ultimate Disposal	Associated Hazard or Issues	Recommended Procedure
Iron	Recycling	<ul style="list-style-type: none"> <li>Some parts may be contaminated with oil. The parts on melting in furnace may give out fumes that are hazardous(Petrochemical) or may constitute a nuisance</li> </ul>	<ul style="list-style-type: none"> <li>Separate oil contaminated parts from the rest</li> <li>Include in the contract agreement with waste disposal contractor condition that the oil contaminated parts will be cleaned before being fed into furnace. Alternatively, the cleaning may be undertaken at PESCO and NTDC sites.</li> </ul>
Copper	Recycling	<ul style="list-style-type: none"> <li>Copper wires are covered with insulation, which if burned in low temperature can release hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>Separate wires and other copper waste with insulation material from the rest</li> <li>Include in the contract agreement with waste disposal contractor condition that such waste will either be incinerated in high temperature incinerators or alternatively, the insulation will be removed mechanically.</li> </ul>
Other Metals	Recycling	<ul style="list-style-type: none"> <li>Some of the waste may be hazardous which can ultimately affect the human health if not appropriately handled</li> </ul>	<ul style="list-style-type: none"> <li>Before final disposal, any potentially hazardous substance shall be identified.</li> <li>The risk associated with the wastes. If any shall be identified, and accepted disposal methods for such waste shall be followed.</li> </ul>
Oils	Recycling through waste contractors	<ul style="list-style-type: none"> <li>Contamination of soil and water bodies</li> </ul>	<ul style="list-style-type: none"> <li>Only recycling contractors with certification from the concerned agencies shall be used for disposal</li> </ul>
Plastic	Recycling	<ul style="list-style-type: none"> <li>Nuisance and littering</li> <li>Open air burning may affect in local air quality</li> </ul>	<ul style="list-style-type: none"> <li>Include in the contract agreement with waste disposal contractor condition that any unwanted plastic waste will be disposed at municipal landfill site</li> </ul>
Wood, cotton waste and packaging material	Waste contractor Municipal landfill	<ul style="list-style-type: none"> <li>Open burning and associated nuisance</li> <li>Improper disposal resulting in littering</li> </ul>	<ul style="list-style-type: none"> <li>Include in the contract agreement with waste disposal contractor condition that such waste will either be disposed at pre-identified municipal landfill site.</li> </ul>
Electronic equipment and circuit boards	Waste contractor	<ul style="list-style-type: none"> <li>Some of devices and equipment may contain toxic material. These can be a health hazard if improperly handled</li> </ul>	<ul style="list-style-type: none"> <li>Include in the contract agreement with waste disposal contractor condition that the equipment will be opened only by a qualified person.</li> </ul>

Table 5: Environmental Mitigation and Monitoring Plan

Activity	Mitigation Measure(s)	Monitoring Indicator(s)	Monitoring	Monitoring and Reporting Frequency	Party(s) Responsible	Inductive Budget
Transportation of equipment	<ul style="list-style-type: none"> <li>Vehicles used for the transportation are NEQS compliant for the emissions and noise. Hire transportation trucks from a well-established company having accreditation for well-maintained fleet of vehicles</li> <li>Use only those vehicles which are smaller in size and in which dryer parts can fit easily. Avoid using big sized vehicles.</li> <li>Use only those vehicles which have VETS certificates for environmental compliance.</li> <li>Use proper unloading systems such as lifters, etc.</li> <li>Avoid bare hand unloading by laborers.</li> <li>Workers at site of unloading should wear PPEs such as gloves, helmet and boots.</li> <li>Unloading site should be away from power transmission lines.</li> </ul>	Results of the noise and emissions	<ul style="list-style-type: none"> <li>Accreditation of transport company</li> <li>Vehicle Emission Testing (VET) certification</li> <li>No. of workers using PPEs</li> </ul>	Once before start the transportation, EPP team inspects the activity once in the month and develops report on observation. USAID reporting on quarterly basis.	Contractor RE or site Engineer, designated NTDC and PESCO staff (Engineer), EPP Environmental Expert	See Table No. 7

Activity	Mitigation Measure(s)	Monitoring Indicator(s)	Monitoring	Monitoring and Reporting Frequency	Party(s) Responsible	Inductive Budget
Onsite handling and storage of new equipment	<ul style="list-style-type: none"> <li>The new equipment shall be stored in properly demarcated and identified areas</li> <li>Separate storage of each item should be adopted and each area should be marked either on floor or cordoned off by tapes</li> <li>Lifting equipment (cranes) used for the equipment shall follow the prescribed safety specification.</li> <li>Material Safety Data Sheet (MSDS) for chemicals, if any, shall accompany the consignment. A copy of the MSDS shall be available near the storage area at all times.</li> </ul>	<p>Availability of certification of lifting equipment</p> <p>Availability of MSDS</p>	<ul style="list-style-type: none"> <li>A checklist-based monitoring shall be undertaken at the following stages:</li> <li>Inspection of designated storage areas prior to arrival of the supplies</li> <li>During unloading of equipment</li> <li>One a month, while the equipment is stored</li> <li>After final removal of all equipment and rehabilitation of the site, if required</li> <li>Incidental, in case of an accident or reporting of noncompliance</li> </ul>	Monthly, EPP team inspects the activity once in the month and develops report on observation. USAID reporting on quarterly basis.	Contractor RE or site Engineer, designated NTDC and PESCO staff (Engineer), EPP Environmental Expert	See Table No. 7
Repair, rehabilitation and installation activities—general	<ul style="list-style-type: none"> <li>Appropriate PPEs shall be provided to the workers and it shall be ensured that the PPEs are used</li> <li>The staff shall be provided with training in use of PPEs.</li> <li>Proper scaffolding platforms shall be provided for all work areas located more than 1 m above floor level.</li> <li>First Aid facilities and fire protection devices should be placed in areas where activities will be performed</li> <li>Ear protection device shall be used if the noise level is above 85 dB(A)</li> </ul>	<p>Installation of specified scaffolding</p> <p>Availability and use of PPEs</p> <p>Availability of first aid facilities</p>	<ul style="list-style-type: none"> <li>A checklist-based monitoring shall be undertaken at the following stages:</li> <li>Inspection of work areas prior to start of activities</li> <li>Once a week during repair, rehabilitation or installation work</li> <li>Incidental, in case of an accident or reporting of noncompliance</li> <li>Noise level monitoring once at the start and once at the peak of activities</li> </ul>	Weekly, EPP team inspects the activity once in the month and develops report on observation. USAID reporting on quarterly basis.	Contractor RE or site Engineer, designated NTDC and PESCO staff (Engineer), EPP Environmental Expert	See Table No. 7

Activity	Mitigation Measure(s)	Monitoring Indicator(s)	Monitoring	Monitoring and Reporting Frequency	Party(s) Responsible	Inductive Budget
Repair, rehabilitation and installation activities—working in confined spaces	<ul style="list-style-type: none"> <li>All confined spaces<sup>5</sup> should be identified</li> <li>The temperature of the confined space should be in the human tolerance range</li> <li>Artificial and intrinsically safe lighting shall be provided in the confined spaces</li> <li>If there is a risk of gases or fumes in the confined space the provisions for ventilation shall be made</li> </ul>	<p>Visual Inspection of the confined space prior to activity</p> <p>Temperature measurement before commencement of activities</p>	<ul style="list-style-type: none"> <li>A checklist-based monitoring shall be undertaken prior to entry into confined space, covering: <ul style="list-style-type: none"> <li>Inspection of entrance</li> <li>Measurement of temperature</li> <li>Risk of fumes or gases</li> <li>Availability of equipment</li> </ul> </li> </ul>	Weekly, EPP team inspects the activity once in the month and develops report on observation. USAID reporting on quarterly basis.	Contractor RE or site Engineer, designated NTDC and PESCO staff (Engineer), EPP Environmental Expert	See Table No. 7
Waste management	<ul style="list-style-type: none"> <li>Properly develop inventory of waste.</li> <li>Proper handling and storage of waste.</li> <li>Remove waste from waste dumps and transport to municipal sites frequently.</li> <li>Reuse and recycle of valuable waste.</li> </ul>	<p>Quantity of waste generated, their classification and disposal mechanism</p> <p>Waste disposals contracts for inclusion of appropriate clauses</p>	<ul style="list-style-type: none"> <li>Inventory of all waste shall be prepared. For each type of waste the quantity and disposal mechanism shall be identified</li> <li>Where necessary, audit of the waste contractor</li> </ul>	Weekly, EPP team inspects the activity once in the month and develops report on observation. USAID reporting on quarterly basis.	NTDC & PESCO Store Supervisor	See Table No. 7

<sup>5</sup> Confined space" means a space that:

- (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- (3) Is not designed for continuous employee occupancy.

Activity	Mitigation Measure(s)	Monitoring Indicator(s)	Monitoring	Monitoring and Reporting Frequency	Party(s) Responsible	Inductive Budget
Live Power Lines	<ul style="list-style-type: none"> <li>Only allowing trained and certified worker install, maintain or repair electrical equipment.</li> <li>Provide the PPEs</li> <li>Deactivating and properly live power distribution lines.</li> <li>The worker is properly isolated and insulated from any other conductive object</li> </ul>	Capacity	<ul style="list-style-type: none"> <li>Inspection of Personal Protective Equipment (PPEs)</li> <li>Personal training proof.</li> <li>Review the training contents</li> </ul>	Start of training, EPP team inspects the activity. USAID reporting on quarterly basis.	Designated NTDC and PESCO staff (Engineer), EPP Environmental Expert	See Table No. 7
Civil Works	<ul style="list-style-type: none"> <li>Safety materials like boots, gloves, helmet, etc. to be provided to workers.</li> <li>Use locally available resources such as concrete, sand, bricks, iron, wood and human resource as well to avoid social conflict and to increase level of local economy.</li> <li>The generation of dust during construction will be mitigated through avoidance strategies as follows:</li> <li>Subcontractors will be required to spray water during windy conditions.</li> <li>Trucks carrying earth, sand or stone will be covered to avoid spilling.</li> <li>Open burning will be prohibited on the construction sites.</li> <li>The generation of diesel exhaust emissions during construction will be mitigated through avoidance strategies as follows:</li> <li>All equipment will be in good operating condition</li> <li>Machinery will not be left idling unless necessary during winter operations.</li> </ul>	Designated area identified No of labor and masons trained (HSE, Waste disposal)	<ul style="list-style-type: none"> <li>No. of meetings held with stakeholders</li> <li>PPEs provided to workers</li> <li>Availability of well-defined management plan (HSE, Waste, Traffic)</li> </ul>	Weekly, EPP team inspects the activity once in the month and develops report on observation. USAID reporting on quarterly basis.	Contractor RE or site Engineer, designated NTDC and PESCO staff (Engineer), EPP Environmental Expert	See Table No. 7

Table 6: Proposed Training Program

Training Type	Staff	Contents	Schedule	Duration	Responsibility
Occupational Health and Safety	PESCO and NTDC Management and HSE Supervisor	Requirements of EDF, PPE, Identification of confined spaces and entry procedures.	Before the start of the project	Full day; session	External sources
	Project Staff	General safety, Use of PPE, confined space, Health and Hygiene	Before the start of project and during the project	Two days; session	HSE Supervisor
HSE Audit	Personnel involved in audits and inspection related activities	HSE audit and inspection requirements and reporting	At the start of the project	Full day session	External sources
Waste Management and Handling	The relevant staff	Waste management and handling as per EDF	At the start of the project	Full day session	External sources

Table 7: Indicative Budget for Monitoring and Management Plan

Core Activity	Budgeted Activity	Budget Rationale	Indicative Budget
Transportation of equipment	Monitoring of vehicles for emissions and noise	Monitoring of 156 vehicles at PKR 5,000 each	PKR 75,000
Onsite handling and storage of new equipment	Storage of new equipment	No additional cost	–
	Implementation of safety specifications for lifting equipment (cranes)	No additional cost	–
	All types of materials shall be purchased along with respective Material Safety Data Sheet (MSDS)	No additional cost	–
Repair, rehabilitation and installation activities–General	Purchase of required PPEs' Suppliers and contractor and monitoring staff	30 Sets of PPEs' at PKR 15,000 for each	PKR 450,000
	For NTDC and PESCO staff	30 sets of PPEs at PKR 15,000 for each	PKR 450,000
	Proper scaffolding platforms for all work areas located more than 1 m above floor level.	Should be included in the repair and maintenance contract	–
	First Aid facilities and fire protection devices	Cost of five first aid boxes at PKR 4,000	PKR 20,000

<sup>6</sup> The number of vehicles has been estimated based on the size and quantity of the equipment to be transported for project activity.

Core Activity	Budgeted Activity	Budget Rationale	Indicative Budget
	Monitoring of noise levels	Purchase of noise meter	PKR 200,000
Staff Hiring	Recruitment of HSE Supervisor	Salary of an HSE supervisor is estimated at 30,000 per month. The project requires maximum of one HSE supervisor for six months	PKR. 180,000
	Recruitment of Sanitary Workers	Salary of a sanitary worker is estimated at 10000/month. The project may require two sanitary workers at maximum for three months	PKR 60,000
Repair, rehabilitation and installation activities–Working in confined Spaces	Identification of confined spaces	This cost is included in staffing of HSE supervisor	–
	Managing temperature, lighting and risk of gases or fumes in confined spaces	This cost is included in staffing of HSE supervisor	–
	Monitoring and inspection	This cost is included in staffing of HSE supervisor	-
Waste management	Onsite collection, segregation and storage of wastes	Cost of waste bins	PKR 5,000
Trainings	Occupational Health and Safety	HSE Trainer fee for two days at PKR 40,000 per day; travel and boarding at PKR 60,000 per visit	PKR 140,000
	HSE Audit	HSE Trainer fee for one day at PKR 40,000 per day; travel and boarding at PKR 40,000 per visit	PKR 80,000
	Waste Management and Handling	HSE Trainer fee for one day at PKR 40,000 per day; travel and boarding at PKR 40,000 per visit	PKR 80,000
HSE Audit	Conducting and reporting of HSE audit	HSE Auditor fee for four days for two audits at PKR 40,000 per day; travel and boarding at PKR 60,000 per visit	PKR 280,000

## 5. References

1. Pakistan Environmental Protection Act, 1997 <http://www.environment.gov.pk/act-rules/Brief-PEPA-Act1997.pdf>
2. National Quality Standards Regulation, 2000 <http://www.environment.gov.pk/NEQS/neqs2000.pdf>
3. Self Monitoring and Reporting by Industry Rule, 2001 [http://www.environment.gov.pk/NEQS/selfmon\\_ru01.pdf](http://www.environment.gov.pk/NEQS/selfmon_ru01.pdf)
4. Pakistan IEE/EIA Regulation, 2000 <http://www.environment.gov.pk/act-rules/IEE-EIA-REG.pdf>
5. Hazardous Substances Rules, 2003 [http://www.environment.gov.pk/pro\\_pdf/HAZ-RU03.pdf](http://www.environment.gov.pk/pro_pdf/HAZ-RU03.pdf)
6. Sectoral Guidelines for Environmental Reports—Major Thermal Power Stations, 1997 [http://www.environment.gov.pk/eia\\_pdf/h\\_Power.pdf](http://www.environment.gov.pk/eia_pdf/h_Power.pdf)
7. Draft Guidelines for Solid Waste Management, 2005 <http://www.environment.gov.pk/EA-GLines/SWMGLinesDraft.pdf>
8. Environmental, Health, and Safety General Guidelines [http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui\\_EHSGuidelines2007\\_GeneralEHS/\\$FILE/Final+-+General+EHS+Guidelines.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GeneralEHS/$FILE/Final+-+General+EHS+Guidelines.pdf)
9. Asia environmental guideline at, <http://www.usaid.gov/our-work/environment/compliance/ane/guidelines.htm>;
10. Environmental Guidelines for Small Scale Activities in Africa, 2nd edition as provided at <http://www.encapafrika.org>
11. IFC Environmental, Health and Safety Guidelines as provided <http://www.ifc.org/ifcext/sustainability.nsf/Content/EnvironmentaiGuidelines>
12. World Bank 1999 Pollution Prevention and Abatement Handbook as provided at <http://www-wds.worldbank.org/external/default/main?pagePK=64193027&piPK=64187937&theSitePK=523679&menuPK=EI418751O&searchMenuPK=64187283&siteName=WDS&entityID=000094946990409050152283>;
13. EBRD Sub-sectorial Environmental and Social Guidelines <http://www.ebrd.com/about/policies/enviro/sectoral/>;
14. ADB Environmental Guidelines <http://www.adb.org/Water/CFWS/Roadmap-Sectoral-Guidelines.pdf>;
15. World Bank Environmental Assessment Handbook and Updates <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTENVASS/0,,contentMDK:20282864-pagePK:148956-piPK:216618theSitePK:407988,00.html>
16. Khyber Pakhtunkhwa (province, Pakistan) :: Geography – Britannica Online Encyclopedia". Britannica.com. Retrieved 2010-05-25 "Cold weather in upper areas & dry weather observed in almost all parts of the country | PaperPK News about Pakistan". Paperpkads.com. 2013-01-29. Retrieved 2013-05-24.
17. North-West Frontier Province – Imperial Gazetteer of India, v. 19, p. 147". Dsal.uchicago.edu. Retrieved 2010-05-25.

18. Mock, John and O'Neil, Kimberley; *Trekking in the Karakoram and Hindukush*; p. 15 ISBN 0-86442-360-8
19. Mock and O'Neil; *Trekking in the Karakoram and Hindukush*; pp. 18–19
20. World Climate Data: Dir, Pakistan". Weatherbase. 2010. Retrieved 1 September. Check date values in: `|accessdate=` (help)
21. See Wernsted, Frederick L.; *World Climatic Data*; published 1972 by Climatic Data Press; 522 pp. 31 cm.
22. World Climate Data: Dera Ismail Khan, Pakistan". Weatherbase. 2010. Retrieved 1 September. Check date values in: `|accessdate=` (help)
23. People and culture – Government of Khyber Pakhtunkhwa[dead link]
24. UNHCR country operations profile – Pakistan". United Nations High Commissioner for Refugees. Retrieved 2012-12-12.
25. Wajihalikhan I (2011-02-15). "Pushto Muzakarah with Khiyal Jaan – ځنځر ځپ شتو – Islam Ahmadiyya". YouTube. Retrieved 2012-12-12.

