



VEHARI INDUSTRIAL ESTATE

Environmental Impact Assessment Study



FINAL REPORT

August 25, 2015



NEC Consultants (Pvt.) Ltd.

Environmental Impact Assessment VEHARI INDUSTRIAL ESTATE

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NEC Consultants Pvt. Ltd

Perfect SITE, 22 KM Ferozepur Road, Near Gujju Matta Metro Bus Station, Lahore
+92-42-35273741-46, www.nec.com.pk
necnorth@nec.com.pk

This study was assigned by **Punjab Industrial Estate Development & Management Company**

LIST OF ABBREVIATIONS AND ACRONYMS

BOD	Biochemical Oxygen Demand
CBO	Community Based Organization
CETP	Combined Effluent Treatment Plant
cm	centimeter
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
dB	Decibel
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
GOP	Government of Pakistan
H ₂ S	Hydrogen Sulfide
HSP	Health and Safety Plan
IEE	Initial Environmental Examination
IPP	Independent Power Producer
kg/d	kilogram per day
km/h	kilometer per hour
m ³ /d	cubic meter per day
m ³ /h	cubic meter per hour
mg/l	milligram per liter
mm	millimeter
MW	Mega Watt
NEQS	National Environmental Quality Standards
NGO	Non-government Organization
NOC	No Objection Certificate
NO _x	Oxides of Nitrogen
O & M	Operation and Maintenance
OHS	Occupational Health and Safety
PEPA-97	Punjab Environmental Protection Act 1997 (as amended in 2010)
pH	Power of Hydrogen Ion Concentration
PIE	Punjab Industrial Estates Development and Management Company
PM	Particulate Matter
PPE	Personal Protection Equipment
SIE	Sundar Industrial Estate
SO _x	Oxides of Sulfur
SS	Suspended Solids
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UASB	Up-flow Anaerobic Sludge Blanket Reactor
UNESCO	United Nations Educational, Scientific and Cultural Organization
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WAPDA	Water and Power Development Authority
WHO	World Health Organization
WTO	World Trade Organization

Executive Summary

After taking the management control and upgrading of Multan Industrial Estate and Quaid-e-Azam Industrial Estate, the PIE introduced industrial estates in Raiwind, Bhalwal and Rahim Yar Khan and now introduced Vehari Industrial Estate (VIE) in District Vehari. The purpose of this estate is to create new jobs, reduce poverty, encourage industrialization in Punjab and resultantly increase the GDP of the country.

Under the Pakistan Environmental Protection Act 1997 (PEPA-97), clause 12, it is required that the proponent of any development project will have to submit an IEE or EIA report to the concerned Environmental Protection Agency/Department to obtain approval prior to start of construction or operation of the project. The objective of the Environmental Impact Assessment (EIA) study is primarily to document the existing baseline environmental conditions of the project area, establish the potential impacts of the project construction and operation on the physical, ecological and human environments, and propose the mitigation measures for the adverse impacts.

The policy framework for EIA is principally derived from the Pakistan National Conservation Strategy (1992). The principal applicable laws and regulations, in respect of EIA, are the Punjab Environmental Protection Act-1997 (as amended in 2010), the Pakistan Environmental Assessment Procedures (2000), and the NEQS (Self Monitoring and Reporting) Rule, 2001. The institution involved in the administrative action pertaining to the environmental aspect of the project is the Environmental Protection Department, Punjab.

According to the Pakistan Environmental Assessment Procedures (2000) by the PEPA for environmental approval, the VIE plant falls under Category B (Manufacturing and Processing) of Schedule II, which requires EIA for environmental approval prior to any construction. According to the Guidelines for Self Monitoring and Reporting by Industry (2001) prepared by the Environmental Standards Committee for the implementation of the NEQS, the VIE falls under Category A of Schedule I and Schedule II for monitoring and monthly reporting of environmental parameters of effluent and gaseous emissions respectively to the EPD.

The methodology adopted for conducting EIA study includes orientation session, development of the data acquisition plan, review of the existing data, sources and tools of data collection, primary data collection surveys (reconnaissance survey, socioeconomic survey), sources of secondary information and impact assessment matrices.

The area around the project site is flat. The project area is predominantly an uncultivated area and falls under seismic zone 2A with peak horizontal ground acceleration is 0.08 to 0.16. The climate is generally arid, characterized by hot summers and cool or cold winters, and wide variations between extremes of temperature. The quality of drinking water is contaminated with microbial contamination. The ambient air quality data show that the atmosphere of the area is generally good as all the concentration values of the pollutants are below recommended values. The ambient noise levels vary at different locations at different timings.

No forests are found in the project area. Terrestrial fauna are found in the project area but there are no endangered/rare species and protected areas.

There are five settlements namely 24WB, 30WB, 48WB, 28WB and 26WB present within five km of the project site.

Most of the people in these settlements live under nuclear family system. The male to female ratio is 1:19. There are altogether 14 government and private schools for boys and girls. The principle earning occupations include agriculture and wage labour. The land owners of the area tend to grow wheat, fodder crops, vegetable, and fruit plants. Livestock is mainly raised for transportation, food and farming purposes. The income levels of most of the people in the area are reasonable. Most of the houses are constructed in bricks and permanent roofing structures. No community water supply schemes are laid out in these settlements. The quality of ground water is generally good.

Electricity is provided to all the settlements through MEPCO. There is no natural gas supply in the area and the people mostly use cow dung and wood as fuel for cooking and heating. The main mode of transport for local villagers is public bus and wagons. The sanitary conditions are unsatisfactory with most of the people discharging their wastewater and solid waste into open drains and open land. Health of the people is good. The project site is accessible through Khanewal road. There are 09 mosques, 05 madrassa, 1 church, and 2 graveyards. None of the monuments/sites, of archaeological or historical importance, exist in the area. No recreational site of regional or national importance is found in the area. The local people opine that industrial development should take place with the aim to promote job opportunities and improve existing infrastructure.

The major environmental impacts of the proposed project will be due to the constructional and the operational activities. The constructional phase impacts are: generation of dust due to transportation of construction materials in uncovered form, open storage of construction materials, earthwork operations, preparation of concrete at batching plants, movement of construction machinery and construction materials transport vehicles, exhausts of the construction machinery, and construction materials transport vehicles mostly using diesel as fuel; noise due to movement of construction materials transport vehicles and construction and erection of electrical and mechanical equipment; generation of domestic wastewater and solid waste; job opportunities; public health and safety of local population. The operational phase impacts are wastewater generation, solid and liquid wastes generation, air pollution, noise and the OHS issues.

During the operational phase, the wastewater will be generated from the municipal and industrial sources. The solid wastes will mainly comprise empty containers of used lube oil, and chemicals, metal scrap, discarded mechanical parts, and domestic solid waste from all the industries in the VIE. Solid waste will also be produced from commercial and institutional activities in the VIE. The air pollution sources will be mainly generators, boilers, and vehicles. The plant noise and the vehicular noise are the two major sources. The plant noise is normally generated from the moving and rotating parts of the machinery (such as conveyor belts), boilers and generators. Generally, well maintained vehicles have noise within the NEQS level of 85 dBA. The OHS issues mainly concern with the use of the OHS equipment by the plant workers.

The mitigation measures for the construction phase issues include disposal of domestic wastewater, domestic solid waste management, dust suppression and noise control. To mitigate impacts during the operational phase, the management of the PIE should stick to the proposed measures to run the VIE in an environment-friendly manner. For solid waste management, monitoring of the solid waste with respect to its source, type and generation rate is essential. The municipal and industrial wastewater will be treated at the CETP. For liquid wastes, there can be a mutual agreement with the major suppliers of lube oil to take them back after use.

The noise control measures should be implemented both for the plant noise and the vehicles. For the plant noise, the management should take different measures such as noise measurement, audiometric testing, record keeping of medical tests and follow up, engineering controls, administrative controls, and training of employees. For vehicular noise mitigation, the vehicles maintenance program will be implemented for carrying out their regular maintenance.

The management shall develop environmental management plan to implement the mitigation measures proposed for the environmental impacts during the construction and the operation phases. The plan will include institutional measures, waste management plan and occupational health and safety planning, and establishment of environmental monitoring department to carry out water quality monitoring of the CETP, solid waste monitoring (VIE in general and land fill site in particular), air quality monitoring (VIE in general and the land fill site in particular), and noise monitoring.

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Chapter-1

INTRODUCTION

Chapter-1

INTRODUCTION

1.1 Background

The Punjab Industrial Estates Development and Management Company (PIEDMC hereinafter referred to as PIE) is owned by the Government of Punjab and was established in September 2003. The objectives of the PIE include planned and rapid industrialization and develop a chain of new industrial estates. The objective also involves upgrading existing industrial estates in a dynamic and innovative manner by providing solutions and involving local stakeholders in the decision making process. The seed money has been provided by the Government of Punjab, which will be utilized for the development of new industrial estates.

After taking the management control and upgrading of Multan Industrial Estate and Quaid-e-Azam Industrial Estate, the PIE established industrial estates in Raiwind, Bhalwal and Rahim Yar Khan and now launching Vehari Industrial Estate (VIE) in District Vehari.

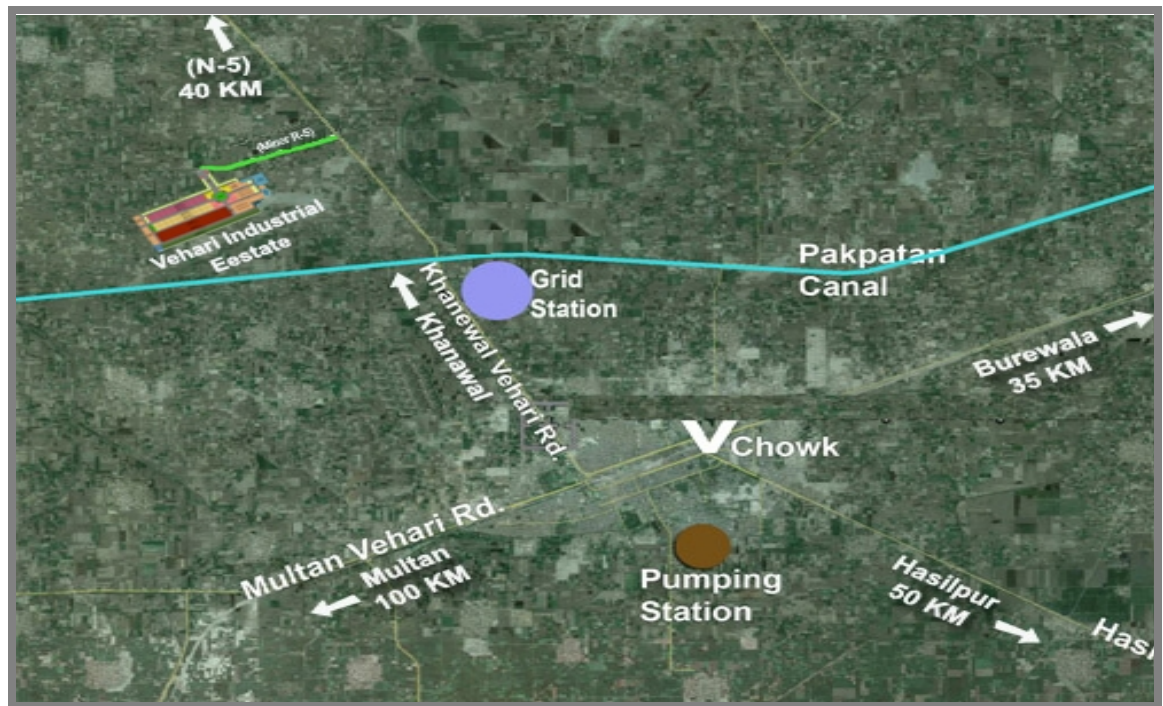
Vehari is mainly an agricultural district. It is one of the best cotton growing areas of the country. There are dozens of cotton processing factories and cotton seed oil manufacturing plants in Vehari. As per feasibility and preliminary design report, there are about 336 large, medium and some small industrial units in the districts. Unplanned and haphazard expansion of residential and industrial activities in the district may cause significant environmental and social issues in future.

1.2 The Proposed Project

The proposed industrial estate involves modern development view with all high quality utilities. The area, comprising 277.28 acre, has been reserved for a number of industrial sectors. The planned infrastructure facilities at the VIE include roads, telecommunication, sewerage, electricity, water supply, gas, petrol-pumps, health safety and environment support etc. There will be no large residential settlements within the VIE. Only a small residential colony will be established for workers.

1.3 Location of the Proposed Project

The proposed industrial estate is located at Khanewal-Vehari Road about 8.5 Km from Vehari city and at about 2.5 Km crossing the Pakpattan Canal, further access from main Khanewal-Vehari road is along a small canal called minor R1 and project site is about 1.9 Km from main road along the minor. The location of VIE is shown in Figure 1.1.

Figure 1.1: Location of VIE is shown in

1.4 Objectives and Scope of the Study

The scope and objectives of this EIA study are:

- Documentation of the applicable policy, legislative and administrative framework;
- Baseline information about the physical, biological and human environmental conditions of the project area. The aim of the baseline conditions is to record pre-project state of the environment, so as to provide basis of comparison during the construction and the operation stages;
- Identification, assessment and significance of the potential environmental impacts of the project;
- Protection of human health and safety;
- Information on the potential impacts of the project and the characteristics of the impacts and magnitude that will effect local environment;
- Propose measures to mitigate negative impacts of the project; and
- Development of Environmental Management Plan (EMP) for effective implementation of the proposed mitigation measures.

1.5 Necessity of the Environmental Impact Assessment (EIA) Study

The apex law governing the subject of environment is the Pakistan Environmental Protection Act – 1997 (PEPA-97). After the 18th amendment to the constitution of Pakistan, environment became a provincial subject, and the environmental law governing the VIE is now the Punjab Environmental Protection Act - 1997 (as amended in 2012). In terms of its contents, the provincial act is a carbon copy of the national act. Under Section 12 of the Act, it is mandatory for the proponents of the projects to execute the IEE and / or EIA (where warranted), and get the approval from concerned

EPA. The EIA/IEE regulations of 2000 provide categories of projects for which IEE or EIA needs to be conducted.

This study also serves the purpose of documentation and incorporation of the environmental concerns and the requirements at the conceptual and feasibility stages of the project. The industrial processes are scrutinized for all the possible environmental issues and their respective impacts. The mitigation measures are proposed to comply with all the National Environmental Quality Standards (NEQS) and to eliminate the possibilities of any impact on ecology. The EIA also proposes an Environmental Management Plan for ensuring that the project should remain environment-friendly throughout its operational life.

1.6 Proponent and Consultant of the Proposed Project

The development of proposed project will be carried by the Punjab Industrial Estates Development and Management Company (PIEDMC), which is owned by the Government of Punjab.

PIEDMC hired NEC Consultants (Private) Ltd. (herein after referred as NEC) for conducting the above mentioned EIA. NEC put together a team of consultants belonging to different subject areas to complete the assignment. The consulting team comprises of the following members:

Mr. Shafqat Ullah	Team Leader/Principle Engineer
Mr. Kashif Gillani	Chemical Engineer
Ms. Rukhsana Shahid	Senior Environmental Scientist
Mr. Adnan Khan	Electrical Engineer

Name and Contact Address of the Proponent

Ms. Sadia Javed
Environment Officer
Punjab Industrial Estate Development and Management Company (PIEDMC)
Phone: 042-35297203
Fax: 042-35297207

1.7 Organization of the Report

Chapter-1 “Introduction” presents scope and objectives of the EIA study.

Chapter-2 “Policy, Statutory and Administrative Frameworks” provides a broad outline of the policy, legislation for sustainable development and environmental protection, statutory and administrative framework, in local perspective, applicable to the environmental impact process.

Chapter-3 “Project Description” furnishes an overall description of the project, including its background and production process.

Chapter-4 “Methodology” lays down methodologies adopted for collection of primary as well as secondary data and information, required for carrying out the EIA study.

Chaper-5 “Baseline Environmental Profile of the Project Area” comprises a detailed documentation of the existing (baseline) conditions of the project area, in respect of its physical, biological and human environments.

Chaper-6 “Anticipated Environmental Impacts and Mitigation Measures”, documents the likely impacts of the project on the physical, biological and human environment, during the construction and the operation phases and appropriate mitigation measures.

Chaper-7 “Environmental Management and Monitoring Plan” provides the proposals on mechanism to be adopted for the implementation and monitoring of the environmental measures

1.8 Limitations

This EIA document has been prepared drawing inferences from site visits, primary data and secondary information collected and provided by the client. The study has been conducted by the consultants in a manner consistent with the level of care and skill exercised by environmental scientist, engineers and socioeconomic expert. The consultants have tried to cover all important aspects and relevant impacts of VIE.

The conclusions in this study are based on primary and secondary data, results derived from earlier studies, and a subjective evaluation of the possible environmental aspects during construction and operations of the proposed project. In evaluating the proposed project, the consulting team has relied on information provided by the management of PIE. The consultants assume that the information provided is factual and accurate. Also the consultants accept no responsibility for any deficiency, misstatement, or inaccuracies contained in this report as a result of omission or misrepresentation by any person interviewed or contacted.

It should be recognized that the passage of time affects the information given in this report; environmental conditions of a site can change. Opinions relating to the specific conditions are based upon information that existed at the time the conclusions were formulated. The mitigation measures and other recommendations put forth in this report are of the level of conceptual design and implementation framework.

Chapter-2

POLICY, STATUTORY AND ADMINISTRATIVE FRAMEWORKS

CHAPTER-2

POLICY, STATUTORY AND ADMINISTRATIVE FRAMEWORKS

2.1 General

This chapter presents the environmental policy, legislative and administrative frameworks for the protection of environment, adopted and enforced in Pakistan. The requirements of these policies, legislations and guidelines have been duly considered in the preparation of this study.

2.2 Policy Framework

The Ministry of Environment is responsible for policy making and planning on the subject of environmental protection in Pakistan. The Pakistan Environmental Protection Council, headed by the Chief Executive of Pakistan, is the apex inter-ministerial and multi-stakeholders decision making body.

2.2.1 Pakistan National Conservation Strategy

The Pakistan's National Conservation Strategy (NCS) is a principal policy document for environmental issues in the country, which was developed and approved by the Government of Pakistan on March 1, 1992. Following are the relevant policies for the proposed project:

a) Industry Policies

- Develop and enforce effective pollution controls;
- Promote clean industrial processes and recycling;
- Establish incentives for environmentally beneficial and benign industries; and
- Build awareness within industry.

b) Pollution Control Policies

Effluents Control

- Adopt wastewater treatment technologies that provide for recovery and reuse of water, nutrients, and organic matter in ways that are safe and profitable to the operator;
- Focus the regulatory approach on industrial discharges, as these contain some of the most toxic effluents;
- Support the recovery and use of heavy metals from industrial effluents; and
- Give priority to areas where there is risk of groundwater contamination

Emissions Control

- Promote good maintenance of motor vehicles and of industrial boilers and furnaces;
- Encourage higher fuel efficiency in motor vehicles; and
- Consider terrain and wind characteristics when siting factories and generating stations

Solid Wastes

- Promote reuse and recycling by privatization of collection

2.3 Statutory Framework**2.3.1 Punjab Environmental Protection Act-1997, amended in 2012**

The Act provides the framework for the implementation of the NCS, protection and conservation of species, wildlife habitats and biodiversity, conservation of renewable resources, establishment of standards for the quality of the ambient air, water and land, establishment of environmental tribunals, appointment of Environmental Magistrates, IEE, EIA, and promotion of public education and awareness of environmental issues through mass media. The Act is the basic legislative tool empowering the government to frame regulations for the protection of the environment. It is applicable to a broad range of issues and extends to air, water, soil, marine, and noise pollution, as well as to the handling of hazardous wastes. Penalties have been prescribed for those contravening the provisions of the Act.

Following are the key features of the law, which have a direct bearing on the project:

Section 12 (1) requires that “no proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination [IEE] or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment [EIA], and has obtained from the Provincial Agency approval in respect thereof.”

Section 12 (2) (b) states that the Provincial Agency shall review the EIA report and accord its approval subject to such conditions as it may deem fit to impose, or require that EIA be resubmitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.

The copy of the PEPA-1997 is attached as **Annexure 2.1**.

2.3.2 PEPA (Review of IEE and EIA) Regulations, 2000

The publication of the PEPA (Review of IEE & EIA) Regulations, 2000 provides necessary details on the preparation, submission, review, approval and monitoring of IEE and EIA. The regulations also categorize the projects for IEE and EIA. The copy of the Regulations is attached as **Annexure 2.2**.

2.3.3 Pakistan Environmental Assessment Procedures, 1997

The Federal EPA has published a set of environmental guidelines for conducting environmental assessments and environmental management of different types of development projects. The guidelines, which are applicable to the proposed project, are listed below:

- ***Policy and Procedures for Filing, Review and Approval of Environmental Assessments:*** These guidelines define the policy context and the administrative procedures, which govern the environmental assessment process, from the project pre-feasibility stage to the approval of the environmental report.
- ***Guidelines for the Preparation and Review of Environmental Reports:*** These guidelines specify the following for the project proponents:
 - Nature of the information to be included in environmental reports;
 - Minimum qualifications of the EIA conductors appointed;
 - Need to incorporate suitable mitigation measures at every stage of the project implementation; and
 - Need to specify monitoring procedures.
- ***Guidelines for Public Participation:*** Public consultation is an obligatory part of the EIA process. It leads to better and more acceptable decision making. Different techniques have been introduced under these guidelines for effective public involvement in the proposed projects.
- ***National Environmental Quality Standards (NEQS):*** The NEQS were promulgated in 1993 and revised in 2000 for municipal and industrial effluents, industrial gaseous emissions, and vehicular emissions. The copy of the NEQS is annexed as **Annexure 2.3**.

2.3.4 Other Relevant Laws

Other laws applicable to the project are outlined hereunder:

a) Wildlife Act 1974

Punjab Wildlife Protection, Conservation and Management Act 1974, requires protecting the wildlife species declared as *endangered/threatened* and *rare*. The Act gives protection to these species by declaring their natural living environment as protected and reserved such as national parks, wildlife sanctuaries, and game reserves.

b) Antiquities Act 1975

The Act provides protection and preservation of historically and archaeologically important sites. The project development activities must take into account the location and other activity patterns around historically important sites and should take all the measures to protect and preserve the original character of such areas of historical and/or archeological importance. In case any antiquities have been found or reported in project

area, it will be the responsibility of the proponent to report to the Department of Archaeology, Government of Pakistan.

c) Factories Act 1934

The clauses relevant to the project are those, which concern the health, safety and welfare of workers, disposal of solid waste and effluent, and damage to private and public properties. The Act also provides regulations for handling and disposing of toxic and hazardous materials.

d) Canal and Drainage Act 1873

The Act prohibits fouling of channels, watercourses, reservoirs and tubewells by industrial and/or domestic waste.

e) Pakistan Penal Code 1960

The Pakistan Penal Code deals with the offences where public or private properties and/or human lives are affected due to intentional or accidental misconduct of an individual or body of people. This Code defines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in Section 268.

In the context of environment, the Penal Code, however, can provide a basis for the VIE to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience.

f) Land Acquisition Act

This Act is the primary law for acquisition of land and built-up properties for public interest and also sets out the procedure and rules for acquisition and compensating the owners. The valuation of land for compensation is governed by sections 23 and 24 of the Act. For the proposed Project, compensation for acquisition of land will be carried out primarily in the light of this Act.

In the project area mostly land ownership belongs to the government. However, some acreage will be acquired from community.

2.4 Administrative Framework

The administrative framework operating in Pakistan relevant to environmental issues of the project, right from execution to monitoring, is briefly presented below:

2.4.1 Environmental Protection Department of the Punjab

The project is geographically located in the province of Punjab; therefore, the EPD Punjab will have jurisdiction over the proposed project. The EPD is headed by the Director General and supported by administrative, technical and legal staff. The major functions of the EPD are to issue, after reviewing, the approval of EIA for different projects; carry out environmental monitoring of the operations in the province; enforce

environmental legislation; and monitor the projects as per the recommendations of the EIA. The EPD can involve district and local administration for the enforcement of environmental legislation.

Chapter-3

PROJECT DESCRIPTION

CHAPTER-3

PROJECT DESCRIPTION

3.1 Type and Category of the Project as per the PEPA Guidelines

According to the Pakistan Environmental Assessment Procedures (2000) by the PEPA for environmental approval, the VIE falls under Category B (Manufacturing and Processing) of Schedule II, which require EIA for environmental approval prior to any construction.

According to the Guidelines for Self Monitoring and Reporting by Industry (2001) prepared by the Environmental Standards Committee for the implementation of the NEQS, the VIE falls under Category A of Schedule I for monitoring and monthly reporting of environmental parameters of effluents to the responsible authority.

For new VIEs, the EIA guidelines may specifically set a prior requirement of approval of its operation. Once after the establishment of the VIE, a comprehensive monitoring report for all the NEQS parameters for normal CETP operation and other plants operations in the VIE may be required to establish that the plants do meet the environmental commitments made in respective EIA submitted. The subsequent monitoring will then be limited to the priority parameters.

The above reference document is attached as **Annexure 3.1**.

3.2 Government Approvals and Lease Required by the Project

The VIE is a government supported project. For industrial installation at the project site, NOC is required from the City District Government Vehari, which has already been obtained. There is no lease required by the project. The project is self-funded. The seed money has been provided by the Government of Punjab.

3.3 Cost and Size of the Project

The estimated total project cost is one billion. It is in the category of very large size project. The proposed project covers total land area of approximately 277 acres.

3.4 Objectives of the Proposed Project

The objectives of the proposed project are to:

- Provide turnkey solutions to the prospective entrepreneurs thereby generating economic activity and creating mass employment opportunities;
- Provide structured platform to set industries
- Support services/utilities at one location;
- Attract/make available skilled and unskilled manpower;
- Capitalize on strengths of Vehari region;
- Provide secure industrial environment;

- Ensure that industrial and related land uses are functional and mutually compatible arrangement, and are easily accessible through efficient road network allowing free flow of traffic;
- Ensure compliance with environmental regulations;

3.5 Basic Amenities proposed for the Project

Keeping the needs of modern entrepreneurs, following basic and special amenities are planned at the VIE:

- Roads
- Underground sewerage system
- Underground electricity distribution system
- Gas
- Water
- Telecommunications
- Estate owned electrical distribution system
- Civic center (post office, sports facilities, banks etc.)
- Appropriately designed food areas for workers at major intersections
- Fire station (including fire trucks) and fire hydrants
- Computerized weigh station
- Information sign boards
- Technical training facilities
- Private security arrangements
- Hospital/emergency medical services (by Social Security)
- Public transport
- Police station
- Mosque
- Motel and restaurant
- Pre-built warehouses and offices for rent
- Petrol pumps
- WTO environmental compliances (drinking quality water, health, safety and environmental support, CETP and solid waste management)

3.6 Master Plan of VIE

The Master Plan of VIE has been developed keeping in view the following

- Industrial Plots of different ranges
- Roads
- Proper drainage system
- Combined Effluent Treatment Plant
- Green Area
- Commercial Spaces

Master Plan of VIE is attached as **Annexure 3.2**.

3.7 Planning Concept

The site for Vehari Industrial Estate is roughly rectangular for which grid iron pattern is ideal. Master Planning of Vehari Industrial City responds to unique characteristics of the site so as to:

- Contribute to the character of the site in a positive manner;
- Integrate site features such as land forms and drainage courses in the overall master plan;
- Maintain scenic quality of the site;
- Be compatible with natural features;
- Support economic and efficient construction and maintain standards;
- 11 KV feeders emanating from 132 KV Grid Station (MEPCO);
- Metering room of Multan Electric Power (MEPCO) with number of metering panels per feeder will be located near the main entrance of VIE;
- Underground 11 KV feeders cables will be laid in underground trench and terminated on terminal poles after the main office building of VIE;
- Overhead 11 KV feeder will be extended from terminal poles in the entire premises as per plan/design.

3.8 Land Use Distribution

Detailed distribution of plot sizes in the VIE is given in **Table 3.1**. The human resources required during the construction phase is 40 including technical staff. During the operation phase, the total staff will be about 40 to 50.

Table 3.1

Land Use Distribution of the VIE

Category	Area (Acre)	%age
Industrial Plots	206.79	74.58
Commercial Area	07.98	2.88
Petrol Pump	1.97	0.71
Hotel	0.99	0.36
Dispensary	0.30	0.11
Rescue 1122	0.34	0.12
Fire Brigade	0.44	0.16
Jamia Mosque	0.99	0.36
Vocational Institute	0.57	0.20
Parks and Open Spaces	2.56	0.92
Grid Station	3.65	1.32
Treatment and Disposal	2.00	0.72
Site Office	0.80	0.29
Roads	47.90	17.27
Total	277.28	100

3.9 Plot Sizes

VIE is proposed to be developed under modular approach to accommodate the future demands. This approach permits the adoption of an optimum size of space unit, various

number of which can be combined to generate plots of varying size. The size of basic module is 4 kanals @ 5,445ft² per kanal or 4.84 kanals @ 4,500ft² per kanal.

Following principles were kept in mind, while preparing the master plan;

- Plots of similar size have been grouped so as to separate small workshop from large scale industry;
- Larger plots in general have been positioned in most visible locations; and
- Grid pattern road layout has been used with mostly staggered T-junctions.

It is inevitable that all the plots cannot be of above sizes because of the site features and constrains. Some of the plots therefore especially those along the periphery and along curves will have no standards size/dimensions.

3.10 Road Network

The road layout proposed for VIE is generally in grid- iron pattern and sympathetic to terrain. Three types of roads have been proposed.

- Primary Roads = 120ft
- Secondary Roads = 100ft
- Local Roads = 80ft

Road alignments conform to the natural topography. Cross junction are avoided as these results in large number of traffic conflicts points. The roads generally meets the in form of T-junctions, which have relatively less numbers of conflicts points and even these can be minimized through traffic management techniques.

3.11 Community Facilities

Following facilities will be provided in VIE.

- Community Centre
- Commercial Area
- Mosque
- Central Park

3.12 Electricity Requirement

11kV feeders emanating from 132 kV grid station (MEPCO) will supply to electricity. Power requirement for the proposed VIE is 41MW. Stand by diesel fired generator will be kept as backup source of electricity generation for administration building during load shedding and electricity shortfalls.

3.13 Water Consumption and Wastewater Generation

Ground water will be used for drinking and industrial processes. Two tube wells of 2 cusec capacity each will be installed to extract the ground water. VIE will supply approximately 25 cusec fresh water to various industrial units through pipeline system. An overhead tank of 125,000 gallons capacity will be constructed to store the fresh

water. Industries will install their own turbines for ground water pumping as per their requirement.

It is estimated that approximately 12 cusec wastewater including sanitary and industrial wastewater will be generated and carried to pump station in sewerage treatment plant through 27" size of pipe. 03 pumps of 4 cusec capacity each will be worked to pump out inflows of about 12 cusec.

3.14 Implementation Schedule

The project implementation schedule is illustrated under **Table 3.2:**

Table 3.2

Project Implementation Schedule

No	Activities	Completion Time
2.	Installation of main equipment	May 2015
3.	Completion work of infrastructure development	21 April 2017
4.	Commissioning of project	July 2017
5.	Start of commercial operations	August 2017

3.15 Combined Effluent Treatment Plant (CETP)

The project has decided to implement a Combined Effluent Treatment Plant (CETP). The CETP-VIE will be designed for the removal of any toxic metals or compounds present in the wastewater and these pollutants, where originating from any individual industry and exceeding the NEQS values, shall be removed by that industry, by providing specific in-house treatment system, prior to discharge of the wastewater into the sewerage system of the VIE. The CETP-VIE shall be designed primarily to bring the BOD, COD, and TSS values of the wastewater within the NEQS limits.

The specific nature of individual industries to be constructed in the VIE, and information on their production is not known at this stage. Therefore pollution load and exact flow cannot be established. Water intensive and high strength waste water generating industries like sugar and big textile industries would not be allowed in VIE.

3.16 Fire Fighting System

A fire fighting system comprising fire hydrants, gate valves, air valves etc will be provided.

Chapter-4
METHODOLOGY

Chapter – 4

METHODOLOGY

4.1 General

This chapter presents methodology adopted for the collection of the requisite data, for the proposed industry, for the purpose of the EIA study.

4.2 Orientation Session

Meetings and discussions were held with the key officials of the project team. This activity was aimed at achieving a common ground of understanding of the various issues of the study.

4.3 Development of the Data Acquisition Plan

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the consulting team. The plan identified specific requirements of the primary and secondary data and their sources, determined time schedules and responsibilities for their collection, and indicated the logistics and facilitation needs for the execution of the data acquisition plan.

4.4 Review of the Existing Data

The relevant secondary data on the physical, technical and institutional aspects of the proposed project available with the proponent were reviewed.

4.5 Sources and Tools of Data Collection for EIA

Both primary and secondary data was acquired to accomplish the said study. In general, the following sources and tools were employed for the collection of the requisite data for the proposed project:

Primary Data Collection Tools	➤ Household Questionnaires ➤ Group Discussion ➤ Field Tests (groundwater, ambient air and noise)
Primary Data Collection Surveys	➤ Reconnaissance Survey ➤ Socio-economic Survey through Household Questionnaires
Sources of Secondary Data	➤ PIEDMC ➤ Public Departments and Agencies ➤ Available Literature Regarding Proposed Project

4.6 Primary Data Collection Surveys

4.6.1 Reconnaissance Survey

This survey was carried out to have an overview of the project area and prepare location and land use maps.

4.6.2 Socio-economic Survey by Household Questionnaires

The prime objective of the socio-economic survey through household questionnaires was to collect baseline socio-economic information about population and their feedback on the project. This survey was carried out on sample basis, through Performa “Households, Housing and Socio-economic Questionnaire” as given in **Annexure 4.1**. The data were collected through random sampling. The respondents were to be both adult and aged members of the households with preference for the head of the household. The questionnaire covered the following socio-economic aspects:

- Demography;
- Education;
- Employment and economic conditions;
- Housing and social amenities; and
- Population feedback.

In addition, the data for the following parameters were also collected and analyzed in the laboratory:

- Groundwater quality;
- Ambient air quality; and
- Noise level

4.7 Sources of Secondary Information

Secondary data about physical and technical aspects of the proposed project available with the PIEDMC Management were reviewed. The additional data were collected from the following concerned departments:

Information Area	Source
Physical Environment	
Climate	Meteorological Department, Lahore
Seismology	Geophysical Center, Quetta
Irrigation Canals/Distributaries	Drainage and Irrigation Department
Biological Environment	
Terrestrial Flora	WWF
Terrestrial Fauna	WWF/Forest Department/Wildlife Department

Information Area	Source
Human Environment	
Demography	Socioeconomic Survey
Occupation and Employment	Socioeconomic Survey
Economic Conditions	Socioeconomic Survey
Local Government and Administration	City District Government
Agriculture	Agriculture Department

Chapter-5

BASELINE ENVIRONMENTAL PROFILE OF THE STUDY AREA

Chapter-5

BASELINE ENVIRONMENTAL PROFILE OF THE STUDY AREA

5.1 General

This chapter presents the existing environment around the proposed project which has been studied with respect to Physical, Ecological and Socio-economic resources.

5.2 Purpose of the Baseline Study

An environmental baseline study is intended to identify and establish all the physical, biological and human environmental conditions prevailing before the execution of the project. Baseline information is used as a reference datum to compare future changes and judge them if the conditions have changed for better or worse. The baseline description is intended to accomplish the following objectives:

- To provide proponent of the project and stakeholders with sufficient knowledge about socio-economic set-up, agriculture, ecological features, built-up buildings and infrastructure of the project area; and
- To allow the planners to evaluate the potential efficacy of the actions to mitigate the adverse impacts and enhance benefits.

5.3 Physical Environment

Physical environment of the project area includes brief description of topography, geology and soil conditions, seismology, climate (Temperature, Humidity, Rainfall and Wind), surface and ground water resources.

5.3.1 Geography

The district is located between 29°36'N71°44'E and 30°22'N72°53'E. The city of Vehari is the capital of the district. The district was created in 1976 out of the three tehsils of Multan District (Vehari, Burewala and Mailsi). The name Vehari means low lying settlement by a flood water channel. It is a part of Indus plain and has the best cultivated land which is suitable for cotton, wheat and other crops.

Vehari district is situated in the heart of Nili Bar. It is purely the result of construction of Pakpattan canal from Sulemanki Head Works on the Sutlej and the institution of Nili Bar colony project in 1925, so called because of the bluish tings of the water of the Sutlej.

The district lies along the right bank of the river Sutlej which forms its southern boundary. The district, having total area of 4,364 Sq.Kms, is surrounded by Sahiwal, Pakpattan, Bahawalpur, Khanewal and Lodhran districts.

5.3.2 Natural Resources

The major crops of the district are wheat, sugarcane, and cotton. Being one of the best cotton growing districts of the country, district Vehari possesses very good potential for textile spinning, weaving and processing, textile made-ups e.g. hosiery, terry towel, sportswear, bed sheets, tents/tarpaulins, canvas cloth, etc. which are directly exportable items.

5.3.3 Soil of the Area

The strata are generally fine to medium grained sand with some amount of silt at 5m depth. Course sand was encountered at places. The colour is generally grey to brownish grey. Strata are loose to medium dense. At top, strata are generally dry with some roots of vegetation but at depth moisture is observed.

Fine to medium grained medium dense sand with grey colour was encountered upto 6m depth. The stratum is dry. From 6m to 10m depth, the stratum is medium grained sand.

Chemical analysis shows that sulphate contents of soil is within the permissible limit of 0.2%. Sulphate concentration in water samples exceeds the limiting value of 200ppm at depth of 27.5m while at depth of 91.5m sulphate, concentration is within the limit. For construction point of view, water should be used at deeper depth. Alternatively, sulphate resistant cement will be used for construction activities.

5.3.4 Climate

The climate is generally arid, characterized by hot summers and cool or cold winters, and wide variations between extremes of temperature. Vehari has are four seasons; a cool, dry winter from December through February; a hot, dry spring from March through May; the summer rainy season, or southwest monsoon period, from June through September; and the retreating monsoon period of October and November. There is little rainfall.

5.3.5 Meteorology of the Study Area

Table 5.1 shows the meteorological conditions at the project site. Meteorological data was monitored at the project site on June 12-13, 2015. The parameters measured were temperature, wind direction, wind speed and humidity. All the readings were recorded for 24 hours with an interval of one hour. The maximum and minimum temperature was recorded to be 30°C and 42°C, respectively. Wind speed showed variation with maximum wind speed (10.3 m/s) recorded at 14:00hrson June 12, 2015 and minimum wind speed (0.4 m/s) recorded at 22:00 hrs and 22:00 on June 12, 2015.

Table 5.1: Meteorological Data Recorded at the Project Site

Sr. No	Date	Time	Temp (°C)	Wind Direction	Wind Speed (m/s)	Humidity (%)
1	12-06-2015	12:00	40	N	7.6	36
2		13:00	41	NE	8.4	39
3		14:00	41	NE	10.3	35
4		15:00	42	NE	8.5	33
5		16:00	41	NE	8.5	33
6		17:00	41	N	7.6	33
7		18:00	39	NE	5.8	36
8		19:00	37	NE	4.5	42
9		20:00	36	NE	2.2	46
10		21:00	33	NE	1.3	54
11		22:00	32	N	0.4	62
12	13-06-2015	23:00	31	N	1.3	68
13		00:00	30	N	1.3	70
14		01:00	30	N	1.8	67
15		02:00	30	NW	2.2	69
16		03:00	30	NW	1.8	67
17		04:00	31	NW	3.6	62
18		05:00	31	N	4.5	61
19		06:00	31	N	5.4	62
20		07:00	32	N	5.4	59
21		08:00	34	N	8.0	56
22		09:00	36	N	7.6	51
23		10:00	38	N	7.6	46
24		11:00	38	N	5.4	47

Source: Monitoring at the Site by the SGS Lahore, June 12-13, 2015

5.3.6 Seismicity of the project Site

Pakistan lies in a seismic active zone. Seismic observations indicate that hundreds of shocks originate every year. According to the seismic zoning map of Pakistan included in Pakistan Building Code Seismic provisions (2007), the project area falls under seismic zone 2A with peak horizontal ground acceleration is 0.08 to 0.16. The seismic zoning map of Pakistan is attached as **Annexure 5.1**.

5.3.7 Roads and Communication

Vehari was developed as a planned town with wide roads and streets in a grid iron pattern. Vehari lies on the main Multan Lahore GT Road. It bisects the town in two parts and is running parallel to the railway track. It is connected with major towns by provincial highways such as Multan, Khanewal, Hasilpur, Luddon and Burewala.

Khanewal road enters the town from north-west and ends at Khanewal Chowk. From Khanewal Chowk, Multan Road goes west of town along railway track and Lahore Road goes east along with railway track. Luddon Road goes south-east from Quaid e - Azamchowk and passes through the town. The project site is accessible through Khanewal road.



Exhibit: 5.1: Site Accessibility through Khanewal Road



Exhibit: 5.2: View of proposed project site showing the entrance of the project site.



Exhibit: 5.3: View of proposed project site.



Exhibit: 5.4: Road section which connects VIE site to main Khanewal road

5.4 Baseline Conditions

5.4.1 Existing Noise Levels

The noise levels were measured at four corners of the project site. These levels vary at different locations in different timings as shown in **Table 5.2**.

Table 5.2: Ambient Noise Levels

Sampling Point	Time	Sound Level (dB-A)
Point 1	0117-0120 0130-0133	42.3-52.1
Point 2	0140-0143 0150-0153	40.1-50.8
Point 3	0336-0339 0342-0345	48.0-51.0
Point 4	0215-0218 0230-0233	41.2-52.2
Point 6	0300-0303 0315-0318	40.5-54.4
Point 7	0330-0333 0350-0353	49.0-54.3

Source: Monitoring at the Site by the LES Lahore, May, 2015

It is obvious from the Table 5.2 that noise levels were below the prescribed limits of residential, commercial and industrial area standards. It is because; there is no continuous source of noise near the project area. The NEQS standards for residential area are 55 dB (A) and 45 dB (A) for day and night time respectively, 65 dB(A) and 55 dB(A) for day and night time respectively for commercial area and 75 dB(A) and 65 dB(A) for day and night time respectively for industrial area.

5.4.2 Groundwater Conditions

For establishing baseline conditions of the area, four groundwater samples were collected at various depths from project site and nearby settlements for analysis of both chemical and microbiological parameters.

First sample (Sample 1) was collected from hand pump at the depth of 65ft. Second sample (Sample 2) was collected from hand pump at the depth of 70 ft. Third sample was collected from motor pump at the depth of 100ft. Fourth sample was collected from water turbine at the depth of 350ft.

Table 5.3: shows the test results of two samples while laboratory test reports are attached as **Annexure 5.2**.

Table 5.3: Laboratory Test Result

#	Test Method	Parameter	Test Results				NSDWQ (2010)
			Sample-1 (65ft)	Sample-2 (70ft)	Sample-3 (100ft)	Sample-4 (350ft)	
Physico-chemical Testing							
1	APHA-4500-H ⁺ -B	PH	7.80±0.08	7.12±0.07	7.52±0.08	7.79±0.07	6.5-8.5
2	HACH-8025	Color	32±01	28±1	12±1	6±1	15 (TCU)
3	Turbidity Meter	Turbidity - (NTU)	1.5±0.3	14.4±0.5	10.9±0.4	12.5±0.4	5
4	APHA 2150-A	Odor	Odorless	Odorless	Odorless	Odorless	Acceptable
5	APHA 216--A	Taste	Tasteless	Tasteless	Tasteless	Tasteless	Acceptable
6	APHA-2540-D	Total Suspended Solids (TSS) - mg/l	02±1	03±1	04±1	02±1	NGV
7	APHA-2540-C	Total Dissolved Solids (TDS) - mg/l	170±4	630±6	400±8	330±4	1000
8	APHA-2340-C	Hardness - Total (as CaCO ₃) - mg/l	132±2	348±5	266±5	96±1	500
9	APHA-3500-Ca-B	Calcium - mg/l	30±1	93±2	70±1	28.5±0.5	200
10	APHA 3500-Mg-E	Magnesium - mg/l	13.6±0.6	28±1	12.4±0.8	7.5±0.3	100
11	HACH 8029	Fluoride - mg/l	0.03±0.01	0.17±0.02	0.42±0.03	0.32±0.03	1.5
12	HACH-8039	Nitrate - mg/l	0.7±0.1	1.9±0.2	1.0±0.1	1.2±0.2	50
13	HACH-8051	Sulfate - mg/l	20±1	112±2	80±1	50±1	400
14	APHA-4500-Cl-B	Chloride - mg/l	27±1	36±1	57±1	23±1	250
15	HACH-8008	Total Iron - mg/l	0.62±0.03	0.64±0.04	0.44±0.02	0.28±0.04	0.3
16	Arsenic Kit	Arsenic - mg/l	BDL	BDL	BDL	BDL	0.01
Bacteriological Testing							
1	APHA-9221-B	Total Coliform	>23	5.1	>23	16	NIL
2	APHA-9221-E	Faecal Coliform	23	<1.1 (Absent)	23	<1.1 (Absent)	NIL
NTU - Nephelometric Turbidity Unit							
APHA – American Public Health Association							
NIL – Must not be detectable in any 100ml sample							
NGV – No Guideline Value							
NSDWQ – National Standards for Drinking Water Quality, 2010							
Source: Monitoring at the Site by the LES Lahore, September, 2014							

Results reveal that in all the tested Physico-chemical parameters are well within the limits when compared with the National Standards for Drinking Water Quality, 2010 and WHO Guidelines.

Microbiological contamination was detected in all the tested samples. According to the WHO Guidelines for Drinking Water Quality 2004, *Escherichia coli* are present in large numbers in the normal intestinal flora of humans and animals, where it generally causes no harm. However, in other parts of the body, *E. coli* can cause serious disease, such as urinary tract infections bacteraemia and meningitis. A limited number of enteropathogenic strains can cause acute diarrhea.

5.4.3 Ambient Air Quality

Ambient air quality was continuously monitored for 24 hours within the premises of the proposed project to find the present concentrations of the following parameters.

- CO
- SO₂
- NO₂
- Ambient Particulate Matter (PM₁₀)

Table 5.4: shows the average concentrations of tested parameters while laboratory test reports are attached as **Annexure 5.2**.

Table 5.4: Average Concentrations of Tested Parameters

Parameter	Unit	Monitoring Duration	Average Obtained Concentration	NEQSAS (2010)
Nitrogen Dioxide (NO ₂)	µg/m ³	24 Hours	3.12	80 µg/m ³ (For 24 Hours)
Sulfur Dioxide (SO ₂)	µg/m ³	24 Hours	6.04	120 µg/m ³ (For 24 Hours)
Carbon Monoxide (CO)	µg/m ³	24 Hours	2.16	05 mg/m ³ (For 08 Hours)
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	102.5	150 µg/m ³ (For 24 Hours)

NEQSAA National Environmental Quality Standards for Ambient Air, 2010

Results of ambient air quality data, when compared with National Environmental Quality Standards for Ambient Air, 2010, show that ambient air quality of the area is generally good as all the concentration values of the pollutants are below recommended values.

5.5 Ecological Environment of the Project Area

5.5.1 Terrestrial Fauna

Terrestrial fauna of the area are of common domestic nature. Buffaloes, cows, goats, donkeys, hens, dogs, cats and horse etc. are the commonly available animals in the Project Area. The bird community, found in the area, includes variety of residential birds such as crow, sparrow, parrots and doves.

5.5.2 Terrestrial Flora

The major crops cultivated around the proposed project site are Wheat, Millet, Maize, Jawar and cotton. The trees comprise largely of Keekar (*Acacia nilotica*), Phulai (*Acacia modesta*), Shisham or Tahli (*Dalbergiasissoo*), Peeple (*Ficusindica*), and Eucalyptus (*Eucalyptus citriodora*).



Exhibit: 5.5:Crops cultivation in the area



Exhibit: 5.6: View of terrestrial flora of the area

5.6 Socio-economic Environment of the Project Area

This section covers the socio-economic conditions of the population that will be directly or indirectly affected by the project. The socio-economic profile focuses on the sources of livelihood, income levels, and accessibility to social services like health, education etc.

The socio-economic data collection process is explained in Chapter-4. This section covers the socio-economic profiles of the settlements located in the immediate surroundings of the project site.

5.6.1 Public Consultation Process

Public consultation plays a very important role for successful execution of the proposed project. In order to ascertain the views of nearby residents regarding impacts of project execution, a detailed socioeconomic survey was conducted for the settlements located within 5 km distance of the project site. On the basis of the mentioned criteria, five settlements named 24WB, 30WB, 48WB, 28WB and 26WB were surveyed.

The socioeconomic survey was divided into a village profile and a socio economic household survey. Village information was collected from respective secretary of UC 14, 15 and 16.

Residents were interviewed with the help of semi structured questionnaire. Besides this, interviews with the influential and group discussion sessions were also held with the community.

**Exhibit: 5.7:** Meeting with Secretary, 24WB**Exhibit: 5.8:** Group discussion with the inhabitants of "48WB"**Exhibit: 5.9:** Group discussion with the inhabitants of "26WB"**Exhibit: 5.10:** Group discussion at "48WB"

5.6.2 Political and Administration Unit

According to the City District Government System in Pakistan, the districts are divided into towns/tehsils and union councils. These are official administrative divisions. Vehari district is administratively subdivided into three tehsils, Burewala, Mailsi and Vehari. The proposed project comes under Vehari tehsil.

Table 5.5: Administrative Divisions of Vehari.

Sr. No.	Tehsils	Union Councils
1	Vehari	26
2	Burewala	32
3	Mailsi	31
Total		89

5.6.3 Village Profile

There are five settlements namely 24WB, 30WB, 48WB, 28WB and 26WB present within five km of the project site.

Settlement Pattern

The basic information regarding infrastructural characteristics, total households and population of the village was collected from the secretary of the respective Union Councils. **Table 5.6** presents distribution of the settlements vis-à-vis their population.

Table 5.6: Distribution of Population

Settlements	Total Population	
	Number	Percentage
24WB	4,500	25
30WB	2,500	14
48WB	2,800	16
28WB	3,500	20
26WB	4,550	25
Total	17,850	100
Source: Socio-economic Survey (Village Profiles), May, 2015		

Social and Cultural Values

The existing communities reflect rural culture with its characteristic norms and values. Women do all household work by themselves. Mostly women do the teaching job. Majority of the population follows Islamic tradition. Common food is wheat bread. Yogurt, Lassi and milk are also used. The common dress for males is Shalwar Qameez and for females Shalwar, Qameez and Dupatta/Chadar. Marriages are celebrated in traditional manners.

Conflict Resolution Mechanism

The people of the area were found to be loving, caring and hardworking. They reported that for petty conflicts resolution, they involve the senior and influential people of the area, who after listening to both the parties try to reach an unbiased decision which is acceptable to the aggrieved. Generally, the people accept the decisions of the influential.

Public Health

The major diseases that afflicted the residents of the area are seasonal. Cough, flu, fever etc. are the most commonly encountered seasonal diseases. No case of any major disease was reported during the survey.

There are no adequate health care facilities in the surveyed settlement. Rural Health Centre (RHC) is located at 1 km from the settlement. Basic Health Unit (BHU) is located in each settlement. There is no qualified practitioner (MBBS) in the area. Dispensaries and Traditional Healers are also present in surveyed settlement. The only medical services available in the village are provided by Lady Health Workers (LHW). There are 13 LHV in the area. People visit city hospitals in case of major ailment.

Educational Facilities

There are fourteen government schools in the area, two government high schools, four middle government schools for boys and girls and eight primary schools.

Primary and middle level education is also provided by the private co-education schools. Students wishing to continue their study after matriculation go to Vehari and Multan. The village madrassas provides religious education to young male and female students.

Sanitation and Drainage

Underground sewerage system is absent in most of the settlements. Septic tanks are present in all the sampled households included in the socio economic survey. All the sewage carrying drains of the area are concreted but uncovered. The open drains in addition to attracting mosquitoes and flies on the sewerage water also produce unpleasant odor. This situation may cause health hazards to the local community. Household wastewater is disposed into open drains which ultimately find its way towards fields.

Transport and Travel Mode

The modes of transport among the local villagers are buses and wagons. Personal transport includes bicycles, motor cycles and cars owned by the residents of the surveyed settlements.

The proposed project site is located approximately 50 m from Khanewal road. Public transport is easily available to access the site.

Road and Street Condition

The main access tracks that connect the settlements to main Khanewal road are metaled roads. Most of the settlements streets are brick paved and concreted.



Exhibit: 5.11: Black top road in 48WB



Exhibit: 5.12: Brick paved street in 26WB

Civic Amenities

Potable Water Supply

There is no government water supply scheme in the area. Ground water is the only source of water for the area being used by the community for all domestic purposes. Inhabitants have installed the electric motors at the depth of 100 to 300ft in their premises.

Water quality is excellent in terms of physic-chemical parameters but contaminated with bacteria. No precautionary measures are undertaken before the consumption of water. Furthermore, there is no filtration plant available for the residents of the village.

Electricity Supply

Multan Electric Power Company (MEPCO) provides electricity to the area. Inhabitants of the area face 8hours/day load shedding of electricity.

Natural Gas Supply

Most of the area lacks natural gas supply. Inhabitants use wood and cow dung cake as cooking and heating fuel in their houses.

Telecommunication Network

Majority of the residents use cellular phone for communication.

Religious Resources

Religious sites include shrine, mosques, graveyards and historical buildings. There are 15 mosques, two shrine, four graveyards in the study area. Mosque has been built in the recent past and has no historical or architectural significance. Shrine is regarded as a sacred place and receives devotion from the locals of nearby population built not well known outside the area.

Recreational Areas

No recreational site of regional or national importance is found in the study area.

5.6.4 Demographic Characteristics of the Study Area***Population and Family Size***

Based on socioeconomic survey, the population of 241 households is calculated as 1,787 as given in the Table 5.7. Average household size was calculated as 7.4. The shares of male and female population are 54% and 46%, respectively. Male to female ratio is 1.19. The percentage of younger population (85%) is higher than above 40 years of age. **Table 5.7** shows the gender wise population of sample based survey.

Table 5.7: Gender Wise Population

Gender	Number and %age	Sex ratio	Household size
Male	972 (54%)	1.19	7.4
Female	815 (46%)		
Total	1,787 (100%)		

Source: Socio economic Census Survey, May, 2015

Type of Family

According to the sample based socioeconomic survey, population of the area live under nuclear, joint and extended family system. The distribution of household with respect to the type of family is given in the **Table 5.8**.

Table 5.8: Type of family

Type of Family	Distribution	Percentage (%)
Nuclear	180	75
Joint	61	25
Total	241	100

Source: Socio economic Census Survey, May, 2015

The population of the village resides largely in nuclear families e.g., family unit consisting of parents and their dependent children.

Religion

The main religious groups in the area are Muslims and Christians. The population of the surveyed settlement is predominately Muslims.

Language Spoken

Punjabi is the most common language spoken by majority of population in the area. Urdu is spoken as secondary language.

Castes and Ethnicities and Minority Groups

The project area is inhabited by the people of various castes including Sheikh, Rajpoot, Ansari, Qureshi, Chaddar, Araen, Mughal, Butt, Dhaha, Malik, Khokhar and Tawri. Reportedly, lower castes associated with hereditary menial professions are also the part of the village population.

Educational Status

Educational facilities in any area predict the educational level and the interest of the people towards the education. Educational status of the respondents of surveyed village is shown in **Table 5.9**.

In the **Table 5.9**, 10 children having age group 1-4 have been excluded. Out of remaining, majority of the respondents had primary level education. It is also obvious from the table that the ratio of the matric, intermediate and graduates is very low as compared to those having education up to primary and middle.

Table 5.9: Educational Level of the Respondents

Education Level	Male	Female	Male (%)	Female (%)	Total	%age
Primary	202	194	21	24	396	22
Middle	200	116	21	14	316	18
Matric	87	40	09	05	127	07
Intermediate	40	16	04	02	56	03
Graduate	31	08	03	01	39	02
Masters	06	01	01	00	07	00
M.phill	01	00	00	00	01	00
Deeni Taleem	04	02	00	00	06	00
Illiterate	325	350	34	43	675	38
Total	969	808	100	100	1777	100

Source: Socio economic Census Survey, May, 2015

5.6.5 Economic Conditions of the Study Area

Occupations and Employment

Various income generating activities are practiced in the area. Leaving the categories of housework and students, which mainly pertains to the housewives and children, the major earning occupations are wage labor and agriculture.

Based on the sample-based socio-economic survey of the project area, **Table 5.10** presents distribution of the household members by occupation.

Table 5.10: Distribution of Household Members by Occupation

Occupation/ Source of Income	Number	%age
Agriculture	173	11
Housewives	321	20
Domestic Work	144	07
Students	462	29
Wage labor	164	10
Business	79	05
Government Servant	29	02
Unemployed	170	11
Retired Servant	05	00
Overseas	02	00
Private Jobs	78	05
Total	1597	100

Source: Socio economic Census Survey, May, 2015

Income Levels

Table 5.11 shows the distribution of households with respect to their reported average monthly household income. It is evident from the table that the income level of most of the respondents is reasonably good.

Table 5.11: Distribution of Households by Average Monthly Household Income

Income Group	Number	%age
10,000-20,000	40	17
20,000-30,000	71	29
30,000+	130	54
Total	241	100

Source: Socio economic Census Survey, 3-5 May, 2015

Housing Characteristics

Housing condition is an important indicator for determining the economic conditions of the population as it reflects the financial position and living standards of the inhabitants.