# ANNEXES

# Annex I: IEE of the Proposed Activity



# USAID | PAKISTAN

FROM THE AMERICAN PEOPLE

## INITIAL ENVIRONMENTAL EXAMINATION

### PROGRAM/ACTIVITY DATA:

**Country:** Pakistan

**Objective:** Provide technical assistance To USAID/Pakistan program to increase power generation (MWs) on the Grid, decrease transmission losses and increase cost recovery and supporting Government of Pakistan (GOP) reform efforts.

**Activity Name:** Energy Policy Program (EPP)

**Funding Begins:** FY 2012      **Funding Ends:** 15 Oct 2015      **LOP Amount:** \$80,283,410

**IEE Prepared By:** Imran Ahmed

**Date:** 01 October, 2012

**IEE Amendment (Y/N):** No If "yes", Filename & date of original IEE:

However, Request for Categorical Exclusion (OAPA tracking No., OAPA-12-OCT-PAK-0001) was approved on October 07, 2011 for activities known at the start of project.

### ENVIRONMENTAL ACTION RECOMMENDED: (Place X where applicable)

Categorical Exclusion	<input checked="" type="checkbox"/>	Deferral	<input type="checkbox"/>
Positive Determination	<input type="checkbox"/>	Negative Determination	<input checked="" type="checkbox"/>
With Conditions	<input checked="" type="checkbox"/>	Exemption	<input type="checkbox"/>

## 1.0 BACKGROUND AND ACTIVITY/PROGRAM DESCRIPTION

### 1.1 Purpose and Scope of IEE

Purpose of this Initial Environmental Examination (IEE), in accordance with 22 CFR 216, is to provide the first review of the reasonably foreseeable effects on the environment as well as recommended Threshold Decisions for the proposed new activities in the existing Energy Policy Program ("EPP" or the "Program") in support of the Government of Pakistan ("GOP") which have been authorized by increasing the program ceiling from \$14,893,410 to \$80,283,410 and extending the completion date to October 15, 2015. Referred authorization amendment to the EPP increases the ceiling to allow the added resources to fund additional highly visible and high impact activities in generation, transmission, and policy and power sector reform. This IEE is applicable to all the task orders under this program.

A "Request for Categorical Exclusion" (OAPA tracking No. OAPA-12-OCT-PAK-0001) was approved on October 07, 2011 for all known activities of the program at the start which at that time was known as "Pakistan Power Generation and Transmission Improvement Project (GTIP)". This IEE is therefore prepared to incorporate all newly identified and expanded activities of the same program. The scope of work and nature of activities established under the earlier approved Request for Categorical Exclusion (RCE) as well as all conditions established in the referred RCE for continuing activities remain the same and in force. This will be referred as IEE for Energy Policy Project (EPP) (the new name for Pakistan Power Generation and Transmission Improvement Project (GTIP) viz modification 1 of contract/order No. AID-EPP-I-00-03-00004)

## 1.2 Background

The objectives of EPP are two-fold: (1) support USAID in its efforts to add more power (MWs) to the Pakistan power system through generation and transmission improvements; and (2) support GOP counterparts in undertaking a range of policy initiatives to resolve the energy crisis and complete the implementation of the GOP's stalled Power Sector Reform Program. These efforts support USAID's overall intermediate development results of increased energy supply and improved energy sector governance. These in turn support the USAID Energy Office's higher level development objective of increased energy supplied to the economy, including (1) increased energy availability; (2) decreased hours of unscheduled load shedding; and (3) reduced percentage growth rate in the circular debt in the energy sector. Going forward, it is important to note that USAID's Energy Office will only have two implementing mechanisms, in addition to project-specific funding agreements called Fixed Amount Reimbursable Agreements (FARAs), to achieve its energy sector objectives: EPP and the USAID Power Distribution Program ("PDP"). EPP focuses on generation, transmission, system operations, and higher-level policy initiatives, including fuel-mix issues.

Key EPP partners include the following:

1. Ministry of Water and Power (MWP);
2. Planning Commission (PC);
3. Ministry of Petroleum and Natural Resources (MPNR);
4. Water and Power Development Authority (WAPDA);
5. GENCO Holding Company;
6. Generation Companies (GENCOs);
7. National Dispatch and Transmission Company (NTDC);
8. National Power Control Center (NPCC);
9. Multilateral lenders such as the Asian Development Bank (ADB) and the World Bank (WB).

The EPP is currently operating under Task Order 12, signed in October 2011 with effective date of February 1, 2012. The Task Order 12 completion date is set at January 31, 2015, leaving 30 months remaining in the program as of the date of this Action Memorandum. The estimated cost ("Task Order Ceiling") for Task Order 12 was set at \$14,893,410, with the current obligation set at \$6,693,080 as of the signature date.

In support of the USG's Signature Power Generation Projects funded by USAID through FARAs with the GOP, the EPP, under Component 1, has overseen the addition of 447 MW to the national power supply system. This includes the following projects:

1. Tarbela Hydropower Station Rehabilitation Project: 128 MW added to the grid to date.
2. Muzaffargarh Thermal Power Station Rehabilitation Project: 280 MW added to the grid to date.
3. Jamshoro Thermal Power Station Rehabilitation Project: 25 MW added to the grid to date.
4. Satpara Multipurpose Dam Project: 14 MW added to the local grid.

Furthermore, EPP also has been assisting on other ongoing projects already committed, such as the Guddu Thermal Power Station Rehabilitation Project and the Gomal Zam Multipurpose Dam Project.

On Component 2, EPP has prepared a number of reports, action plans, and business plans for the MWP and other GOP entities and is working to advise and assist on their implementation. Under Component 3, EPP is evaluating potential new projects, including the Kurram Tangi Multipurpose Dam Project and the Mangla Hydropower Station Upgrading Project.

### 1.3 Description of Activities

Despite successes in adding new and rehabilitated generation capacity to the Pakistan power system, the USAID/Pakistan Energy Office and the Government of Pakistan are concerned with the overall worsening trend in the Pakistan energy sector crisis. For example, the incidence of both planned and unplanned load shedding increased year-over-year, and appears set to reach new levels in the coming year. At the same time, circular debt is still increasing. As a consequence of USAID's concern and the Government of Pakistan's request to review what more could be done in the shorter term, the Energy Office has held several meetings over a period of time with EPP, USAID's other direct partners, and generation, transmission, and distribution companies in June and July 2012 to discuss progress on implementation and develop current and future activities that can produce short-term impacts.

The additional high visibility and high impact activities proposed include the contracting of an liquefied natural gas (LNG) advisor to assist the GOP in importing LNG as a short-term solution to add power to the grid; consulting services and equipment to monitor and improve the efficiency of the GOP's thermal generating plants ("GENCOs") to improve output in the short-term; and consulting services to assist the National Power Control Center ("NPCC") to improve its functions and reduce the incidence of unscheduled load shedding in the short term, and consulting services and equipment to improve transmission at National Transmission Dispatch Company (NTDC) and DISCOs with an emphasis on the transmission systems of a Model DISCO and Turnaround (PESCO) DISCO. Consequently, USAID is proposing new and adjusted in-scope activities focused on five main areas keeping gender as a crosscutting component, with a renewed focus on short-term results under component 4 of EPP.

#### Adjusted Activities:

1. NTDC/NPCC/Unscheduled Load Shedding – Continue and expand efforts to improve operations, enhance economic dispatch, and reduce incidence of unscheduled load shedding; develop concept and scope of work for the import of power from Afghanistan to Peshawar;
2. GENCOs – Continue and expand efforts to improve operating efficiency at GOP-owned thermal generating facilities;
3. GOP advisors - Continue support for embedded personnel to drive the policy discussion at key GOP counterpart agencies.

#### New Activities:

1. Turnaround and Model DISCO transmission system interventions and live line training in all nine DISCOs.
2. Natural Gas – Support the GOP in developing the LNG option while at the same time advising on reforms to stimulate domestic production of natural gas.

## **2.0 Environmental Lessons Learned from similar USAID funded energy projects in Pakistan**

Under the phase-I Signature Energy Program, the U.S. Government acting through USAID is funding the rehabilitation of four power plants, which includes three thermals (Jamshoro, Muzaffargarh and Guddu) and one hydro (Tarbela dam). The IEE's for rehabilitation were developed before the implementation began in May-Jun 2010 which identified 'Negative Determination with Conditions' per CFR 216, and recommended development of Environmental Mitigation and Monitoring plans (EMMPs) for each plant to elaborate environmentally safe and sound waste management and disposal as well as ensure compliance with all Occupational Health and Safety (OHS) requirements acceptable to USAID. USAID supported the development of EMMP's for individual power plants through its Energy Policy Program (EPP). The implementation of the EMMP is being carried out by the GOP implementing partners' as per the G2G agreements.

Following are the lessons learned during the design and implementation of EMMPs:

- A main environmental concern was to ensure safe disposal of old equipment/spares and wastes to make sure that the rehabilitation was compliant with GOP and USG environmental policies and regulations. This concern was addressed by the development of EMMPs as part of a rapid Environmental Assessment for each plant by environmental experts hired by USAID. Observations regarding environmental mitigation, monitoring and OHS measures were recorded with photographs by the environmental experts during their initial site visits. The assessment was completed with support from the GOP implementing partners who also reviewed and agreed with the recommendations in the EMMPs.
- Tarbela dam is operated under WAPDA which has a separate environmental cell that supervises the implementation of environmental activities. Therefore the monitoring of EMMP is being carried out in close collaboration with WAPDA Environmental Cell with oversight from USAID. This program is acceptable to both parties.

## **3.0 LEGISLATIVE AND REGULATORY FRAMEWORK**

### **3.1 NATIONAL REQUIREMENTS**

#### **3.1.1 Pakistan Environmental Protection Act, 1997**

The Pakistan Environmental Protection Act, 1997 (the Act/PEPA) is the basic legislative tool empowering the government to frame regulations for the protection of the environment [the 'environment' has been defined in the Act as: (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the interrelationships between any of the factors specified in sub-clauses 'a' to 'f'.]

The Act is applicable to a broad range of issues and extends to socioeconomic aspects, land acquisition, air, water, soil, marine and noise pollution, as well as the handling of hazardous waste. The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration or level in excess of the National Environmental Quality Standards (NEQS) specified by the Pakistan Environmental Protection Agency (Pak- EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs), established under the Pakistan Environmental Protection Ordinance 1983, have also been

considerably enhanced under the 1997 legislation and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord, or upon the registration of a complaint.

The PEPA and corresponding Pakistan Environmental Protection Agency Review for IEE and EIA Regulations (2000) prescribe the environmental assessment requirements and procedures applicable in Pakistan. The PEPA, Section 12 requires proponents of all development projects to prepare and submit environmental assessment reports for review and approval by the competent authority. It also lays down the requirements for Initial Environmental Examination (IEE) and EIA. "No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal EPA or Provincial EPAs as the case may be, or, where the project is likely to cause adverse Environmental effects, an EIA and has obtained from the Government Agency approval in respect thereof;"

'The Government Agency shall, subject to standards fixed by Pak EPA:

- a) Review the IEE and accord its approval, or require submission of an EIA by the proponent or:
- b) Review the EIA and accord its approval subject to such conditions as it may deem fit to impose, require that the EIA be resubmitted after such modification as may be stipulated or reject the project as being contrary to environmental objectives.

PAK-EPA in August 2000 issued "Policy and Procedures for Filing, Review and Approval of Environmental Assessment". Schedules A and B define the type of development projects requiring EIA or IEE respectively. Schedule A provides a list of projects which have potential to affect a large number of people. The impacts of these projects may be irreversible and could lead to significant changes in land use and in the social, physical and biological environment. For dams and irrigation projects Schedule A determines that EIA is required for "dams and reservoirs with a maximum storage volume greater than 50 million m<sup>3</sup> or surface area greater than 8 km<sup>2</sup> or irrigation serving more than 15,000 ha."

Schedule B defines projects which require IEE. It deals with projects where the range of environmental issues is comparatively narrow and issues can be understood and managed through less extensive analysis. Under the legislation of Pakistan, an IEE is required for 'dams and reservoirs with a maximum storage volume less than 50 million m<sup>3</sup> or surface area less than 8 km<sup>2</sup> or small scale irrigation systems."

### **3.1.2 Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations 2000**

The PEPA review of the 2000 IEE and EIA regulations (the 'regulations') provides the necessary details on the preparation, submission and review of the IEE and the EIA reports. The regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists them in two separate schedules. Schedule-I lists projects that may not have significant environmental impacts and therefore require an IEE. Schedule-II lists projects of potentially significant environmental impacts requiring preparation of an EIA. However, it may be noted that this regulation does not have any other category for equipment procurement projects.

### 3.1.3 National Environmental Quality Standards (NEQS) 2000

First promulgated in 1993, the NEQS were last amended in 2000. These constitute the basic guidelines with which municipal and industrial origin liquid effluent and gaseous emissions must comply. These standards present the maximum allowable concentration for liquid effluent before its discharge into sea, inland water and sewage (total 32 parameters with which to comply) and gaseous emissions in the ambient air from industrial sources (total 16 parameters with which to comply).

**In addition to the aforementioned, following regulatory and other Government of Pakistan requirements should be complied with:**

1. Pakistan Environmental Protection Act, 1997  
<http://www.environment.gov.pk/act-rules/Brief-PEPA-Act1997.pdf>
2. National Quality Standards Regulation, 2000  
<http://www.environment.gov.pk/NEQS/neqs2000.pdf>
3. Self-Monitoring and Reporting by Industry Rule, 2001  
[http://www.environment.gov.pk/NEQS/selfmon\\_ru01.pdf](http://www.environment.gov.pk/NEQS/selfmon_ru01.pdf)
4. Pakistan IEE/EIA Regulation, 2000  
<http://www.environment.gov.pk/act-rules/IEE-EIA-REG.pdf>
5. Hazardous Substances Rules, 2003  
[http://www.environment.gov.pk/pro\\_pdf/HAZ-RU03.pdf](http://www.environment.gov.pk/pro_pdf/HAZ-RU03.pdf)
6. Draft Guidelines for Solid Waste Management, 2005  
<http://www.environment.gov.pk/EA-GLines/SWMGLinesDraft.pdf>
7. Environmental, Health, and Safety General Guidelines  
[http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui\\_EHSGuidelines2007\\_GeneralEHS/SFILE/Final+-+General+EHS+Guidelines.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GeneralEHS/SFILE/Final+-+General+EHS+Guidelines.pdf)

The Pakistan Environmental Protection Act 1997 requires that an initial environmental examination or environmental impact assessment shall be carried out for every 'project'. The types of project for which the requirement is applicable are listed in Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment (EIA) Procedures 2000. The definition of the project under the law includes both construction of a new project and modification to the existing project. There is no definition in the law on the level of modification which defines the threshold after which the IEE or EIA requirement is applicable on a modification project. However, the practice that is followed is that if the modification results in substantial change in the emission, effluent, waste generation, production, or use of natural resources, the IEE or the EIA, as appropriate shall be carried out.

### 3.2 USAID REQUIREMENTS

The United States laws require that all activities financed by USAID shall comply with the requirement of the US law 22 CFR 216. To promote pesticide safety, the USAID environmental regulations require that for any pesticide, or any chemical that can also be used as pesticide, a Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) shall be prepared. USAID has prepared a program level PERSUAP for its activities in Pakistan. It is likely, that certain waste material may contain chemicals that are regulated by PERSUAP. If any chemical from waste material falls in the regulated category, AEAI shall inform USAID.

### 4.0 Identification and Evaluation of Program Issues with Respect to Environmental Impacts Potential and Recommended Threshold Decisions:

**4.0 Identification and Evaluation of Program Issues with Respect to Environmental Impacts Potential and Recommended Threshold Decisions:**

- 4.1.1 Categorical Exclusion per 22CFR216.2(c)(2)(i) has determined for activities under the project. These include:**
- a) Identification of opportunities to implement activities for improvement of the sector and/or respond to the load-shedding crisis.
  - b) Assistance to the DISCOs and Government Ministries/ Departments in policy reforms.
  - c) Training of specially selected crew of lineman.
  - d) Strengthening the capacity of public sector GENCOs and hydropower stations and NPCC staff to improve technical and management decision making
  - e) Sustainable improvement in upstream policy, rules, regulatory framework and E& P programs to expedite increase in domestic production to mitigate fuel supply issues to power sector.
  - f) Support decision-making for a rational setting of GOP direction for alternative fuels
  - g) Explore the technical options and commercial considerations for Pakistan to import power from Turkmenistan, and Uzbekistan through Afghanistan to mitigate the energy crisis.
  - h) Capacity building for Membership of Electric Power Research Institute (EPRI), USA for 2 years
  - i) Training to dispatch engineers on system operation and load dispatch techniques.
  - j) Provision of two to three advisers at NPCC and three advisers for the GENCOs
  - k) Increased awareness about the business plans and best practices to manage these entities.
  - l) Increased awareness about the key activities and success stories of EPP
  - m) Electronic/Digital documentation of project activities and accomplishments highlighting USAID as the problem solver to the energy crisis.
  - n) Training of staff for the improved operation and maintenance
  - o) Provision of authentic data base of system assets (condition and options) for future use.
  - p) Provide prioritized recommendations for performance improvement to improve system reliability.
- Implementers will follow best industry practices for Environmentally Sound Design and Management (ESDM) and all trainings etc., will be conducted on appropriate environmental considerations.