Most of the houses in the study area are semi pucca. Rooms are built with cement and bricks and permanent roofing structures while yards are muddy. All the respondents (100%) are living in their own houses and none was found to live in the rented houses. Nature of the housing conditions of the study area is shown in **Table 5.12**.

Table 5.12: Housing Type

Categories	Number	%age
Pucca	166	69
Katcha	30	12
Semi Pucca	45	19
Total	241	100

Source: Socio economic Census Survey, May, 2015

Number of Rooms

The number of rooms depends upon the need of the family. In larger families with marital extensions of sons, additional rooms are built to fulfill the additional space requirement.

Most of the surveyed houses (85%) have 1-4 rooms, whereas 14% have 5-8 rooms and only 01% have 9-10 rooms. Details are shown in **Table 5.13**.

Table 5.13: Number of Rooms

No. of Rooms	1	2	3	4	5	6	7	8	9	10
No. of Respondents	42	65	50	47	12	11	06	05	00	03
%age	17	27	21	20	05	05	02	02	00	01

Source: Socio economic Census Survey, May, 2015

5.6.7 Livestock

The people of area keep the animals at house hold level for their personal necessities and livelihood. Livestock also plays a vital role in economies and particularly lower class and lower middle class as a main source of their income.

Major livestock animals of the area are cows, buffalos, goats, sheep, donkeys and poultry birds. Cow, Goats and Sheep are kept for the whole year and sold and sacrificed on the event of Eid Ul Adha. People of the area were of the view that sufficient fodder is available for the livestock.

5.6.8 Industries/ Commercial Activities

Industrial Activities

In district Vehari, there is one textile composite unit, 3 textile spinning and 6 textile weaving units, 25 rice mills, 11 flour mills, 4 vegetable ghee/cooking oil units and a number of oil expelling units and cotton ginning/pressing factories. Among these, Burewala Textile Mill (BTM) Ltd. and its sister concerns i.e. BTM Ginning / Pressing Factory, BTM Oil Extracting/Cooking Oil and BTM Poultry Feed Mill is very good example of linkage between the industrial units.

Being one of the best cotton growing districts of the country, district Vehari possesses very good potential for textile spinning, weaving and processing, textile made-ups e.g.

hosiery, terry towel, sportswear, bed sheets, tents / tarpaulins, canvas cloth, etc. which are directly exportable items.

These industries have both positive and negative impacts on the people. On one hand, these industries are the source of employment for local people but on other hand deteriorating the quality of life and health of people by generating uncontrolled emissions into environment.

5.6.9 Agricultural Activities in the Area

The climate of this area is very suitable for agriculture and most of its population is depending upon agriculture. The major crops of the district are wheat, sugarcane and cotton. The average annual production of wheat and sugarcane during the period 1998-2001 was 763 and 650 thousand Million Tons and of cotton was 863 thousand bales. The average annual productions of fruits i.e. citrus, mangoes, and guava are 61, 46 and 18 thousand Million Tons during 1998-2001, respectively.

5.6.10 Perceptions and Apprehensions of the Community Regarding Proposed Project

Public consultation provides an opportunity to the various stakeholders to share their views and experiences about the proposed activity in the area. Public involvement leads to the better and more acceptable decision making. There are following broad objectives of decision making.

- Informing the community about what is being proposed and anticipated impacts during construction and operational phase on the socioeconomic environment of the area.
- Providing the opportunity to the stakeholders to ascertain their views regarding various aspects of the proposed project.
- Reducing the conflicts through early identification of contentious issues and find appropriate and practical solution.

In order to achieve the aforementioned objectives, comprehensive consultation with the community of the project area was carried out. Five group discussions were held in the area. **Table 5.14** shows the number of participants.

Table 5.14: Participants of Group Discussions

Session	Date	Venue	No. of Participants
24WB	May, 2015	Village	10
30WB	May, 2015	Village	08
48WB	May, 2015	Village	15
28WB	May, 2015	Village	20
26WB	May, 2015	Village	05

During public consultation and meetings with other stakeholders, the overall response was positive. Most of the people of the project area were not aware about the proposed project. The overall project including proponents, components, environmental and socioeconomic were introduced to the local people and asked to mention positive and negative concerns related to the proposed project. A summary of feedback received is given in **Table 5.15**.

Table 5.15: Summary of feedback

Comment Category	Issue/Comment	Response
Job creation	➤ Unemployment is an issue of the area. It seems that this issue will increase even with increasing industrial activities in the area. ➤ Communities in the project area emphasized that local villagers should be given priority when employing people for various project-related works and activities according to their skills. ➤ People complained that cement industries of the area don't prefer the local people for hiring.	➤ The proposed project will create the limited job opportunities for the local people. ➤ Project director assured that local of the area will be given preference during hiring of labor based on their skills.
Traffic congestion/accidents	Accidents will increase at main Khanewal road branch road approaching the VIE.	➤ Management will consider this issue and management plan will be implemented. ➤ Any aggrieved person from the community can forward any project related complain to the management. Complain will be considered and action will be taken to rectify the problem.
Cattle disturbance	➤ Heavy vehicles may disturb the cattle and livestock may get hurt or run away or die accidental death due to vehicular movement when crossing or going along the road	➤ Management will consider this issue and management plan will be implemented.

Comment Category	Issue/Comment	Response
Air quality	➤ Would the project emit hazardous emissions in the air like other industries	➤ Mitigation measures are suggested in the report. Management will implement these measures to control the emissions. ➤ As per environmental law, People may note their environmental related complaints to district Environment Department.
Community relations	➤ We are thankful to the proponent for providing the opportunity to voice our concerns	➤ Noted and Thanks
Positive achievement	➤ Installation of such type of mega projects will reduce the unemployment in the country	➤ Noted
Communication	➤ Public hearing arranged at the project site so that locals could also attend the event. ➤ Local language should be used in the meeting	➤ Noted and informed that public hearing will be advertised in the national and local newspaper. ➤ Local language will be used to discuss the project related issues. ➤ Every project related question will be invited happily and suggestions of the local will also be considered in the report, if applicable.
Wastewater	➤ Will the wastewater be discharged into the environment?	➤ Wastewater will be treated prior to discharge. Management is considering various options for safe disposal of treated wastewater.
Communication	➤ Management must be available when any public issue arises	➤ Noted
Communication	➤ Authorities should maintain a cooperative attitude towards	➤ Noted

Comment Category	Issue/Comment	Response
	community and pay attention to all the community concerns that may arise during the project implementation	
Area development	➤ Apart from industry related activities, natural gas, paved streets, schools, vocational training center and medical facilities are the necessities for the development of the area.	➤ Noted

Chapter-6

ENVIRONMENTAL AND SOCIOECONOMIC ISSUES AND IMPACTS AND MITIGATION MEASURES

CHAPTER-6

ENVIRONMENTAL AND SOCIOECONOMIC ISSUES AND IMPACTS AND MITIGATION MEASURES

6.1 General

This section identifies the overall impacts (both positive and negative) of the proposed project during design, construction and operational phases on physical, biological and socioeconomic environments of the project area. Furthermore, it also describes the appropriate mitigation measures to eliminate or reduce the adverse environmental impacts on human and natural environment to an acceptable level within prevailing legislative and regulatory framework.

Identification of Potential Impacts

For the identification of potential impacts, screening of all the activities causing impacts has been carried out in different phases of the project. The major project activities were identified and the impacts on physical, biological and human environment of the area were evaluated.

All the project activities are divided into three phases;

- Design phase
- Construction phase; and
- Operational phases

Environmental impacts and issues that need to be carefully addressed during aforementioned phases with appropriate mitigation measures are presented in detail.

6.2 Design Phase

This phase mainly comprises of feasibility study and appropriate design selection for the proposed industrial estate.

There will be no major activities during this phase except site inspection and soil investigation at the proposed site. Soil investigation will be carried out through soil sampling. Most of the activities do not require extensive physical interference in the project area, therefore, no significant environmental, socioeconomic and health impacts have been identified.

Mitigation Measures

No mitigation measures are required for design phase of the project.

6.3 Construction Phase

Construction phase includes the activities related to leveling of site, construction of structures, utility installations and installation of equipments. Most of the construction

phase impacts will be of a temporary nature and their magnitudes are subject to the management practices adopted during construction.

6.3.1 Water Quality Deterioration

Wastewater generated from sanitary facilities provided to the workers may affect the ground water resources if proper treatment system is not established.

In the first phase, admin block has been completed. Sanitary facilities are provided with septic tank system therefore, impact would be insignificant.

Mitigation Measures

No other measures are needed.

6.3.2 Disposal of Solid Waste

The main sources of solid waste, associated with the construction of the project are domestic solid waste from admin block and excavation activities. The solid waste will be generated in the form of excavated soil, residual from construction material (construction debris etc) and domestic waste.

The extent of environmental impacts of the solid waste depends upon their disposal practices and pollution control measures. Indiscriminate disposal of solid waste may lead to generation of obnoxious smells/odor and unhygienic conditions. The impacts of solid waste are predicted as insignificant.

Mitigation Measures

- It is desirable to utilize the surplus construction material for fill up the low laying areas or in other construction activities taking place in the immediate vicinity or within the project area;
- Domestic solid waste from all the sources should be collected at a common point and then safely disposed off only in demarcated waste disposal sites.
- During the wrapping up of the construction phase, machinery and equipment will be packed up and transported back. For the sake of site clearing, discarded pieces of machineries, construction material should be disposed of at the dumping sites.

6.3.3 Air Pollution

Pollution causing activities during the construction phase are as follows:

Dust would be generated due to open storage of construction material blown by wind, land clearing, excavation, dumping, spreading, grading and compaction and use of uncovered trucks for the transportation of construction materials.

The dust emissions from the above sources and operations would cause public health hazards and nuisance, to the nearby communities particularly since these emissions get released at the ground level, with less chances of diffusion. Much of the fugitive dust

generated by construction activities consists of relatively large size particles, which are expected to settle within a short distance from their source.

Construction material transport vehicle to and from the site and construction machinery and equipment would cause the production of gaseous emissions including carbon monoxide (CO), oxides of sulfur (SO_x) and oxides of nitrogen (NO_x). Generators, to be operated as standby in case of shut down of electricity supplies from the WAPDA, shall also contribute to air pollution. Most of the construction equipment is mobile; the emissions are likely to be fugitive. Ambient air levels are not expected to increase from the standards, therefore the impacts would be insignificant.

Mitigation Measures

- All the construction equipment and vehicles should be maintained in good operating condition and properly tuned in order to minimize the exhaust emissions;
- Open burning of solid waste should be avoided;
- Excavation activities should be avoided during excessive windy days;
- Construction material transportation vehicles should be covered;
- Sprinkling of water should be performed during the construction stage;
- Chimneys and particulate scrubber should be provided to the plants generating particulate matter; and
- Masks should be provided to drivers and operators of vehicles and construction machinery.

6.3.4 Noise Pollution

Noise is a byproduct of human activities and potentially a serious pollutant and threat to environmental health. The major sources of noise are construction and erection of electrical and mechanical equipment.

Construction equipment generate the noise ranging between 75-95 depending on type and number of the construction equipment being operated, their noise generation characteristics and their distance from that location.

Table 6.1 and 6.2 shows the maximum limits of noise levels of construction equipment and machinery.

Table 6.1: Maximum Limits of Noise Levels

Sr. No.	Equipment	Noise Levels dB (A)
1	Earth Moving Machinery	75-85
2	Material Handling Equipment	75
3	Stationary Equipment	75
4	Tools, Hammers and Drivers	80-95

Source: The General Services Administration, Construction Noise Specification, USEPA 1972

Table 6.2: Maximum Limits of Noise Levels at 5 m distance from the source

Sr. No.	Equipment	Observation Point from the Source (m)	Noise Levels dB (A)
1	Grader	5	90
3	Bulldozer	5	86
4	Truck	5	92
5	Concrete Mixer	5	91
6	Concrete Pump	5	85

Source: Guangzhou City Centre, Inner Ring Road Project, Environmental Assessment Report (1997)

During baseline survey, the recorded noise levels were below the standard value.

It is expected that when the project activities will start, the existing noise levels would be slightly augmented. The increased noise levels will be site specific and of temporary nature. Moreover, all the settlements are located at a fair distance from the project site therefore; no major impacts within the project area and on the surroundings are expected.

Mitigation Measures

- Up-to-date and well maintained machinery with reduced noise levels should be used; and
- Construction workers should be provided with suitable hearing protection like ear plugs.

6.3.5 Impacts on Land Use

The land use of the project area will be permanently changed from agricultural/barren land to industrial category. Construction of buildings industrial activities will permanently change the aesthetics of the area to some extent. However, this change will be limited to the industrial estate area only.

Mitigation Measures

- In order to improve the environment, green belt should be developed. This will improve the aesthetic of the project site.

6.3.6 Impacts on Flora

The proposed project site is devoid of major vegetation. No rare, endangered, endemic or any commercial or ecological important terrestrial plant species were observed during the survey. Therefore, the site clearance would not bring about any damage to the flora.

Mitigation Measures

- Plantation in the area will result in positive shift in the ecological status of the area.

6.3.7 Impacts on Fauna

During the site survey, no endangered or threatened species were found to inhabit the project area. Similarly, no special status of wildlife is reported from the project site. Therefore, the construction of proposed project will not result in any significant loss or damage to species or habitats of special status.

6.3.8 Meteorology of the Area

Construction of the proposed project will not have any impact on the climate of the area. Hence, impact on the meteorology of the area would be insignificant and no mitigation measures are required.

6.3.9 Socio- economic Impacts

Local Employment

During construction phase, there will be positive impacts on the local employment. Local people will get opportunities of direct construction-related jobs. Contractor should give the preference to the local people while hiring labor. As the limited job opportunities will be available for the locals therefore, the impact would be low beneficial.

6.3.10 Occupational Health and Safety

Various activities during the construction phase of the project could have health & safety impacts. Workers safety hazards are associated with the operation of construction machinery and equipment, loading and unloading, concrete mixing and conveyance, and installation of structures.

The causes of safety hazards are human errors, operational faults of machinery and unforeseen incidences. The impact on workers health and safety is high adverse, if safety measures are not adopted.

Mitigation measures

- Proponent should depute a person to supervise the construction activities; and
- Contractor should provide the PPE to the workers, where necessary.
- Efficient management, staff training, equipment maintenance and other preventive measures. Accident prevention is essentially an engineering and administrative problem and rests mainly on strict compliance with the established safety rules and regulations.

6.3.11 Land Acquisition

Land acquisition will not be the issue for PIEMDC as approximately 277 acres area has already been acquired by the management. Most of the land is government owned. Private land has been acquired through voluntarily negotiation with the land owners. Judicious compensation has been paid based on market rate.

6.3.12 Loss of Cultural Resources

There is no cultural, historical or archaeological site within or in close vicinity of the project area. Hence, no impact is envisaged on the places of interest.

6.3.13 Loss of Assets/Structures

No public or private assets will be affected due to the execution of the project.

6.4 Environmental Impacts during the Operation Phase

The proposed project, right from the decision for its implementation to the operation phase, will cause environmental impacts on three environmental settings such as physical, biological and human.

6.4.1 Wastewater Impacts

a) Sources of Wastewater Generation

Following are the major sources of wastewater generation from industrial estate;

- Sanitary wastewater
- Industrial wastewater

Sanitary Wastewater

The sanitary wastewater sources are administration office, commercial area and the other facilities provided in the VIE. **Table 6.3** presents the typical characteristics of untreated sanitary wastewater.

Table: 6.3: Typical Composition of Untreated Domestic Wastewater

Sr. #	Parameter	Concentration (Medium Strength)
1	Total Dissolved Solids (TDS)-mg/l	500
2	Total Suspended Solids (TSS)-mg/l	210
3	Biochemical Oxygen Demand (BOD ₅)-mg/l	190
4	Chemical Oxygen Demand (COD)-mg/l	430
5	Chlorides-mg/l	50
6	Sulfate-mg/l	30
7	Oil and Grease-mg/l	90
8	pH	7

Source: Wastewater Engineering-Treatment and Reuse (Metcalf & Eddy, 186)

Industrial Wastewater

It is estimated that about 12 cusec flow including sanitary and industrial process will be generated from the proposed VIE when fully developed. As the specific nature of industries to be constructed in the VIE is not known therefore wastewater

characteristics, expected from the VIE cannot be established. The generated wastewater will be treated in CETP prior to disposal.

b) Impacts of Wastewater

Table 6.4 presents impacts of wastewater on environment and human health.

Table 6.4

Impacts of Wastewater on Environment and Human Health

Parameter	Impacts
pH	Growth inhibition of bacterial species (responsible for removing organic pollution) under highly acidic or alkaline conditions
	Corrosion of water carrying system and structures with acidic wastewaters having low Ph
	Malfunctioning and impairment of certain physico-chemical treatment processes under highly acidic or alkaline conditions
Organic Pollutants	Depletion of dissolved oxygen (DO) levels, of the receiving water body, below limits necessary to maintain aquatic life (4-5 mg/l)
Suspended Solids	Sedimentation in the bottom of water bodies leaving adverse impact on flora and fauna
	Localized depletion of dissolved oxygen in the bottom layers of water bodies
	Reduced light penetration in natural waters and consequent reduction in photosynthesis
	Aesthetic nuisance
Oil and grease	Reduced re-aeration in natural surface bodies, because of floating oil and grease film and consequent depletion in dissolved oxygen levels
	Reduced light penetration in natural waters and consequent reduction in photosynthesis
	Aesthetic nuisance

The impacts of untreated wastewater on physical, biological and human environments would range from low adverse to medium adverse.

Mitigation Measures

- The wastewater impacts are in the category of low adverse to medium adverse. Such impacts can be managed by incorporating the pollution control technology. Some of these impacts can be eliminated through the administrative controls but not all. The control technology is the CETP (at the VIE level) and pre-treatment plants (at the industrial level) whereas the administrative controls include training of workers, implementation of operational and process control, preventive maintenance, and environmental monitoring and reporting. The management has incorporated wastewater pollution control measures in the planning stage.

The management of the VIE is recommended to implement the following measures to manage the process wastewater.

a) Water Consumption Monitoring

Water consumption both for the process and sanitary purposes should be monitored and its quantities recorded by each industry in the VIE. All the main water inlets shall be provided with flow meters to record daily water intake. Unit water consumption with respect to production and water consumption per capita per day for domestic use can be established by this measured water quantity.

b) Sanitary Wastewater Disposal

The management should encourage the use of the septic tank for pre-treatment of sanitary wastewater in each industrial unit. This system is the partial treatment of wastewater. The BOD and suspended solids are decreased 40 per cent and 70 per cent respectively from this system. In this process, the suspended solids are settled down by the provision of retention time of about 18-24 hours. The BOD is reduced by anaerobic treatment, in which organic matters are converted into methane, H₂S and CO₂. The overflow water from the septic tank will be conveyed to the CETP prior to disposal.

c) Process Wastewater

To comply with the NEQS, the management should treat wastewater of all industries by adopting Activated Sludge Process technique.

d) Wastewater Monitoring and Reporting

Wastewater discharged from all the industries including the CETP will be monitored with respect to its quantity and quality. As per the NEQS (Self Monitoring and Reporting) Rules, 2001, the priority parameters for wastewater from different industries will vary accordingly. After monitoring water consumption and wastewater discharges, water balance can be established. On the basis of monitoring, the departments consuming huge water quantities can be controlled through water audit.

The frequency of reporting of the priority parameters to the concerned authority will vary according to the nature of industries in the VIE. The services of some reliable private laboratory can be hired or an in-house laboratory can be established and training can be imparted to its own professionals for this exercise

6.4.2 Solid and Liquid Waste Impacts

The solid waste will generally comprise empty containers of lube oil and chemicals, metal scrap, discarded mechanical parts and domestic solid waste from all the industries in the VIE. Other major solid waste streams will depend upon the varying nature of industries in the VIE. Solid waste will also be produced from commercial and institutional activities in the VIE.

The liquid waste is generally the used lube oil from different machines, especially from the gears and from the vehicles. The quantity of this waste stream is not possible to estimate at this stage. The improper disposal of liquid waste can cause air, water and soil pollution. The solid and liquid waste impacts on different environmental conditions would be mainly medium adverse.

Mitigation Measures

- For safe disposal of industrial wastes, the management can encourage the use of three R's concept (reduce, reuse and recycle the solid waste). The plant operators should be trained to do their best to produce less solid waste from the process by employing different cleaner production techniques. The solid waste management team should explore ways to reuse waste in house as such. If it is possible to reuse any waste after making some change on it (called *recycling*); it should be practiced.

Monitoring of the solid waste with respect to its source, type, and generation rate is essential. For such monitoring, there will be solid waste management system in the organizations in which, waste segregation, collection and storage will be integrated with the industries operations. The management will ensure that these wastes are used under no objection circumstances. A sanitary landfill site will be constructed by the management of the VIE to dispose of industrial solid waste.

- The domestic waste generated from the administration buildings in the VIE will be collected and dumped at appropriate bins. From waste collection bins, it will be transported to the VIE designated solid waste dumping site daily.
- Major liquid waste streams include used lubricants. There should be a mutual agreement with the major suppliers of lube oil to take them back after use. Their safe disposal or reclamation will be the responsibility of the suppliers.

6.4.3 Air Pollution

a) Sources of Air Pollution

There will essentially be the following major sources of air pollution in the VIE:

- Generators/Power Plant
- Boilers
- Vehicles

Generators/Power Plant

Diesel oil is used as fuel normally in generators used for standby electricity generation, but now gas fired generators are also being used. Gas fired generators are preferred for because their emissions are quite clean. Diesel based generators generally emit pollutants like CO, NO_x, SO₂ and particulate matter.

Boilers

The boiler flue gases are the major air emissions in the industry. The major pollutants in the gas fired boiler are CO, NO_x, CO₂, and PM. This is a visual nuisance as well as health concern.

Vehicles

With the commencement of the VIE, the traffic in the area will increase. Such increase in traffic would cause fugitive dust emission in the area. The traffic will mainly comprise trucks, vans and office cars. These vehicles will also increase air emission due to fuel combustion. The major pollutants present in air emission will be oxides of nitrogen and carbon, particulate matter and un-burnt hydrocarbons. For well maintained vehicles, the air emissions will remain within the NEQS.

The VIE will be a blend of different industrial clusters which will produce air emissions (of varying intensities) relative to their respective processes. The CETP and the land fill site will also be the sources of air pollution. All the industries will be required to have their own EIAs prior to construction in the VIE.

b) Impacts of Air Pollution

Table 6.5 presents impacts of air emission on environment (E) and human health and life (HL).

Table 6.5

Impacts of Air Emission on Environment (E) and Human Health and Life (HL)

Parameter		Impact
Particulate Matter	E	Damage to plants by choking the leaf pores and restricting photosynthesis
		Impairment of the atmospheric visibility affecting transportation safety
		Deterioration of aesthetic quality of atmosphere, land and water
		Soiling of materials, physical properties and infrastructure
	HL	Increase in the frequency of respiratory infections such as bronchitis
Carbon Monoxide	HL	Heart attack by reducing the oxygen carrying capacity of blood
		Birth defects including mental retardation and impairment of fetus growth
		Dizziness, headache, and nausea
		Increase in reaction time of the drivers, a threat to the road safety
Oxides of Sulfur	E	Chlorosis and Plasmolysis in plants
		Damage to materials and property, by acid rains, resulting from oxidation of sulfur oxides to sulfuric acid, after reacting with water vapors

Parameter		Impact
	HL	Serious lung damage, particularly in sulphate form
		Respiratory diseases like chronic bronchitis
Oxides of Nitrogen	E	Formation of photochemical oxidants
		Damage to materials and property, by acid rains, resulting from oxidation of oxides of nitrogen to nitric acid, after reacting with water vapors
		Retardation of growth in plants
	HL	Reduction in oxygen carrying capacity of blood
		Impairment of olfactory sense and night vision
		Dryness and roughness of throat
VOC		Formation of photochemical oxidants
Photo Chemical Oxidants	E	Leaf discoloration and cell collapse in plants
		Damage to rubber, textiles, paints and other materials
	HL	Severe eye, nose and throat irritations
		Severe coughing and shortness of breath

However, the impacts of air pollution are assessed as low adverse to medium adverse.

Mitigation Measures

a) Air Emission Control Program

The following measures are recommended for air emissions control:

- ✕ Process control of combustion chambers
- ✕ Air emissions monitoring and reporting

Process Control of Combustion Chambers

The combustion process can be controlled to make air pollutants within the NEQS level. The parameters to control are the uniform supply of fuel, control on air supply and fine tuning of the combustion equipment and burners.

There should be regular monitoring of boiler flue gases for NO_x, CO, excess air supply, the PM, and generator emissions for CO, NO_x, SO_x and the PM by the industries. In case, these parameters are above the desired level, the appropriate measures can be taken.

Air Emissions Monitoring and Reporting

As mentioned in Section 3.1 that the VIE falls under the Category A for effluent and air emissions. For the EPA monitoring and reporting requirement, the Category A industry has to monitor its air emissions and report to the EPD monthly.

The priority parameters for air emissions monitoring and reporting for different industries in the VIE will vary accordingly.

6.4.4 Noise Pollution and Vibration

There are two types of noise sources i.e., plant noise and vehicular noise.

a) Sources of Noise

Plant Noise

The possible sources of noise after the establishment of the VIE would be different process equipments (depending upon the types of industries), boilers and generators.

Vehicular Noise

The industrial activities in the VIE will increase traffic in the area. The vehicular noise will be one of the added nuisances for the nearby community. An area of about 2 km radius will be directly affected by vehicular noise. The office vehicles will also contribute to this noise level, which will further increase after startup of the VIE operations. Generally, the well maintained vehicles have noise levels within the NEQS level of 85 dBA.

b) Impacts of Noise

The high noise levels result into various health impacts such as hearing loss and number of physiological and other effects.

Hearing Loss

Exposure to sufficiently intense noise for long enough duration results in damage to the inner ear and thus decreases one's ability to hear. It is specifically the organ of corti that is most commonly affected. In addition to a general decrease in the ability to detect sounds, the quality and clarity of auditory perception can be affected as well.

Acoustic Trauma

Acoustic trauma, which results from a single or relatively few exposures, is defined as "immediate organic damage to the ear from excessive sound energy." If the noise is intense enough, other structure outside the inner ear may also be affected, such as the eardrum, which may become ruptured. However, such damage is rare, and occurs only in instances involving extremely intense noise and blasts. Additionally, acoustic trauma often causes some degree of permanent damage to the auditory system.

Temporary and Permanent Threshold Shift

In temporary and permanent threshold shift, the person's auditory sensitivity decreases. The difference between these two effects is that, in temporary threshold shift, the auditory level returns to its original level, whereas in permanent, problems remain permanent. Thus a person with permanent threshold shift, no further recovery is

possible. Sometimes, the permanent threshold shift results from acoustic trauma but it often results from long period of repeated exposure of noise.

Physiological Effects

In addition to effects on hearing, noise also causes some physiological effects. These include cardiovascular and gastric effects. The studies have shown that anti-hypertensive medication consumption is generally higher in the noisy areas. Loud noise is related with the vasoconstriction with the consequent increase in blood pressure. One laboratory study showed that plasma cortisol and blood cholesterol levels were increased with the increase of noise level above 85 dBA.

Exposure to noise can also lead to gastric changes. A study showed noise level above 80 dBA resulted in a reduction in stomach contraction strength and helped in ulcer development.

Other Effects

Some of the other effects of noise are cognitive performance, occupational performance, psychological functioning, effects on social behavior and effects on aggression.

Various studies related with cognitive performance reveal that recall is detrimentally affected by background noise. Vigilance and attention are also impaired by noise exposure.

Occupational performance exerts its influence either directly or indirectly on the person through annoyance or job dissatisfaction. It has been seen that in the situation involving noise levels over 90 dBA, there are often increased number of errors in tasks requiring continuous attention. Also the occupational tasks involving sensory input can be hindered by noise. Poor concentration, irritation, nervousness, frustration, headaches, accidents, aggressive social behavior, fatigue and anxiety are some of the common other effects. There would be mainly medium adverse impacts on different environmental conditions.

Mitigation Measures

The management should encourage the use of the following sequence to control noise at various plants locations within the VIE:

- Noise measurement of the noisy areas (if required)
- Audiometric testing of workers exposed to high noise levels
- Record keeping of medical tests and follow up
- Engineering control for noise reduction
- Administrative control for noise reduction
- Training of employees
- Vehicular noise

a) Plant Noise Measurement

Table 6.6 provides threshold limit values (TLV) of the noise according to the American Conference of Government Industrial Hygienists (ACGIH).

Table 6.6
Noise Threshold Limit Values

Duration per Day (Hours)	Sound Level (dBA)
16	80
8	85
4	90
2	95
1	100
1/2	105
1/4	110
1/8	115

When the sound levels listed above exceed, the feasible administrative or engineering controls should be instituted. If these controls fail to reduce the sound levels to within those listed above, the hearing protection devices should be provided and used to reduce sound levels to an acceptable level.

b) Audiometric Testing

The management should implement audiometric testing of the workers exposed to high noise levels.

Audiometer is used to measure the hearing threshold of employees. These tests can detect changes in hearing threshold of employees. A negative change represents hearing loss within a given frequency range. The initial audiogram establishes a baseline-hearing threshold. After that, audiometric testing should occur at least annually.

c) Follow Up

It is very important to follow up monitoring of those employees having early stage of noise induced hearing loss. Hearing loss can occur without producing any evidence of physiological damage. Therefore, it is important to follow up on even the slightest evidence of a change in an employee's hearing threshold.

d) Engineering Control

There are three components of noise hazards i.e. noise source, noise path and noise receiver. The most desirable noise controls are those that reduce noise at the source. The second priority is to reduce the noise along its path. The last resort is noise reduction at the receiver using personal protective devices. The latter approach should never be substituted for the two former approaches.

- Noise can be reduced at its source by enclosing the source, altering the acoustical design at the source, substituting equipment that produces less noise, making alternations to the existing equipment, or changing the process so that less noisy equipment can be used;
- Noise can be reduced along its path by moving the source farther away from receivers and improving the acoustical design of the path so that more sound is absorbed as it travels toward receivers; and
- Noise can be reduced at the receiver by enclosing the worker, using personal protective devices.

e) Administrative Control

Administrative controls are the controls that reduce the exposure of VIE employees to noise rather than reducing the noise. There could be many operations in which the exposure of employees to noise could be controlled administratively, that is, production schedules can simply be changed or jobs can be rotated so that exposure times are reduced. This includes such measures as transferring employees from a job location with a high noise level to a job location with a lower one if this procedure would make the employee's daily noise exposure acceptable.

Administrative controls should be considered a second level approach with engineering controls given top priority.

f) Training

The workers' training and education will be helpful for the management of each industry in the VIE to convince workers for the implementation of noise control strategies. The training and education program will provide information about the adverse effects of noise and how to prevent noise induced hearing loss. At a minimum, all trainings will cover the following topics:

- Noise induced hearing loss
- Recognizing hazardous noise
- Symptoms of overexposure to hazardous noise
- Hearing protection devices (HPD) - advantages and limitations
- Selection, fitting, use, and maintenance of the HPD

g) Vehicular Noise

The vehicles maintenance program should be implemented for carrying out regular maintenance of the office vehicles. Maintenance should focus on noise monitoring, engine tuning, oil change and general up keep. Generally, well maintained vehicles, in all respects, cause less noise pollution in the area.

6.4.5 Socio-economic Impacts

After start up of the industrial operations, there will be increase in traffic in the project area, which may result in road accidents. There may also be the job opportunities available to the local residents.

6.4.6 Impacts on Occupational Health and Safety

There could be a number of safety issues in the industrial operations. General impression in the industrial operations is that the workers hesitate to use the occupational health and safety equipments.

Mitigation Measures for Socioeconomic Impacts

- The traffic management measures are required as a means of reducing road accidents, improving the residential living environment and reducing the chance of collisions between vehicles, pedestrians and cyclists. After the VIE is in operation, there will be traffic load on the major external Khanewal-Vehari road as well as internal roads.
- As a measure to streamline heavy traffic in the area, proper road marking and signboard posting should also be done. Proper pedestrian precincts should be provided where development has encroached the human passages.
- The vehicle drivers should be apprised of the local customs and values, and be advised to remain courteous to the local population.
- The raw material transport activities scheduling should be such that most of the tasks are executed in a manner so as not to cause traffic jams and congestion in the area. Preference for job opportunities should be given to the local affected communities for their social and economic uplift.

Improvements in Occupational Health and Safety

a) Training of Workers

Workers of the industries in the VIE need training on the OHS issues such as the use of the OHS equipment, fire fighting, first aid, emergency response etc. Frequency of these trainings can be established according to the need. The consultants, trainers and people from different agencies working on these issues can provide in house trainings.

Each new entrant will undergo such trainings at the time of joining. Afterward he/she will also attend the scheduled trainings. To evaluate the effectiveness of these trainings, people of the facility should be tested time to time through different drills.

b) Comfortable Working Environment

The management of the VIE should ensure the following sequence to be adopted to control heat stresses on workers and to improve the working conditions in industries:

- Measurement of heat stresses at high temperature working areas
- Establishing rest break schedules for workers of heat stress areas
- Improving working conditions by improving ventilation

- First aid training to workers to fight heat stresses

c) Enforcement and Use of the OHS Equipment

Workers should be enforced to use the OHS equipments in the plants. The management should also adopt such practices to motivate workers. Workers should be trained on these issues and provide knowledge of all the occupational hazards and associated diseases. After getting knowledge, they will definitely follow safety protocols. All such measures can eliminate the chances of accidents in the working areas. The management has the responsibility to supply these equipments to the workers uninterruptedly.

Chapter-7

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Chapter-7

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.1 General

The Environmental Management Plan (EMP) is an integral part of the EIA report. The main purpose of the EMP is to ensure effective implementation of the mitigation measures proposed for the environmental impacts during the construction and the operation phases. The specific objectives of the EMP are outlined as under:

7.2 Objectives of the EMP

The main objectives of the EMP during the construction phase will be to:

- Monitor actual project impacts on the physical, ecological, cultural and socioeconomic receptors. This will indicate adequacy of the EIA.
- Recommend mitigation measure for any unexpected impacts of the project during construction period which are not mentioned in the EIA study, or if the level of impact exceeds the anticipated limit of the EIA study.
- Ensure compliance of the legal and community obligations, including safety on the site; and
- Ensure safe disposal of the construction debris, including excavated soil.

Whereas, the objectives of the EMP during the operation phase of the project are as below:

- Evaluate adequacy of the EIA with respect to the project's predicted long term impacts on the environment; and
- Evaluate effectiveness of the mitigation measures proposed in the EIA and recommend improvement if any needed.

7.3 Scope of the EMP

The scope of the EMP includes the following phases of the project.

- Construction Phase
- Operation Phase

All the activities performed during the construction & operation phases will be controlled and monitored according to this EMP.

7.4 Commitment to Environmental, Health and Safety (EHS)

PIE is committed to perform all of its activities in a way which is safe for the environment as well as the health & safety of its employees and the person(s) working on behalf of PIE Management i.e. contractor. The management PIE will use this EMP as a reference to control and monitor all the activities that will be performed during the construction and operation phases of proposed project.

7.5 Key Environmental Issues

The environmental issues associated with the proposed VIE are discussed in detail in Chapter 6.

7.6 Cost of the Mitigation Plan

The direct costs of implementing the mitigation plan will be very modest, as nearly all the recommendations depend on good and proper management of the construction activities and high standards of operations of the plant itself. However, environmental monitoring cost, which is approximately 1.8 millions is included in the cost of the project.

7.7 Impact Mitigation Plan

Impact Mitigation Plan ensures the effective implementation of mitigation measures proposed. **Tables 7.1** and **7.2** present the impact mitigation plans for construction and operation phase of the project. Mitigation plans include the issues identified, mitigations proposed, and proposed staff held responsible for its implementation.

Table 7.1
Impact Mitigation Plan for Construction Phase

Project Components/Impacts	Proposed Mitigation Measures	Responsibility
Water Quality	No need	
Solid Waste	➤ Utilize the surplus construction material for fill up the low laying areas or in other construction activities taking place in the immediate vicinity or within the project area; ➤ Collect domestic solid waste from all the sources at a common point and then safely dispose off only in demarcated waste disposal sites; and ➤ Pack up machinery and equipment and transported back during the wrapping up of the construction phase. For the sake of site clearing, discarded pieces of machineries, construction material should be disposed of at the dumping sites.	PIEDMC & CC
Air Pollution	➤ All the construction equipments and vehicles should be maintained in good operating condition and properly tuned in order to minimize the exhaust emissions; ➤ Open burning of solid waste should be avoided; ➤ Excavation activities should be avoided during excessive windy days; ➤ Construction material transportation vehicles should be covered; ➤ Sprinkling of water should be performed during the construction stage; ➤ Chimneys and particulate scrubber should be provided to the plants generating particulate matter; and ➤ Masks should be provided to drivers and operators of vehicles and construction machinery.	PIEDMC & CC
Noise Pollution and Vibration	➤ Up-to-date and well maintained machinery with reduced noise levels should be used; and ➤ Construction workers should be provided with suitable hearing protection like ear plugs	PIEDMC & CC
Land Use	➤ In order to improve the environment, green belt should be developed. This will improve the aesthetic of the project site	PIEDMC & CC
Flora	➤ Plantation in the plant area will result in positive shift in the ecological status of the area.	PIEDMC & CC
Fauna	No need	
Occupational Health and Safety	➤ Proponent should depute a person to supervise the construction activities;	PIEDMC & CC

Chapter-7

Project Components/Impacts	Proposed Mitigation Measures	Responsibility
	➤ Contractor should provide the PPE to the workers, where necessary; and ➤ Efficient management, staff training, equipment maintenance and other preventive measures. Accident prevention is essentially an engineering and administrative problem and rests mainly on strict compliance with the established safety rules and regulations.	
Environmental Monitoring Plan	➤ Ensure the implementation of “Environmental Monitoring Plan” during the construction phase	PIEDMC & CC

CC: Construction Contractor

PIEDMC: Punjab Industrial Estate and Management Company

Table 7.2
Impact Mitigation Plan for Operational Phase

Project Components/Impacts	Proposed Mitigation Measures	Responsibility
Wastewater Generation	➤ Install CETP at estate level and pre-treatment plants at the industrial level; ➤ Take administrative controls which includes training of workers, implementation of operational and process control, preventive maintenance, and environmental monitoring and reporting; ➤ Water Consumption Monitoring; and ➤ Septic tank for sanitary wastewater disposal	PIEDMC
Solid and Liquid Waste	➤ Encourage the use of three R's concept (reduce, reuse and recycle the solid waste). ➤ Implement solid waste management system for monitoring of solid waste with respect to its source, type, and generation ➤ Construct sanitary landfill by the management of the VIE to dispose of industrial solid waste. ➤ Collected domestic waste generated from the administration buildings in the VIE and dumped at appropriate bins inside the estate. ➤ Sent back the used of lube oil to the suppliers	PIEDMC
Air Emissions	➤ Process control of combustion chambers ➤ Air emissions monitoring and reporting	PIEDMC
Noise Pollution and Vibration	➤ Noise measurement of the noisy areas ➤ Audiometric testing of workers exposed to high noise levels ➤ Record keeping of medical tests and follow up ➤ Engineering control for noise reduction ➤ Administrative control for noise reduction ➤ Training of employees ➤ Vehicular noise measurement	PIEDMC

PIEDMC: Punjab Industrial Estate and Management Company

7.8 Institutional Needs for Implementation of Environmental Measures

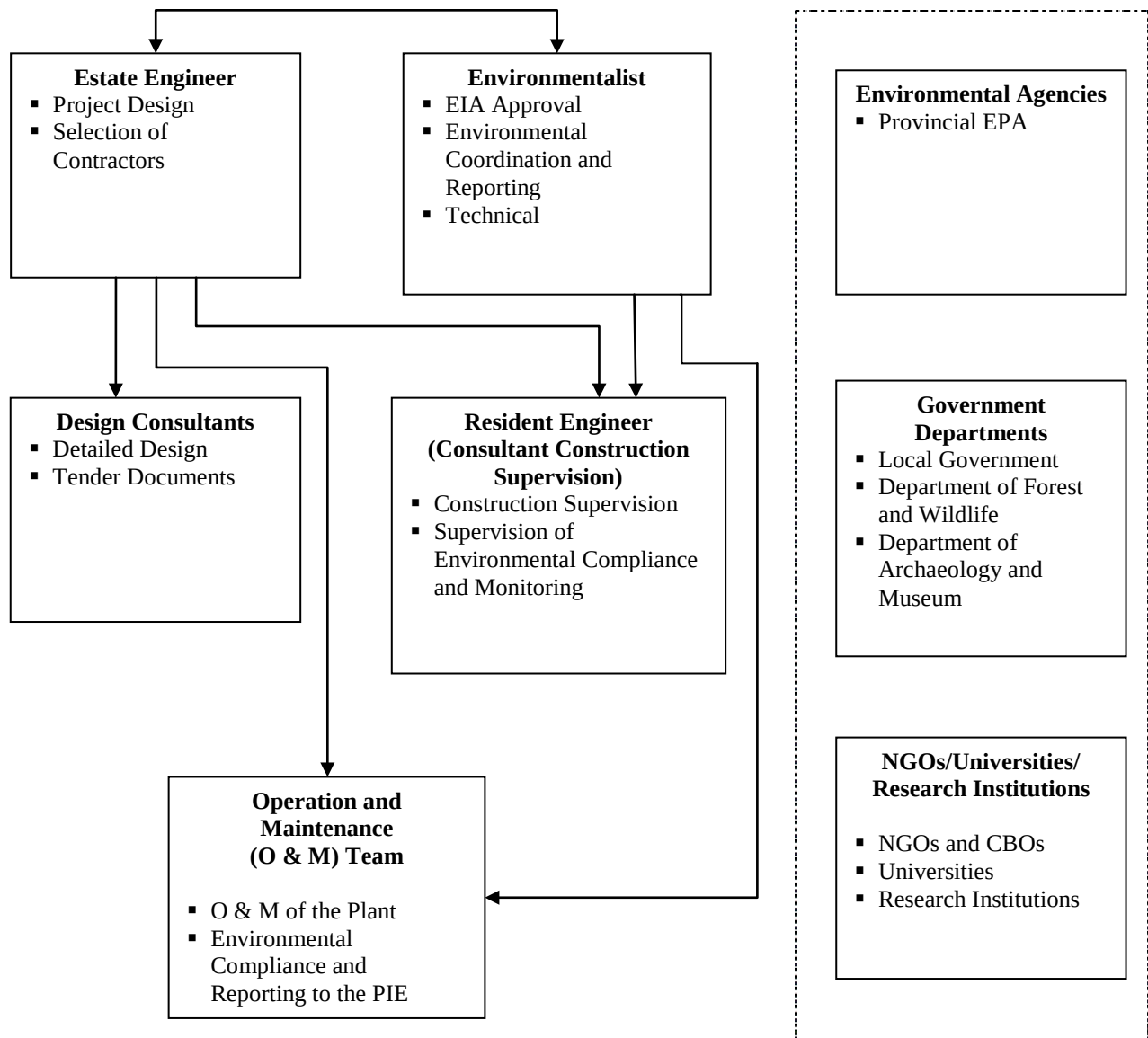
The potential impacts of the VIE on air, water and soil necessitate institutional support for efficient conduct and supervision of materials handling, pollution control, and waste reduction. This section of the EIA report aims at assessing the institutional capabilities that exist within the PIE set-up, identifying their future plans for implementing environmental measures, and then providing an outline of recommended institutional measures, which need to be developed by the PIE in order to make them an environmentally-sensitive and abiding entity.

7.9 Recommended Institutional Measures

The PIE is responsible for overall implementation of the VIE project. **Figure 7.1** indicates the key roles and responsibilities assigned within the PIE as well as its interrelationship with the other monitoring agencies.

The main individual, groups, government agencies, NGOs etc. identified with their respective responsibilities for implementing the mitigation plan include:

- Environmentalist (PIE)
- Estate Engineer (PIE);
- Design Engineer;
- Resident Engineer;
- Contractor;
- Plant Manager;
- Plant Operators; and
- Stakeholders

Figure 7.1: Key roles and responsibilities assigned within the PIE

7.10 Roles and Responsibilities

Environmental (PIE)

The Environmental, PIE will have overall responsibility for ensuring compliance of the EMP. The scope of responsibilities will include:

- Setting up system for environmental management and supervising environmental and social impact assessment;
- Providing information and support to the Estate Engineer to ensure that the environmental considerations have been incorporated in the design of the CETP-VIE;

- Liaising with the Resident Engineer (consultant construction supervision) and the Estate Engineer to ensure monitoring of environmental compliance during construction and provide technical support where required;
- Coordinating with the regulatory agencies including EPA, District Local Government, Local NGOs, CBOs that could assist the PIE in independent review of environmental compliance;
- Reporting environmental monitoring and evaluation of compliance to the EPA;
- Providing incentives for industries to progressively implement their own pre-treatment systems;
- Setting up forum for industrialists to discuss waste management;
- Informing the O & M team of the CETP-VIE about the new environmental legislation and guide for up-gradation of the plant.

b) Estate Engineer (PIE)

The Estate Engineer and his staff are responsible for:

- Supervising the design consultant when preparing an outline design and tender documents for project contracts;
- Hiring contractors for construction of the CETP-VIE, using a competitive bid process; and
- Ensuring that all the recommendations of the EIA have been incorporated in the design.

c) Design Engineer

The CETP-VIE Design Engineer must ensure:

- Mitigation requirements are appended to the tender documents so that the mitigation costs are also incorporated by the contractors while preparing bids;
- Mitigation requirements included in tender documents are enforceable;
- Features are provided for public and operator's safety;
- Design facilities, which can be readily operated and maintained properly;
- Features are incorporated to minimize production of odors;
- Areas with higher potential of odor production are enclosed;
- Features are provided for security;

- Appropriate landscaping is provided for visual effect and noise suppression;
- Modular type of design for the CETP-VIE is provided;
- Noisy equipment are enclosed; and
- Emergency generators are provided so that the facilities can operate during power failures

d) Resident Engineer (Consultant Construction Supervision)

The Resident Engineer has the following responsibilities:

- Ensure contractors to understand mitigation requirements and their responsibilities for implementing the mitigation plan;
- Monitor contractor's actions and enforce contractual obligations;
- Plan construction schedule with contractors to ensure that the construction process is as quick and efficient as possible; and
- Ensure provisions, for health and safety of construction workers, are in place including swift supply of medical facilities in the event of accidents, PPEs etc.

e) Contractor

The responsibilities envisaged for the contractor working for the VIE are as follows:

- Ensure efficient site management for the storage of equipment, stockpiling materials etc.;
- Ensure construction plan devised and agreed with the Resident Engineer;
- Recruit labor from locals first;
- For the construction of admin building on the site, ensure appropriate sanitary arrangements, accommodation and drinking water availability;
- Liaise with the local communities regarding services and goods supply at the site;
- Liaise with the local communities regarding construction activity, time span, likely nuisances such as noise, dust and disturbance;
- Ensure provision of appropriate night lights; and
- Plan working hours to provide minimum disturbance to the community.

f) Plant Manager (O & M Team)

The Plant Manager during operation of the CETP-VIE is responsible for the tasks:

- Manage plant efficiently at all times;
- Maintain cleanliness of the site and the facilities;
- Recruit highly motivated and well trained staff to run the plant;
- Ensure staff is aware of the contents of the operational manuals (on the wastewater treatment in particular) comprising safety procedures, emergency, shut-down or accidental injury on the site;
- Ensure all equipment regularly maintained and repaired;
- Keep stocks of spares in case of equipment failure;
- Ensure effluent quality monitoring and problems remedied as soon as possible;
- If problems of receiving un-authorized wastewater at works crop up, coordinate with the PIE to identify source of problem and take remedial action;
- Ensure instant diagnosis and repair of leaks, spills and blockages – alert communities of imminent health hazards in discharge area;
- Liaise with community organizations regarding nature, functions and relationship with operation of the plant;
- Ensure timely redress of complaints about the plant;
- Maintain record of complaints received and actions taken;
- Ensure positive response to requests for site visits etc. with the view to enhance relations with the locals and other institutions;
- If monitoring shows that the effluent treatment is not adequate to meet the water application of technology and the quality standards, then take action to install treatment which is adequate;
- If necessary, seek advice on how to improve the situation, especially if equipment not performing to the specifications;
- Devise odor control system if problems occur and persist.

g) Plant Operators (O & M Team)

The following responsibilities are identified for the Plant Operators:

- Read and digest operational manuals;
- Ensure safety and firefighting equipment are in place and accessible;
- Ensure regular maintenance of the equipments;

- Report malfunctioning of the equipment and equipment failure to the Plant Manager; and
- Ensure responsible and conscientious attitude towards execution of their duties at all times.

h) Stakeholders

The following responsibilities are identified for the community as *Stakeholders* during the construction and operation phases of the CETP-VIE:

- Liaise with the Resident Engineer regarding schedule of construction activities;
- Avoid construction routes for personal and work routines;
- If plant creates nuisance, odors or excessive noise, contact the Plant Manager, with the information on time, place and wind direction, etc.; and
- If the CETP-VIE or activities associated with it and any other activities of VIE units, in any way, jeopardize health of the nearby community, ensure the Plant Manager and the EPD are alerted.

7.11 Disaster/Hazard Management

The existence of hazards, associated with industrial facilities, calls for disaster/risk management plan, which will comprise:

- Conditions potentially leading to major release accidents including releases from pipes, flexible connections, filters, valves, vessels, pumps, compressors, tanks, stacks etc.
- Explosion in boiler and storage areas
- Occupational health and well being conditions
- Occupational safety conditions

The last two points will be discussed under “Occupational Health and Safety Planning”. The discussion under disaster management mainly pertains to the hazards associated with the VIE and the controls to be exercised, as part of the disaster management, to overcome the danger of being exposed to these hazards.

Hazards assessment for the proposed facilities in the VIE will take into account the potential hazards likely to occur during the construction and the operation stages of the project.

The construction phase hazards may involve danger to the safety of workers as a result of unforeseen accidents. Exposure to toxic materials and explosives can pose serious threats to the health of the workers. The hazards associated with the operation phase

may be of the following categories:

a) Electrical

Electrocution from live conductors and misuse of power tools, overhead power lines, downward electrical wires, buried cables, and work during electric storms

b) Mechanical

Collision accidents with moving equipment, especially when operating in reverse, failed pulleys, snapped cables and clothes catching in gears or drills

c) Structural

Potential for falling or strain when working conditions include slippery surfaces, steep grades, narrow stairs, open holes, and unstable flooring, potential puncture from objects, and potential burial from trench cave-ins or from unstable slopes on material stock-piles

d) Temperature

Heat stress in hot environments or when working in clothing, which limits the dissipation of body heat and moisture

e) Noise

Stress and physical damage to the ear when subjected to noise levels exceeding recommended guidelines (e.g. an 8-hour, time-weighted average sound level of 90 dBA, as per the US guidelines; NEQS recommended 85 dBA as the limiting value for motor vehicle noise – there is no NEQS limitation imposed on noise generated from industrial processes.

f) Radiation

Burns and/or internal damage when subjected to excessive levels of ionizing radiation

g) Oxygen Deficiency

Health effects due to displacement of oxygen due to another gas or consumption of oxygen by a chemical reaction, particularly in confined spaces may occur. In addition, it is possible that if the work areas are not designed properly, they can cause workers discomfort and mental stress, which can result in loss of efficiency, and thus lessen the worker's ability to respond promptly to any hazard. Also, creation of such conditions can cause monotony and fatigue thereby increasing the potential for hazards and accidents to occur.

The recommended control measures to minimize and manage potential hazards include engineering controls and administrative controls, which are elucidated below:

i) Engineering Controls***Layout Design***

Unit operations being laid out in such a manner that incompatible substances and incompatible operations are not located within close proximity to each other. Specific examples of incompatible substances, not being located in close proximity, include:

- Particulate matter and liquid droplets from boilers will not fall within the battery limits of the complex, and will be sufficiently diluted before reaching the ground.
- It is planned that the wastewater treatment plant will be designed so as not to allow the mixing of incompatible streams - each stream will be given specific treatment before mixing with other wastewater streams on entering the wastewater treatment plant.

Resource Minimization

Recycling and reuse of wastewater generated in the plant

Access Control

Limitations of personnel to those specifically trained in the work conditions present within a potentially hazardous area including use of personnel identification, double lock, security services and barriers.

Labeling

Complete hazard labeling of all switches, valves, containers, and unit operations; complete identification of specific hazardous substances by name and type (e.g. toxic, reactive, ignitable, and explosive).

Monitoring

Monitoring of the environment in the immediate vicinity of potential hazards as well as at the fence-line of the installation, provides an early warning of a hazard occurring. For example, air quality monitoring for oxygen levels, combustible gas levels, and/or specific air constituents could be conducted on a regular basis using portable equipment or on a continuous basis with stationary equipment. Smoke detectors, heat monitors, and radiation detectors can be used to signal a hazard occurring.

Secondary Containment

Provision of appropriate systems to contain releases including water curtains to restrict gas releases, dikes to contain spills; emergency response equipment to collect spilled material, fire-proofing to limit the spread of fire; absorbents to absorb or adsorb hazardous substance; and buffer zones.

ii) Administrative Controls

These controls need to be exercised in situations where it is not possible to reduce hazards through engineering controls. It is recommended that administrative controls should be implemented in the form of rearrangement of work schedules so as to minimize the duration of exposure to hazards and transfer or rotation of personnel who have, over a period of time, reached a maximum allowable exposure limit.

The controls should also be exercised to ensure easy access to and availability of PPE for use within the vicinity of potential hazards. Such equipment could include chemical resistant gloves, safety shoes, ear protection plugs, safety glasses etc. Special clothing should be provided as well as basic items for use in emergencies such as portable light, safety belt, two-way radio etc. should be easily accessible at all times for 24 hours a day.

During training, the following areas of knowledge and experience are considered essential:

- Appreciation of the properties (e.g. flammability, corrosiveness, toxicity, reactivity) of hazardous substances, as well as the levels at which they pose a significant danger requiring protective measures.
- Awareness of early-warning indicators, hazards/risk identification, and ability to recognize potentially hazardous situations.
- Familiarity with engineering controls to avoid occurrence of hazardous situations
- Familiarity with capabilities and limitations of the facility to respond to hazardous emergencies: ventilation systems, plumbing systems, shut-off systems, containment devices, and emergency response procedures.
- Knowledge of the use and maintenance of emergency response equipment as well as routine equipment for health and safety monitoring and protection.
- Knowledge of methods and procedures for decontaminating personnel, equipment, and facility, following potential chemical contamination.

7.12 Occupational Health and Safety Planning

It is recommended to the management of the PIE to carry out a complete assessment and identification of all potential hazards anticipated during the construction, operation, and other phases of the VIE, and to prepare a Health and Safety Plan (HSP) along with the Plant Health and Safety Rules developed. The HSP, aimed at identifying, evaluating, monitoring and controlling health hazards, should provide the following basic information:

- Definition of all potential hazards
- Health and safety implications of each hazard

- Description of routine health and safety management techniques, including health and safety inspections, maintenance/repair follow-up on inspection citations, recordkeeping, personnel protective gear, and medical monitoring.
- Outline of the emergency response procedures following occurrence of a major hazard including organizational structure of key trained personnel to act as emergency responders, action steps for entering and working within zone of hazard, evacuation procedures, protective gear requirements, decontamination procedures, lines of communication, emergency telephone numbers, map of route to nearest medical centre etc.
- A follow-up procedure after the emergency is over.

The management needs to ensure that the HSP along with the associated Health and Safety Rules is established and enforced. The Plant Health and Safety Rules should include provisions for prevention of and response to toxic chemicals and gases.

An Occupational Health and Safety Programme (OHSP) need to be developed, which is both appropriate and affordable. Major components of such a programme should include control of injury hazards, procedures for emergency care of injured personnel, routine medical examinations of the plant workers and surveillance programme, provision for compensation of injured workers, maintenance of in-plant sanitation including proper management of hazardous wastes and provision of safe drinking water supply and adequate bathing/washing facilities including emergency showers and eye douches. Occupational Health and Safety Training in plant health and safety should be imparted on a regular basis, with emphasis being given on good environmental house-keeping practices.

7.13 Solid Waste Management

Construction Stage

During the construction phase, quantities of excavated materials and other wastes will be generated which will require disposal in an appropriate and environmentally acceptable manner. Prior to start the construction, contractor will prepare and submit construction waste management plan keeping in view the following objectives:

- To assess the construction activities involved for the proposed works and determine the type, nature and where possible, estimate the volume of waste to be generated;
- To identify any potential environmental impacts from the generation of waste associated with the works;
- To categorize waste materials where practical, i.e. suitability for re-use/recycling, disposal to landfill and any pre-treatment requirements prior to disposal;
- To recommend appropriate waste management options (including waste minimization on-site, re-use or recycling opportunities and off-site disposal options);

In order to fulfill the aforementioned objectives, waste management procedures will be specified to minimize potential impacts to the environment. This may be achieved by considering following procedures:

- Avoiding and/or minimizing waste generation where practical by improvements or changes in the project design or site procedures;
- Reusing/recycling/recovering materials where possible and thereby minimizing disposal requirements (e.g. by waste segregation according to type, separation of recyclable materials such as metal, reuse of wood from site hoarding/concrete formwork, utilization of excavated material for filling or landscaping)
- Ensuring that all treatment and disposal options comply with best practice and all relevant guidelines and legislation

Table 7.3 shows the type of waste likely to be generated and suggested guidelines/control measures that contractor can follow during the development of SWM plan.