**4.1.2 Negative Determination with Conditions per 22 CFR 216.3 (a) (2) (iii).**

- a. Equipment including laboratory equipment, electric power generation / distribution / testing equipment, spare parts, computers and furniture etc., procured under this project require appropriate disposal at the end of their useful life. The project will include requirements for proper disposal in all authorizations for such procurement. A Negative Determination per 22 CFR 216.3(a)(2)(iii) is recommended for purchase of all such equipment provided in the project in accordance with ADS 312
- b. Activities under the project may have potentially minor to moderate adverse environmental and social impacts and thus qualify for These include:
  - i. Design and oversight for identified system improvements.
  - ii. Facilitation of successful formulation and implementation of GOP's LNG import program and institutional capacity building.
  - iii. Rehabilitation and renovation activities / Construction Supervision and Environmental mitigation and monitoring activities

- v. Enable turnaround DISCO to handle future imports of electricity from Central Asian Republics.
- vi. Strengthen Transformer repair shops for DISCOs.
- vii. Procure, install and commission instrumentation to allow continual heat rate assessment (heat sensors for predictive maintenance).
- viii. Perform a one-time heat rate test for the GENCOs that will serve as a baseline for each station while meeting NEPRA requirements to have a reputable third-party perform the test.
- ix. Replacement and Up gradation of Equipment

Required mitigations are the development of an Environmental Documentation Form (EDF) including an Environmental Monitoring and Mitigation Plan (EMMP)<sup>1</sup> for each of the activities under Component B and for the status of the resettlement plan it is required provision of housing, land and compensation. The EDF must be cleared by the COR/program Manager and approved by the USAID Pakistan Mission Environmental Officer (MEO)

**5.0 Summary of Recommended Threshold Decisions**

The originator of this action has determined that the following activities of the Project have no adverse effect on the physical and/or natural environment under: (I) Categorical Exclusion per 22CFR216.2(c)(2)(i); and (II) Negative Determination with Conditions per 22 CFR 216.3(2)(iii). The table below applies and provides environmental determinations to the illustrative activities of the Project.

No	Task Description	Activities	Environmental Impact	Recommended Determination
1.	Turnaround (PESCO) & model DISCO (Possibly FESCO) Transmission Improvement	Upgrading of the transmission system to Improve the transmission and maintenance capacity of two DISCOs, which may involve Rehabilitation and renovation activities / Construction Supervision. (turnaround DISCO identified as PESCO and Model DISCO possibly FESCO). This will enable turnaround DISCO to handle future imports of electricity from Central Asian Republics. The model DISCO will gain around 500-600 MWs	Minor to moderate adverse impact on natural and physical environment is expected.	<b>Negative Determination with Conditions</b> per 22 CFR 216.3 (a) (2) (iii), the Conditions (with reference to the Pakistani laws and guidance being: a) use of environmentally sound materials, monitoring and evaluation (M&E), and good international industry practices acceptable to USAID; b) an EDF shall be prepared for each activity; c) based on the A/COR & MEO approved EDF including an Environmental Mitigation and Monitoring Plan (EMMP, see Attachment 1) shall be prepared, which will elaborate environmentally safe and sound waste management and disposal as well as ensure compliance with all OHS requirements acceptable to USAID; EMMP shall be approved by A/COR & MEO. Additional

<sup>1</sup> These forms are Attachment 1 and 2 of this IEE

No	Task Description	Activities	Environmental Impact	Recommended Determination
		<p>through these measures. Transformer repair shops for both DISCOs will also be strengthened.</p>		<p>Conditions are stipulated below.</p>
2.	<p>Turnaround (PESCO) &amp; model DISCO (Possibly FESCO) Transmission Improvement</p>	<p>Design and oversight for any identified system improvements. The USG may choose to put a part of this money into a FARA instead of AEAI.</p>	<p>Minor to moderate adverse impact on natural and physical environment is expected.</p>	<p><b>Negative Determination with Conditions</b> per 22 CFR 216.3 (a) (2) (iii), the Conditions (with reference to the Pakistani laws and guidance being: a) use of environmentally sound materials, monitoring and evaluation (M&amp;E), and good international industry practices acceptable to USAID; b) an EDF shall be prepared for each activity; c) based on the A/COR &amp; MEO approved EDF including an Environmental Mitigation and Monitoring Plan (EMMP, see Attachment 1) shall be prepared, which will elaborate environmentally safe and sound waste management and disposal as well as ensure compliance with all OHS requirements acceptable to USAID; EMMP shall be approved by A/COR &amp; MEO. Additional Conditions are stipulated below.</p>
3.	<p>High Impact Opportunities</p>	<p>Identification of opportunities to implement activities for improving the sector and/or respond to the load-shedding crisis, especially where there is a political will. The activity will focus on identification of those opportunities which have visible impact over the life of the project.</p>	<p>No adverse impact on the natural or physical environment</p>	<p>Categorical Exclusion 22 CFR 216.2(c)(2)(i)</p>

No	Task Description	Activities	Environmental Impact	Recommended Determination
4.	Governance	<p>Assistance to the DISCOs and Government Ministries/ Departments in policy reforms. The project will provide Best Professional Judgment on priorities to both the USG and GOP.</p> <p>Assistance to GENCOs in implementing systematic change such as in the human resources area (utilizing Leadership Change Management) with the goal of overall organizational restructuring which shall include, but not limited to improving transparency and reducing mismanagement.</p>	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
5.	Live line Training at nine DISCOs	<p>Training of specially selected crew of lineman on how to do repairs to reduce losses of MWHrs on live electric lines, current world best practice in all model utilities, to reduce revenue losses from sales and industrial sector outputs.</p> <p>Offering specialized skills to lineman will help improve the incentive structure and the maintenance technique of the discos.</p> <p>Nine vehicles with</p>	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)

No	Task Description	Activities	Environmental Impact	Recommended Determination
		accessories for transmission system lineman in DISCOs will be purchased either through PDP and/or alternate mechanism.		
6.	Specialized services in developing a LNG supply chain for MPNR.	Facilitate successful formulation and implementation of GOP's LNG import program and institutional capacity building. Provide short term solution for meeting gas shortages and improve fuel supply to power sector	Minor to moderate adverse impact on natural and physical environment is expected.	<b>Negative Determination with Conditions</b> per 22 CFR 216.3 (a) (2) (iii), the Conditions (with reference to the Pakistani laws and guidance being: a) use of environmentally sound materials, monitoring and evaluation (M&E), and good international industry practices acceptable to USAID; b) an EDF shall be prepared for each activity; c) based on the A/COR & MEO approved EDF including an Environmental Mitigation and Monitoring Plan (EMMP, see Attachment 1) shall be prepared, which will elaborate environmentally safe and sound waste management and disposal as well as ensure compliance with all OHS requirements acceptable to USAID; EMMP shall be approved by A/COR & MEO. Additional Conditions are stipulated below.
7.	Provide overall E & P expertise to support MPNR in upstream Oil & Gas activities, including shale gas (Policy, regulatory oversight, concessions, EP activities etc.)	Sustainable improvement in upstream policy, rules, regulatory framework and E& P programs to expedite increase in domestic production to mitigate fuel supply issues to power sector.	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)

No	Task Description	Activities	Environmental Impact	Recommended Determination
8.	Add 1mid-level adviser at MPNR (National Staff)	Support decision-making for a rational setting of GOP direction for alternative fuels	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
9.	Concept report for power import from regional countries	Explore the technical options and commercial considerations for Pakistan to import power from Turkmenistan, and Uzbekistan through Afghanistan to mitigate the energy crisis. Report will provide a higher level of information to assist decision makers on appropriate future actions.	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
10.	Feasibility Study for power import from Afghanistan.	Details for possible improvement in the capacity and availability of the power sector. Results will provide the requisite information to develop scope of work to produce a tender for design, procurement and construction of the transmission system/line(s) to Peshawar.	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
11.	Transmission system review of NTDC and DISCOS (two) 500, 220, 132 and 66 KV network, data collection, technical audit and	Provide an authentic data base of system assets (condition and options) for future use. Provide prioritized recommendations for performance improvement to improve system reliability. Additional personnel will be	Minor to moderate adverse impact on natural and physical environment is expected.	<b>Negative Determination with Conditions</b> per 22 CFR 216.3 (a) (2) (iii), the Conditions (with reference to the Pakistani laws and guidance being: a) use of environmentally sound materials, monitoring and evaluation (M&E), and good international industry practices acceptable to USAID; b) an EDF shall be prepared for each activity; c) based on the A/COR & MEO

No	Task Description	Activities	Environmental Impact	Recommended Determination
	performance improvement action plan.	needed to conduct this audit such as O&M engineer, protection engineer, analyst, communications engineer. They will seek to identify constraints but also be involved in training GOP personnel to resolve bottlenecks.		approved EDF including an Environmental Mitigation and Monitoring Plan (EMMP, see Attachment 1) shall be prepared, which will elaborate environmentally safe and sound waste management and disposal as well as ensure compliance with all OHS requirements acceptable to USAID; EMMP shall be approved by A/COR & MEO. Additional Conditions are stipulated below.
12.	Real time digital simulator (hardware & software) for DC and AC transmission system at NTDC	Capacity building at NTDC and for NPCC. Benefits include: <ul style="list-style-type: none"> <li>- Improved DC &amp; AC system operation</li> <li>- Improved protection and system integration</li> <li>- Tool to assist NPCC staff improve understanding of the grid and make more informed dispatching decisions.</li> </ul>	Minor to moderate adverse impact on natural and physical environment is expected.	<b>Negative Determination with Conditions</b> per 22 CFR 216.3 (a) (2) (iii), the Conditions (with reference to the Pakistani laws and guidance being: a) use of environmentally sound materials, monitoring and evaluation (M&E), and good international industry practices acceptable to USAID; b) an EDF shall be prepared for each activity; c) based on the A/COR & MEO approved EDF including an Environmental Mitigation and Monitoring Plan (EMMP, see Attachment 1) shall be prepared, which will elaborate environmentally safe and sound waste management and disposal as well as ensure compliance with all OHS requirements acceptable to USAID; EMMP shall be approved by A/COR & MEO. Additional Conditions are stipulated below.
13.	Power Planning, NTDC Capacity Building	Membership of Electric Power Research Institute (EPRI), USA for 2 years (will have access to EGEAS and other software Enhanced technical skill for improved performance to overcome the present	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)

No	Task Description	Activities	Environmental Impact	Recommended Determination
		crises and cater modern era challenges		
14.	Training	<p>a. NPCC planning department for creating the database for thermal and hydro generators</p> <p>b. Operation &amp; Maintenance practices for promoting energy efficiency in thermal and hydro power plants.</p> <p>Training to dispatch engineers on system operation and load dispatch techniques. Strengthening the capacity of public sector GENCOs and hydropower stations and NPCC staff to improve technical and management decision making: Improved O&amp;M practices can lead to increased availability and efficiency, reducing unscheduled load shedding; Improved planning can lead to optimized resource allocation and improved system efficiencies; and, Improved load dispatch can provide system efficiency gains.</p> <p>Training will be provided to GENCO personnel.</p>	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)

No	Task Description	Activities	Environmental Impact	Recommended Determination
15.	Secondment of staff	<p>Provide two to three advisers at NPCC (National is already a staff member) and 1 International Staff part time to improve economic dispatch and reduce planned and unplanned load shedding</p> <p>Three advisers for the GENCOs (At least 1 International (priority) and eventually 2 other Staff for each of three GENCOs)</p>	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
16.	Perform heat rate analysis at one GENCO thermal power station	<p>Procure, install and commission instrumentation to allow continual heat rate assessment (heat sensors for predictive maintenance).</p> <p>Perform a one-time heat rate test for the GENCOs that will serve as a baseline for each station while meeting NEPRA requirements to have a reputable third-party perform the test.</p> <p>Benefits include:</p> <ol style="list-style-type: none"> <li>1. Improved cost recovery by providing a revised basis for the allowable tariff</li> <li>2. Activity funds are leveraged – Utility to install and test</li> </ol>	Minor to moderate adverse impact on natural and physical environment is expected.	<p><b>Negative Determination with Conditions</b> per 22 CFR 216.3 (a) (2) (iii), the Conditions (with reference to the Pakistani laws and guidance being: a) use of environmentally sound materials, monitoring and evaluation (M&amp;E), and good international industry practices acceptable to USAID; b) an EDF shall be prepared for each activity; c) based on the A/COR &amp; MEO approved EDF including an Environmental Mitigation and Monitoring Plan (EMMP, see Attachment 1) shall be prepared, which will elaborate environmentally safe and sound waste management and disposal as well as ensure compliance with all OHS requirements acceptable to USAID; EMMP shall be approved by A/COR &amp; MEO. Additional Conditions are stipulated below.</p>

No	Task Description	Activities	Environmental Impact	Recommended Determination
		<p>equipment 3. Data will allow for more efficient operations resulting in improved financial position.</p>		
17.	Workshops for BOD of NTDC and senior management of GENCOs and training on internal audit procedures	Increased awareness about the business plans and best practices to manage these entities.	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
18.	Workshops for disseminating results of key activities of EPP.	Increased awareness about the key activities and success stories of EPP	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
19.	Increase public awareness campaign –	Electronic/Digital documentation of project activities and accomplishments highlighting USAID as the problem solver to the energy crisis.	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)
20.	Add Legal Advisor and/or Pakistani Firm Subcontract to provide advice on various GOP contracts	This would be for assistance above and beyond what is being proposed related to LNG and gas.	No adverse impact on the natural or physical environment	Categorical Exclusion 22 CFR 216.2(c)(2)(i)

## 5.1 Other Conditions

The Implementer shall ensure that:

1. ALL activities will be implemented in accordance with the Pakistani environmental, OHS, regulations, standards, norms and guidelines and national obligations under ratified international environmental agreements (see: <http://www.environment.gov.pk> ) and in their absence in accordance with the best international practice appropriate to the seismicity levels in Pakistan and in the respective districts; these should be acceptable to USAID.
2. All activities will be implemented in accordance with best practice guidance provided in the Asia environmental guidelines at [www.usaid.gov/our\\_work/environment/compliance/ane/guidelines.htm](http://www.usaid.gov/our_work/environment/compliance/ane/guidelines.htm); Environmental Guidelines for Small Scale Activities in Africa, 2<sup>nd</sup> edition as provided at <http://www.encapafrika.org>; EBRD Sub-sectoral Environmental and Social Guidelines (<http://www.ebrd.com/about/policies/enviro/sectoral/>); ADB Environmental Guidelines (<http://www.adb.org/Water/CFWS/Roadmap-Sectoral-Guidelines.pdf>).
3. The Implementer shall include environment compliance considerations into all aspects of the project implementation and will promote and train local counterparts on environmental requirements and standards across all of the project's activities; such proposed activities will be included in annual work plans, and results will be reported in annual reports.
4. Implementer will seek concurrence and obtain all applicable permits and licenses from the national duly authorized environmental and relevant agencies. Implementer will also seek concurrence from the duly provincial environmental agency(ies) on each the EMMP. The Contractor is required to obtain a letter from the local or regional office for environmental protection stating that the office: a) has been contacted by the contractor concerning the project activities; b) will maintain contact with the project; and c) will be aware of the potential environmental impacts of the project to help ensure that no detrimental impact will result from this project.
5. The implementing partners shall minimize the use of, and properly dispose of hazardous materials and wastes for all project activities. The implementing partners will adhere to USEPA guidance at [www.epa.gov/asbestos](http://www.epa.gov/asbestos) and [www.epa.gov/lead/pubs/renovation.htm](http://www.epa.gov/lead/pubs/renovation.htm) for dealing with asbestos and lead.
6. The implementing partners will screen all potential environmental impacts by preparing an Environmental Document Form (EDF) (**Attachment 1**). The implementing partners will prepare Environmental Mitigation and Monitoring Plan (EMMP) (**Attachment 2**) for all moderate risk activities and will monitor implementation to ensure enforcement of the mitigating measures. All such reviews and conditions will be documented, reviewed by the COR/AOR and the Mission Environmental Officer (MEO) / Deputy Mission Environmental Officer (DMEO) for the program, and maintained in project files and documentation.
7. Recommendations from the Environmental Lessons Learnt from similar USAID funded signature energy projects in Pakistan will be duly addressed in each EMMP to be developed for project sub activities.
8. The implementing partners will have adequate funds to implement any environmental mitigation and monitoring measures as well as it/they will have a qualified, MEO-approved environmental impact professional(s) (EIP) who will assess and recommend environmental actions to be taken by the project and will coordinate implementation of mitigation measures, monitoring and reporting.
9. The recipient will properly manage and dispose equipment when its useful life ends. For procuring of electronic and miscellaneous equipment and furniture, the implementing partners will adhere to USAID's general policies on commodity eligibility provided at <http://www.usaid.gov/policy/ads/300/31251m.pdf> and will not finance unsafe or ineffective

- products, such as certain pesticides, food products, or pharmaceuticals and other commodities not eligible for financing under this policy.
10. When equipment (computers, electric power generation & distribution equipment, laboratory equipment, etc.) is procured, at the end of its life, it will be disposed in an environmentally safe manner by a certified company in accordance with Pakistani laws, and in their absence, in accordance with international best practices acceptable to USAID (alternatively, when procuring equipment from a licensed provider/dealer an agreement may be reached that such equipment will be returned to the dealer for its environmentally safe disposal).
  11. Monitoring will be conducted during the project (beginning with a baseline) to determine the environmental impact (positive and/or negative) of all project activities. Contractor shall use only qualified staff for overseeing the mitigation and monitoring work. Monitoring shall occur during implementation as stipulated in the MEO approved EMMP. The Contractor will ensure that the environmental procedures are implemented, potential impacts mitigated. If negative environmental impacts are discovered through regular monitoring and evaluation of project activities, immediate actions will be taken to rectify the situation.
  12. When asbestos and/or lead-containing paints are encountered, these will be treated in accordance with the best international industry and management practice, acceptable to USAID in accordance with guidance at: <http://www.epa.gov>
  13. All environmental Conditions established in this IEE shall be duly transposed in RFP and Contract.
  14. USAID will arrange for mandatory environmental training for the key personnel of implementing partner and other stakeholders by the REA/Asia & OAPA and/or the MEO/DMEO before the project activities begin.
  15. COR, together with the MEO/DMEO, USAID/Pakistan will explain and clarify, at the project launch, to the Implementer environmental conditions and compliance procedures established in this IEE and the Contract.
  16. Implementer(s) shall document and regularly report to USAID on the implementation of the Negative Determination with Conditions (NDC) activities; reporting will include photographic documentation and site visit reports confirming implementation of the agreed EMMP, photos of site-specific activities prior to, during and after rehabilitation and renovation activities, during operation.
  17. USAID/Pakistan COR and MEO/DMEO shall regularly audit the Contractor's processes and related documents including inspection reports to ensure 22 CFR 216 environmental compliance throughout the life of the Contract.
  18. If any un-anticipated potentially significant environmental and social impacts are expected to arise, the COP shall promptly notify the COR and MEO/DMEO and seek guidance on the proper course of action.
  19. New activities introduced into the project that are substantively different from those presented in this IEE will required submission of an amended IEE to the BEO/OAPA.
  20. No additional activities will be conducted prior to receiving approval of the amended IEE by the BEO/OAPA. The implementing partners shall minimize the use of, and properly dispose of hazardous materials and wastes for rehabilitation and renovation activities.
  21. In accordance with 22 CFR 216.2 (a), this IEE will be amended to reflect substantive amendments, including change in funding levels and scopes of activities, or extensions of ongoing projects, programs and activities.
  22. Use of personal protection equipment should be in practice as is needed for the activities funded under the project.
  23. All transformers should be free from Polychlorinated Biphenyls (PCBs)

**6.0 Allocation, Training and Reporting requirements:**

- Reports will be submitted to the Contracting Officer's Representative (COR) and Mission Environmental Officer (MEO) at the completion of activity.
- The Contractor's progress report to USAID shall contain a section specific to environmental mitigation and monitoring and will include project summaries along with environmental impacts, success or failure of mitigation measures being implemented, results of environmental monitoring, and any major modifications/revisions to the project, mitigation measures or monitoring procedures.
- COR/MEO will explain to the Contractor(s) all environmental Conditions established in this IEE and their applicability to specific activities.