Table 7.3: Type of waste likely to be generated and suggested guidelines/control measures

Waste Category	Type of wastes	Stage	Suggested Measures	Disposal Area
General	All types	Design stage	➤ Minimize excavation as far as possible ➤ Re-use of materials for example, within existing landscape ➤ Considering treatments for unsuitable excavated ➤ Materials e.g. upgrading of subsoil to top soils by mixing with compost	-
		Construction stage	➤ Minimize waste generation for disposal through reduction/recycling/re-use) ➤ Segregate waste materials in accordance with type to facilitate re-use and recycling ➤ Training site staff in waste minimization practices ➤ Transport of wastes off site as soon as possible ➤ use of re-useable metal signboards ➤ No on-site burning will be permitted	-
Site Clearance Waste	Trees and shrubs	Construction stage	The project site is barren/uncultivated. Vegetation cover including grass and shrubs is present on a small patch of land. This waste can be disposed off.	Landfill site
Excavated Material	Sandy soil	Construction stage	Offsite and onsite reuse option	-
General	scrap metal, wood	Construction	➤ Segregate materials to	Landfill site

Waste Category	Type of wastes	Stage	Suggested Measures	Disposal Area
Construction Waste	pieces, concrete, pipe cuttings	stage	facilitate recycling/reuse ➤ Recycle and reuse material where possible.	disposal of unsuitable material
Municipal Waste	Food waste, packaging and waste paper	Construction stage	➤ Collect waste at temporary refuse disposal site ➤ Collect from temporary site daily through waste collector	Landfill site
Chemical Waste	empty fuel/lubricant drums, scrap batteries, used oil/air filters, , vehicle parts, waste oils/grease, spent solvents/detergents and possibly spent acid/alkali from batteries maintenance	Construction stage	➤ Minimize waste production and recycle oils/solvents ➤ Store in lock ➤ Develop spill response procedures ➤ Training of workers for chemical use and site cleanliness	

Operation Stage

The proper management of solid waste is a major challenge for industrial estates due to the large quantity and variability of waste characteristics. Therefore, solid waste management has become very crucial to the industrial estate managers. In this regard some appropriate approach is required by industrial estate managers to assess the overall use of resources, and to seek waste reduction, reuse and recycling opportunities both at the individual industrial unit level and among different tenant industrial units. There are numbers of waste management approaches and concepts being practiced worldwide. These vary in their usage between countries or regions. Some of the most general, widely used approaches/concepts include:

- Waste Hierarchy (5Rs);
- Extended Producer Responsibility;
- Polluter Pays Principle;
- Creating By-Product Exchanges (BPX) among Companies; and
- Integrated Waste Management System.

During operational phase, three types of wastes including organic, inorganic and hazardous waste will be produced. As, the specific nature of industrial sectors/individual industries to be constructed in the VIE, is not known at this stage therefore it is not possible to list the type of solid waste to be produced and quantify it.

However, following guiding principles and scope of action plan can be used by the management of PIE to develop a comprehensive SWM plan for VIE. The guiding principles have been derived from above mentioned approaches/concepts.

Guiding Principles

- Safe disposal of all types of solid waste to be generated in VIE;
- Safe disposal of hazardous waste will be the responsibility of individual industrial unit;
- The PIE as an institution is responsible for the development and implementation of solid waste management system within VIE in coordination with TMA, DC and WMC.
- Apply polluters' pay principle to meet the costs of solid waste management;
- Compliance of legislation regarding solid waste by all the stakeholders; and
- Target zero solid waste generation as a long-term goal

Scope of the Action Plan

- Prepare the solid waste generation and disposal profile for VIE;
- Establish trends of waste generation;
- Estimate future generation quantities of solid waste on the basis of current generation rates and trends;
- Develop waste/by-product exchange synergies among tenant industrial units;
- Collection of segregated non-hazardous solid waste by VIE administered/outsourced service;
- Transfer and disposal of collected waste at a Government administered dumping site;
- Formulate and enforce guidelines for proper handling and disposal of hazardous solid waste by the polluters; and
- Develop cost estimates for waste managing options

7.14 Environmental Monitoring Program

It is the process of repeated observation and measurement of one or more environmental quality parameters to enable changes to be observed over a period of time. These changes relate to the physio-chemical and biological parameters of various components of the environment such as air, water, and soil.

The main objective of this programme is the conservation of the quality of the various components of the environment. Monitoring is carried out to obtain quantitative information on current levels of harmful or potentially harmful parameters of water quality, air quality and soil quality. The information, so obtained, enables an assessment to be made of the extent of the polluting damages of these parameters, the rising and falling levels of specific polluting parameters, and the control measures that need to be implemented.

This programme needs to be developed by the PIE with the following functional parameters:

Planning: This is to include economic projections and engineering-economics analysis of what structural and non structural measures need to be put into use when, where and how?

Implementation: This shall comprise design and construction of facilities, setting

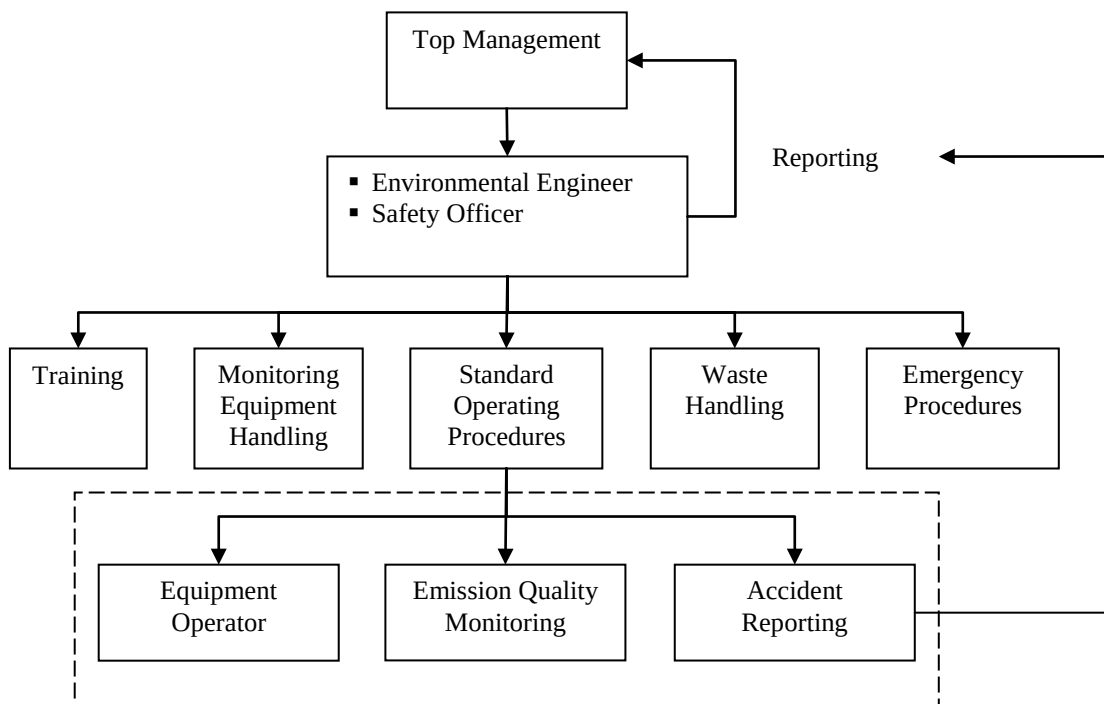
effluent and emissions standards and establishing inspection procedures.

Operation: This is based on the opening/closing of facilities, making inspections, and repairs and maintenance.

It is, therefore, recommended to the PIE to develop a monitoring programme based on the above functional parameters, to include a whole range of activities from selection of sampling station sites of monitoring network, effluent and emissions quality parameters, instrumentation, sampling and analyses, data processing and documentation, research and development, including training of personnel.

Figure 7.2 depicts schematic presentation of the proposed Environmental Monitoring Programme for the VIE. All industries in the VIE will have their own environmental monitoring programs.

Figure 7.2: Organizational Structure of the Environmental Monitoring Department and its Functions



The instrumentation requirement of the environmental monitoring programme falls under the categories of:

- Physical analysis instruments
- Chemical analysis instruments
- Biological analysis instruments
- Data processing instruments

In case of the VIE, the monitoring of the following parameters is recommended on the basis of detailed assessment of the discharges and emissions anticipated:

7.15 Water Quality Monitoring

Water quality monitoring is essential for analyzing the quality of drinking water and discharges from point sources during the construction and the operation stages. The monitoring is carried out for the purpose of obtaining quantitative information about the current levels of harmful or potentially harmful water quality parameters. These parameters include physical, chemical and biological parameters.

Through a proper and effective monitoring network, water and wastewater samples can be collected, tested and analyzed against regulatory standards. The national drinking water quality guidelines will, therefore, be the yardsticks by which the performance of the VIE (including the CETP and the landfill sites) will be evaluated in terms of compliance/non-compliance.

Specific drinking water and effluent quality monitoring requirements identified for the construction stage are specified below:

- Quantities of pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms in groundwater or the VIE water supply should be monitored quarterly on the construction site to ensure compliance with the NEQS drinking water guidelines.

Specific drinking water and effluent quality monitoring requirements identified during the operation stage are given below:

- Quantities of pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, and total coliforms in groundwater at the VIE in general and the sanitary landfill site in particular should be monitored quarterly to ensure compliance with the national drinking water guidelines.
- Quantities of pH, BOD₅, COD, and TSS in the effluent (from the CETP) should be monitored monthly so that they don't exceed the limits prescribed in the NEQS.

7.16 Solid Waste Monitoring

The anticipated solid wastes generation from the construction site offices, administrative buildings, and the CETP site will need to be monitored so as to ensure that no immediate and long-term environmental and health problems are caused.

The parameters to be monitored daily during the construction stage include domestic solid waste (source, type and generation), used oil, discarded mechanical parts, and construction chemicals. During the operation stage, the monitoring of domestic solid waste (source, type and generation) and the sludge produced at the CETP site will be carried out on daily basis.

Unfortunately in Pakistan, there are no national regulations for monitoring of the toxic chemicals and solid wastes to ensure that these are not improperly used and that all precautions are taken to prevent and minimize the likelihood of accidents involving such chemicals and solid wastes.

7.17 Air Quality Monitoring

The first step in air quality monitoring is to prepare an inventory of all the emissions for the purpose of establishing benchmarks. The inventory will include location of the air pollution source, type and magnitude of pollution, projected emissions of pollutants, frequency and duration. The frequency and intensity of air quality monitoring supplements to housekeeping practices.

The monitoring will be carried out at both the construction and the operation stages. The parameters to be monitored during these stages include CO, NO_x, SO_x, and PM₁₀. The monitoring will be carried out in the downwind direction. The monitoring will be carried out for continuous 24/ 8 hours period. The compliance of the monitoring results with the NEQS will be ensured. The laboratory should be set up and adequately equipped for this purpose.

7.18 Noise Level Monitoring

The noise levels will be measured for different noise producing entities during the construction and the operation stages. During the construction stage, noise levels will be measured at construction areas and near residential areas while during operational phase, noise levels will be measured near residential areas. All these noise levels will be compared with the NEQS and OSHA guidelines for compliance.

Table 7.3 presents summary of the environmental monitoring plan comprising environmental quality parameters, applied standards, sampling locations, frequency and duration and monitoring cost.

Table 7.3: Environmental Monitoring Plan

Project Stage	Parameters	Details	Applied Standards	Location	Frequency	No. of Samples per Year	Duration	Monitoring Cost (PKR)
WATER QUALITY								
1) Construction								
a) Drinking water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms	Groundwater or VIE water supply	NEQS	Construction site	Quarterly	04	-	32,000
2) Operation								
a) Drinking water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, iron, faecal coliforms, total coliforms	Groundwater or VIE water supply	NEQS	➤ VIE Supply to be used for drinking purposes ➤ Near landfill site	Quarterly	08	-	64,000
b) Wastewater ¹	Effluent flow, temperature, pH, BOD ₅ , COD, TDS, oil and grease, chromium, copper, zinc, TSS, chloride	Effluent from the CETP and leachate from the landfill site	NEQS	CETP and landfill sites	Monthly	24	-	192,000
AIR QUALITY								
Construction	CO, NO _x , SO _x , PM ₁₀	-	NEQS	At 2 points (near residential areas) in the downwind direction	Bi-annually	04	24/8 hours	280,000
Operation	CO, NO _x , SO _x , PM ₁₀	-	NEQS	At 4 points (near residential	Quarterly	16	24/8	1,120,000

¹ There is dearth of information about priority parameters for effluent monitoring from the CETP. However, the selection of these parameters is tentative contingent upon the data received from each industry about its effluent characteristics.

Project Stage	Parameters	Details	Applied Standards	Location	Frequency	No. of Samples per Year	Duration	Monitoring Cost (PKR)
				areas, the CETP site, landfill site) in the downwind direction			hours	
NOISE LEVELS								
Construction	Noise levels on dBA scale	Near active construction sites and residential areas	NEQS, OSHA	6 points (at the active construction sites and near residential areas)	Bi-monthly	36	8 hours	180,000
Operation	Noise levels on dB (A) scale	Near residential area	NEQS	6 points (04 near residential areas and 02 near generator room)	Quarterly (for residential areas) and daily for generator room	16 (for residential areas)	8 hours (for residential areas)	80,000 (Cost for 06 points near residential areas)
SOLID WASTE								
Construction	➤ Domestic solid waste ➤ General Construction waste ➤ Chemical and Municipal Waste (source, type, generation)	-	-	Construction site	Daily		-	-
Operation	Domestic solid waste and other waste(source, type, generation), CETP sludge	-	-		Daily		-	-
TOTAL COST								1,786,000
SAY								1.8 MILLIONS

Annexure 2.1

**PUNJAB ENVIRONMENTAL PROTECTION
ACT (1997) AS AMENDED IN 2010**

AMENDED UPTO ACT 35 OF 2012, DATED 18.4.2012

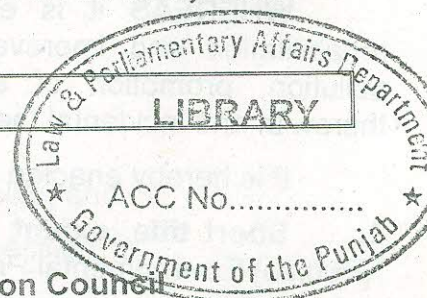
**THE PUNJAB ENVIRONMENTAL PROTECTION ACT, 1997
(XXXIV OF 1997)**

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2. Definitions
3. Establishment of the Punjab Environmental Protection Council
4. Functions and powers of the Council
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34. Repeal, savings and succession

SCHEDULE

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attested
Ruqiyah
RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

attested
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RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

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to provide for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development,

WHEREAS it is expedient to provide for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution, promotion of sustainable development, and for matters connected therewith and incidental thereto;

It is hereby enacted as follows:

1. Short title, extent and commencement.— (1) This Act shall be called the ¹[Punjab] Environmental Protection Act, 1997.

(2) It extends to the whole of ²[the Punjab].

(3) It shall come into force at once.

2. Definitions.— In this Act, unless there is anything repugnant in the subject or context:-

(i) "adverse environmental effect" means impairment of, or damage to, the environment and includes:

(a) impairment of, or damage to, human health and safety or to biodiversity or property;

(b) pollution; and

(c) any adverse environmental effect as may be specified in the regulations;

(ii) "**agriculture waste**" means waste from farm and agricultural activities including poultry, cattle farming, animal husbandry, residues from the use of fertilizers, pesticides and other farm chemicals:

(iii) "**air pollutant**" means any substance that causes pollution of, air and includes soot, smoke, dust particles, odor, light, electro-magnetic radiation, heat, fumes, combustion exhaust, exhaust gases, noxious gases, hazardous substance and radioactive substances;

(iv) "**biodiversity**" or "**biological diversity**" means the variability among living organisms from all sources, including inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; including diversity within species, between species and of eco-systems;

(v) "**Council**" means the ³[Punjab] Environmental Protection Council established under section 3;

(vi) "**discharge**" includes spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping;

(vii) "**ecosystem**" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit;

(viii) "**effluent**" means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapour;

(ix) "**emission standards**" means the permissible standards established by the ⁴[Provincial Agency] for emission of air pollutants and noise and for discharge of effluent and waste;

RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

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attested
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RUQIYA UMBREEN
 Law Officer/Prosecutor
 Environmental Protection Agency
 Punjab, Lahore.

- (x) **"environment"** means:-
- air, water and land;
 - all layers of the atmosphere;
 - all organic and inorganic matter and living organisms;
 - the ecosystem and ecological relationships;
 - buildings, structures, roads, facilities and works;
 - all social and economic conditions affecting community life; and
 - the inter-relationships between any of the factors specified in sub-clauses (a) to (f);
- (xi) **"environmental impact assessment"** means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed;
- (xii) **"Environmental Magistrate"** means the Magistrate of the First Class appointed under section 24;
- (xiii) **"Environmental Tribunal"** means the Environmental Tribunal constituted under section 20;
- (xiv) ⁵[*****]
- (xv) **"Factory"** means any premises in which industrial activity is being under taken.
- ⁶[(xvi) **"Government"** means Government of the Punjab.]
- ⁷[(xvii) **"Government Agency"** includes—
- a department, an attached department or any other office of the Government; and
 - a development authority, local authority, company or a body corporate established or controlled by the Government;]
- (xviii) **"hazardous substance"** means:-
- a substance or mixture of substances, other than a pesticide as defined in the Agricultural Pesticides Ordinance, 1971 (II of 1971), which, by reason of its chemical activity or toxic, explosive, flammable, corrosive, radioactive or other characteristics causes, or is likely to cause, directly or in combination with other matters, an adverse environmental effect; and
 - any substance which may be prescribed as a hazardous substance;
- (xix) **"hazardous waste"** means waste which is or which contains a hazardous substance or which may be prescribed as hazardous substance or which may be prescribed as hazardous waste, and includes hospital waste and nuclear waste;
- (xx) ⁸[*****];

attested

RUQIYA
RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

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- (xxi) "**hospital waste**" includes waste medical supplies and materials of all kinds, and waste blood, tissue, organs and other parts of the human and animal bodies, from hospitals, clinics and laboratories;
- (xxii) "**industrial activity**" means any operation or process for manufacturing, making, formulating, synthesising, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal, or for mining, for oil and gas exploration and development, or for pumping water or sewage, or for generating, transforming or transmitting power or for any other industrial or commercial purpose;
- (xxiii) "**industrial waste**" means waste resulting from an industrial activity;
- (xxiv) "**initial environmental examination**" means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an adverse environmental effect for requiring preparation of an environmental impact assessment;
- (xxv) "**local authority**" means any agency set up or designated by the ⁹[Government] by notification in the official Gazette to be a local authority for the purposes of this Act;
- (xxvi) "**local council**" means a local council constituted or established under a law relating to local government;
- (xxvii) "**motor vehicle**" means any mechanically propelled vehicle adapted for use upon land whether its power of propulsion is transmitted thereto from an external or internal source, and includes a chassis to which a body has not been attached, and a trailer, but does not include a vehicle running upon fixed rails;
- (xxviii) "**municipal waste**" includes sewage, refuse, garbage, waste from abattoirs, sludge and human excreta and the like;
- (xxix) ¹⁰[*****];
- (xxx) "**noise**" means the intensity, duration and character of sounds from all sources, and includes vibration;
- (xxxi) "**nuclear waste**" means waste from any nuclear reactor or nuclear plant or other nuclear energy system, whether or not such waste is radioactive;
- (xxxii) "**person**" means any natural person or legal entity and includes an individual, firm, association, partnership, society, group, company, corporation, co-operative society, Government Agency, non-governmental organization, community-based organization, village organization, local council or local authority and, in the case of a vessel, the master or other person having for the time being the charge or control of the vessel;
- (xxxiii) "**pollution**" means the contamination of air, land or water by the discharge or emission of effluents or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavourably the chemical, physical, biological, radiational, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or

attested
RUQIYA
RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

(xxxv) "**project**" means any activity, plan, scheme, proposal or undertaking involving any change in the environment and includes:-

- (a) construction by use of buildings or other works;
- (b) construction or use of roads or other transport systems;
- (c) construction or operation of factories or other installations;
- (d) mineral prospecting, mining, quarrying, stone-crushing, drilling and the like;
- (e) any change of land use or water use; and
- (f) alteration, expansion, repair, decommissioning or abandonment of existing buildings or other works, roads or other transport systems, factories or other installations;

(xxxvi) "**proponent**" means the person who proposes or intends to undertake a project;

¹²[(xxxvii) "**Provincial Agency**" means the Provincial Environmental Protection Agency established under the Act, or any Government Agency, local council or local authority exercising the powers and functions of the Provincial Agency];

¹³[(xxxvii-a) "**Punjab Environmental Quality Standards**" mean the standards prepared by the Provincial Agency and approved by the Council];

(xxxviii) "**regulations**" means regulations made under the Act;

(xxxix) "**rules**" means rules made under this Act;

(xl) "**sewage**" means liquid or semi-solid wastes and sludge from sanitary conveniences, kitchens, laundries, washing and similar activities and from any sewerage system or sewage disposal works;

(xli) "**standards**" means qualitative and quantitative standards for discharge of effluents and wastes and for emission of air pollutants and noise either for general applicability or for a particular area, or from a particular production process, or for a particular product, and includes the ¹⁴[Punjab] Environmental Quality Standards, emission standards and other standards established under this Act and the rules and regulations made there under;

xlii) "**sustainable development**" means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs;

xliii) ¹⁵[*****];

(xliv) "**vessel**" includes anything made for the conveyance by water of human beings or of goods; and

(xix) "**waste**" means any substance or object which has been, is being or is intended to be, discarded or disposed of, and includes liquid waste, solid waste, waste gases, suspended waste, industrial waste, agricultural waste, nuclear waste, municipal waste, hospital waste, used polyethylene bags and residues from the incineration of all types of waste.

¹¹ Clause (xxxiv) substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

¹² Clause (xxxvii) substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV

attested
RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

3. **Establishment of the ¹⁶[Punjab] Environmental Protection Council.—**¹⁷[(1) The Government shall, by notification in the official Gazette, establish a Council to be known as the Punjab Environmental Protection Council consisting of—

- i) Chief Minister of the Punjab; or such other **Chairperson**
person as nominated by the Chief Minister;
- ii) Minister Incharge of the Environment **Vice Chairperson**
Protection Department;
- iii) such other persons not exceeding thirty five **Members**
as the Government may appoint, of which at least twenty five shall be non-official including at least three Members of the Provincial Assembly of the Punjab, five representatives of the Chambers of Commerce and Industry and one or more representatives of the Chambers of Agriculture, Medical and legal profession, trade unions and non-governmental organizations concerned with the environment and sustainable development, and scientists, technical experts and educationalists; and
- iv) Secretary to the Government, Environment **Member/Secretary]**
Protection Department.

attested
Ruqiyah
RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

(2) The Members of the Council, other than ex officio members, shall be appointed in accordance with the prescribed procedure and shall hold office for a term of three years.

(3) The Council shall frame its own rules of procedure.

(4) The Council shall hold meetings as and when necessary, but not less than two meetings shall be held in a year.

(5) The Council may constitute committees of its members and entrust them with such functions as it may deem fit, and the recommendations of the committees shall be submitted to the Council for approval.

(6) The Council or any of its committees may invite any technical expert or representative of any Government Agency or non-governmental organization or other person possessing specialized knowledge of any subject for assistance in performance of its functions.

4. **Functions and powers of the Council.—**(1) The Council shall---

- (a) co-ordinate and supervise enforcement of the provisions of this Act;
- (b) approve comprehensive ¹⁸[Punjab] environmental policies and ensure their implementation within the framework of a ¹⁹[Punjab] conservation strategy as may be approved by the ²⁰[Government] from time to time;
- (c) approve the ²¹[Punjab] Environmental Quality Standards;

¹⁶ Word "Pakistan" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

¹⁷ Sub-section (1) substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

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- (d) provide guidelines for the protection and conservation of species, habitats, and biodiversity in general, and for the conservation of renewable and non-renewable resources;
- (e) coordinate integration of the principles and concerns of sustainable development into ²²[Punjab] development plans and policies; and
- (f) consider the ²³[Punjab] Environment Report and give appropriate directions thereon.

(2) The Council may, either itself or on the request of any person or organisation, direct the ²⁴[Provincial Agency] or any Government Agency to prepare, submit, promote or implement projects for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, and the sustainable development of resources, or to undertake research in any aspect of environment.

5. Establishment of the ²⁵[Provincial] Environmental Protection Agency.—

²⁶[(1) The Government shall, by notification in the official Gazette, establish the Provincial Environmental Protection Agency to exercise the powers and perform the functions assigned to it under this Act, the rules and the regulations].

(2) The ²⁷[Provincial Agency] shall be headed by a Director General, who shall be appointed by the ²⁸[Government] on such terms and conditions as it may determine.

(3) The ²⁹[Provincial Agency] shall have such administrative, technical and legal staff as the ³⁰[Government] may specify, to be appointed in accordance with such procedure as may be prescribed.

(4) The powers and functions of the ³¹[Provincial Agency] shall be exercised and performed by the Director-General.

(5) The Director-General may, by general or special order, delegate any of these powers and functions to staff appointed under sub-section (3).

(6) For assisting the ³²[Provincial Agency] in the discharge of its functions, the ³³[Government] shall establish Advisory Committees for various sectors, and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

6. Functions of the ³⁴[Provincial Agency].— (1) The ³⁵[Provincial Agency] shall—

²² Word "National" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

²³ Word "National" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

²⁴ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

²⁵ Words "Pakistan" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

²⁶ Sub-section (1) substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

²⁷ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

²⁸ Words "Federal Government" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

²⁹ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

³⁰ Words "Federal Government" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

³¹ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

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- (a) administer and implement the provisions of this Act and the rules and regulations made thereunder;
- (b) prepare, in coordination with the appropriate Government Agency and in consultation with the concerned sectoral Advisory Committees,³⁶[****] environmental policies for approval by the Council;
- (c) take all necessary measures for the implementation of the³⁷[****] environmental policies approved by the Council;
- (d) prepare and publish an annual³⁸[Punjab] Environmental Report on the state of the environment;
- (e) prepare or revise, and establish the³⁹[Punjab] Environmental Quality Standards with approval of the Council:

Provided that before seeking approval of the Council, the⁴⁰[Provincial Agency] shall publish the proposed⁴¹[Punjab] Environmental Quality Standards for public opinion in accordance with the prescribed procedure; and

- (f) ensure enforcement of the⁴²[Punjab] Environmental Quality Standards;
- ⁴³[(g)] establish standards for the quality of the ambient air, water and land, by Notification in the Official Gazette;
- (h) co-ordinate environmental policies and programmes nationally and internationally;
- (i) establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors;
- (j) take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development;
- (k) certify one or more laboratories as approved laboratories for conducting tests and analysis and one or more research institutes as environmental research institutes for conducting research and investigation, for the purposes of this Act;
- (l) identify the needs for, and initiate legislation in various sectors of the environment;
- (m) render advice and assistance in environmental matters, including such information and data available with its as may be required for carrying out the purposes of this Act:

Provided that the disclosure of such information shall be subject to the restrictions contained in the proviso to sub-section (3) of section 12;

³⁶ Word "National" omitted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

³⁷ Word "National" omitted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

³⁸ Word "National" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

³⁹ Word "National" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁴⁰ Word "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act.

- (n) assist the local councils, local authorities, Government Agencies and other persons to implement schemes for the proper disposal of wastes so as to ensure compliance with the standards established by it;
- (o) provide information and guidance to the public environmental matters;
- (p) recommend environmental courses, topics, literature and books for incorporation in the curricula and syllabi of educational institutions;
- (q) promote public education and awareness of environmental issues through mass media and other means, including seminars and workshops;
- (r) specify safeguards for the prevention of accidents and disasters which may cause pollution, collaborate with the concerned person in the preparation of contingency plans for control of such accidents and disasters, and co-ordinate implementation of such plans;
- (s) encourage the formation and working of non-governmental organizations, community organizations and village organizations to prevent and control pollution and promote sustainable development;
- (t) take or cause to be taken all necessary measure for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development; and
- (u) perform any function which the Council may assign to it.

(2) The ⁴⁴[Provincial Agency] may---

- (a) undertake inquires or investigation into environmental issues, either of its own accord or upon complaint from any person or organisation;
- (b) request any person to furnish any information or data relevant to its functions;
- (c) initiate with the approval of the ⁴⁵[Government], requests for foreign assistance in support of the purposes of this Act and enter into arrangements with foreign agencies or organizations for the exchange of material or information and participate in international seminars or meetings;
- (d) recommend to the ⁴⁶[Government] the adoption of financial and fiscal programmes, schemes or measures for achieving environmental objectives and goals and the purposes of this Act including:-
 - (i) incentives, prizes awards, subsidies, tax exemptions, rebates and depreciation allowances;
 - (ii) taxes, duties, cesses and other levies;
- (e) establish and maintain laboratories to help in the performance of its functions under this Act and to conduct research in various aspects of the environment and provide or arrange necessary assistance for establishment of similar laboratories in the private sector; and
- (f) provide or arrange, in accordance with such procedure as may be prescribed, financial assistance for projects designed to facilitate the discharge of its functions.

7. Powers of the ⁴⁷[Provincial Agency].— Subject to the provisions of this Act, the ⁴⁸[Provincial Agency] may---

⁴⁴ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

attested
Amir

RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

- (a) lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property both movable and immovable;
- (b) sell, convey, mortgage, pledge, exchange or otherwise dispose of its property and assets;
- (c) fix and realize fees, rates and charges for rendering any service or providing any facility, information or data under this Act or the rules and regulations made thereunder;
- (d) enter into the contracts, execute instruments, incur liabilities and do all acts or things necessary for proper management and conduct of its business;
- (e) appoint with the approval of the ⁴⁹[Government] and in accordance with such procedures as may be prescribed, such advisers, experts and consultants as it considers necessary for the efficient performance of its functions on such terms and conditions as it may deem fit;
- (f) summon and enforce the attendance of any person and require him to supply any information or document needed for the conduct of any enquiry or investigation into any environmental issue;
- (g) enter and inspect and under the authority of a search warrant issued by the Environmental Tribunal or Environmental Magistrate, search at any reasonable time, any land, building, premises, vehicle or vessel or other place where or in which, there are reasonable grounds to believe that an offence under this Act has been or is being committed;
- (h) take samples of any materials, products, articles or substances or of the effluents, wastes or air pollutants being discharged or emitted or of air, water or land in the vicinity of the discharge or emission;
- (i) arrange for test and analysis of the samples at a certified laboratory;
- (j) confiscate any article used in the commission of the offence where the offender is not known or cannot be found within a reasonable time;

Provided that the power under clauses (f), (h), (i), and (j) shall be exercised in accordance with the provisions of the Code of Criminal Procedure, 1898 (Act V of 1898), or the rules made under this Act and under the direction of the Environmental Tribunal or Environmental Magistrate; and

- ⁵⁰[(k) establish the Punjab Environmental Coordination Committee comprising the Director General as its convener and such other members as the Government may appoint to exercise such powers and perform such functions as may be delegated or assigned to it by the Government for carrying out the purposes of this Act.]

8. ⁵¹[*****].

9. **Establishment of the Provincial Sustainable Development Funds.**— ⁵²[(1) There shall be established a Provincial Sustainable Development Fund].

(2) The Provincial Sustainable Development Fund shall be derived from the following sources, namely:-

- (a) grants made or loans advanced by the ⁵³[Government or the Federal Government];

⁴⁸ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁴⁹ Words "Federal Government" substituted by the Punjab Environmental Protection (Amendment) Act,

- (b) aid and assistance, grants, advances, donations and other non-obligatory funds received from foreign governments, ⁵⁴[punjab] or international agencies, and non-governmental organizations; and
- (c) contributions from private organizations, and other persons.
- (3) The Provincial Sustainable Development Fund shall be utilized in accordance with such procedure as may be prescribed for..
 - (a) providing financial assistance to the projects designed for the protection, conservation, rehabilitation and improvement of the environment, the prevention and control of pollution, the sustainable development of resources and for research in any specified aspect of environment; and
 - (b) any other purpose which in the opinion of the Board shall help achieve environmental objectives and the purposes of this Act.

10. Management of the Provincial Sustainable Development Fund.—⁵⁵[(1) The Provincial Sustainable Development Fund shall be managed by a Board known as the Provincial Sustainable Development Fund Board consisting of-

- (i) Chairman, Planning and Development Board; Chairperson
- (ii) Such officers of the Government, not exceeding six, as the Government may appoint including Secretaries incharge of the Finance, Industries and Environment Departments; Members
- (iii) such non-official persons not exceeding ten as the Government may appoint including representatives of the Chamber of Commerce and Industry, non-governmental organizations and major donors; and Members
- (iv) Director General of the Provincial Agency. Member/Secretary]

(2) In accordance with such procedure and such criteria as may be prescribed, the Board shall have the power to---

- (a) sanction financial assistance for eligible projects;
- (b) invest moneys held in the Provincial Sustainable Development Fund in such profit-bearing government bonds, savings schemes and securities as it may deem suitable; and
- (c) take such measures and exercise such powers as may be necessary for utilization of the Provincial Sustainable Development fund for the purposes specified in sub-section (3) of section 9.

(3) The Board shall constitute committees of its members to undertake regular monitoring of projects financed from the Provincial Sustainable Development Fund and to submit progress reports to the Board which shall publish an Annual Report incorporating its annual audited accounts, and performance evaluation based on the progress reports.

11. Prohibition of certain discharges or emissions.— (1) Subject to the provisions of this Act and the rules and regulations made there under no person shall discharge or emit or allow the discharge or emission of any effluent or waste or air pollutant or noise in an amount, concentration or level which is in excess of the

⁵⁶[Punjab] Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6.

(2) The ⁵⁷[Government] may levy a pollution charge on any person who contravenes or fails to comply with the provisions of sub-section (1), to be calculated at such rate, and collected in accordance with such procedure as may be prescribed.

(3) Any person who pays the pollution charge levied under sub-section (2) shall not be charged with an offence with respect to that contravention or failure.

(4) The provision of sub-section (3) shall not apply to projects, which commenced industrial activity on or after the thirtieth day of June, 1994.

12. Initial environmental examination and environmental impact assessment.— (1) No proponent of a project shall commence construction or operation unless he has filed with the ⁵⁸[Provincial Agency] an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the ⁵⁹[Provincial Agency] approval in respect thereof.

(2) The ⁶⁰[Provincial Agency] shall.—

(a) review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or

(b) review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the environmental impact assessment be re-submitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.

(3) Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to---

(i) trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director - General of the ⁶¹[Provincial Agency] is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or

(ii) International relations, ⁶²[punjab] security or maintenance of law and order, except with the consent of the ⁶³[Government]; or

(iii) matters covered by legal professional privilege.

(4) The ⁶⁴[Provincial Agency] shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or

⁵⁶ Word "National" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁵⁷ Words "Federal Government" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁵⁸ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁵⁹ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁶⁰ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁶¹ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁶² ...

environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations made thereunder.

(5) Subject to sub-section (4) the ⁶⁵[Government] may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

(6) The provisions of sub-section (1), (2), (3), (4), and (5) shall apply to such categories of projects and in such manner as may be prescribed.

(7) The ⁶⁶[Provincial Agency] shall maintain separate Registers for initial environmental examination and environmental impact assessment project, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such Registers shall be subject to the restrictions specified in sub-section (3).

⁶⁷**[13. Prohibition of import of hazardous waste.—** No person shall import hazardous waste into the Punjab.]

14. Handling of hazardous substances.— Subject to the provisions of this Act, no person shall generate, collect, consign, transport, treat, dispose of, store, handle or import any hazardous substance except:-

- (a) under a licence issued by the ⁶⁸[Provincial Agency] and in such manner as may be prescribed; or
- (b) in accordance with the provisions of any other law for the time being in force, or of any international treaty, convention, protocol, code, standard, agreement or other instrument to which Pakistan is a party.

15. Regulation of motor vehicles.— (1) subject to the provisions of this Act and the rules and regulations made thereunder, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the ⁶⁹[Punjab] Environmental quality standards, or where applicable the standards established under clause (g) of sub-section (1) of section 6.

(2) For ensuring compliance with the standards mentioned in sub-section (1), the ⁷⁰[Provincial Agency] may direct that any motor vehicle or class of vehicles shall install such pollution control devices or other equipment or use such fuels or undergo such maintenance or testing as may be prescribed.

(3) where a direction has been issued by the ⁷¹[Provincial Agency] under sub-section (2) in respect of any motor vehicles or class of motor vehicles, no person shall operate any such vehicle till such direction has been complied with.

16. Environmental protection order.— ⁷²(1) Where the Provincial Agency is satisfied that the discharge or emission of any effluent, waste, air pollutant or noise, or the disposal of waste, or handling of hazardous substance, or any other act or omission is likely to occur, or is occurring, or has occurred, in violation of any provision of this Act, rules

⁶⁵ Words "Federal Government" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁶⁶ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁶⁷ Section 13 substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁶⁸ Words "Federal Agency" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

⁶⁹ Word "National" substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

or regulations or of the conditions of a license, or is likely to cause, or is causing, or has caused an adverse environmental effect, the Provincial Agency may, after giving the person responsible for such discharge, emission, disposal, handling, act or omission an opportunity of being heard, by order, direct such person to take such measures as the Provincial Agency may consider necessary within such period as may be specified in the order.]

(2) In particular and without prejudice to the generality of the foregoing power, such measures may include---

- (a) immediate stoppage, preventing, lessening or controlling the discharge, emission, disposal, handling, act or omission, or to minimize or remedy the adverse environmental effect;
- (b) installation, replacement or alteration of any equipment or thing to eliminate or control or abate on a permanent or temporary basis, such discharge, emission, disposal, handling, act or omission;
- (c) action to remove or otherwise dispose of the effluent, waste, air pollutant, noise, or hazardous substances; and
- (d) action to restore the environment to the condition existing prior to such discharge, disposal, handling, act or omission, or as close to such conditions may be reasonable in the circumstances, to the satisfaction of the ⁷³[Provincial Agency].

(3) Where the person, to whom directions under sub-section (1) are given, does not comply therewith, the ⁷⁴[Provincial Agency] may, in addition to the proceeding initiated against him under this Act or the rules and regulations, itself take or cause to be taken such measures specified in the order as it may deem necessary, and may recover the costs of taking such measures from such person as arrears of land revenue.

17. Penalties.— (1) Whoever contravenes or fails to comply with the provisions of sections 11, 12, 13, or section 16 or any order issued thereunder shall be punishable with fine which may extend to ⁷⁵[five million] rupees, and in the case of a continuing contravention or failure, with an additional fine which may extend to one hundred thousand rupees for every day during which such contravention or failure continues and where such contravention or failure continues:

Provided that if contravention of the provision of section 11 also constitutes contravention of the provisions of section 15, such contravention shall be punishable under sub-section (2) only.

(2) Whoever contravenes or fails to comply with the provisions of section 14 or 15 or any rule or regulation or conditions of any licence, any order or direction issued by the Council or by the ⁷⁶[Provincial Agency] shall be punishable with fine which may extend to ⁷⁷[five hundred thousand] rupees, and in case of continuing contravention, or failure with an additional fine which extend to one thousand rupees for every day during which such contravention continues.

(3) Where an accused has been convicted of an offence under sub-section (1) and (2), the Environmental Tribunal and Environmental magistrate shall, in passing sentence, take into account the extent and duration of the contravention or failure constituting the offence, and the attendant circumstances.

(4) Where an accused has been convicted of an offence under sub-section (1) and the Environmental Tribunal is satisfied that as a result of the commission of the offence monetary benefits have accrued to the offender, the Environmental Tribunal may order the offender to pay, in addition to the fines under sub-section (1), further additional fine commensurate with the amount of the monetary benefits.

⁷³ Words substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012)

(5) Where a person convicted under sub-sections (1) or sub-section (2); and had been previously convicted for any contravention under this act, the Environmental Tribunal or, as the case may be, Environmental Magistrate may, in addition to the punishment awarded thereunder:-

- (a) endorse a copy of the order of conviction to the concerned trade or industrial association, if any, or the concerned Provincial Chamber of commerce and Industry or the Federation of Pakistan Chambers of Commerce and Industry;
- (b) sentence him to imprisonment for a term which may extend up to two years;
- (c) order the closure of the factory;
- (d) order confiscation of the factory, machinery, and equipment, vehicle, material or substance, record or document or other object used or involved in contravention of the provisions of the Act.

Provided that for a period of three years from the date of commencement of this Act, the sentence of imprisonment shall be passed only in respect of persons who have been previous convicted for more than once for any contravention of section 11, 13, 14 or 16 hazardous waste;

- (e) order such person to restore the environment at his own cost, to the conditions existing prior to such contravention or as close to such conditions as may be reasonable in the circumstances to the satisfaction of the ⁷⁸[Provincial Agency]; and
- (f) order that such sum be paid to any person as compensation for any loss, bodily injury, damage to his health or property suffered by such contravention.

(6) The Director-General of the ⁷⁹[Provincial Agency] or an officer generally or specially authorized by him in this behalf may, on the application of the accused compound as offence under this Act with the permission of Environmental Tribunal or Environmental Magistrate in accordance with such procedure as may be prescribed.

(7) Where the Director-General of the ⁸⁰[Provincial Agency] is of the opinion that a person has contravened any provision of this Act, he may, subject to the rules, by notice in writing to that person require him to pay to the ⁸¹[Provincial Agency] an administrative penalty in the amount set out in the notice for each day the contravention continues; and a person who pays an administrative penalty for a contravention shall not be charged under this Act with an offence in respect of such contravention.

(8) The provisions of sub-sections (6) and (7) shall not apply to a person who has been previously convicted of offence or who has compounded an offence under this Act or who has paid an administrative penalty for a contravention of any provision of this Act.

18. Offences by bodies corporate.— Where any contravention of this Act has been committed by a body corporate, and it is proved that such offence has been committed with the consent or connivance or, or is attributed to any negligence on the part of, any director, partner, manager, secretary or other officer of the Body corporate, such director, partner, manager, secretary or other officer of the body corporate, shall be deemed guilty of such contravention along with the body corporate and shall be punished accordingly;

Provided that in the case of a company as defined under the Companies Ordinance, 1984 (XLVII of 1984), only the Chief Executive as defined in the said Ordinance shall be liable under this section.

Explanation.- For the purposes of this section, "body corporate" includes a firm, association of persons and a society registered under the Societies Registration Act, 1860 (XXI of 1860), or under the Co-operative Societies Act, 1925 (VII of 1925).

19. Offences by Government Agencies, local authorities or local councils.— Where any contravention of this Act has been committed by any Government Agency, local authority or local council, and it is proved that such contravention has been committed with the consent or connivance of, or is attributable to any negligence on the part of, the Head or any other officer of the Government Agency, local authority or local council, such Head or other officer shall also be deemed guilty of such contravention along with the Government Agency, local authority or local council and shall be liable to be proceeded against and punished accordingly.

20. Environmental Tribunals.— (1) The ⁸²[Government] may, by notification in the official Gazette, establish as many Environmental Tribunals as it considers necessary and, where it establishes more than one Environmental Tribunal, it shall specify territorial limits within which, or the class of cases in respect of which, each one of them shall exercise jurisdiction under this Act.

(2) An Environmental Tribunal shall consist of a Chairperson who is, or has been, or is qualified for appointment as, a Judge of the High Court to be appointed after consultation with the Chief Justice of the High Court and two members to be appointed by the ⁸³[Government] of which at least one shall be a technical member with suitable professional qualifications and experience in the environmental field as may be prescribed.

(3) For every sitting of the Environmental Tribunal, the presence of the Chairperson and not less than one Member shall be necessary.

⁸⁴[(4) A decision of an Environmental Tribunal shall be expressed in terms of the opinion of the majority, or if the case has been decided by the Chairperson and only one of the members and there is a difference of opinion between them, the decision of the Environmental Tribunal shall be expressed in terms of the opinion of the Chairperson.]

(5) An Environmental Tribunal shall not, merely by reason of a change in its composition, or the absence of any member from any sitting, be bound to recall and rehear any witness who was given evidence, and may act on the evidence already recorded by, or produced, before it.

(6) An Environmental Tribunal may hold its sittings at such places within its territorial jurisdiction as the Chairperson may decide.

(7) No act or proceeding of an Environmental Tribunal shall be invalid by reason only of the existence of vacancy in, or defect in the constitution of the Environmental Tribunal.

(8) The terms and conditions of service of the Chairperson and members of the Environmental Tribunal shall be such as may be prescribed.

21. Jurisdiction and powers of Environmental Tribunals.— (1) An Environmental Tribunal shall exercise such powers and perform such functions as are, or may be, conferred upon or assigned to it by or under this Act, or the rules and regulations made thereunder.

(2) All contravention punishable under sub-section (1) of section 17 shall exclusively be triable by an Environmental Tribunal.

(3) An Environmental Tribunal shall not take cognizance of any offence triable under sub-section (2) except on a complaint in writing by---

- (a) the ⁸⁵[Provincial Agency] or any Government Agency or local council; and
- (b) any aggrieved person, who has given notice of not less than thirty days to the ⁸⁶[Provincial Agency] concerned of the alleged contravention and of his intention to make a complaint to the Environmental Tribunal.

(4) In exercise of its criminal jurisdiction, the Environmental Tribunal shall have the same powers as are vested in Court of Session under the Code of Criminal Procedure, 1898 (Act V of 1898).

(5) In exercise of the appellate jurisdiction under section 22 of Environmental Tribunal shall have the same powers and shall follow the same procedure as an appellate court in the Code of civil Procedure, 1908 (Act V of 1908).

(6) In all matters with respect to which no procedure has been provided for in this Act, the Environmental Tribunal shall follow the procedure laid down in the Code of civil Procedure, 1908 (Act V of 1908)

(7) An Environmental Tribunal may, on application filed by any officer duly authorized on this behalf by the Director General of the ⁸⁷[Provincial Agency], issue bail able warrant for the arrest of any person against who reasonable suspicion exist, of his having been involved in contravention punishable under sub-section (1) of section 17:

Provided that such warrant shall be applied for, issued, and executed in accordance with the provisions of the code of Criminal Procedure, 1898 (Act V of 1898);

Provided further that if the person arrested executes a bond with sufficient sureties in accordance with the endorsement on the warrant, he shall be released from custody, failing which he shall be taken or sent without delay to the officer-in-charge of the nearest police station.

(8) All proceedings before the Environmental Tribunal shall be deemed to be judicial proceedings within the meaning of sections 193 and 228 of the Pakistan Penal Code (Act XLV of 1860), and the Environmental Tribunal shall be deemed to be a court for the purposes of sections 480 and 482 of the code of Criminal Procedure, 1898 (Act V of 1898).

(9) No court other than an Environmental Tribunal shall have or exercise any jurisdiction with respect to any matter to which the jurisdiction of an Environmental Tribunal extends under this Act or the rules and regulations made thereunder.

(10) Where the Environmental Tribunal is satisfied that a complaint made to it under sub-section (3) is false and vexatious to the knowledge of the complainant, it may, by an order, direct the complainant to pay to the person complained against such compensatory costs which may extend to one hundred thousand rupees.

22. Appeals to the Environmental Tribunal.— (1) any person aggrieved by any order or direction of the ⁸⁸[Provincial Agency] under any provision of this Act and rules or regulations made thereunder may refer an appeal with the Environmental Tribunal within thirty days of the date of communication of the impugned order or direction to such person.

(2) An appeal to the Environmental Tribunal shall be in such form, contain such particulars and be accompanied by such fees as may be prescribed.

23. Appeals from orders of the Environmental Tribunal.— (1) Any person aggrieved by any final order or by any sentence of the Environmental Tribunal passed under this Act may, within thirty days of communication of such order or sentence, prefer an appeal to the High Court.

(2) An appeal under sub-section (1) shall be heard by a Bench of not less than two Judges.

24. Jurisdiction of Environmental Magistrates.— (1) Notwithstanding anything contained in the Code of Criminal Procedure, 1898 (Act V of 1898), or any other law for the time being in force, but subject to the provisions of this Act, all contraventions punishable under sub-section (2) of section 17 shall exclusively be triable by a judicial Magistrate of the first class as Environmental Magistrate especially empowered in this behalf by the High Court.

(2) An Environmental Magistrate shall be competent to impose any punishment specified in sub-sections (2) and (4) of section 17.

(3) An Environmental Magistrate shall not take cognizance of an offence triable under sub-section (1) except on a complaint in writing by--

(a) the ⁸⁹[Provincial Agency], or Government Agency or local council; and

(b) any aggrieved person.

25. Appeals from orders of Environmental Magistrates.— Any person convicted of any contravention of this Act or the rules or regulations by an Environmental Magistrate may, within thirty days from the date of his conviction, appeal to the Court of Sessions, whose decision thereon shall be final.

⁹⁰[**26. Power to delegate.**— The Government may, by notification in the official Gazette, delegate any of its or of the Provincial Agency's powers or functions under this Act, the rules or the regulations to any Government Agency, local council or local authority.]

⁹¹[**27. Power to give directions.**— In the performance of its functions, the Provincial Agency shall be bound by the directions given to it in writing by the Government.]

⁹²[**28. Indemnity.**— No suit, prosecution or other legal proceedings shall lie against the Government, the Council, the Provincial Agency, the Director General of the Provincial Agency, members, officers, employees, experts, advisors, or consultants of the Provincial Agency or the Environmental Tribunal, an Environmental Magistrate or any other person for anything which is in good faith done or intended to be done under this Act or the rules or the regulations.]

29. Dues recoverable as arrears of land revenue.— Any dues recoverable by the ⁹³[Provincial Agency] under this Act, or the rules or regulations made thereunder shall be recoverable as arrears of land revenue.

30. Ordinance to override other laws.— The provisions of this Act shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force.

31. Power to make rules. - The ⁹⁴[Government] may, by notification in the official Gazette, make rules for carrying out the purposes of this Act including rules may for implementing the provisions of the international environmental agreements, specified in the Schedule to this Act.

32. Power to amend the Schedule.— The ⁹⁵[Government] may, by notification in the official Gazette, amend the Schedule so as to add any entry thereto or modify or omit any entry therein.

⁸⁹ Words substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012).

⁹⁰ Section 26 substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012).

⁹¹ Section 27 substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012).

⁹² Section 28 substituted by the Punjab Environmental Protection (Amendment) Act, 2012 (XXXV of 2012).

attested

33. Power to make regulations.— (1) For carrying out the purposes of this Act, the ⁹⁶[Provincial Agency] may, by notification in the official Gazette and with the approval of the ⁹⁷[Government], make regulations not inconsistent with the provisions of this Act or the rules made thereunder.

(2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for:-

- (a) submission of periodical reports, data or information by any Government Agency, local authority or local council in respect of environmental matters;
- (b) preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and calamities;
- (c) appointment of officers, advisors, experts, consultants and employees;
- (d) levy of fees, rates and charges in respect of services rendered, actions taken and schemes implemented;
- (e) monitoring and measurement of discharges and emissions;
- (f) categorization of projects to which, and the manner in which, section 12 applies;
- (g) laying down of guidelines for preparation of initial environmental examination and environmental impact assessment and development of procedures for their filling, review and approval;
- (h) providing procedures for handling hazardous substances; and
- (i) installation of devices in, use of fuels by, and maintenance and testing of motor vehicles for control of air and noise pollution.

34. Repeal, savings and succession.— (1) The Pakistan Environmental Protection Ordinance, 1983 (XXXVII of 1983) is hereby repealed.

(2) Notwithstanding the repeal of the Pakistan Environmental Protection Ordinance, 1983 (XXVII of 1983), any rules or regulations or appointments made, orders passed, notifications issued, powers delegated, contracts entry into, proceedings commenced, rights acquired liabilities incurred, penalties, rates, fees or charges levied, things done or action taken under any provisions of that Act shall, so far as they are not inconsistent with the provisions of this Act, be deemed to have been made, passed, issued, delegated, entered into, commenced, acquired, incurred, levied, done or taken under this Act.

⁹⁸[*****]

SCHEDULE

(See section 31)

1. International Plant Protection Convention, Rome, 1951.
2. Plant Protection Agreement for the South-East Asia and Pacific Region (as amended), Rome, 1956.
3. Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in South-West Asia (as amended), Rome, 1963.

4. Convention on Wetlands of International importance Especially as Waterfowl Habitat, Ramsar, 1971 and its amending Protocol, Paris, 1982.
 5. Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention), Paris, 1972.
 6. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973.
 7. Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.
 8. Convention on the Law of the Sea, Monte go Bay, 1982.
 9. Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985.
 10. Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987 and amendments thereto.
 11. Agreement on the Network of Aquaculture Centres in Asia and the Pacific, Bangkok, 1988.
 12. Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal, Basel, 1989.
 13. Convention on Biological Diversity, Rio De Janeiro, 1992.
- United Nations Framework Convention on Climate change, Rio De Janeiro, 1992.

attested

RUQIYA UMBREEN
Law Officer/Prosecutor
Environmental Protection Agency
Punjab, Lahore.

Annexure 2.2

**PEPA (REVIEW OF IEE & EIA) REGULATIONS
(2000)**

**PAKISTAN ENVIRONMENTAL PROTECTION AGENCY (REVIEW OF IEE
AND EIA) REGULATIONS, 2000**

S.R.O. 339 (1)/2001. - In exercise of the powers referred by section 33 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), Pakistan Environmental Protection Agency, with the approval of the Federal Government is pleased to make the following Rules, namely : -

1. Short title and commencement

(1) These regulations may be called the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.

(2) They shall come into force at once.

2. Definitions

(1) In these regulations, unless there is anything repugnant in the subject or context –

(a) “Act” means the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997);

(b) “Director-General” means the Director-General of the Federal Agency;

(c) “EIA” means an environmental impact assessment as defined in section 2(xi);

(d) “IEE” means an initial environmental examination as defined in section 2(xxiv); and

(e) “section” means a section of the Act.

(2) All other words and expressions used in these regulations but not defined shall have the same meanings as are assigned to them in the Act.

3. Projects requiring an IEE

A proponent of a project falling in any category listed in Schedule I shall file an IEE with the Federal Agency, and the provisions of section 12 shall apply to such project.

4. Projects requiring an EIA

A proponent of a project falling in any category listed in Schedule II shall file an EIA with the Federal Agency, and the provisions of section 12 shall apply to such project.

5. Projects not requiring an IEE or EIA

- (1) A proponent of a project not falling in any category listed in Schedules I and II shall not be required to file an IEE or EIA:

Provided that the proponent shall file –

- (a) an EIA, if the project is likely to cause an adverse environmental effect;
 - (b) for projects not listed in Schedules I and II in respect of which the Federal Agency has issued guidelines for construction and operation, an application for approval accompanied by an undertaking and an affidavit that the aforesaid guidelines shall be fully complied with.
- (2) Notwithstanding anything contained in sub-regulation (1), the Federal Agency may direct the proponent of a project, whether or not listed in Schedule I or II, to file an IEE or EIA, for reasons to be recorded in such direction:

Provided that no such direction shall be issued without the recommendation in writing of the Environmental Assessment Advisory Committee constituted under Regulation 23.

- (3) The provisions of section 12 shall apply to a project in respect of which an IEE or EIA is filed under sub-regulation (1) or (2).

6. Preparation of IEE and EIA

- (1) The Federal Agency may issue guidelines for preparation of an IEE or an EIA, including guidelines of general applicability, and sectoral guidelines indicating specific assessment requirements for planning, construction and operation of projects relating to particular sector.
- (2) Where guidelines have been issued under sub-regulation (1), an IEE or EIA shall be prepared, to the extent practicable, in accordance therewith and the proponent shall justify in the IEE or EIA any departure therefrom.

7. Review Fees

The proponent shall pay, at the time of submission of an IEE or EIA, a non-refundable Review Fee to the Federal Agency, as per rates shown in Schedule III.

8. Filing of IEE and EIA

- (1) Ten paper copies and two electronic copies of an IEE or EIA shall be filed with the Federal Agency.

- (2) Every IEE and EIA shall be accompanied by –
 - (a) an application, in the form prescribed in Schedule IV; and
 - (b) copy of receipt showing payment of the Review Fee.

9. Preliminary scrutiny

- (1) Within 10 working days of filing of the IEE or EIA, the Federal Agency shall –
 - (a) confirm that the IEE or EIA is complete for purposes of initiation of the review process; or
 - (b) require the proponent to submit such additional information as may be specified; or
 - (c) return the IEE or EIA to the proponent for revision, clearly listing the points requiring further study and discussion.
- (2) Nothing in sub-regulation (1) shall prohibit the Federal Agency from requiring the proponent to submit additional information at any stage during the review process.

10. Public participation

- (1) In the case of an EIA, the Federal Agency shall, simultaneously with issue of confirmation of completeness under clause (a) of sub-regulation (1) of Regulation 9, cause to be published in any English or Urdu national newspaper and in a local newspaper of general circulation in the area affected by the project, a public notice mentioning the type of project, its exact location, the name and address of the proponent and the places at which the EIA of the project can, subject to the restrictions in sub-section (3) of section 12, be accessed.
- (2) The notice issued under sub-regulation (1) shall fix a date, time and place for public hearing of any comments on the project or its EIA.
- (3) The date fixed under sub-regulation (2) shall not be earlier than 30 days from the date of publication of the notice.
- (4) The Federal Agency shall also ensure the circulation of the EIA to the concerned Government Agencies and solicit their comments thereon.
- (5) All comments received by the Federal Agency from the public or any Government Agency shall be collated, tabulated and duly considered by it before decision on the EIA.