**7.0 LIMITATIONS OF THE IEE**

This assistance doesn't cover activities involving:

1. Assistance for the procurements (includes payment in kind, donations, guarantees of credit) or use (including handling, transport, fuel for transport, storage, mixing, loading, application, clean-up of spray equipment, and disposal) of pesticides (where pesticides cover all insecticides, fungicides, and rodenticides, etc. covered under the "Federal Insecticide, Fungicide, and Rodenticide Act" FIFRA.) or activities involving procurement, transport, use, storage, or disposal of toxic materials. All the proposed activities involving assistance for the procurement or use, or both, of pesticides in the existing and expanded geographic areas shall be subject to the procedures prescribed in 22 CFR 216.3(b)(I)(i) through (v). USAID/Pakistan has BEO/OAPA-approved Programmatic PERSUAP, which shall be used for any procurement, use and/or recommendation for use of pesticides. Referred USAID/Pakistan programmatic "umbrella" PERSAUP (PPERSUAP), covers procurement, use or recommendation of use of pesticides in all sectoral ongoing and planned programs and projects in the country for the forthcoming 3-5 years.
2. Assistance, procurement or use of genetically modified organisms (GMOs), will require preparation of biosafety assessment (review) in accordance with ADS 201.3.11.2(b) in an amendment to the IEE reviewed by the Agency Biosafety Review Advisor and approved by Asia BEO.
3. Procurement or use of Asbestos Containing Materials (ACM) i.e. piping, roofing, etc., Polychlorinated Biphenyl's (PCB) or other toxic/hazardous materials prohibited by US EPA as provided at: <http://www.epa.gov/asbestos> and/or under international environmental agreements and conventions e.g. Stockholm Convention on Persistent Organic Pollutions as provided at: <http://chm.pops.int>
4. USAID/Pakistan restricts the use of USAID funds, directly or indirectly, to produce, acquire, use, transport, store, sell, or otherwise deal with ammonium nitrate (AN) and calcium ammonium nitrate (CAN) for agricultural or rehabilitation and renovation activities and construction/demolition purposes.
5. Activities involving support to wood processing, agro-processing, industrial enterprises and regulatory permitting
6. GDA and/or DCA.

Any of these actions would require an amendment to the IEE duly approved by the BEO/OAPA.

## **8.0 REVISIONS**

In accordance with 22 CFR 216.3(a)(9,) if a project is revised or new information becomes available, including during preparation of an EDF, which indicates that a proposed action might be "major" and its effects "significant," the Determination will be reviewed and revised by the originator(s) of the program and projects and submitted through the MEO to the Bureau Environmental Officers, OAPA, for approval and, if warranted, an environmental assessment will be launched and scoping statement and environmental assessment report prepared. The scoping and EA process, if determined necessary during scoping, will follow and comply with 22 CFR 216.3(a)(4).

**Confidential information redacted**

**Attachment 1**

**Environmental Documentation Form**

**INSERT PROJECT NAME**

**A. Applicant information**

Contractor/grantee(organization)	Parent grant or project
individual contact and title	Address, phone and email (if available)
activity (brief description)	Amount
Location of activity	Start and end date of activity

**B. Activities, screening results, and recommended determination**

TABLE 1  Proposed Sub-activities	Screening result (Step 3 of instructions)			Recommended Determinations (Step 6 of instructions. Complete for all moderate and high-risk activities)		
	Very Low Risk	Moderate Risk	High Risk	No significant adverse impact	mitigation, no significant	Significant Adverse impact
1.						
2.						
3.						
4.						
6.						
8.						
9.						

(continue on additional page if necessary)

C. Summary of recommended determinations (check all that apply)

The activity contains. . .	<i>(equivalent regulation 216 terminology)</i>
<input type="checkbox"/> Very low risk sub-activities	<i>categorical exclusion(s)</i>
<input type="checkbox"/> After environmental review, sub-activities determined to have <b>no significant adverse impacts</b>	<i>negative determination(s)</i>
<input type="checkbox"/> After environmental review, sub-activities determined to have <b>no significant adverse impacts, given appropriate mitigation and monitoring</b>	<i>negative determination(s) with conditions</i>
<input type="checkbox"/> After environmental review, sub-activities determined to have <b>significant adverse impacts</b>	<i>positive determination(s)</i>

D. Certification:

I, the undersigned, certify that:

1. The information on this form is correct and complete
2. The following actions have been and will be taken to assure that the activity complies with environmental requirements established for the Mangla Dam under the Code of Federal Regulations 22 CFR 216:
3.
  - These design elements and best practices will be followed in implementing this activity, except with the approval of USAID.
  - Any specific mitigation or monitoring measures described in the attached information will be implemented in their entirety.
  - Compliance with these conditions will be regularly confirmed and documented by on-site inspections during the activity and at its completion.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

**BELOW THIS LINE FOR USAID USE ONLY**

**Approval**

USAID Project Officer	(print name)	(signature)
<input type="checkbox"/> Approved		
<input type="checkbox"/> Rejected		
USAID MEO or DMEO	(print name)	(signature)
<input type="checkbox"/> Approved		
<input type="checkbox"/> Rejected		

**USAID comments: (if documentation is rejected, comments must be provided to applicant)**

Attachment 2

**Environmental Mitigation & Monitoring Plan (EMMP)**

- An EMMP should either be included in or developed for (1) all IEEs that have at least one “Negative Determination with Conditions” (or for activities for which an environmental review has been completed pursuant to an IEE requirement) and (2) all Environmental Assessments (EAs).
- If the EMMP is not developed as part of the IEE, the implementing partner should usually lead development of the EMMP, subject to review and oversight by the MEO and COTR/AOTR.
- In all cases, the tasks identified in the EMMP are incorporated into the implementing partner’s Work Plan, budget, and reporting.
- The following EMMP format is recommended. It can be adapted, as necessary.

**Environmental Mitigation and Monitoring Plan**

**Activity Title:**

**Implementer:**

Activity	Mitigation Measure(s)	Monitoring Indicator(s)	Monitoring and Reporting Frequency	Party(ies) Responsible	Indicative Budget
<p>List all activities in IEE that received a “negative determination with conditions.”</p> <p><i>Do not list any other activities in separate rows.</i></p>	<p>If mitigation measures are well-specified in the IEE, quote directly from IEE</p> <p>If they are not well-specified in the IEE, define more specifically here.</p>	<p>Specify indicators to (1) determine if mitigation is in place and (2) successful.</p> <p>For example, visual inspections for seepage around pit latrine; sedimentation at stream crossings, etc.)</p>	<p>For example: “monitor weekly, and report in quarterly reports. If XXX occurs, immediately inform USAID activity manager.”</p>	<p>If appropriate, <i>separately</i> specify the parties responsible for mitigation, for monitoring and for reporting.</p>	

## Annex II: Waste Management Companies

### **Petro Waste Busters**

Contacted person: Abdul Qayyum  
Designation: Coordinator  
Contact Number: +92 (51) 220 4348, 220 4350  
Website: <http://www.petrowaste.com.pk>  
Email: [aquyyum@petrowaste.com.pk](mailto:aquyyum@petrowaste.com.pk)  
Type of waste: Industrial and hazardous waste  
Transportation and collection: They provide transportation  
Internal and External audits: Not mentioned  
Certifications: ISO 9000 and EPA certified  
Disposal certificate: Yes  
Comments: Detailed profile and NOCs received

### **Waste Busters**

Contacted person: Zillay Mariam  
Designation:  
Contact number: +92 (42) 667 2632, +92 (42) 667 2065  
Website: <http://www.wastebusters.com.pk>  
Email: [zillay.m@gmail.com](mailto:zillay.m@gmail.com)  
Type of waste: Mostly Industrial Waste  
Transportation and collection: Not mentioned  
Internal and External audits: Not mentioned  
Certifications: Not mentioned  
Disposal certificate: Not mentioned  
Comments: Demands project details and specifications before providing company profile

### **GEL (Pvt.) Ltd /Global Environmental Management Services Pvt Ltd**

Contacted person: Zahid Raza  
Designation: General Manager  
Contact number: +92 (21) 351 13804 5  
Website: <http://www.gemspakistan.org>  
Email: [zraza@gel.com.pk](mailto:zraza@gel.com.pk)  
Type of waste: All types of waste  
Transportation and collection: There is no regular arrangement but they can arrange  
Internal and External audits: external auditors come and check at random intervals  
Certifications: Certified for Quality management systems and working for ISO 17025 accreditation  
Disposal certificate: Yes  
Comments: Details requested

## Waste Management Company

Contacted person:	Shariq Moazzam
Designation:	
Contact number:	+92 (21) 3431 1466
Website:	<a href="http://www.wmc.com.pk">http://www.wmc.com.pk</a>
Email:	<a href="mailto:shariq@wmc.com.pk">shariq@wmc.com.pk</a>
Type of waste:	Waste oils and lubricants Waste oil sludge Oil contaminated soil Activated carbon Spent catalysts and exhausted media Waste chemicals/solvents Waste OBM and WBM and cuttings Oil Filters, Air Filters Amine Filters Coalesces Filters Printer and photocopier Cartridges Food waste Metal waste Wood waste Glass waste Rubber and Plastic waste Tires and tubes Insulation Materials Clinical and biological Waste Used batteries and cells Waste tube-lights and bulbs
Transportation and collection:	WMC (Pvt) Ltd. hires from reputable companies third party audited vehicles having FTW "fit to work" status as and when requires, WMC also ensures that the drivers and their companions engaged for the waste transportation are PPE clad have trainings pertained to Safe Driving and Road Safety besides the reasonable knowledge of HSE and have inductions about the sensitivity of activity with a satisfactory track record of Driving rules and Policy compliance /work (Driving) experience, awareness about ROW (Right of Way).
Internal and External audits:	Not mentioned
Certifications:	ISO 9001, ISO 14001, OHSAS 18001
Disposal certificate:	Not mentioned
Comments:	Demands project details and specifications before providing company profile

**Bizxperts (Pvt) Ltd.**

Contacted person: Muhammad Suffian Sabir  
Designation: Director  
Contact number: +92 (300) 833 1693  
Website:  
Email: [info@biz-xperts.com](mailto:info@biz-xperts.com)  
Type of waste: Hazardous & Non Hazardous Waste, Pharmaceutical Waste, Clinical Waste, Dental Waste, School Waste, Oil-Absorbent Materials, Textiles, Rubber, Paper, Carpet, and Treated Wood  
Transportation and collection: Waste collection service is provided usually  
Internal and External audits: Materials Recycling Audit that assesses and continually monitors entire waste handling process.  
Certifications: Not mentioned  
Disposal certificate: Yes  
Comments: Detailed profile received

**National Cleaner Production Center (NCPC)**

Contacted person: M Irshad Ramay  
Designation: Coordinator NCPC  
Contact number: +92 (51) 548 7041  
Website: Not found  
Email: [irshadramay@gmail.com](mailto:irshadramay@gmail.com)  
Type of waste:  
Transportation and collection:  
Internal and External audits: Regular internal and external audits are conducted  
Certifications: EPA certification

**WD Systems**

Contacted person: Shahid Shah  
Designation: Manager (Implementation)  
Contact number:  
Website: Not found  
Email: [shahid.shah@wdsystems.com.pk](mailto:shahid.shah@wdsystems.com.pk)  
Type of waste:  
Transportation and collection:  
Internal and External audits:  
Certifications:  
Disposal certificate:  
Comments: Information requested

# Annex III: Typical Occupational Health and Safety Procedures

Confined Space Entry

Buildings and Floors

Equipment Guarding, Safeguard and Safety Devices

Ladders, Stairs, Walkways and Working Platforms

Lifting Devices

Fall Protection

# Confined Space Entry

## 1.0 PURPOSE AND SCOPE

- 1.1 The worker who enters a confined space may be exposed to multiple hazards including poor lighting, slippery work surfaces, excessive noise levels, heat, toxic and flammable gases, and oxygen deficient atmospheres. Such hazards, encountered when entering or working in confined spaces, are capable of causing bodily injury, illness or even death to the worker. Accidents often occur among workers because of failure to recognize that a confined space represents serious potential hazards.
- 1.2 The purpose of this procedure is to specify the appropriate precautions that shall be taken to ensure that safe conditions are provided and maintained for all employees entering or working in confined spaces.

## 2.0 DEFINITIONS

- 2.1 *Confined Space* means a space that meets all the below listed criteria:
  - 2.1.1 Is large enough and so configured that an employee can bodily enter and perform assigned work; and
  - 2.1.2 Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits); and
  - 2.1.3 Is not designed for continuous employee occupancy.
- 2.2 *Permit Required Confined Space* means a confined space that has one or more of the following characteristics:
  - 2.2.1 contains, or has a potential to contain, a hazardous atmosphere;
  - 2.2.2 contains a material that has the potential for engulfing an entrant;
  - 2.2.3 has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or floors that slope downward and taper to a smaller cross-section; and
  - 2.2.4 contains any other recognized serious safety or health hazard.
- 2.3 *Non-Permit Confined Space* means a confined space that does not contain, or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.
- 2.4 *Authorized Entrant* means a trained employee who is authorized to enter a confined space during the term of a permit. Authorized Entrants may rotate duties with Safety Attendants. Any properly trained person with the authority to authorize entry may enter the space during the term of the permit provided the Attendant is informed of the entry.
- 2.5 *Safety Attendant* means a trained individual stationed outside the confined space who monitors the authorized entrants of that space. The Safety Attendant must remain in contact with the entrants at all times (visually or verbally) and is the first responder in the event of an emergency, though he does not enter the confined space for rescue. The Safety Attendant shall not be assigned to any other duties while monitoring a confined space.
- 2.6 *Confined Space Entry Permit (CSEP)* means a document giving written authorization to enter a confined space which is initiated by the Supervisor responsible for work that is required in that confined space. A sample CSEP is provided as Attachment 10.2 to this procedure. The Confined Space Entry Permit defines:
  - 2.6.1 the conditions under which the permit space may be entered;

- 2.6.2 reasons for entering;
  - 2.6.3 any anticipated hazards;
  - 2.6.4 precautions which have been taken to protect entrants;
  - 2.6.5 lists eligible Safety Attendants, entrants and those in charge of the entry;
  - 2.6.6 establishes the length of time for which the permit will remain valid.
- 2.7 *Entry* is the act by which any part of an entrant's body breaks the plane of an opening of a confined space.
- 2.8 *Hazardous Atmosphere* is an atmosphere that exposes employees to one or more of the following:
- 2.8.1 a flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
  - 2.8.2 an airborne combustible dust at a concentration that obscures vision at a distance of 1.5 meters or less;
  - 2.8.3 an atmospheric oxygen concentration below 19.5% or above 23.5%;
  - 2.8.4 an atmospheric concentration of any substance exceeding a permissible exposure limit (PEL)
  - 2.8.5 any atmosphere immediately dangerous to life or health.
- 2.9 *Hot Work* are operations such as riveting, welding, cutting, burning, or heating, including smoking, that could create sufficient heat so as to provide a source of ignition.
- 2.10 *Hot Work Permit* are document which gives written authorization to perform the above operations. This permit shall be attached to the back of, or incorporated in, the Confined Space Entry Permit anytime hot work is required in a confined space.
- 2.11 *Lower Flammable Limit (LFL)* of a gas or vapor at ordinary ambient temperature expressed in a percentage of the gas/vapor in air by volume. (If the air monitor reads 10 for LFL, that means the air being tested has a level of flammable gas that is 10% that of the LFL of the gas to which the instrument has been calibrated).
- 2.12 *Permissible Exposure Limit (PEL)* is the time-weighted average concentration for a normal 8- hour work day, and a 40-hour work week, to which nearly all workers may be exposed without adverse effects. The PEL is measured as parts of the vapor or gas per one million parts of air by volume (ppm) or an approximate milligrams of particulate per cubic meter of air (mg/m<sup>3</sup>).
- 2.13 *Emergency* means any occurrence (including any failure of hazard control or monitoring equipment) internal or external to the confined space, that could endanger entrants.
- 2.14 *Engulfment* means the surrounding and effective capture of a person by a liquid or finely divided solid substance.
- 2.15 *Blanking and Blinding* means the absolute closure of a pipe, line, or duct, by fastening across its bore a solid plate or "cap" which completely covers the bore, and is capable of withstanding the maximum upstream pressure without leakage.
- 2.16 *Double Block and Bleed* means the closure of a line, duct, or pipe, by locking and tagging a drain, or vent, which is open to the atmosphere in the line between two locked-closed valves.
- 2.17 *Immediately Dangerous to Life or Health (IDLH)* refers to a condition which poses an immediate threat of loss of life, irreversible or immediate-severe health effects, or which could impair escape from the permit space.
- 2.18 *Inerting* means rendering the atmosphere of a permit space non-flammable, non-explosive, or otherwise chemically non-reactive by such means as displacing or diluting, the original

atmosphere with steam or a gas that is non-reactive with respect to that space.

- 2.19 *Isolation* means the separation of a permit space from unwanted forms of energy which could be a serious hazard to permit space entrants.
- 2.20 *Line Breaking* means the intentional opening of a pipe, line or duct that is, or has been, carrying flammable, corrosive or toxic material, an inert gas, or any fluid at a pressure or temperature capable of causing injury.
- 2.21 *Rescue Team* means a group of two or more persons designated and trained to perform rescues in permit spaces.
- 2.22 *Oxygen Deficient Atmosphere* means an atmosphere containing less than 19.5 percent oxygen by volume.
- 2.23 *Oxygen Enriched Atmosphere* means an atmosphere containing more than 23.5 percent oxygen by volume.
- 2.24 *Retrieval Line* means a line or rope secured at one end to the worker by a chest-waist or full-body harness, or wristlets, and with its other end secured to either a lifting device, or to an anchor point located outside the entry portal.
- 2.25 *Permit Authorizing Person* refers to the person assigned the responsibility for, and in charge of, the entry being permitted. This person may be the entrant or attendant.

### **3.0 RESPONSIBILITY AND AUTHORITY**

- 3.1 The Chief Executive Officer/ Chief Engineer (CEO) shall be ultimately responsible for program implementation and for proper interpretation of these procedures.
- 3.2 The Maintenance and Operation Managers shall ensure that these procedures are followed when entering and/or working in confined spaces.
- 3.3 The CEO or designee shall ensure that annual field evaluations of this program are conducted.
- 3.4 The Training Coordinator shall ensure that appropriate initial training is conducted for employees associated with work in confined spaces. The Training Coordinator shall also ensure that annual refresher training is conducted for employees associated with work in confined spaces.
- 3.5 Each Supervisor shall be given a copy of the Confined Space Entry Procedure. Supervisors shall be responsible for fully understanding this procedure in its entirety and shall review the procedure with workers prior to any confined space work.
- 3.6 Each employee shall be obligated to comply with these procedures when entering and/or working in confined spaces. If there is any doubt or question about the safety of a planned confined space entry, the task should not be performed until all parties agree that safe conditions exist.

### **4.0 IDENTIFYING CONFINED SPACES**

#### **4.1 Confined Space Listing**

- 4.1.1 Attachment 10.1 is a list of all confined spaces at the Power Plant, grid stations. In the event that a new confined space which is not identified on this list is encountered, it shall be brought to the attention of the Safety coordinator and appropriate measures will be taken to incorporate it into this program.
- 4.1.2 Every item on the list of Attachment 10.1 shall be treated as a confined space and procedural requirements for entry into them shall be followed as outlined in this procedure.

#### **4.2 Labeling**

- 4.2.1 A sign stating "Caution – Confined Space – Entry By Permit Only" or other such labeling defining the area as a confined space, shall be posted in the immediate vicinity of all known confined spaces.
- 4.2.2 These signs will be at least 6" X 9", so as to make them obvious. Ideally, they should be placed on every possible entrance to a confined space. In certain instances where several entrances to a single space are next to each other, one large sign that clearly identifies that space as a permit regulated area can be used.
- 4.2.3 Where a confined space is a pit or similar area, a sign located adjacent to the area, which identifies the particular area, shall be posted.

#### 4.3 Confined Space Entry Permit (CSEP)

- 4.3.1 The confined space entry permit shall be affixed to the sign or to the entrance of that confined space after the space has been approved for safe entry. This will allow Authorized Entrants, Safety Attendants, and those authorizing entry easy access to permit condition information such as the expiration date, or make them more aware of a change from original permit conditions.
- 4.3.2 The Confined Space Permit shall remain valid until conditions in or around that space change or the job has been completed.
- 4.3.3 A sample CSEP is provided as Attachment 10.2 to this procedure.

### 5.0 CONFINED SPACE ENTRY PROCEDURES

#### 5.1 Initiating a Confined Space Entry Permit (CSEP)

The department Supervisor responsible for the employees in the confined space shall initiate the CSEP by filling out the permit (Attachment 10.2). At this time, a determination shall be made of the potential hazards that exist in that space.

#### 5.2 Electrical and Mechanical Clearance

A confined space shall be isolated electrically and mechanically in accordance with established clearance procedures, prior to entry.

#### 5.3 Confined Space Atmosphere Monitoring

- 5.3.1 The atmosphere of every confined space shall be monitored for O<sub>2</sub> level and flammable gas level (LFL).
- 5.3.2 Initial monitoring shall be performed by the Supervisor in charge of the employees that will be working in the space, or by those Authorized Entrants and Safety Attendants themselves, provided they have been given proper training.

***Note:** Because the O<sub>2</sub> level indicator is self-calibrating, carefully monitor calibration and use. Upon instrument start-up it should be turned on in an area with normal ventilation. Likewise, the LFL indicator should read zero upon instrument start-up. If not, it should be zeroed in an area free of combustible vapors.*

- 5.3.3 The Confined Space Atmosphere must contain between 19.5 and 23.5 percent oxygen and have a LFL of <10%. If these conditions are not met, see Attachment 10.3 for guidance.
- 5.3.4 If the confined space was previously determined to have a potential to contain hazards other than low O<sub>2</sub> or flammable gas, the confined space will be tested for those potential hazards before entry is authorized.

#### 5.4 Hot Work

- 5.4.1 If hot work is to be done inside a confined space, a Hot Work Permit shall be

completed in accordance with established procedures.

- 5.4.2 No hot work or any other spark or flame producing operation is permitted in or near the opening of a confined space unless that confined space has been tested and the LFL is found to be <10%.
- 5.4.3 Hot work in a confined space requires continuous O<sub>2</sub> level monitoring, and requires the use of mechanical ventilation.
- 5.4.4 Compressed gas cylinders shall not be allowed inside a confined space with the exception of Self Contained Breathing Apparatus (SCBA) when hot work is being performed.
- 5.4.5 Aerosol containers shall not be used in a confined space when hot work or any other spark or flame producing operation is being performed.
- 5.4.6 Equipment shall be inspected prior to each use when working in a confined space. Gas welding and cutting equipment shall be pre-tested for leaks prior to entry into a confined space. The torch and hose shall be removed from the confined space whenever the hot work is completed or the confined space is vacated, even temporarily.
- 5.4.7 Any time hot work is being performed inside a confined space, appropriate extinguisher media will be present in the event of a fire. An appropriate extinguisher will be chosen before entry upon the discretion of the Supervisor(s) in charge of the work. In all likelihood, water is preferred over chemical extinguishers because of the danger of asphyxiation associated with carbon dioxide or other agents.

## 5.5 Mechanical Ventilation

- 5.5.1 Mechanical ventilation is required for hot work. All sources of air used for ventilation shall be from a safe area. When ventilating, care shall be taken to prevent an unsafe buildup of flammable or explosive vapors/gasses in other areas of the grid stations.
- 5.5.2 Oxygen shall not be used to ventilate a confined space.
- 5.5.3 If ventilation equipment fails, all personnel shall vacate the confined space immediately.

## 5.6 Safety

- 5.6.1 A trained Safety Attendant shall be stationed outside the confined space and remain in visual or auditory contact with the Entrants at all times.
- 5.6.2 No other duties that would conflict with the Attendant's ability to monitor the safety of the Entrants shall be assigned.
- 5.6.3 The most important responsibility of a Safety Attendant is to recognize a problem or emergency and respond appropriately. In the event of an emergency, **the Safety Attendant is NOT to enter the confined space**, but is to call the Control Room using the radio or page phone.
- 5.6.4 The Control Room is to be provided the following information:
  - 5.6.4.1 nature of the emergency;
  - 5.6.4.2 the location of the emergency;
  - 5.6.4.3 the number of people involved;
  - 5.6.4.4 the Safety Attendant shall stay on the line until all pertinent information is conveyed. The Control Room will hang up first;
  - 5.6.4.5 in the event of an emergency elsewhere in the Grid station, the Safety

Attendant shall initiate Entrant evacuation immediately.

- 5.6.5 The Control Room shall call the appropriate emergency numbers which will be posted on or near the telephone.
- 5.6.6 In situations where flammable vapors or gasses cannot be totally removed from a confined space, non-sparking tools and explosion proof lighting shall be used.
- 5.6.7 Whenever electrical equipment is used in a confined space, it shall have ground fault interrupter protection. The ground fault circuit interrupter shall be tested prior to use and shall be located safely outside of the confined space.
- 5.6.8 Before entry into a confined space, all employees shall be verbally given specific safety instructions on their job assignments and the precautions required by the Supervisor in charge of the work.
- 5.6.9 If any monitoring instrument alarm sounds, all personnel in the confined space shall immediately leave the space.

*Note: re-entry shall not be permitted until monitoring instrumentation indicates the confined space atmosphere has returned to within acceptable limits and the reason for the alarm determined.*

- 5.6.10 If anyone working in the confined space should experience dizziness, faintness, nausea, buzzing or ringing in the ears, rapid heartbeat, or smells something abnormal, they shall signal for help and everyone shall immediately leave the confined space.
- 5.6.11 Personnel assigned to work in a confined space shall be trained, qualified and physically able to wear respiratory equipment, including SCBA.
- 5.6.12 The use of flammable/toxic materials within a confined space shall be avoided whenever possible and quantities kept to an absolute minimum when needed. These materials shall be kept in approved containers. The need for such materials shall be noted on the Confined Space Entry Permit. Continuous monitoring shall be conducted while such materials are being used in this space.
- 5.6.13 When toxic substances are present for which no equipment to test the atmosphere is available, the employee shall be permitted to enter the confined space-only-with the use of appropriate respiratory equipment and other appropriate personal protective equipment as specified in the Confined Space Entry Permit.
- 5.6.14 A harness and retrieval line shall be used anytime a worker enters a permitted confined space unless such equipment increases the hazard for rescue.

## 5.7 Equipment

The following equipment shall be available at the confined space job site to aid in an emergency:

- 5.7.1 retrieval lines;
- 5.7.2 harnesses;
- 5.7.3 Self Contained Breathing Apparatus (SCBA);
- 5.7.4 air monitoring instruments.

## 6.0 CONFINED SPACE RESCUE

This section defines the actions to be taken in the event that an emergency or accident should occur while employees are working within a confined space.

### 6.1 Safety Attendant

- 6.1.1 Every Safety Attendant should be trained in accordance with Section 8.0 of this procedure which states that they shall not enter the confined space, but call the Control Room by page, phone, or radio, and convey the following in the event of an emergency:
  - 6.1.1.1 The nature of the emergency
  - 6.1.1.2 The location
  - 6.1.1.3 The number of people involved
- 6.1.2 Safety Attendant shall remain on the line until all necessary information is received by the Control Room Operator.
- 6.2 Control Room
  - 6.2.1 The Control Room Personnel will then call the appropriate emergency response agency(s) or personnel as required to respond to any emergency situation.
  - 6.2.2 The Control Room will then announce over the Grid station alert system that there is a confined space emergency, and give the specific location.
- 6.3 Response Team
  - 6.3.1 Members of the Response Team will be made up of individuals who have received training in the proper rescue techniques, use of SCBA, and trained in first aid and CPR.
  - 6.3.2 The telephone numbers of the current list of individuals shall be kept in the Control Room.
  - 6.3.3 When the Grid station Response Team arrives at the scene, they will at that time assess the situation and take appropriate action at their discretion.
  - 6.3.4 There will not be an attempt to move the victim(s) unless they are in immediate danger of life and health, or unless this can be done easily because of their proximity to the confined space opening.
  - 6.3.5 All rescue personnel shall wear SCBA when entering the confined space unless it can be determined that the cause of the emergency is not space related (i.e.: heart attack, etc.).
- 6.4 Contractor Requirements
  - 6.4.1 Any contractor that will be working in a confined space at the Grid station will comply with these Confined Space Entry Procedures.
  - 6.4.2 Contractor shall have a Confined Space Entry Procedure and Confined Space Entry Permit.
  - 6.4.3 Any contractor which will be working in a confined space at the grid station shall be responsible for all monitoring requirements and documentation of monitoring.
  - 6.4.4 Any contractor which will be working in a confined space at the grid station shall be responsible for supplying their employees with proper personal protective equipment as well as have a plan for confined space rescue.
  - 6.4.5 All contractors working within confined spaces shall be given a list of emergency numbers to contact in case of an emergency.
  - 6.4.6 A failure of any contractor to comply with any of these requirements is grounds for immediate termination of contract and removal from the site.

## **7.0 ANNUAL REVIEW**

- 7.1 A copy of each canceled confined space entry permit must be retained for at least one year after which there shall be an annual review of the permit program.
  - 7.1.1 This process shall include reviewing the comments for problems encountered during the permit period so that appropriate revisions to the program can be made.
  - 7.1.2 This review is site specific.
- 7.2 The CEO or designee shall ensure that both the Supervisors in charge of work in confined spaces, and personnel authorizing and conducting confined space entry, receive annual refresher training.

## **8.0 TRAINING**

- 8.1 General
  - 8.1.1 The CEO or designee shall see that Supervisors in charge of work in confined spaces (Work Supervisors) and personnel authorizing entry receive annual refresher training.
  - 8.1.2 An outline of the training and topics discussed as well as the attendance list shall be kept on file for record.
- 8.2 Work Supervisor Training
  - 8.2.1 Work Supervisor training shall include the following topics:
    - 8.2.1.1 the proper steps in initiating and filling out a Confined Space Entry Permit;
    - 8.2.1.2 how to effectively determine the length of time for which the Permit is valid;
    - 8.2.1.3 how to terminate or close out a Confined Space Entry Permit;
    - 8.2.1.4 how to determine potential hazards in spaces and special requirements for those spaces;
    - 8.2.1.5 the maintenance and proper use of monitoring and safety equipment;
    - 8.2.1.6 the importance of the Electrical and Mechanical Clearance Procedure, the Hot Work Permit Procedure, and how they fit into confined space work;
    - 8.2.1.7 guidelines to use in training Safety Attendants and Authorized Entrants;
    - 8.2.1.8 guidelines for specific safety instructions to be given before the job;
    - 8.2.1.9 how to make sure all the equipment is needed for safety and/or rescue is available.
  - 8.2.2 Each Supervisor shall be given a copy of the Confined Space Entry Procedure.
  - 8.2.3 An outline of the training and subjects discussed, as well as an attendance list, shall be kept on file for record.
  - 8.2.4 The CEO or designee shall also review emergency procedures involving Control Room Operators who will be responsible for contracting local emergency response in the event of an emergency, on at least an annual basis.
  - 8.2.5 Work Supervisors shall be responsible for knowing that all Safety Attendants and Authorized Entrants have been trained before they are allowed to work in or around confined spaces.

- 8.2.6 This training shall be done at a minimum annually, and ideally before each scheduled outage that includes any planned or possible confined space work.
  - 8.2.7 No Supervisor should conduct, or be expected to conduct training, without approval to do so by the Site Superintendent.
- 8.3 Safety Attendant and Authorized Entrant Training
- The training given to all Safety Attendants and Authorized Entrants shall include:
- 8.3.1 the definition of a Confined Space:
    - 8.3.1.1 a Confined Space has or may have a limited means of access or egress;
    - 8.3.1.2 a Confined Space is not intended for employee occupancy;
    - 8.3.1.3 a Confined Space may have a known, or potential to contain, a hazardous atmosphere.
  - 8.3.2 review of the list of all confined spaces at the Grid station and labeling requirements for these spaces;
  - 8.3.3 review of the importance of Electrical and Mechanical Clearance Procedures and Hot Work Permit as it relates to confined space;
  - 8.3.4 review of the potential hazards that exist in some of the confined spaces at the Grid station . (e.g.: nitrogen blanketing of HRSG, flammable gas in the turbine oil tank, etc.);
  - 8.3.5 discuss specific safety equipment that is to be worn in a confined space. (e.g. harness and retrieval lines for going down through openings.);
  - 8.3.6 proper use of monitoring and safety equipment;
  - 8.3.7 oxygen limits ( >19.5 - <23.5% ) and what to do in specific cases. (reference Attachment 10.1);
  - 8.3.8 define/explain LFL (Lower Flammable Limit) and what to do in specific cases. Reference : Confined Space Monitoring and Ventilation.
  - 8.3.9 review - Confined Space Entry Procedure
    - 8.3.9.1 Duties of Safety Attendants: the most important duty is to initiate an emergency response by calling for help If an emergency should arise. In the event of an emergency:
      - 8.3.9.1.1 **DO NOT ENTER THE CONFINED SPACE!**
      - 8.3.9.1.2 call the Control Room for help;
      - 8.3.9.1.3 state the nature of the emergency;
      - 8.3.9.1.4 the location of the emergency;
      - 8.3.9.1.5 the number of people involved.
    - 8.3.9.2 The Safety Attendant shall remain in contact (audibly or visually) with Entrants at all times and cannot leave Entrants unattended at any time while in the confined space.
    - 8.3.9.3 initiate Entrant evacuation in the event of an emergency in another area of the Grid station.
    - 8.3.9.4 remain alert to any possible changes in conditions in and around the confined space, and initiate Entrant evacuation (e.g., failure of ventilation equipment) where necessary.