- (6) The Federal Agency may issue guidelines indicating the basic techniques and measures to be adopted to ensure effective public consultation, involvement and participation in EIA assessment.

11. Review

- (1) The Federal Agency shall make every effort to carry out its review of the IEE within 45 days, and of the EIA within 90 days, of issue of confirmation of completeness under Regulation 9.
- (2) In reviewing the IEE or EIA, the Federal Agency shall consult such Committee of Experts as may be constituted for the purpose by the Director-General, and may also solicit views of the sectoral Advisory Committee, if any, constituted by the Federal Government under sub-section (6) of section 5.
- (3) The Director-General may, where he considers it necessary, constitute a committee to inspect the site of the project and submit its report on such matters as may be specified.
- (4) The review of the IEE or EIA by the Federal Agency shall be based on quantitative and qualitative assessment of the documents and data furnished by the proponent, comments from the public and Government Agencies received under Regulation 10, and views of the committees mentioned in sub-regulations (2) and (3) above.

12. Decision

On completion of the review, the decision of the Federal Agency shall be communicated to the proponent in the form prescribed in Schedule V in the case of an IEE, and in the form prescribed in Schedule VI in the case of an EIA.

13. Conditions of approval

- (1) Every approval of an IEE or EIA shall, in addition to such conditions as may be imposed by the Federal Agency, be subject to the condition that the project shall be designed and constructed, and mitigatory and other measures adopted, strictly in accordance with the IEE/EIA, unless any variation thereto have been specified in the approval by the Federal Agency.
- (2) Where the Federal Agency accords its approval subject to certain conditions, the proponent shall –
 - (a) before commencing construction of the project, acknowledge acceptance of the stipulated conditions by executing an undertaking in the form prescribed in Schedule VII;

- (b) before commencing operation of the project, obtain from the Federal Agency written confirmation that the conditions of approval, and the requirements in the IEE/EIA relating to design and construction, adoption of mitigatory and other measures and other relevant matters, have been duly complied with.

14. Confirmation of compliance

(1) The request for confirmation of compliance under clause (b) of sub-regulation (2) of Regulation 13 shall be accompanied by an Environmental Management Plan indicating the measures and procedures proposed to be taken to manage or mitigate the environmental impacts for the life of the project, including provisions for monitoring, reporting and auditing.

(2) Where a request for confirmation of compliance is received from a proponent, the Federal Agency may carry out such inspection of the site and plant and machinery and seek such additional information from the proponent as it may deem fit:

Provided that every effort shall be made by the Federal Agency to provide the requisite confirmation or otherwise within 15 days of receipt of the request, with complete information, from the proponent.

(3) The Federal Agency may, while issuing the requisite confirmation of compliance, impose such other conditions as the Environmental Management Plan, and the operation, maintenance and monitoring of the project as it may deem fit, and such conditions shall be deemed to be included in the conditions to which approval of the project is subject.

15. Deemed approval

The four-month period for communication of decision stipulated in sub-section (4) of section 12 shall commence from the date of filing of an IEE or EIA in respect of which confirmation of completeness is issued by the Federal Agency under clause (a) of sub-regulation (1) of Regulation 9.

16. Extension in review period

Where the Federal Government in a particular case extends the four-month period for communication of approval prescribed in sub-section (5) of section 12, it shall, in consultation with the Federal Agency, indicate the various steps of the review process to be taken during the extended period, and the estimated time required for each step.

17. Validity period of approval

(1) The approval accorded by a Federal Agency under section 12 read with Regulation 12 shall be valid, for commencement of construction, for a period of three years from the date of issue.

(2) If construction is commenced during the initial three year validity period, the validity of the approval shall stand extended for a further period of three years from the date of issue.

(3) After issue of confirmation of compliance, the approval shall be valid for a period of three years from the date thereof.

(4) The proponent may apply to the Federal Agency for extension in the validity periods mentioned in sub-regulations (1), (2) and (3), which may be granted by the Federal Agency in its discretion for such period not exceeding three years at a time, if the conditions of the approval do not require significant change:

Provided that the Federal Agency may require the proponent to submit a fresh IEE or EIA, if in its opinion changes in location, design, construction and operation of the project so warrant.

18. Entry and inspection

(1) For purposes of verification of any matter relating to the review or to the conditions of approval of an IEE or EIA prior to, during or after commencement of construction or operation of a project, duly authorized staff of the Federal Agency shall be entitled to enter and inspect the project site, factory building and plant and equipment installed therein.

(2) The proponent shall ensure full cooperation of the project staff at site to facilitate the inspection, and shall provide such information as may be required by the Federal Agency for this purpose and pursuant thereto.

19. Monitoring

(1) After issue of approval, the proponent shall submit a report to the Federal Agency on completion of construction of the project.

(2) After issue of confirmation of compliance, the proponent shall submit an annual report summarizing operational performance of the project, with reference to the conditions of approval and maintenance and mitigatory measures adopted by the project.

(3) To enable the Federal Agency to effectively monitor compliance with the conditions of approval, the proponent shall furnish such additional information as the Federal Agency may require.

20. Cancellation of approval

(1) Notwithstanding anything contained in these Regulations, if, at any time, on the basis of information or report received or inspection carried out, the Federal Agency is of the opinion that the conditions of an approval have not been complied with, or that the information supplied by a proponent in the approved IEE or EIA is incorrect, it

shall issue notice to the proponent to show cause, within two weeks of receipt thereof, why the approval should not be cancelled.

(2) If no reply is received or if the reply is considered unsatisfactory, the Federal Agency may, after giving the proponent an opportunity of being heard:

- (i) require the proponent to take such measures and to comply with such conditions within such period as it may specify, failing which the approval shall stand cancelled; or
- (ii) cancel the approval.

(3) On cancellation of the approval, the proponent shall cease construction or operation of the project forthwith.

(4) Action taken under this Regulation shall be without prejudice to any other action that may be taken against the proponent under the Act or rules or regulations or any other law for the time being in force.

21. Registers of IEE and EIA projects

Separate Registers to be maintained by the Federal Agency for IEE and EIA projects under sub-section (7) of section 12 shall be in the form prescribed in Schedule VIII.

22. Environmentally sensitive areas

(1) The Federal Agency may, by notification in the official Gazette, designate an area to be an environmentally sensitive area.

(2) Notwithstanding anything contained in Regulations 3, 4 and 5, the proponent of a project situated in an environmentally sensitive area shall be required to file an EIA with the Federal Agency.

(3) The Federal Agency may from time to time issue guidelines to assist proponents and other persons involved in the environmental assessment process to plan and prepare projects located in environmentally sensitive areas.

(4) Where guidelines have been issued under sub-regulation (3), the projects shall be planned and prepared, to the extent practicable, in accordance therewith and any departure therefrom justified in the EIA pertaining to the project.

23. Environmental Assessment Advisory Committee

For purposes of rendering advice on all aspects of environmental assessment, including guidelines, procedures and categorization of projects, the Director-General shall constitute an Environmental Assessment Advisory Committee comprising –

- (a) Director EIA, Federal Agency ... Chairman

- | | | | |
|-----|--|-----|---------|
| (b) | One representative each of the Provincial Agencies | ... | Members |
| (c) | One representative each of the Federal Planning Commission and the Provincial Planning and Development Departments | ... | Members |
| (d) | Representatives of industry and non-Governmental organizations, and legal and other experts | ... | Members |

24. Other approvals

Issue of an approval under section 12 read with Regulation 12 shall not absolve the proponent of the duty to obtain any other approval or consent that may be required under any law for the time being in force.

SCHEDULE I
(See Regulation 3)

List of projects requiring an IEE

A. Agriculture, Livestock and Fisheries

1. Poultry, livestock, stud and fish farms with total cost more than Rs.10 million
2. Projects involving repacking, formulation or warehousing of agricultural products

B. Energy

1. Hydroelectric power generation less than 50 MW
2. Thermal power generation less than 200 KW
3. Transmission lines less than 11 KV, and large distribution projects
4. Oil and gas transmission systems
5. Oil and gas extraction projects including exploration, production, gathering systems, separation and storage
6. Waste-to-energy generation projects

C. Manufacturing and processing

1. Ceramics and glass units with total cost more than Rs.50 million
2. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost less than Rs.100 million
3. Man-made fibers and resin projects with total cost less than Rs.100 million
4. Manufacturing of apparel, including dyeing and printing, with total cost more than Rs.25 million
5. Wood products with total cost more than Rs.25 million

D. Mining and mineral processing

1. Commercial extraction of sand, gravel, limestone, clay, sulphur and other minerals not included in Schedule II with total cost less than Rs.100 million
2. Crushing, grinding and separation processes

3. Smelting plants with total cost less than Rs.50 million

E. Transport

1. Federal or Provincial highways (except maintenance, rebuilding or reconstruction of existing metalled roads) with total cost less than Rs.50 million
2. Ports and harbor development for ships less than 500 gross tons

F. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume less than 50 million cubic meters of surface area less than 8 square kilometers
2. Irrigation and drainage projects serving less than 15,000 hectares
3. Small-scale irrigation systems with total cost less than Rs.50 million

G. Water supply and treatment

Water supply schemes and treatment plants with total cost less than Rs.25 million

H. Waste disposal

Waste disposal facility for domestic or industrial wastes, with annual capacity less than 10,000 cubic meters

I. Urban development and tourism

1. Housing schemes
2. Public facilities with significant off-site impacts (e.g. hospital wastes)
3. Urban development projects

J. Other projects

Any other project for which filing of an IEE is required by the Federal Agency under sub-regulation (2) of Regulation 5

SCHEDULE II
(See Regulation 4)

List of projects requiring an EIA

A. Energy

1. Hydroelectric power generation over 50 MW
2. Thermal power generation over 200 MW
3. Transmission lines (11 KV and above) and grid stations
4. Nuclear power plans
5. Petroleum refineries

B. Manufacturing and processing

1. Cement plants
2. Chemicals projects
3. Fertilizer plants
4. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above
5. Industrial estates (including export processing zones)
6. Man-made fibers and resin projects with total cost of Rs.100 M and above
7. Pesticides (manufacture or formulation)
8. Petrochemicals complex
9. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel), printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million
10. Tanning and leather finishing projects

C. Mining and mineral processing

1. Mining and processing of coal, gold, copper, sulphur and precious stones
2. Mining and processing of major non-ferrous metals, iron and steel rolling
3. Smelting plants with total cost of Rs.50 million and above

D. Transport

1. Airports
2. Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of Rs.50 million and above
3. Ports and harbor development for ships of 500 gross tons and above
4. Railway works

E. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of 50 million cubic meters and above or surface area of 8 square kilometers and above
2. Irrigation and drainage projects serving 15,000 hectares and above

F. Water supply and treatment

Water supply schemes and treatment plants with total cost of Rs.25 million and above

G. Waste Disposal

1. Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, incineration of hospital toxic waste)
2. Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic meters

H. Urban development and tourism

1. Land use studies and urban plans (large cities)
2. Large-scale tourism development projects with total cost more than Rs.50 million

I. Environmentally Sensitive Areas

All projects situated in environmentally sensitive areas

J. Other projects

1. Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5.
2. Any other project likely to cause an adverse environmental effect

SCHEDULE III
(See Regulation 7)

IEE/EIA Review Fees

Total Project Cost	IEE	EIA
Upto Rs.5,000,000	NIL	NIL
Rs.5,000,001 to 10,000,000	Rs.10,000	Rs.15,000
Greater than Rs.10,000,000	Rs.15,000	Rs.30,000

SCHEDULE IV

[See Regulation 8(2)(a)]

Application Form

1.	Name and address of proponent		Phone: Fax: Telex:	
2.	Description of project			
3.	Location of project			
4.	Objectives of project			
5.	IEE/EIA attached?	IEE/EIA	:	Yes/No
6.	Have alternative sites been considered and reported in IEE/EIA?	Yes/No		
7.	Existing land use		Land requirement	
8.	Is basic site data available, or has it been measured?	(only tick yes if the data is reported in the IEE/EIA) Meteorology (including rainfall) Ambient air quality Ambient water quality Ground water quality	<u>Available</u> Yes/No Yes/No Yes/No Yes/No	<u>Measured</u> Yes/No Yes/No Yes/No Yes/No
9.	Have estimates of the following been reported?	Water balance Solid waste disposal Liquid waste treatment	<u>Estimated</u> Yes/No Yes/No Yes/No	<u>Reported</u> Yes/No Yes/No Yes/No
10.	Source of power		Power requirement	
11.	Labour force (number)	Construction: Operation:		

Verification. I do solemnly affirm and declare that the information given above and contained in the attached IEE/EIA is true and correct to the best of my knowledge and belief.

Date _____

Signature, name and _____
designation of proponent
(with official stamp/seal)

SCHEDULE V
[See Regulation 12]

Decision on IEE

1. Name and address of proponent _____

2. Description of project _____
3. Location of project _____
4. Date of filing of IEE _____
5. After careful review of the IEE, the Federation Agency has decided –
 - (a) to accord its approval, subject to the following conditions:

 - or (b) that the proponent should submit an EIA of the project, for the following reasons –

[Delete (a) or (b), whichever is inapplicable]

Dated _____

Tracking no.____

Director-General
Federal Agency
(with official stamp/seal)

SCHEDULE VI
[See Regulation 12]

Decision on EIA

1. Name and address of proponent _____

2. Description of project _____
3. Location of project _____
4. Date of filing of EIA _____
5. After careful review of the EIA, and all comments thereon, the Federation Agency has decided –

(a) to accord its approval, subject to the following conditions:

or (b) that the proponent should submit an EIA with the following modifications-

or (c) to reject the project, being contrary to environmental objectives, for the following reasons:

[Delete (a)/(b)/(c), whichever is inapplicable]

Dated _____

Tracking no.____

Director-General
Federal Agency
(with official stamp/seal)

SCHEDULE VII
[See Regulation 13(2)]

Undertaking

I, (full name and address) as proponent for (name, description and location of project) do hereby solemnly affirm and declare that I fully understand and accept the conditions contained in the approval accorded by the Federal Agency bearing tracking no. _____ dated _____, and undertake to design, construct and operate the project strictly in accordance with the said conditions and the IEE/EIA.

Date _____

Signature, name and _____
designation of proponent
(with official stamp/seal)

Witnesses

(full names and addresses)

(1) _____

(2) _____

SCHEDULE VIII
(See Regulation 21)
Form of Registers for IEE and EIA projects

S. No.	Description	Relevant Provisions
1	2	3
1.	Tracking number	
2.	Category type (as per Schedules I and II)	
3.	Name of proponent	
4.	Name and designation of contact person	
5.	Name of consultant	
6.	Description of project	
7.	Location of project	
8.	Project capital cost	
9.	Date of receipt of IEE/EIA	
10.	Date of confirmation of completeness	
11.	Approval granted (Yes/No)	
12.	Date of approval granted or refused	
13.	Conditions of approval/reasons for refusal	
14.	Date of Undertaking	
15.	Date of extension of approval validity	
16.	Period of extension	
17.	Date of commencement of construction	
18.	Date of issue of confirmation of compliance	
19.	Date of commencement of operations	
20.	Dates of filing of monitoring reports	
21.	Date of cancellation, if applicable	

Annexure 2.3

**NATIONAL ENVIRONMENTAL QUALITY
STANDARDS (NEQS) (2000), 2010**

The Gazette



of Pakistan

EXTRAORDINARY
PUBLISHED BY AUTHORITY

ISLAMABD, THURSDAY, AUGUST 10, 2000

PART-II

Statutory Notification (S.R.O)

GOVERNMENT OF PAKISTAN

MINISTRY OF ENVIRONMENT, LOCAL GOVERNMENT AND
RURAL DEVELOPMENT

NOTIFICATION

Islamabad, the 8th August 2000

S.R.O. 549 (I)/2000.___ In exercise of the powers conferred under clause (c) of sub-section (1) of section of 6 of the Pakistan environmental Protection Act. 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to direct that the following further amendments shall be made in its Notification No. S.R.O. 742(I)/93, dated the 24th August, 1993, namely: ___

In the aforesaid Notification, in paragraph 2._____

(1289)

[4138(2000)/Ex.GAZ]

Price : Rs. 5.00

(1) for Annex, I the following shall be substituted, namely:_____

Annex-I

**“NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR MUNICIPAL AND
LIQUID INDUSTRIAL EFFLUENTS (mg/l,
UNLESS OTHERWISE DEFINED)**

<u>S. No.</u>	<u>Parameter</u>	Existing Standards	<u>Revised Standards</u> Into Inland Waters	Into Sewage Treatment ⁽⁵⁾	Into Sea ⁽¹⁾
1	2	3	4	5	6
1.	Temperature or Temperature Increase *	40 ⁰ C	≤3 ⁰ C	≤3 ⁰ C	≤3 ⁰ C
2.	pH value (H ⁺) .	6-10	6-9	6-9	6-9
3.	Biochemical Oxygen Demand (BOD) ₅ at 20 ⁰ C ⁽¹⁾	80	80	250	80**
4.	Chemical Oxygen Demand (COD) ⁽¹⁾	150	150	400	400
5.	Total Suspended Solids (TSS)	150	200	400	200
6.	Total Dissolved Solids (TDS)	3500	3500	3500	3500
7.	Oil and Grease	10	10	10	10
8.	Phenolic compounds (as phenol)	0.1	0.1	0.3	0.3
9.	Chloride (as Cl ⁻)	1000	1000	1000	SC***
10.	Fluoride (as F ⁻)	20	10	10	10
11.	Cyanide (as CN ⁻) total ..	2	1.0	1.0	1.0
12.	An-ionic detergents (as MBAS) ⁽²⁾	20	20	20	20
13.	Sulphate (SO ₄ ²⁻)	600	600	1000	SC***
14.	Sulphide (S ²⁻)	1.0	1.0	1.0	1.0
15.	Ammonia (NH ₃)	40	40	40	40
16.	Pesticides ⁽³⁾	0.15	0.15	0.15	0.15

1	2	3	4	5	6
17.	Cadmium ⁽⁴⁾	0.1	0.1	0.1	0.1
18.	Chromium (trivalent and hexavalent ⁽⁴⁾	1.0	1.0	1.0	1.0
19.	Cooper ⁽⁴⁾	1.0	1.0	1.0	1.0
20.	Lead ⁽⁴⁾	0.5	0.5	0.5	0.5
21.	Mercury ⁽⁴⁾	0.01	0.01	0.01	0.01
22.	Selenium ⁽⁴⁾	0.5	0.5	0.5	0.5
23.	Nickel ⁽⁴⁾	1.0	1.0	1.0	1.0
24.	Silver ⁽⁴⁾	1.0	1.0	1.0	1.0
25.	Total toxic metals	2.0	2.0	2.0	2.0
26.	Zinc	5.0	5.0	5.0	5.0
27.	Arsenic ⁽⁴⁾	1.0	1.0	1.0	1.0
28.	Barium ⁽⁴⁾	1.5	1.5	1.5	1.5
29.	Iron	2.0	8.0	8.0	8.0
30.	Manganese	1.5	1.5	1.5	1.5
31.	Boron ⁽⁴⁾	6.0	6.0	6.0	6.0
32.	Chlorine	1.0	1.0	1.0	1.0

Explanations:

1. Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Federal Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent.
2. Methylene Blue Active Substances; assuming surfactant as biodegradable.
3. Pesticides include herbicides, fungicides, and insecticides.
4. Subject to total toxic metals discharge should not exceed level given at S. N. 25.
5. Applicable only when and where sewage treatment is operational and BOD₅=80mg/l is achieved by the sewage treatment system.

6. Provided discharge is not at shore and not within 10 miles of mangrove or other important estuaries.
- * The effluent should not result in temperature increase of more than 3⁰C at the edge of the zone where initial mixing and dilution take place in the receiving body. In case zone is not defined, use 100 meters from the point of discharge.
- ** The value for industry is 200 mg/l
- *** Discharge concentration at or below sea concentration (SC).

Note:_____ 1. Dilution of liquid effluents to bring them to the NEQS limiting values is not permissible through fresh water mixing with the effluent before discharging into the environment.

2. The concentration of pollutants in water being used will be subtracted from the effluent for calculating the NEQS limits” and

(2) for Annex-II the following shall be substituted, namely:_____

Annex-II

“NATIONAL ENVIRONMENTAL QUALITY STANDARDS FOR INDUSTRIAL GASEOUS EMISSION (mg/Nm³, UNLESS OTHERWISE DEFINED).”

S. No.	Parameter	Source of Emission	Existing Standards	Revised Standards
1	2	3	4	5
1.	Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate matter	(a) Boilers and Furnaces		
	(1)	(i) Oil fired	300	300
		(ii) Coal fired	500	500
		(iii) Cement Kilns	200	300
		(b) Grinding, crushing, Clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	500	500
3.	Hydrogen Chloride	Any	400	400

1	2	3	4	5
4.	Chlorine	Any	150	150
5.	Hydrogen Fluoride	Any	150	150
6.	Hydrogen Sulphide	Any	10	10
7.	Sulphur Oxides ^{(2) (3)}	Sulfuric acid/Sulphonic acid plants		
		Other Plants except power Plants operating on oil and coal	400	1700
8.	Carbon Monoxide	Any	800	800
9.	Lead	Any	50	50
10.	Mercury	Any	10	10
11.	Cadmium	Any	20	20
12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200
16.	Oxides of Nitrogen	Nitric acid manufacturing unit.	400	3000
	(3)	Other plants except power plants operating on oil or coal:		
		Gas fired	400	400
		Oil fired	-	600
		Coal fired	-	1200

Explanations:-

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent Sulphur content in fuel oil. Higher content of Sulphur will case standards to be pro-rated.
3. In respect of emissions of Sulphur dioxide and Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards:-

A. Sulphur Dioxide

Sulphur Dioxide Background levels Micro-gram per cubic meter ($\mu\text{g}/\text{m}^3$) Standards.

Background Air Quality (SO_2 Basis)	Annual Average	Max. 24-hours Interval	Criterion I Max. SO_2 Emission (Tons per Day Per Plant)	Criterion II Max. Allowable ground level increment to ambient ($\mu\text{g}/\text{m}^3$) (One year Average)
Unpolluted	<50	<200	500	50
Moderately Polluted*				
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	>100	>400	100	10

* For intermediate values between 50 and 100 $\mu\text{g}/\text{m}^3$ linear interpolations should be used.

** No projects with Sulphur dioxide emissions will be recommended.

B. Nitrogen Oxide

Ambient air concentrations of Nitrogen oxides, expressed as NO_x should not be exceed the following:-

Annual Arithmetic Mean	100 $\mu\text{g}/\text{m}^3$ (0.05 ppm)
------------------------	--

Emission level for stationary source discharge before missing with the atmosphere, should be maintained as follows:-

For fuel fired steam generators as Nanogram (10^0 -gram) per joule of heat input:

Liquid fossil fuel	..	..	..	130
Solid fossil fuel ..	..	..	..	300
Lignite fossil fuel	..	..	..	260

Note:- Dilution of gaseous emissions to bring them to the NEQS limiting value is not permissible through excess air mixing blowing before emitting into the environment.

[File No. 14(3)/98-TO-PEPC.]

HAFIZ ABDULAH AWAN
DEPUTY SECRETARY (ADMN)

The Gazette of Pakistan

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PART II

Statutory Notifications (S. R. O.)

GOVERNMENT OF PAKISTAN

MINISTRY OF ENVIRONMENT

NOTIFICATIONS

Islamabad, the 18th October, 2010

S. R. O. 1062(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (I) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Ambient Air.

National Environmental Quality Standards for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Effective from 1st July, 2010	Effective from 1st January 2013	
Sulphur Dioxide (SO ₂)	Annual Average* 24 hours**	80 µg/m ³ 120 µg/m ³	80 µg/m ³ 120 µg/m ³	-Ultraviolet Fluorescence method
Oxides of Nitrogen as (NO)	Annual Average* 24 hours**	40 µg/m ³ 40 µg/m ³	40 µg/m ³ 40 µg/m ³	- Gas Phase Chemiluminescence

(3205)

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Effective from 1st July, 2010	Effective from 1st January 2013	
Oxides of Nitrogen as (NO ₂)	Annual Average*	40 µg/m ³	40 µg/m ³	- Gas Phase Chemiluminescence
	24 hours**	80 µg/m ³	80 µg/m ³	
O ₃	1 hour	180 µg/m ³	130 µg/m ³	-Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400 µg/m ³	360 µg/m ³	- High Volume Sampling, (Average flow rate not less than 1.1 m ³ /minute).
	24 hours**	550 µg/m ³	500 µg/m ³	
Respirable Particulate Matter. PM ₁₀	Annual Average*	200 µg/m ³	120 µg/m ³	-β Ray absorption method
	24 hours**	250 µg/m ³	150 µg/m ³	
Respirable Particulate Matter. PM _{2.5}	Annual Average*	25 µg/m ³	15 µg/m ³	-β Ray absorption method
	24 hours**	40 µg/m ³	35 µg/m ³	
	1 hour	25 µg/m ³	15 µg/m ³	
Lead Pb	Annual Average*	1.5 µg/m ³	1 µg/m ³	- ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2 µg/m ³	1.5 µg/m ³	
Carbon Monoxide (CO)	8 hours**	5 mg/m ³	5 mg/m ³	- Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m ³	10 mg/m ³	

*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly /8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.

S. R. O. 1063(I)/2010.— In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Standards for Drinking Water Quality.

National Standards for Drinking Water Quality

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Bacterial			
All water intended for drinking (e.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water entering the distribution system (E.Coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Most Asian countries also follow WHO standards
Treated water in the distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12 month period.	Most Asian countries also follow WHO standards
Physical			
Colour	≤ 15 TCU	≤ 15 TCU	
Taste	Non objectionable/Acceptable	Non objectionable/Acceptable	
Odour	Non objectionable/Acceptable	Non objectionable/Acceptable	
Turbidity	< 5 NTU	< 5 NTU	
Total hardness as CaCO ₃	< 500 mg/l	---	
TDS	< 1000	< 1000	
pH	6.5 – 8.5	6.5 – 8.5	
Chemical			
<i>Essential Inorganic</i>	<i>mg/Litre</i>	<i>mg/Litre</i>	
Aluminium (Al) mg/l	≤ 0.2	0.2	

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Antimony (Sb)	≤ 0.005 (P)	0.02	
Arsenic (As)	≤ 0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	
Chloride (Cl)	< 250	250	
Chromium (Cr)	≤ 0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic	mg/Litre	mg/Litre	
Cyanide (CN)	≤ 0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤ 1.5	1.5	
Lead (Pb)	≤ 0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤ 0.001	0.001	
Nickel (Ni)	≤ 0.02	0.02	
Nitrate (NO ₃)*	≤ 50	50	
Nitrite (NO ₂)*	≤ 3 (P)	3	
Selenium (Se)	0.01(P)	0.01	
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source	—	
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries

* indicates priority health related inorganic constituents which need regular monitoring.

Properties/Parameters	Standard Values for Pakistan	Who Standards	Remarks
Organic			
Pesticides mg/L		PSQCA No. 4639-2004, Page No. 4 Table No. 3 Serial No. 20- 58 may be consulted.***	Annex II
Phenolic compounds (as Phenols) mg/L		≤ 0.002	
Polynuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	
Radioactive			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

*** PSQCA: Pakistan Standards Quality Control Authority.

Proviso:

The existing drinking water treatment infrastructure is not adequate to comply with WHO guidelines. The Arsenic concentrations in South Punjab and in some parts of Sindh have been found high then Revised WHO guidelines. It will take some time to control arsenic through treatment process. Lead concentration in the proposed standards is higher than WHO Guidelines. As the piping system for supply of drinking water in urban centres are generally old and will take significant resources and time to get them replaced. In the recent past, Lead was completely phased out from petroleum products to cut down Lead entering into environment. These steps will enable to achieve WHO guidelines for Arsenic, Lead, Cadmium and Zinc. However, for bottled water, WHO limits for Arsenic, Lead, Cadmium and Zinc will be applicable and PSQCA Standards for all the remaining parameters.

S. R. O. 1064(I)/2010.—In exercise of the powers conferred under clause (c) of sub-section (1) of section 6 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Pakistan Environmental Protection Agency, with the prior approval of the Pakistan Environmental Protection Council, is pleased to establish the following National Environmental Quality Standards for Noise.

National Environmental Quality Standards for Noise

S. No.	Category of Area / Zone	Effective from		Effective from	
		1st July, 2010		1st July, 2012	
		Limit in dB(A) Leq **			
		Day Time	Night Time	Day Time	Night Time
1.	Residential area (A)	65	50	55	45
2.	Commercial area (B)	70	60	65	55
3.	Industrial area (C)	80	75	75	65
4.	Silence Zone (D)	55	45	50	45

- Note:*
1. Day time hours: 6.00 a. m to 10.00 p. m.
 2. Night time hours: 10.00 p. m. to 6.00 a.m.
 3. 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.
 4. 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.