#### 8.3.10 Duties of Entrants

- 8.3.10.1 Must be trained before entering the space.
- 8.3.10.2 Shall look at the Confined Space Permit checklist to see that it has been completed and signed. If not, **NO ENTRY SHALL BE MADE!**
- 8.3.10.3 Use ground fault circuit interrupters on any electrical equipment in a confined space.
- 8.3.10.4 Evacuate the space in the event of an emergency or if any monitoring equipment alarm sounds.
- 8.3.10.5 Leave confined space if you feel dizziness, faintness, nausea, ringing of the ears, rapid heartbeat, or smell something abnormal..

#### 8.4 Control Room Personnel Training

- 8.4.1 Control Room Personnel will take calls from Safety Attendants during emergencies. These personnel shall be trained on an annual basis. Items to be reviewed include:
  - 8.4.1.1 list of emergency telephone numbers;
  - 8.4.1.2 current list of Response Team members and their phone numbers and/or outside Response Team;
  - 8.4.1.3 review of chain of events required, including:
    - 8.4.1.3.1 receiving appropriate information;
    - 8.4.1.3.2 nature of the emergency;
    - 8.4.1.3.3 the location;
    - 8.4.1.3.4 the number of people involved;
  - 8.4.1.4 discuss which emergency response organizations should be contacted;
  - 8.4.1.5 what to announce over the Grid station alert system.

#### 9.0 REFERENCES

- 9.1 US Code of Federal Regulations, Occupational Safety and Health Standards, 29 CFR 1910.146.
- 9.2 W.J.Rowe, *Safe Working in Confined Spaces Manual*, 1997.

#### 10.0 ATTACHMENTS

- 10.1 Possible List of Confined Spaces in the Grid station
- 10.2 Confined Space Entry Permit
- 10.3 Confined Space Monitoring and Ventilation Requirements

## Possible List of Confined Spaces in the Complex

1. Boiler
2. Water Storage Tank
3. Generator
4. Unit and Main Transformer
5. Turbine etc

## Confined Space Entry Permit

Grid station

**A copy of this permit will remain at the job site until job is completed.**

Location and Description of Confined Space

---



---

Purpose of Entry:

Date/Time:

Person in Charge of Work:

Expiration:

Supervisor(s) in charge of crews	Type of crew				Telephone	
Special Requirements	Yes	No			Yes	No
Lockout De-Energize			Escape Harness			
Lines Broken - Capped or Blanked			Emergency Rescue Equipment			
Purge - Flush and Vent			Lifelines			
Ventilation			Fire Extinguishers			
Secure Area			Lighting			
Breathing Apparatus			Protective Clothing			
			Respirator			

Tests to be taken	P.E.L.	Yes	No	Date						
% of Oxygen	19.5 +23.5									
% of L.F.L.	Any % Over 10									
Carbon Monoxide	50 ppm									
Toxics										
Organic Dust/Vapor										

# CONFINED SPACE ENTRY PERMIT

Page 2

Name of person testing atmosphere:

\_\_\_\_\_

**Note:** requirements for continuous or periodic atmospheric testing during work shall be established before beginning job.

For questions concerning test requirements contact:

\_\_\_\_\_

Instruments Used	Name	Type	Identification Number

Safety Attendant(s)	Authorized Entrant(s)

Supervisor authorizing all above conditions satisfied:

\_\_\_\_\_  
*Signature* *Date*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
*Print Name, Position & Shift*

## Confined Space Monitoring and Ventilation Requirements

Condition	Special Requirements	Ventilation	Monitoring
Hot work being performed	Affix Hot Work Permit. No hot work if LFL >10%. Ideally, LFL should be lowered to near 0% Attendant must have access to appropriate fire extinguishing media (water extinguisher preferable).	Continuous permanent or portable ventilation	Continuous monitoring for O <sub>2</sub> content and LFL. O <sub>2</sub> : = 19.5% to 23.5% LFL: = <10%
Oxygen level 19.5% or below on initial reading	NO ENTRY until O <sub>2</sub> level is above 19.5%! Otherwise, SCBA or air- line respirator with escape bottle required.	Permanent, portable or natural ventilation to bring oxygen level between 19.5% and 23.5%	Check periodically to ensure low O <sub>2</sub> condition does not return.
Oxygen level above 23.5%	NO ENTRY until oxygen level is into acceptable range. Determine cause of high O <sub>2</sub>	Permanent, portable or natural ventilation to bring oxygen level between 19.5% and 23.5%	Check periodically to ensure high O <sub>2</sub> condition does not return.
Lower Flammable Limit (LFL) above 0% and below 10% range.	If possible, isolate and remove source of flammable gas from the confined space.	Continuous permanent or portable ventilation unless the source of LFL monitoring indicates 0%.	Continuous monitoring for LFL unless the source of LFL monitoring indicates 0%.
LFL 10% or above	NO ENTRY NO HOT WORK until LFL is reduced to zero.	Continuous permanent or Portable ventilation	Continuous monitoring for LFL unless the source of LFL is removed and LFL monitoring indicates 0%.
Toxic or flammable materials present, believed to be present, or to be used in confined space.	Contact Supervisor for instructions	Continuous permanent or portable ventilation until source of toxic or flammable material is removed and monitoring indicates 0.	Monitor for toxic or flammable material periodically.
Level detected above PEL for material in Confined Space.	NO ENTRY until ventilation brings level below PEL. If possible, isolate and remove material source from confined space or wear appropriate respiratory equipment.	Continuous permanent or portable ventilation until source of toxic material is removed and monitoring indicates 0.	None if source of contamination is removed and level is 0. Monitor for toxic materials periodically.
Level detected above 0 and below PEL.	If possible, isolate and remove material source from confined space. Use of respiratory protection is at the discretion of the employee.	Continuos permanent or portable ventilation until source of toxic material is removed and monitoring indicates 0.	None if source of contamination is removed and level is 0. Monitor for toxic materials periodically.

# Buildings and Floors

## 1.0 PURPOSE AND SCOPE

- 1.1 The purpose of this document is to specify the minimum standard for physical maintenance of buildings and floors in the Grid station to ensure safety of employees and persons visiting the Grid station.
- 1.2 The objective is to maintain Grid station buildings and floors in a good state of repair and clear from scattered material, equipment, debris and spills. This eliminates or minimizes slips, trips and falls and resulting injuries and damage to equipment. Well-maintained buildings provide better working environment, motivate employees and also make a good impression on clients and members of the public. Following concerns are addressed through these specifications:
  - 1.2.1 damaged or neglected structures
  - 1.2.2 wet floors and spill of slippery materials, such as oil
  - 1.2.3 scattered material and equipment on floor.
- 1.3 The specifications provide the minimum design and operation standards that must be met at the Grid station to protect employee health and safety. In particular, the specifications shall be consulted in the following situations:
  - 1.3.1 developing routine maintenance and operations procedures and work instructions for the Grid station;
  - 1.3.2 evaluating design of existing facilities;
  - 1.3.3 designing new facilities and making structural changes to existing facilities; and
  - 1.3.4 occupational safety and health audit of the Grid station.
- 1.4 Once these specifications are approved, any amendment will require approval of the CEO or designee.
- 1.5 The system specifications described in this document must be followed in letter and spirit throughout the Grid station. However, it is envisaged that there will be situations in which exceptions will be required. All exceptions must be approved by the CEO or designee and recorded in Section 5 of this document.

## 2.0 DEFINITIONS

- 2.1 *CEO* refers to the Chief Executive Officer/Chief Engineer
- 2.2 *MM* refers to Maintenance Manager

## 3.0 STATUTORY REQUIREMENTS

- 3.1 Factories Act, 1934 – Section 13

## 4.0 MINIMUM REQUIREMENTS

- 4.1 Damage to Buildings and Floors
  - 4.1.1 All Grid station area shall be allocated to supervisors by means of a plan or written description for maintenance and upkeep.<sup>1</sup>
  - 4.1.2 The supervisors shall be responsible to conduct periodic inspections of the area allocated to them to observe any damage to the building or floor.
  - 4.1.3 All damage to buildings and floors shall be reported promptly to the MM using the

form included as Attachment 8.1.

- 4.1.4 The MM shall make arrangements to repair the damage, as soon as possible, after the damage is reported.
- 4.1.5 Any damage to buildings or floors detected by an employee shall be reported to concerned supervisor immediately.
- 4.2 Spills
  - 4.2.1 The surfaces of floors shall not be permitted to become slippery. The use of high gloss paints or excessive polishing should be avoided.
  - 4.2.2 Spills of slippery substances e.g. oil, must be treated and cleaned up immediately.
  - 4.2.3 Water shall not be allowed to accumulate on the floor in any part of the Grid station.
  - 4.2.4 Broom stations shall be provided corresponding to the cleaning needs of the workplace.
- 4.3 Demarcation
  - 4.3.1 To prevent cluttering of floor and haphazard storage of materials and equipment use of floor area shall be planned and the floors shall be demarcated accordingly.
  - 4.3.2 The Supervisor in charge of each area shall be primarily responsible for the demarcation process.
  - 4.3.3 Aisles, storage areas, walkways and “keep clear” areas shall be demarcated according to the needs of the workplace.
  - 4.3.4 Demarcation lines shall be clearly marked – 100mm wide depending on the needs of the workplace.
  - 4.3.5 Aisle and walkways must be adequate width to allow free movement of potential traffic and must be obstruction free.
  - 4.3.6 Demarcation lines must not be allowed to deteriorate or become indistinct.
  - 4.3.7 Demarcation must be adhered to. No protruding shall be permitted beyond shortage demarcation lines and no storage is permitted in work or walking areas.
  - 4.3.8 All colors used for demarcation should be consistent throughout the Grid station.
  - 4.3.9 For repair and maintenance work, temporary demarcation lines shall be drawn using tape to indicate area occupied by maintenance team.
  - 4.3.10 The supervisors in charge of each area shall carry out monthly inspections to verify that the demarcation system is working and rectify any deviation.
  - 4.3.11 ESH Manager shall inspect demarcation during his periodic inspection and must report any deviations.
- 4.4 Painting and Varnishing
  - 4.4.1 All inside walls, partitions and ceilings of the Grid station that have painted or varnished finish shall be cleaned at least once in every twelve months and repainted or re- varnished at least once in every five years.

## 5.0 ATTACHMENTS

### 5.1 Building and Floor Damage Reporting Form

---

<sup>1</sup> The Unit Layout key plan of the Grid station may be adapted for this purpose.

### Building and Floor Damage Reporting Form

Zone	
Building	
Location of Defect	
Nature of Defect	<input checked="" type="checkbox"/> Masonry <input checked="" type="checkbox"/> Steel Structure Floor Doors and Door Frames Walkways Ladders and Stairs Ceiling Other <input type="checkbox"/> <input type="checkbox"/>
Description of Defect	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Reported by:	
Date:	

# Equipment Guarding, Safeguard and Safety Devices

## 1.0 PURPOSE AND SCOPE

- 1.1 These specifications for reporting and investigation of accident apply to the following:
  - 1.1.1 All accidents occurring in the Grid station whether resulting in physical harm to persons or material damage or not involving employees of Grid station or equipment owned by Grid station
  - 1.1.2 All accidents occurring within the limits of the Grid station involving employees of Grid station contractors or equipment owned by contractors and resulting in physical harm to the contractor's employees.
  - 1.1.3 All accidents occurring outside the physical limits the plant involving equipment, including vehicles, owned by the Grid station or involving employees of the Grid station on official assignment.
- 1.2 Amendment to these specifications requires approval of the CEO or designee.
- 1.3 The system specifications described in this document must be followed in letter and spirit throughout the Grid station. However, it is envisaged that there will be situations in which exceptions will be required. All exceptions must be approved by the CEO or designee and recorded in Section 5 of this document.

## 2.0 DEFINITIONS

- 2.1 *AM* means the Administration Manager.
- 2.2 Plant refers to the Grid station.
- 2.3 *CEO* refers to the Chief Executive officer/Chief Engineer.

## 3.0 STATUTORY REQUIREMENTS

- 3.1 Factories Act, 1934 – Section 26

## 4.0 MINIMUM REQUIREMENTS

- 4.1 The guarding of machinery must comply with the requirements of the law.
- 4.2 During the design and tender stage, adequate specifications for effective guards must be laid down.
- 4.3 A guard must be a permanent part of the machine and must offer maximum positive protection, without holding any danger for the operation or hampering the effective performance.
- 4.4 Guards must be hard wearing, non-corrosive, heat resistant and easy to remove for maintenance or repair work.
- 4.5 Guards should not impede the ventilation of the machine.
- 4.6 Guards should be designed to follow the contour of the machinery.
- 4.7 Guards should create the minimum interference with the operation, cleaning, set-up, maintenance and other activities.
- 4.8 Guards should not pose any additional hazards, i.e. automatic operation of guards.

- 4.9 Interlocking guards should prevent the machine from operation, unless the guard is closed or prevents opening or access until the hazard has passed.
- 4.10 Electrical, mechanical, hydraulic or pneumatic trip devices must effectively provide a barrier to access to the danger area.
- 4.11 Two-handed control devices should not set the dangerous parts in motion unless the controls are operated within 0.5 seconds of each other and the process should be automatically stopped if one hand leaves a switch before the hazardous operation is complete.
- 4.12 Process material hazards and non-mechanical hazards (e.g. heat, electricity, radiation, etc.) must also be adequately guarded.
- 4.13 Abrasive wheels and grinders should be provided with a guard sufficient to contain a wheel that fractures. The operating speed of the wheel must be clearly indicated on the machine.
- 4.14 Machinery may under no circumstances be operated unless the machine guards are in place and in good condition.
- 4.15 Moving parts and the inside of a guard must be painted orange.
- 4.16 Any projecting shaft or spindle within reach and which projects more than one quarter of its own diameter must be enclosed completely by a cap or casing. Flush shaft ends should be painted orange with a 5mm black line drawn across.
- 4.17 Limit switches, thermostats, thermocouples, level switches and other safety devices should also form part of the machine guarding and maintenance system.
- 4.18 No person shall be permitted to clean any dangerous part of the machinery in a workplace while the machinery is in motion by the aid of any mechanical power.

# Ladders, Stairs, Walkways and Working Platforms

## 1.0 PURPOSE AND SCOPE

- 1.1 These specifications apply to all permanent or temporary ladders, stairs, walkways and working platforms in Grid station whether installed by Grid station staff or by Grid station contractors.
- 1.2 Amendment to these specifications requires approval of the CEO or designee.
- 1.3 The system specifications described in this document must be followed in letter and spirit throughout the Grid station. However, it is envisaged that there will be situations in which exceptions will be required. All exceptions must be approved by the CEO or designee and recorded in Section 5 of this document.

## 2.0 DEFINITIONS

- 2.1 *AM* means the Administration Manager.
- 2.2 *Plant* refers to the Grid station.
- 2.3 CEO refers to the Chief Executive Officer/ Chief Engineer.

## 3.0 STATUTORY REQUIREMENTS

- 3.1 Factories Act, 1934 – Section 33

## 4.0 MINIMUM REQUIREMENTS

### 4.1 Ladders

- 4.1.1 All ladders must conform to the requirements of relevant standards.
- 4.1.2 All ladders must be numbered, using a standardized method, 1000 mm from the bottom end of the ladder on one of the stiles.
- 4.1.3 A register for inspection purposes must be kept for all ladders.

### 4.2 Fixed Steps

- 4.2.1 Fixed steps must have at least a 255 mm wide tread.
- 4.2.2 Steps must be constructed as an angel of 30 degrees to 35 degrees.
- 4.2.3 A resting platform of 1000 mm x 750 mm should be provided at every tenth to twelve step.
- 4.2.4 The vertical height between steps should not exceed 180 mm.

### 4.3 Fixed Staircases

- 4.3.1 All fixed staircases with more than four steps must be provided with a single handrail on either side.
- 4.3.2 The heights and widths of steps should be uniform.
- 4.3.3 The surfaces of all staircases should be non-slip.
- 4.3.4 Staircases must be free of any obstruction.

#### 4.4 Scaffoldings

- 4.4.1 Scaffolds must be erected, altered and demolished under the direct supervision of a competent person.
- 4.4.2 All defective scaffold parts must be replaced without delay.
- 4.4.3 Scaffolds must at all times be used on a surface of sufficient size and strength.
- 4.4.4 Training must be provided for all personnel using ladders and scaffolding.

#### 4.5 Platforms

- 4.5.1 All work areas or platforms of more than 1m above floor level must be equipped with a handrail which should be at least 900 mm and not more than 1050 mm above floor/platform and should be equipped with a middle rail.
- 4.5.2 The top rail must be properly fixed to withstand impact pressure of 100 kg from any direction.
- 4.5.3 Vertical supports should be provided at intervals of not more than 2500 mm.
- 4.5.4 Toe-boards 100 mm high must be provided.
- 4.5.5 When painting handrails the verticals should be painted black and the horizontals painted yellow.

# Lifting Devices

## 1.0 PURPOSE AND SCOPE

- 1.1 These specifications apply to all lifting devices in the Grid station.
- 1.2 Amendment to these specifications requires approval of the CEO
- 1.3 The system specifications described in this document must be followed in letter and spirit throughout the Grid station. However, it is envisaged that there will be situations in which exceptions will be required. All exceptions must be approved by the CEO and recorded in Section 5 of this document.

## 2.0 DEFINITIONS

- 2.1 *Plant* refers to the Grid station.
- 2.2 *CEO* refers to the Chief Executive officer/ Chief Engineer.

## 3.0 STATUTORY REQUIREMENTS

- 3.1 Factories Act, 1934 – Section 33

## 4.0 MINIMUM REQUIREMENTS

- 4.1 All lifting appliances such as gears, cranes, jacks, wire and chain slings, steel blocks, and carrying beams must be identified.
- 4.2 All lifting appliances and lifting gears must bear a permanent mark on which the safe working load as well as the serial number. The serial number must also be entered in the register.
- 4.3 A register must be kept for all lifting gear.
- 4.4 All lifting equipment must be examined to ensure that it confirms with statutory requirement.
- 4.5 All inspection work should be carried out by a competent examiner in well-lit conditions and should be preceded by thorough cleaning. If there is any doubt at all about the competence of available personnel for inspection purposes, then the services of specialists should be called in. At no time shall repair work be done to slings by the user unless he is satisfied that he has all the required facilities to do so, maintaining the factor of safety.
- 4.6 All lifting appliances should be of good mechanical construction, made of strong and sound materials, free from patent defect and property maintained.
- 4.7 All lifting gear, whether rope, wire or chain, should be stored in a suitable store room when not in use.
- 4.8 All defective lifting gear that has been scrapped must be destroyed.
- 4.9 The safe working load of any lifting appliance and lifting gear should not be exceeded, except when test of such appliances are being done by competent examiners.
- 4.10 All hoisting beams, lifting lugs, etc. must bear a clear, permanent marking indicating the safe working load.
- 4.11 All personnel involved in lifting procedures must be adequately trained and competent.
- 4.12 If the operator of a lifting appliance does not have a clear and unrestricted view which is necessary for the safe working of the appliance, one person should be appointed and stationed to give effective signals to the operator of the lifting appliance to ensure its safe

working.

- 4.13 Standard hand signals must be used.
- 4.14 The load should not be left suspended from a lifting appliance unless a competent person is in charge of it during the period of suspension.
- 4.15 Adequate arrangements should be made for fixing or anchoring the appliance to ensure its safety.
- 4.16 All hooks must bear a clear, permanent mark including the safe working load.
- 4.17 All steel hooks must be marked using the three punch marking method.
- 4.18 Hooks of which the opening is more than 15% of the original opening as a result of bending, must be replaced.
- 4.19 All crane operators must be at least 21 years old, adequately trained and identified.
- 4.20 Safe access to cranes must be provided.
- 4.21 The hoisting mechanism of a crane should not be used except for raising or lowering loads vertically, unless it can be used otherwise, without imposing undue stress or endangering the stability, and unless a competent person supervises the operation.
- 4.22 A crane (including a crane with a derricking jib) with variable operation radii should be marked with safe working load at various radii of the jib, trolley or grab.
- 4.23 In the case of a crane with derricking jib, the maximum permissible radius at which the job may be worked should be marked on it. Such crane should have an accurate indicator visible to the driver, showing the radius of the job, trolley or grab at anytime and the safe working load for that radius.

# Fall Protection

## 1.0 PURPOSE AND SCOPE

- 1.1 The purpose of this procedure is to provide guidelines for the prevention of injuries to employees as a result of falling.
- 1.2 This procedure establishes minimum requirements and criteria for fall protection in the workplace.
- 1.3 This procedure does not apply when employees are making an inspection of workplace conditions prior to the actual start of the work or after the work has been completed. Employees making inspections, assessments, investigations, etc., are required to use precautionary measures to ensure they perform these duties in a safe manner.
- 1.4 This procedure does not cover fall protection from portable ladders for which a separate procedure is available (see reference).

## 2.0 DEFINITIONS

- 2.1 *Anchorage* means a secure point of attachment for lifelines, lanyards, or deceleration devices.
- 2.2 *Body Harness* means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with - for attaching it to other components of a personal fall arrest system.
- 2.3 *Buckle* means any device for holding the body harness closed around the employee's body.
- 2.4 *Connector* means a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together.
- 2.5 *Deceleration Device* means any Mechanical device (such as a toe grab, rip-stitch lanyard, specially-woven tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc.) that serves to dissipate a substantial amount of energy during an arrest, or otherwise limit the energy imposed on an employee during fall arrest.
- 2.6 *Equivalent* means alternative designs, materials, or methods to protect against a hazard which can be demonstrated that will provide an equal or greater degree of safety for employees than the methods, materials, or designs specified by OSHA.
- 2.7 *Free Fall Distance* means the vertical displacement of the fall arrest attachment point on the employee's safety harness between onset of the fall and just before the system begins to apply force to arrest the fall.
- 2.8 *Guardrail System* means a barrier erected to prevent employees from falling to lower levels
- 2.9 *Hole* means a gap or void 2 inches or more in its least dimension in a floor, roof, or other walling/working surface.
- 2.10 *Lanyard* means a flexible line of rope, wire rope, or strap, which generally has a connector at each end connecting the body harness to a deceleration device, lifeline, or anchorage.
- 2.11 *Leading Edge* means the edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes locations as additional floor, roof, decking, or formwork is placed, formed, or constructed, and is considered to be an unprotected side or edge.
- 2.12 *Lifeline* means a component consisting of a flexible line for connecting to an anchorage at one end vertically, or for connection to anchorage's at bottom ends to stretch horizontally, and which serves as a - for other components of a personal fall arrest system to the anchorage.

- 2.13 *Lower Levels* means those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.
- 2.14 *Opening* means a gap or void 30 inches or more high, and 18 inches or more wide, in a wall or partition, through which employees can fall to a lower level.
- 2.15 *Personal Fall Arrest System* means a system used to arrest an employee in a fall from a working level, and consists of an anchorage, connectors, body harness, and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.
- 2.16 *Positioning Device System* means a body harness system rigged to allow an employee to be supported on an elevated vertical surface which allows both hands free for working.
- 2.17 *Roof* means the exterior surface on the top of a building.
- 2.18 *Snaphook* means a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object, and, when released, automatically closes to retain the object. This snap hook is to be of the locking type.
- 2.19 *Unprotected Sides and Edges* means any side or edge of a walking/working surface, such as, a roof, ramp, or runway where there is no wall or guardrail system at least 39 inches high.
- 2.20 *Walking/Working Surface* means any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork, and concrete reinforcing steel.

### **3.0 RESPONSIBILITY AND AUTHORITY**

It shall be determined by a supervisor or delegated representative if the walking/working surfaces on which employees are to work have the strength and structural integrity to support employees safely.

### **4.0 STATUTORY REQUIREMENTS**

- 4.1 All floors, stairs, passages and gangways shall be of sound construction and properly maintained and where it is necessary to ensure safety, steps, ladders, passages and gangways shall be provided with substantial handrails [Factories Act, 1934: Section 33D(a)].
- 4.2 Safe means of access to every place at which any person is at any time is required to work shall be provided and maintained, so far as reasonably practicable [Factories Act, 1934: Section 33D(b)].
- 4.3 All places of work from which a worker may be liable to fall a distance exceeding 1.07 meters (3.5 feet) shall be provided with fencing or other suitable safeguards [Factories Act, 1934: Section 33D(c)].
- 4.4 Adequate provisions shall be made for the drainage of floors in wet processes and for the use of slotted stands and platforms [Factories Act, 1934: Section 33D(d)].
- 4.5 Every fixed vessel, sump, tank pit or opening in the ground or in a floor which by reasons of its depth, situation, construction or contents, is or may be a source of danger, shall be either securely covered or securely fenced [Factories Act, 1934: Section 33E(1)]. The Provincial Government is empowered to exempt any vessel, sump, tank or pit from requirements of the clause. Such exemption shall be in writing, and may be subject to conditions as may be imposed by the Provincial Government.

### **5.0 FALL PROTECTION REQUIREMENTS**

## 5.1 Unprotected Sides and Edges

Each employee on a walking/working surface (ANSI vertical) with an unprotected side or edge 6 feet or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

## 5.2 Leading Edges

5.2.1 Each employee who is constructing a leading edge 1 m or more above lower levels shall be protected from falls by a guardrail, safety net or personal fall arrest system.

Note: An exception is when it can be demonstrated that it is infeasible or creates a greater hazard to use these systems.

5.2.2 Each employee on a walking/working surface 1 m or more above a lower level where leading edges are under construction, but who is not engaged in the leading edge work shall be protected from falling by a guardrail, safety net, or personal fall arrest system.

## 5.3 Hoist Areas

Each employee in a hoist area shall be protected from falling 1 m or more to lower levels by a guardrail or personal fall arrest system. When an employee must lean over the top of or through the guardrail system to guide, receive, or work on equipment and/or materials, the employee shall be protected from fall hazards by a personal fall arrest system.

## 5.4 Holes

5.4.1 Each employee on walking/working surfaces shall be protected from falling through holes more than 6 feet above lower levels by personal fall arrest systems, covers, or guardrail systems erected around such holes.

5.4.2 Each employee on a walking/working surface shall be protected from tripping in, or stepping into, or through holes by covers.

5.4.3 Each employee on a walking/working surface shall be protected from objects falling through holes by covers.

## 5.5 Excavations

5.5.1 Each employee at the edge of an excavation 1 m or more in depth shall be protected from falling by guardrail systems, fences, or barricades.

5.5.2 Each employee at the edge of a well, pit, shaft, and similar excavations 6 feet or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

## 5.6 Wall Openings

Each employee working on, at, above, or near wall openings where the outside bottom edge of the wall opening is 6 feet or more above lower levels, and the inside bottom edge of the wall opening is less than 3 inches above the walking/working surface, shall be protected from falling by the use of a guardrail, safety net, or personal fall arrest system.

## 5.7 Other Walking/Working Surfaces

5.7.1 If not previously covered in sections 3.1 through 3.6, employees on a walking/working surface 6 feet or more above lower levels shall be protected from falling by a guardrail, safety net, or a personal fall arrest system.

5.7.2 When an employee is exposed to falling objects, the following measures shall be implemented:

- 5.7.2.1 Erect toeboards, screens, or guardrail systems to prevent objects from falling from higher levels; or,
- 5.7.2.2 Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced; or,
- 5.7.2.3 Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

## **6.0 FALL PROTECTION SYSTEMS**

### **6.1 Guardrail Systems**

Guardrail systems will need to comply with the following provisions:

- 6.1.1 Top edge height of top rails, or equivalent guardrail system members, shall be between 1 m and 1.15 m (39 and 45 inches) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 1.15-m (45-inch) height, provided the guardrail system meets all other required provisions.
- 6.1.2 Midrails, screens, mesh, immediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 53 cm (21 inches) high.
- 6.1.3 Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.
- 6.1.4 Screens and mesh shall extend from the top rail to the walking/working level and along the entire opening between top rail supports.
- 6.1.5 Intermediate members shall be not more than 48 cm (19 inches) apart.
- 6.1.6 Other structural members (such as additional midrails) shall be installed such that there are no openings in the guardrail system that are more than 48 cm (19 inches) wide.
- 6.1.7 Guardrail systems shall be capable of withstanding, without failure, a force of at least 0.89 kN (200 pounds) applied within 5 cm (2 inches) of the top edge, in any outward or downward direction, at any point along the top edge.
- 6.1.8 Midrails, screens, mesh, intermediate vertical members, etc., shall be capable of withstanding, without failure, a force of at least 0.67 kN (150 pounds) applied in any downward or outward direction at any point along the midrail or other member.
- 6.1.9 Guardrail systems shall be surfaced so as to not cause injury to employees by puncturing or lacerating the body, or snagging of clothing.
- 6.1.10 The ends of all top and midrails shall not overhang the terminal posts in such a manner as to create a projection hazard.
- 6.1.11 When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole.
- 6.1.12 When guardrail systems are used around holes which are used as points of access (such as ladderways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

### **6.2 Safety Net Systems**

Safety net systems and their use shall comply with the following provisions:

- 6.2.1 Safety nets shall be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet below such level.
- 6.2.2 Safety nets shall extend outward from the outermost projection of the work surface as follows:

<i>Vertical distance</i>	<i>Horizontal distance</i>
Up to 1.5 m (5 feet)	2.4 m (8 feet)
1.5 m (5 feet) to 3 m (10 feet)	3 m (10 feet)
More than 3 m (10 feet)	4 m (13 feet)

- 6.2.3 Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force.
- 6.2.4 Safety nets and their installations shall be capable of absorbing an impact force of 1.78 kN (400 pounds) dropped from a 76 cm (30 inch) height. These nets shall be drop tested every 6 months if left in place, and at the time of initial installation.
- 6.2.5 Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration while installed, and after any occurrence which could affect the integrity of the safety net system.
- 6.2.6 Size of mesh openings cannot exceed 15 cm (6 inches) on either leg of the opening nor more than 6 inches from center of opening to center of opening and must have a minimum breaking strength of 22.3 kN (5,000 pounds).

6.3 Personal Fall Arrest Systems

- 6.3.1 Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing components of the system.
- 6.3.2 Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.
- 6.3.3 Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper. Snaphooks shall be of the locking type.
- 6.3.4 On suspended scaffolds or similar work platforms with horizontal lifelines which may become vertical life-lines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.
- 6.3.5 Horizontal lifelines shall be designed, installed and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two (2).
- 6.3.6 Lanyards and vertical lifelines shall have a minimum breaking strength of 22.3 kN (5,000 pounds).
- 6.3.7 Each employee using a vertical lifeline shall be attached to a separate lifeline (no more than one person to a lifeline).
- 6.3.8 Lifelines shall be protected against being cut or abraded.
- 6.3.9 Self-retracting lifelines and lanyards which automatically limit free fall distance to 0.61 m (2 feet) or less shall be capable of sustaining a minimum tensile load of 13.4 kN (3,000 pounds) applied to the device. For self-retracting lifelines and lanyards which do not limit free fall distance to 0.61 m (2 feet) or less, the lanyards, lifelines, and

strength components of body harnesses shall be made from synthetic fibers.

- 6.3.10 Anchorage's used for attachment of personal fall arrest systems shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 22.3 kN (5000 pounds) per employee. These anchorage's shall be installed by a qualified person and have a safety factor of two (2).
  - 6.3.11 Personal fall arrest systems, when stopping a fall, shall limit maximum arresting force on an employee to 8 kN (1800 pounds) using a body harness, and be rigged such that an employee can neither free fall more than 1.8 m (6 feet), nor contact any lower level, bringing an employee to a complete stop and limit maximum deceleration distance an employee can travel to 1.1 m (3.5 feet). Personal fall arrest systems must have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 1.8 m (6 feet).
  - 6.3.12 The attachment point for body harnesses shall be located in the center of the wearer's back, near the shoulder level, or above the wearer's head.
  - 6.3.13 Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again until inspected and determined by a competent person to be undamaged and suitable for reuse.
  - 6.3.14 Personal fall protection systems shall be inspected prior to each use for wear, damage or deterioration. Defective components are to be removed from service.
  - 6.3.15 Personal fall arrest systems shall not be attached to guardrail systems.
  - 6.3.16 When a personal fall arrest system is used at hoist areas, it shall be rigged to allow movement of the employee only as far as the edge of the walking/working surface.
  - 6.3.17 Prompt rescue of employee shall be made the event of a fall.
- 6.4 Positioning Devices
- 6.4.1 Positioning devices shall be rigged such that employees cannot free fall more than 1 m.
  - 6.4.2 Positioning devices shall be secured to an anchorage capable supporting at least twice the potential impact load of an employee's fall, or 13.4 kN (3000 pounds), whichever is higher.
  - 6.4.3 Connectors shall be drop forged, pressed or formed steel, or made of equivalent material.
  - 6.4.4 Connectors shall have a corrosion-resistant finish with all surfaces smooth to prevent damage to interfacing parts.
  - 6.4.5 Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement.

## **7.0 TRAINING**

- 7.1 Each employee who might be exposed to fall hazards must be trained to recognize the hazards of falling.
- 7.2 Each employee must be trained in the procedures to be followed for minimizing fall hazards.
- 7.3 Training must be conducted by a competent person qualified in the following areas:
  - 7.3.1 The nature of fall hazards in the workplace.
  - 7.3.2 The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.

- 7.3.3 The use and operation of guardrail, personal fall arrest, safety net, warning line systems, and other protection to be used.
- 7.3.4 The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.
- 7.4 Training of employees must be documented.
- 7.5 Retraining of employees shall be required when there is reason to believe that any affected employee trained in fall protection lacks the understanding and skills required.
- 7.6 Retraining of employees shall also be required when changes in the workplace renders previous training obsolete, and/or when changes in fall protection systems or equipment renders previous training obsolete.

## **8.0 REFERENCES**

- 8.1 U.S. Code of Federal Regulations, Title 29, Part 1910, Occupational Safety and Health Standards. Following Subparts:
  - 8.1.1 Subpart D: Walking-Working Surfaces (1910.22: General requirements; 1910.23: Guarding floor and wall openings and holes; 1910.24: Fixed industrial stairs; 1910.27: Fixed ladders; 1910.28: Safety requirements for scaffolding; 1910.30: Other working surfaces)
  - 8.1.2 Subpart F: Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms (Appendix C to 1910.66: Personal Fall Arrest System)

# Annex IV: Environmental and Social Monitoring Report—Sample

Report No		Prepared By:	
Date		Distribution	
Reference		Page	
Reporting Period			
Monitoring/ Inspection Team			

### Project Activities Carried Out

<i>Activity</i>	<i>Status</i>

### Waste Generated and Handled

<i>Waste Type</i>	<i>Sources</i>	<i>Quantity</i>	<i>Status</i>

### Summary of Occupational safety and health and environmental issues Identified

<i>No</i>	<i>Issue</i>	<i>Location</i>	<i>Discussion</i>	<i>Decision/Action</i>	<i>Responsible Person</i>	<i>Target Date</i>
1						
2						

### Follow-up of Outstanding Issues

<i>No</i>	<i>Date Issue Raised</i>	<i>Issue and Action</i>	<i>Status</i>	<i>Discussion</i>	<i>Responsible Person</i>	<i>Revised Target Date</i>

Report No		Prepared By:	
Date		Distribution	
Reference		Page	
Reporting Period			
Monitoring/ Inspection Team			

## Inspection

### A. Rating Codes for the Checklist

<i>Rating Code</i>	<i>Rating</i>	<i>Description</i>
3	Excellent	The activity, area, system, and/or knowledge are superior Comments detailing
2	Adequate	The activity, area, system, and/or knowledge meet the basic minimum requirements which include proper documentation and full implementation.
1	Deficient	The activity, area, system, and/or knowledge are weak and not up to acceptable standards (documented and not implemented or implemented and not documented). Comments outlining weaknesses required.
0	Unsatisfactory	The activity, area, system, and/or knowledge are missing or of such a nature to warrant serious no compliance. Comments detailing concerns required.
N/A	Not Applicable	The question is not applicable to the type of operation, or the item was unable to be addressed during the audit.

### B. Checklist

<i>Requirement</i>	<i>3</i>	<i>2</i>	<i>1</i>	<i>0</i>	<i>N/A</i>	<i>Details</i>
<b>A. Waste Handling and Storage</b>						
1. Use of protective leather gloves while handling sharp edged metals						
2. All parts and machines dispatched from site to storage yard after dismantling, preferably on the same day						
3. Marking and segregation of wastes in scrap yard and a clear passage way marked by lines on the ground for walking of staff. No waste stored within the passage way.						
4. Sharp edged metal are not to be left unattended at any time. In the storage yard, the storage area for shard edged metals cordoned off using clearly visible tapes.						
5. All parts and machines dispatched from site after dismantling to store yard as soon as possible, preferably on the same day						

Report No		Prepared By:	
Date		Distribution	
Reference		Page	
Reporting Period			
Monitoring/ Inspection Team			

<i>Requirement</i>	<i>3</i>	<i>2</i>	<i>1</i>	<i>0</i>	<i>N/A</i>	<i>Details</i>
6. Before final disposal, any potentially hazardous substance such as lead or material containing lead are identified and disposed off accordingly.						
7. To the extent possible any oil or grease in the equipment to be replaced is removed before dismantling of the equipment						
8. All effort are made to avoid spilling the oil on the floor						
9. Any spillage is removed immediately. For this purpose, spill control kits are made available near the work areas.						
10. Waste oil is stored in leak proof containers						
11. Oil is stored in designated and clearly marked areas. The oil storage area is lined with impervious flooring						
12. The oil storage area is away from direct heat and fire source						
13. The oil storage area has dykes constructed around it to control accidental leakages and spills						
14. All type of plastic is collected and stored in separate bins marked for this purpose						
15. Plastic waste is not burnt in open air or disposed off by dumping in the areas surrounding the Grid station site						
16. Nails are removed from the woods						
17. All type of waste is collected and stored in separate bins marked for the designated purpose						
18. The equipment is opened only under the supervision of a qualified person. Any potentially hazardous material such as mercury is identified prior to dismantling and appropriate safety measures are taken.						
19. Masks are used to avoid respiratory infections while handling carbon soot						
20. Soot is transported and stored in covered containers						
21. Soot is preferably disposed as soon as it is removed from the duct. Prolonged storage, particularly at the site, is generally avoided.						

Report No		Prepared By:	
Date		Distribution	
Reference		Page	
Reporting Period			
Monitoring/ Inspection Team			

<i>Requirement</i>	<i>3</i>	<i>2</i>	<i>1</i>	<i>0</i>	<i>N/A</i>	<i>Details</i>
22. Waste is not burnt in open air or disposed off by dumping in the areas surrounding the Grid station site						
23. Standard protective equipment including eye protective glass, gloves and mask are used						
<b>B. Waste Disposal</b>						
1. Separate oil contaminated parts from the rest.						
2. The oil contaminated parts of waste is cleaned before being fed into furnace. Alternatively, the cleaning may be undertaken at power station.						
3. Segregate wires and other copper material and insulation material from the rest						
4. Before final disposal, any potentially hazardous substance such as lead or material containing lead is identified.						
5. The risk associated with the wastes is identified, and accepted disposal methods for such waste are followed.						
6. Only certified recycling contractors are used for disposal from the relevant agencies.						
7. Agreement with the contractors for the disposal of plastic waste in the designated pre-identified municipal landfill site.						
<b>C. Transportation of equipment</b>						
1. Vehicles used for the transportation are NEQS compliant for the emissions and noise.						
<b>D. Onsite handling and storage of new equipment</b>						
1. The new equipment is stored in properly demarcated and identified areas						
2. Separate storage of each item is adopted and each area is marked either on floor or cordoned off by tapes						
3. Lifting equipment (cranes) used for the equipment follows the prescribed safety specification.						

Report No		Prepared By:	
Date		Distribution	
Reference		Page	
Reporting Period			
Monitoring/ Inspection Team			

<i>Requirement</i>	<i>3</i>	<i>2</i>	<i>1</i>	<i>0</i>	<i>N/A</i>	<i>Details</i>
4. Material Safety Data Sheet (MSDS) for chemicals, if any, shall accompany the consignment. A copy of the MSDS is available near the storage area at all times.						
<b>E. Repair, rehabilitation and installation activities—General</b>						
1. Appropriate PPE is provided to the workers and ensured that the PPEs' are used						
2. The staff is provided with training in use of PPE.						
3. Proper scaffolding platforms are provided for all work areas located more than 1 m above floor level.						
4. First Aid facilities and fire protection devices are placed in areas where activities are to be performed						
5. Ear protection devices are used if the noise level is above 85 dB(A)						
<b>F. Repair, rehabilitation and installation activities—Working in confined Spaces</b>						
1. All confined spaces are identified						
2. The temperature of the confined space are in the human tolerance range						
3. Artificial and intrinsically safe lighting are provided in the confined spaces						
4. If there is a risk of gases or fumes in the confined space the provisions for ventilation is made						

# Annex V: PCB Test Report



# Orient Oils (Private) Limited

Orient Energy Group of Companies

## LAB TEST REPORT

## SOS LABORATORY COMPLEX

Plot # 14, Sector-16 Korangi Industrial Area, Karachi.,

TEST REPORT NO: EL-270214-10250

Tel: +92-21-35122406-10, +92-21-35121822-3 FAX: +92-21-35121821

Dated: 27-Feb-2014

## ELECTROIL TEST REPORT

Customer : PAKISTAN WAPDA FOUNDATION	Batch #:	
SPECIFICATION : IEC 60296-2012	Date Of Sample :	27-Feb-2014
	TRV:	2
Quality check	Tank/ Tank Lorry :	TUB 289

Properties	Test Methods	Unit (limits )	Test Result
Color	D1500	-	L0.5
<b>Function:</b>			
Kinematic Viscosity at 40°C	ISO 3104	mm <sup>2</sup> /s(12Max)	10.13
Kinematic Viscosity at -20°C	ISO 3104	mm <sup>2</sup> /s(1800Max)	270.18
Pour Point	ISO 3016	C (-30Max)	-30
Water Content	IEC 60814	ppm(30Max)	16
Break Down Voltage	IEC 60156	Kv(30Min)	87
Density at 20°C	ISO 12185	0.895 gm/ml(Max)	0.8515
DDF @ 90C	IEC 60247	(0.005max)	0.0029
<b>Refining/Stability:</b>			
Appearance	-	-	Clear
Acidity	IEC 62021-1	mg KOH/gm(0.1Max)	0.0052
Potentially Corrosive Sulphur*	IEC 62535	Not Corrosive	Not Corrosive
Corrosive sulphur	DIN 51353	Not Corrosive	Not Corrosive
Anti Oxidant Additives	IEC60666/FTIR	%(ND)	ND
Furfural Contents	IEC 61198	mg/kg(0.05×5Max)	ND
<b>Performances:</b>			
Oxidation Stability*	IEC 61125©	-	-
Total Acidity	-	mg KOH/gm(1.2Max)	0.5
Sludge %	-	%(0.8Max)	0.35
DDF @ 90C	IEC 60247	(0.5Max)	0.21
<b>Health, Safety and Environment:</b>			
Flash Point PMCC	ISO 2719	C(135Min)	160
PCA Content*	BS 2000/IP- 346	%(3Max)	<2
PCB Content	IEC61619	ND(<2mg/kg)	ND

COMMENTS :- The sample confirms to the product specification with respect of test carried out.

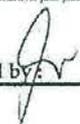
1 ltr sample bottle is being sent with the consignment.

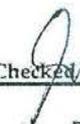
ND= Not Detectable .

\* Reported from Bulk Material.

Density @ 85F= 0.8452

(Orient Electrical Contains PPD of Oil in Derivatives, separate storage is advised for transformer oil containing PPD's of different concentrations in case mixing is required to be done in any proportions, sample is recommended to be tested for pour point prior to mixing.)

Analysed by: 

Checked by: 

Chief Chemist 

# Annex VI: Material Safety Data Sheet Transformer Oil

## MATERIAL SAFETY DATA SHEET

### 76 Transformer Oil

#### 1. PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** 76 Transformer Oil  
**Product Code:** 1041410  
**Intended Use:** Insulating Oil  
**Synonyms:** Conoco Transformer Oil  
Phillips Transformer Oil  
**Chemical Family:** Petroleum Hydrocarbon

**Responsible Party:** Conoco Lubricants  
A Division of ConocoPhillips  
600 N. Dairy Ashford  
Houston, Texas  
77079-1175

**Customer Service:** 800-255-9556  
**Technical Information:** 800-255-9556

The intended use of this product is indicated above. If any additional use is known, please contact us at the Technical Information number listed.

#### EMERGENCY OVERVIEW

**24 Hour Emergency Telephone Numbers:**

Spill, Leak, Fire or Accident Call CHEMTREC:

North America: (800) 424-9300

Others: (703) 527-3887 (collect)

California Poison Control System: (800) 356-3219

**Health Hazards/Precautionary Measures:** Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

**Physical Hazards/Precautionary Measures:** Keep away from all sources of ignition.

**Appearance:** Clear brown  
**Physical Form:** Liquid  
**Odor:** Mild petroleum

**NFPA 704 Hazard Class:**

**Health:** 1 (Slight)  
**Flammability:** 1 (Slight)  
**Instability:** 0 (Least)

**HMIS Hazard Class:**

**Health:** 1 (Slight)  
**Flammability:** 1 (Slight)  
**Physical Hazards:** 0 (Least)

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

NON-HAZARDOUS COMPONENTS					
Component / CAS No:	Percent (%)	ACGIH:	OSHA:	NIOSH:	Other:
Hydrotreated Distillate, Light Naphthenic ..C15-30 64742-53-6	> 99	5 mg/m <sup>3</sup> TWA 10 mg/m <sup>3</sup> STEL	5 mg/m <sup>3</sup> TWA	2500 mg/m <sup>3</sup> IDLH	as Oil Mist, if Generated  5 mg/m <sup>3</sup> NOHSC TWA
Additives PROPRIETARY	< 1	NE	NE	NE	

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

1%=10,000 PPM.  
NE=Not Established

All components are listed on the TSCA inventory.

## 3. HAZARDS IDENTIFICATION

### Potential Health Effects:

**Eye:** Contact may cause mild eye irritation including stinging, watering, and redness.

**Skin:** Contact may cause mild skin irritation including redness, and a burning sensation. Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin leading to dermatitis (inflammation). No harmful effects from skin absorption are expected.

**Inhalation (Breathing):** No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

**Ingestion (Swallowing):** No harmful effects expected from ingestion.

**Signs and Symptoms:** Effects of overexposure may include irritation of the nose and throat, irritation of the digestive tract, nausea and diarrhea.

**Cancer:** Inadequate data available to evaluate the cancer hazard of this material.

**Target Organs:** Inadequate data available for this material.

**Developmental:** No data available for this material.

**Pre-Existing Medical Conditions:** Conditions aggravated by exposure may include skin disorders.

## 4. FIRST AID MEASURES

**Eye:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

**Skin:** Wipe material from skin and remove contaminated shoes and clothing. Cleanse affected area(s) thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser.

**Inhalation (Breathing):** If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

**Ingestion (Swallowing):** First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

**Notes to Physician:** High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. Often these injuries require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

## 5. FIRE-FIGHTING MEASURES

### Flammable Properties:

<b>Flash Point:</b>	> 293°F / > 145°C
<b>Test Method:</b>	(COC)
<b>OSHA Flammability Class:</b>	Not applicable
<b>LEL%:</b>	0.9
<b>UEL%:</b>	7.0
<b>Autoignition Temperature:</b>	No data

**Unusual Fire & Explosion Hazards:** This material may burn, but will not ignite readily. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

**Extinguishing Media:** Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

**Fire Fighting Instructions:** For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

## 6. ACCIDENTAL RELEASE MEASURES

This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

## 7. HANDLING AND STORAGE

**Handling:** Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Use good personal hygiene practices.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

**Storage:** Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Storage temperatures above 113°F may lead to thermal decomposition, resulting in the generation of hydrogen sulfide and other sulfur containing gases. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional engineering controls may be required.

### Personal Protective Equipment (PPE):

**Respiratory:** A NIOSH certified air purifying respirator with a Type 95 (R or P) particulate filter may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a NIOSH approved self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

**Skin:** The use of gloves impervious to the specific material handled is advised to prevent skin contact and possible irritation (see manufacturers literature for information on permeability).

**Eye/Face:** Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

**Other Protective Equipment:** A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

Suggestions for the use of specific protective materials are based on readily available published data. Users should check with specific manufacturers to confirm the performance of their products.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

<b>Appearance:</b>	Clear brown
<b>Physical Form:</b>	Liquid
<b>Odor:</b>	Mild petroleum
<b>Odor Threshold:</b>	No data
<b>pH:</b>	Not applicable
<b>Vapor Pressure (mm Hg):</b>	<0.1
<b>Vapor Density (air=1):</b>	> 5
<b>Boiling Point:</b>	No data
<b>Melting/Freezing Point:</b>	No data
<b>Solubility in Water:</b>	Negligible
<b>Partition Coefficient (n-octanol/water):</b>	No data
<b>Specific Gravity:</b>	0.88 - 0.89
<b>Bulk Density:</b>	7.33 - 7.41 lbs/gal
<b>Viscosity cSt @ 100°C:</b>	2.2 - 3.0
<b>Viscosity cSt @ 40°C:</b>	9.4 - 12.0
<b>Percent Volatile:</b>	Negligible
<b>Evaporation Rate (nBuAc=1):</b>	< 0.01
<b>Flash Point:</b>	> 293°F / > 145°C
<b>Test Method:</b>	(COC)
<b>Flammable/Explosive Limits:</b>	No data
<b>Autoignition Temperature:</b>	No data
<b>Decomposition Temperature:</b>	No data

## 10. STABILITY AND REACTIVITY

**Stability:** Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**Conditions to avoid:** Extended exposure to high temperatures can cause decomposition.

**Materials to Avoid (Incompatible Materials):** Avoid contact with strong acids, strong bases, oxidizing agents.

**Hazardous Decomposition Products:** Combustion can yield and carbon, nitrogen and sulfur oxides.

**Hazardous Polymerization:** Will not occur.

## 11. TOXICOLOGICAL INFORMATION

Hydrotreated Distillate, Light Naphthenic ..C15-30 - 64742-53-6

MSDS Code: 775852

Status: Final

Page 6/8

Date of Issue: 19-Jan-2004

**Target Organs:** Administration of certain mineral hydrocarbon white oils in the diet to Fischer rats at 1500 mg/kg/day for 90 days resulted in the formation of microgranulomas in the liver. However, this response was not observed in studies conducted with other rat strains or dogs. Microgranulomas like those observed in the Fischer 344 rat studies have not been observed in humans.

**Acute Data:**

Hydrotreated Distillate, Light Naphthenic ..C15-30 - 64742-53-6

**Dermal LD50** = No information available

**LC50** = No information available

**Oral LD50** = No information available

Additives - PROPRIETARY

**Dermal LD50** = No information available

**LC50** = No information available

**Oral LD50** = No information available

## 12. ECOLOGICAL INFORMATION

Not evaluated at this time.

## 13. DISPOSAL CONSIDERATIONS

This material under most intended uses would become used oil due to contamination by physical or chemical impurities. RECYCLE ALL USED OIL. While being recycled, used oil is regulated by 40 CFR 279. Use resulting in chemical or physical change or contamination may also subject it to regulation as hazardous waste. Under federal regulations, used oil is a solid waste managed under 40 CFR 279. However, in California, used oil is managed as hazardous waste until tested to show it is not hazardous. Consult state and local regulations regarding the proper handling of used oil. In the case of used oil, the intent to discard it may cause the used oil to be regulated as hazardous waste.

Contents should be completely used and containers emptied prior to discard. Rinsate may be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or a drum reconditioner. To assure proper disposal of small empty containers, consult with state and local regulations and disposal authorities.

## 14. TRANSPORTATION INFORMATION

**DOT Shipping Description:** Not regulated

**Note:** Material is unregulated unless in container of 3500 gal or more then provisions of 49 CFR Part 130 apply for land shipment.

**IMDG Shipping Description:** Not regulated

**ICAO/IATA Shipping Description:** Not regulated

---

## 15. REGULATORY INFORMATION

### U.S. Regulations:

#### EPA SARA 311/312 (Title III Hazard Categories)

Acute Health:	No
Chronic Health:	No
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

#### SARA - Section 313 and 49 CFR 372:

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

--None Known--

#### EPA (CERCLA) Reportable Quantity:

#### CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs

This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

-- None Known --

#### California Proposition 65:

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

-- None Known --

#### Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA.

#### TSCA:

All components are listed on the TSCA inventory.

### **Canadian Regulations:**

#### Domestic Substances List:

Listed

#### WHMIS Classification:

Not regulated

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

---

## 16. OTHER INFORMATION

**Issue Date:** 19-Jan-2004  
**Previous Issue Date:** 10/17/2000  
**Product Code:** 1041410  
**Reason for revision:** Changed responsible party from Conoco to ConocoPhillips. Other formatting changes.  
**MSDS Code:** 775852

**Disclaimer of Expressed and implied Warranties:**

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

**Energy Policy Program**  
House 4, Street 88, G-6/3, Islamabad, Pakistan  
Tel: +92 51 835 7072, Fax: +92 51 835 7071  
[www.ep-ep.com.pk](http://www.ep-ep.com.pk)