[No. F. I(12)/2010-11-General.]

MUHAMMAD KHALIL AWAN,
Section Officer (PEPC).

S.R.O. 528 (1)/2001. - In exercise of the powers conferred by section 31 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Federal Government is pleased to make the following rules, namely: -

1. **Short title and commencement.** - (1) These rules may be called the National Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rule, 2001.
 - (2) They shall come into force at once.
2. **Definitions.** - (1) In these rules, unless there is anything repugnant in the subject or context, -
 - (a) **Act** means the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997);
 - (b) **Associated Company** and associated undertaking, shall have the same meaning as defined in the Companies Ordinance, 1984 (XLVII of 1984);
 - (c) **Certified environmental laboratory** means an environmental laboratory which has been granted certification under the Pakistan Environmental Protection Agency (Certification of Environmental Laboratories) Regulations, 2000;
 - (d) **Director-General** means the Director-General of the Federal Agency;
 - (e) **Environmental monitoring** report means the report submitted by an industrial unit to the Federal Agency in respect of priority parameters;
 - (f) **industrial unit** means any legal entity carrying on industrial activity;
 - (g) **pollution level** means number of units per unit of production determined under the Pollution Charge for Industry (Calculation and Collection) Rules, 2001;
 - (h) **priority parameters** means those parameters of the National Environmental Quality Standards which have been selected for purposes of submission of Environmental Monitoring Reports to the Federal Agency by an industrial unit; and
 - (i) **Schedule** means the Schedule to these rules.

(2) All other words and expressions used in these rules but not defined herein shall have the same meanings as are assigned to them in the Act.

3. **Responsibility for reporting.** - All industrial units shall be responsible for correct and timely submission of Environmental Monitoring Reports to the Federal Agency.

4. **Classification of industrial units.** - On the basis of the pollution level of an industrial unit, the Director-General shall classify the unit into category “A”, “B” or “C” for liquid effluents, and category “A” or “B” for gaseous emissions:

Provided that till such time as the pollution level of an industrial unit is determined, it shall be classified according to the type of industry to which it belongs, as shown in Schedule I for liquid effluents and in Schedule II for gaseous emissions.

5. **Category “A” industrial units.** - (1) An industrial unit in category “A” shall submit Environmental Monitoring Reports on monthly basis-

(a) in respect of liquid effluents, for priority parameters listed in column 3 of Table A of Schedule III:

Provided that during start-up or upset conditions, priority parameters mentioned in column 4 of Table A of Schedule III shall be recorded on hourly basis;

(b) in respect of gaseous emissions, for priority parameters listed in Table B of Schedule III.

(2) An industrial unit in category “A” shall maintain a record of the times during which start-up and upset conditions occur, and shall mention the total time elapsed in such conditions in its monthly Environmental Monitoring Report.

6. **Category “B” industrial units.**- An industrial unit in category “B” shall submit Environmental Monitoring Reports on quarterly basis-

(a) in respect of liquid effluents, for priority parameters listed in Table A of Schedule IV;

(b) in respect of gaseous emissions, for priority parameters listed in Table B of Schedule IV.

7. **Category “C” industrial units.** - An industrial unit in category “C” shall submit Environmental Monitoring Reports on biannual basis for priority parameters in respect of liquid effluents listed in Schedule V.

8. **Special Industries.** - (1) Without prejudice to the provisions of rule 4, the Director-General may classify a large industrial unit with very high pollution levels as "Special Industry".

(2) In addition to complying with the requirements of rule 5, a Special Industry shall submit Environmental Monitoring Reports for such parameters and at such frequency as the Director-General may require.

9. **Environmental Monitoring Report.** - (1) An Environmental Monitoring Report shall comprise a Liquid Effluents Monitoring Report, a Gaseous Emissions Monitoring Report and a Cover Sheet which shall be in the form as set out in Forms A, B and C, respectively, of Schedule VI.

(2) All measurements of priority parameters contained in the Environmental Monitoring Report submitted by an industrial unit shall be based on test reports of a certified environmental laboratory, and attested copies of such results shall be attached with the Environmental Monitoring Report:

Provided that such certified environmental laboratories shall not be part of, or an associated company or associated undertaking of, the said industrial unit.

(3) The Gaseous Emissions Report shall cover the priority parameters listed in Schedule VII, and shall include, every two years, metal analysis of all gaseous emissions from the industrial unit.

10. **Sampling, testing and analysis.** - Sampling testing and analysis of effluents, gaseous emissions and waste shall be carried out in accordance with the Environmental Samples Rules, 2001.

11. **Monitoring conditions of EIA approval.** - The provisions of these rules shall be in addition to, and not in derogation of, the monitoring conditions laid down in an EIA approval.

12. **Compilation, analysis and management of data.** - The Federal Agency shall compile, analyze and manage the data contained in the Environmental Monitoring Reports with the objective, *inter alia*, of enforcing the National Environmental Quality Standards and developing an environmental database.

Schedule I
(See rule 4)
Classification of Industrial Units for Liquid Effluents

1. **Category “A”**

- (1) Chlor-Alkali (Mercury Cell).
- (2) Chlor-Alkali (Diaphragm Cell).
- (3) Metal finishing and electroplating.
- (4) Nitrogenous fertilizer.
- (5) Phosphate fertilizer.
- (6) Pulp and paper.
- (7) Pesticides formulation.
- (8) Petroleum refining.
- (9) Steel industry.
- (10) Synthetic fiber.
- (11) Tanning and leather finishing.
- (12) Textile processing.
- (13) Pigments and dyes.
- (14) Thermal Power Plants (Oil Fired and Coal Fired).
- (15) Rubber products.
- (16) Paints, Varnishes and Lacquers.
- (17) Pesticides.
- (18) Printing.
- (19) Industrial chemicals.
- (20) Oil and Gas production.
- (21) Petrochemicals.
- (22) Combined effluent treatment.
- (23) Any other industry to be specified by Federal or Provincial Agency.

2. **Category “B”**

- (1) Dairy industry.
- (2) Fruit and vegetable processing.
- (3) Glass manufacturing.
- (4) Sugar.
- (5) Detergent.
- (6) Photographic.
- (7) Glue manufacture.
- (8) Oil and Gas exploration.
- (9) Thermal Power Plants (Gas Fired)
- (10) Vegetable oil and ghee mills.
- (11) Woolen mills.
- (12) Plastic materials and products.
- (13) Wood and cork products.

(14) Any other industry to be specified by federal or Provincial Agency.

3. **Category “C”**

- (1) Pharmaceutical (Formulation) Industry.
 - (2) Marble Crushing.
 - (3) Cement.
 - (4) Any other industry to be specified by Federal or Provincial Agency
-

Schedule II

(See rule 4)

Classification of Industrial Units for Gaseous Emissions

1. Category “A”

- (1) Cement.
- (2) Glass manufacturing
- (3) Iron and steel.
- (4) Nitrogenous fertilizer.
- (5) Phosphate fertilizer.
- (6) Oil and Gas production.
- (7) Petroleum refining.
- (8) Pulp and paper.
- (9) Thermal Power Plants (coal and oil based)
- (10) Boilers, ovens, furnaces and kilns (coal and oil fired)
- (11) Brick-Kilns (firewood and bagasse based)
- (12) Any other industry to be specified by Federal or Provincial Agency.

2. Category “B”

- (1) Sugar.
 - (2) Textile.
 - (3) Chloralkali plants.
 - (4) Dairy industry.
 - (5) Fruits and vegetables.
 - (6) Metal finishing and electroplating.
 - (7) Boilers, ovens, furnaces and kilns (gas-fired)
 - (8) Any other industry to be specified by Federal or Provincial Agency.
-

Schedule III
[See rule 5(1)(a) and (b)]
Table A
Category "A"
Priority Parameters for Monitoring of Liquid Effluents

S.No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis ¹	Priority Parameters for Start-up and Upset Conditions to be Recorded on an Hourly Basis
1.	Chlor-Alkali (Mercury Cell)	Effluent flow, Temperature, pH, FSS, Chlorine, Mercury, Chlorides	Effluent Flow, Temperature, pH, TSS, Mercury, Chlorides
2.	Chlor-Alkali (Diaphragm Cell)	Effluent Flow, Temperature, pH, TSS, Chlorine, Chlorides	Effluent Flow, Temperature, pH, TSS, Chlorides
3.	Metal Finishing and Electroplating ²	Effluent Flow, Temperature, pH, TSS, Oil and Grease, Arsenic, Cadmium, Chromium (trivalent), Chromium (hexavalent), Lead, Nickel, Mercury, Silver Zinc, Fluorides, Cyanides	Effluent Flow, Temperature, pH, TSS,
4.	Nitrogenous Fertilizer	Effluent Flow Temperature, pH, TSS, Ammonia, COD	Effluent Flow, Temperature, pH, TSS,
5.	Phosphate Fertilizer	Effluent Flow, Temperature pH, TSS, Cadmium, Fluorides, COD	Effluent Flow, Temperature, pH, TSS,
6.	Pulp and paper	Effluent Flow, Temperature, pH, COD, TSS, TDS Sulfides, BOD5	Effluent Flow, Temperature, pH, TDS, TSS,
7.	Pesticides Formulation	Effluent Flow, Pesticides	Effluent Flow,
8.	Petroleum Refining	Effluent flow, Temperature, pH, COD, TSS, BOD5 Oil and Grease, phenolic compounds	Effluent Flow, Temperature, pH, TSS,
9.	Steel Industry ²	Effluent flow, Temperature, pH, COD, TSS, TDS, Chromium (trivalent), Iron, Oil and Grease, Cadmium Copper	Effluent Flow, Temperature, pH, TSS,
10.	Synthetic Fiber	Effluent Flow, Temperature pH, COD TSS, BOD5, Oil and Grease, Sulfides	Effluent Flow, Temperature, pH, TSS,
11.	Tanning and Leather Finishing	Effluent Flow, Temperature, pH, COD, TSS, BOD5, Sulfide, Oil and Grease, Chromium (trivalent), Chromium (hexavalent), TDS, phenolic compounds	Effluent Flow, Temperature, pH, TSS,
12.	Textile Processing	Effluent Flow, Temperature, pH, COD, TSS, TDS, BOD5, Copper, Chromium	Effluent Flow Temperature, pH, TSS,

S.No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis,	Priority Parameters for Start-up and Upset Conditions to be Recorded on an Hourly Basis
13.	Pigments and Dyes	Effluent Flow, pH, Temperature, COD, lead, Copper, Zinc.	Effluent Flow, Temperature, pH,
14.	Thermal Power Plants (Oil fired and coal fired)	Effluent Flow, Temperature, pH, TSS, Oil and Grease	Effluent Flow, Temperature, pH, TSS
15.	Rubber Products	COD, Cadmium TSS	TSS
16.	Paints, Varnishes & Lacquers	PH, TSS, COD, Lead, Chromium, Cadmium, Zinc, Barium.	PH, TSS
17.	Pesticides	COD, Mercury, Pesticides	COD,
18.	Printing	COD, Lead	COD,
19.	Industrial Chemicals	PH, COD, TDS, Phenolic Compounds, Cyanide, Ammonia, Cadmium*, Chromium*, Mercury*, Nickel*, Zinc*, Arsenic*,	PH, COD, TDS,
20.	Oil and Gas Production	Effluent Flow, Temperature, pH, COD, TSS, Oil and Grease, Chloride, BOD5, Phenolic Compounds	Effluent Flow, Temperature, pH, TSS, TDS,
21.	Petrochemicals	Effluent Flow, Temperature pH, COD TSS, TDS, Oil and Grease, BOD5, Phenolic Compounds	Effluent Flow, Temperature, pH, TSS, TDS,
1.	Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.		
2.	Steel Industry includes steel-re-rolling mills, electric furnaces, and foundries.		
*	Priority parameters will be limited to those occurring in chemicals and raw-materials used.		

Schedule IV
[See rule 6(a) and (b)]
Table A
Category "B"

Priority Parameters for Monitoring of Liquid Effluents

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a quarterly Basis ¹
1.	Dairy Industry	Effluent Flow, Temperature, pH, BOD ₅ , TSS, TDS, Oil and Grease
2.	Fruit and Vegetable Processing	Effluent Flow, Temperature, pH, BOD ₅ , TSS, COD
3.	Glass Manufacturing	Effluent Flow, Temperature, pH, TSS, COD, Oil and Grease
4.	Sugar	Effluent Flow, Temperature, pH, BOD ₅ , TSS, COD, Oil and Grease
5.	Detergent	pH, COD, Oil and Grease, An-ionic Detergent
6.	Photographic	pH, COD, Silver, Cyanide, Fluoride
7.	Glue Manufacture	BOD, COD, pH.
8.	Oil and Gas Exploration	Effluent Flow, Temperature, pH, COD, TSS, TDS, Oil and Grease, Chloride, BOD ₅ , Phenolic compounds
1.	Industry using chromium in its cooling water system will also report Chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector	

Table B
Category "A"
Priority Parameters for Monitoring of Gaseous Emissions

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be reported on a Monthly basis		
		<u>Process Emission</u>	<u>Emission from fired Equipment</u>	
1.	Cement	Particulates	CO, *SOx, NOx, Particulates	
2.	Glass Manufacturing	Particulates	CO, *SOx, NOx, Particulates	
3.	Iron and Steel	Particulates, Fluorides CO, NOx, SOx	CO, *SOx, NOx, Particulates	
4.	Nitrogenous Fertilizers	Ammonia, Particulates	CO, *SOx, NOx, Particulates	
5.	Phosphate Fertilizers	Ammonia, Fluoride, Particulate		
6.	Oil and Gas Production	CO, *SOx, NOx, H ₂ S and Particulates.	CO, *SOx, NOx, Particulates	
7.	Petroleum Refining	H ₂ S, NOx, SOx, Particulates	CO, *SOx, NOx, Particulates	
8.	Pulp and Paper	Chlorine, SOx	*SOx, NOx, CO, Heavy Metals and Particulates	
9.	Thermal Power Plants (Coal and Oil based)		CO, NOx, *SOx, Particulates.	
10.	Boilers, Ovens, Furnaces and Kilns (Coal and Oil fired)			
11.	Brick Kilns (Firewood and Bagasse)		CO, Particulates	
1.	Metal analyses of all gaseous emission would be carried out once in two years. *Only where fuel contains hydrogen sulphide (H ₂ S) more than 20ppm			

Table B
Category "B"
Priority Parameters for Monitoring of Gaseous Emission
Category "B"

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be reported on a Quarterly Basis ¹	
		Process Emission	Emission from fired Equipment
1.	Sugar	Particulates	CO, *SO _x , NO _x , Particulates
2.	Textile		CO, *SO _x , NO _x , Particulates
3.	Chloralkali Plants	Chlorine	
4.	Dairy Industry		CO, NO _x , *SO _x , Particulates
5.	Fruits and Vegetables		CO, NO _x , *SO _x , Particulates
6.	Metal Finishing and Electroplating	Particulates	
7.	Boilers, Ovens, furnaces and Kilns (Gas-fired)		CO, NO _x

1. Metal analyses of all gaseous emission would be carried out once in two years.

*Only where fuel contains hydrogen sulphide (H₂S) more than 20ppm

Schedule V
(See rule 7)
Category "C"
Priority Parameters for Monitoring of Liquid Effluents

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a quarterly Basis ¹
1.	Pharmaceutical (formulation industry, marble crushing, Cement, and any other industry as notified by EPAs	Effluent Flow, Temperature, pH, COD, TSS, TDS,

1. Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.

Schedule VI

FORM A

Liquid Effluents Monitoring Report

SMART Plant Database X

Monitored Effluents

Normal Conditions SMART

Sampling Information

Stream Sampling Date Sampling Time

Location Temp. (C) Flow [m3/hr]

Reported Data

Period

Reported Days Hrs Per Day

Laboratory

Name Address

Sample Analysis

Ammonia mg/l	Chlorine mg/l	Lead mg/l	Silver mg/l
Anionic Detergents mg/l	Chromium (Hexavalent) mg/l	Manganese mg/l	Sulphides mg/l
Arsenic mg/l	Chromium (Trivalent) mg/l	Mercury mg/l	TDS mg/l
Barium mg/l	COD mg/l	Nickel mg/l	Total Chromium mg/l
BOD5 mg/l	Copper mg/l	Oil and Grease mg/l	TSS mg/l
Boron mg/l	Cyanides mg/l	Pesticides mg/l	Zinc mg/l
Cadmium mg/l	Fluorides mg/l	pH	
Chlorides mg/l	Iron mg/l	Phenolic Compounds mg/l	

Province/Plant ID

PUNJAB IAAV

Edit Save Cancel Main

Schedule VI

FORM B

Gaseous Effluents Monitoring Report

SMART Plant Database

Monitored Emissions

×

Normal Conditions

SMART

Sampling Information

Process Emission Stack Sampling Date Time
Location Flow [m3/hr]

Reported Data

Period
Reported Days Hrs Per Day

Laboratory

Name Address

- Sample Analysis

Ammonia mg/nm3	Copper mg/nm3	NOx mg/nm3
Antimony mg/nm3	Hydrogen Fluoride mg/nm3	Particulates mg/nm3
Arsenic mg/nm3	Hydrogen Sulphide mg/nm3	Smoke Ringelman Scale
Cadmium mg/nm3	Hydrogen Chloride mg/nm3	SOx mg/nm3
Chlorine mg/nm3	Lead mg/nm3	Zinc mg/nm3
CO mg/nm3	Mercury mg/nm3	

Province/Plant ID

PUNJAB 1AAV

Edit

Save

Cancel

Main

FORM C

Environmental Monitoring Report Cover Sheet

SMART Plant Database

×

Registration Information

SMART

Company

Company Name	Chief Executive
Address 1	Designation
Address 2	City Code
City	E-mail
Post Code	Phone
	Fax

Plant

Plant Name	Contact Person
Address 1	Designation
Address 2	City Code
City	E-mail
District	Phone
	Fax

Type

Plant Type		
Total Number of Streams	Total Number of Combustion Stacks	Total Number of Process Stacks
Plant Uses Chromium Based Chemicals for Water Treatment ? ☐ Yes ☐ No		

Province/Plant ID

PUNJAB 1AAV

Edit

Save

Cancel

Main

Schedule VII
[See rule 9(3)]
Priority Parameters for Monitoring of Gaseous Emissions

S. No.	Emission source	Priority Parameters 2 for Reporting
1.	Boiler, Ovens Furnaces and Kilns	
	Gas Fired	CO, NO _x
	Oil Fired	CO, NO _x , SOX, Particulates
	Coal	CO, NO _x , SOX, Particulates
	Bagasse and Firewood	CO, Particulates
2.	Brick Kilns	CO, NO _x , SOX, Particulates
3.	Thermal Power Plants	Sox, NO _x , Particulates
4.	Process Emission ¹	Particulates Ammonia, Chlorine, H ₂ S, fluoride, SO _x , NO _x , Co, Mercury*, Lead*, Zinc*, Cadmium*, Arsenic*, Antimony*

1. Process emissions involving fuel combustion will also include parameters as for Boilers, Ovens, furnaces and Kilns.
2. Metal analyses of all gaseous emissions would be carried out once in two years.

* Priority parameters will be limited to those occurring in chemicals and raw-materials used.

F. No. 14 (3)/98-TO-PEPC

(SAEED ATHAR)
Section Officer

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Annexure 3.1

**GUIDELINES FOR SELF MONITORING AND
REPORTING BY INDUSTRY (2001)**

S.R.O. 528 (1)/2001. - In exercise of the powers conferred by section 31 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), the Federal Government is pleased to make the following rules, namely: -

1. **Short title and commencement.** - (1) These rules may be called the National Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rule, 2001.
 - (2) They shall come into force at once.
2. **Definitions.** - (1) In these rules, unless there is anything repugnant in the subject or context, -
 - (a) **Act** means the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997);
 - (b) **Associated Company** and associated undertaking, shall have the same meaning as defined in the Companies Ordinance, 1984 (XLVII of 1984);
 - (c) **Certified environmental laboratory** means an environmental laboratory which has been granted certification under the Pakistan Environmental Protection Agency (Certification of Environmental Laboratories) Regulations, 2000;
 - (d) **Director-General** means the Director-General of the Federal Agency;
 - (e) **Environmental monitoring** report means the report submitted by an industrial unit to the Federal Agency in respect of priority parameters;
 - (f) **industrial unit** means any legal entity carrying on industrial activity;
 - (g) **pollution level** means number of units per unit of production determined under the Pollution Charge for Industry (Calculation and Collection) Rules, 2001;
 - (h) **priority parameters** means those parameters of the National Environmental Quality Standards which have been selected for purposes of submission of Environmental Monitoring Reports to the Federal Agency by an industrial unit; and
 - (i) **Schedule** means the Schedule to these rules.

(2) All other words and expressions used in these rules but not defined herein shall have the same meanings as are assigned to them in the Act.

3. **Responsibility for reporting.** - All industrial units shall be responsible for correct and timely submission of Environmental Monitoring Reports to the Federal Agency.

4. **Classification of industrial units.** - On the basis of the pollution level of an industrial unit, the Director-General shall classify the unit into category “A”, “B” or “C” for liquid effluents, and category “A” or “B” for gaseous emissions:

Provided that till such time as the pollution level of an industrial unit is determined, it shall be classified according to the type of industry to which it belongs, as shown in Schedule I for liquid effluents and in Schedule II for gaseous emissions.

5. **Category “A” industrial units.** - (1) An industrial unit in category “A” shall submit Environmental Monitoring Reports on monthly basis-

(a) in respect of liquid effluents, for priority parameters listed in column 3 of Table A of Schedule III:

Provided that during start-up or upset conditions, priority parameters mentioned in column 4 of Table A of Schedule III shall be recorded on hourly basis;

(b) in respect of gaseous emissions, for priority parameters listed in Table B of Schedule III.

(2) An industrial unit in category “A” shall maintain a record of the times during which start-up and upset conditions occur, and shall mention the total time elapsed in such conditions in its monthly Environmental Monitoring Report.

6. **Category “B” industrial units.**- An industrial unit in category “B” shall submit Environmental Monitoring Reports on quarterly basis-

(a) in respect of liquid effluents, for priority parameters listed in Table A of Schedule IV;

(b) in respect of gaseous emissions, for priority parameters listed in Table B of Schedule IV.

7. **Category “C” industrial units.** - An industrial unit in category “C” shall submit Environmental Monitoring Reports on biannual basis for priority parameters in respect of liquid effluents listed in Schedule V.

8. **Special Industries.** - (1) Without prejudice to the provisions of rule 4, the Director-General may classify a large industrial unit with very high pollution levels as "Special Industry".

(2) In addition to complying with the requirements of rule 5, a Special Industry shall submit Environmental Monitoring Reports for such parameters and at such frequency as the Director-General may require.

9. **Environmental Monitoring Report.** - (1) An Environmental Monitoring Report shall comprise a Liquid Effluents Monitoring Report, a Gaseous Emissions Monitoring Report and a Cover Sheet which shall be in the form as set out in Forms A, B and C, respectively, of Schedule VI.

(2) All measurements of priority parameters contained in the Environmental Monitoring Report submitted by an industrial unit shall be based on test reports of a certified environmental laboratory, and attested copies of such results shall be attached with the Environmental Monitoring Report:

Provided that such certified environmental laboratories shall not be part of, or an associated company or associated undertaking of, the said industrial unit.

(3) The Gaseous Emissions Report shall cover the priority parameters listed in Schedule VII, and shall include, every two years, metal analysis of all gaseous emissions from the industrial unit.

10. **Sampling, testing and analysis.** - Sampling testing and analysis of effluents, gaseous emissions and waste shall be carried out in accordance with the Environmental Samples Rules, 2001.

11. **Monitoring conditions of EIA approval.** - The provisions of these rules shall be in addition to, and not in derogation of, the monitoring conditions laid down in an EIA approval.

12. **Compilation, analysis and management of data.** - The Federal Agency shall compile, analyze and manage the data contained in the Environmental Monitoring Reports with the objective, *inter alia*, of enforcing the National Environmental Quality Standards and developing an environmental database.

Schedule I
(See rule 4)
Classification of Industrial Units for Liquid Effluents

1. **Category “A”**

- (1) Chlor-Alkali (Mercury Cell).
- (2) Chlor-Alkali (Diaphragm Cell).
- (3) Metal finishing and electroplating.
- (4) Nitrogenous fertilizer.
- (5) Phosphate fertilizer.
- (6) Pulp and paper.
- (7) Pesticides formulation.
- (8) Petroleum refining.
- (9) Steel industry.
- (10) Synthetic fiber.
- (11) Tanning and leather finishing.
- (12) Textile processing.
- (13) Pigments and dyes.
- (14) Thermal Power Plants (Oil Fired and Coal Fired).
- (15) Rubber products.
- (16) Paints, Varnishes and Lacquers.
- (17) Pesticides.
- (18) Printing.
- (19) Industrial chemicals.
- (20) Oil and Gas production.
- (21) Petrochemicals.
- (22) Combined effluent treatment.
- (23) Any other industry to be specified by Federal or Provincial Agency.

2. **Category “B”**

- (1) Dairy industry.
- (2) Fruit and vegetable processing.
- (3) Glass manufacturing.
- (4) Sugar.
- (5) Detergent.
- (6) Photographic.
- (7) Glue manufacture.
- (8) Oil and Gas exploration.
- (9) Thermal Power Plants (Gas Fired)
- (10) Vegetable oil and ghee mills.
- (11) Woolen mills.
- (12) Plastic materials and products.
- (13) Wood and cork products.

(14) Any other industry to be specified by federal or Provincial Agency.

3. **Category “C”**

- (1) Pharmaceutical (Formulation) Industry.
 - (2) Marble Crushing.
 - (3) Cement.
 - (4) Any other industry to be specified by Federal or Provincial Agency
-

Schedule II

(See rule 4)

Classification of Industrial Units for Gaseous Emissions

1. Category “A”

- (1) Cement.
- (2) Glass manufacturing
- (3) Iron and steel.
- (4) Nitrogenous fertilizer.
- (5) Phosphate fertilizer.
- (6) Oil and Gas production.
- (7) Petroleum refining.
- (8) Pulp and paper.
- (9) Thermal Power Plants (coal and oil based)
- (10) Boilers, ovens, furnaces and kilns (coal and oil fired)
- (11) Brick-Kilns (firewood and bagasse based)
- (12) Any other industry to be specified by Federal or Provincial Agency.

2. Category “B”

- (1) Sugar.
 - (2) Textile.
 - (3) Chloralkali plants.
 - (4) Dairy industry.
 - (5) Fruits and vegetables.
 - (6) Metal finishing and electroplating.
 - (7) Boilers, ovens, furnaces and kilns (gas-fired)
 - (8) Any other industry to be specified by Federal or Provincial Agency.
-

Schedule III
[See rule 5(1)(a) and (b)]
Table A
Category "A"
Priority Parameters for Monitoring of Liquid Effluents

S.No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis ¹	Priority Parameters for Start-up and Upset Conditions to be Recorded on an Hourly Basis
1.	Chlor-Alkali (Mercury Cell)	Effluent flow, Temperature, pH, FSS, Chlorine, Mercury, Chlorides	Effluent Flow, Temperature, pH, TSS, Mercury, Chlorides
2.	Chlor-Alkali (Diaphragm Cell)	Effluent Flow, Temperature, pH, TSS, Chlorine, Chlorides	Effluent Flow, Temperature, pH, TSS, Chlorides
3.	Metal Finishing and Electroplating ²	Effluent Flow, Temperature, pH, TSS, Oil and Grease, Arsenic, Cadmium, Chromium (trivalent), Chromium (hexavalent), Lead, Nickel, Mercury, Silver Zinc, Fluorides, Cyanides	Effluent Flow, Temperature, pH, TSS,
4.	Nitrogenous Fertilizer	Effluent Flow Temperature, pH, TSS, Ammonia, COD	Effluent Flow, Temperature, pH, TSS,
5.	Phosphate Fertilizer	Effluent Flow, Temperature pH, TSS, Cadmium, Fluorides, COD	Effluent Flow, Temperature, pH, TSS,
6.	Pulp and paper	Effluent Flow, Temperature, pH, COD, TSS, TDS Sulfides, BOD5	Effluent Flow, Temperature, pH, TDS, TSS,
7.	Pesticides Formulation	Effluent Flow, Pesticides	Effluent Flow,
8.	Petroleum Refining	Effluent flow, Temperature, pH, COD, TSS, BOD5 Oil and Grease, phenolic compounds	Effluent Flow, Temperature, pH, TSS,
9.	Steel Industry ²	Effluent flow, Temperature, pH, COD, TSS, TDS, Chromium (trivalent), Iron, Oil and Grease, Cadmium Copper	Effluent Flow, Temperature, pH, TSS,
10.	Synthetic Fiber	Effluent Flow, Temperature pH, COD TSS, BOD5, Oil and Grease, Sulfides	Effluent Flow, Temperature, pH, TSS,
11.	Tanning and Leather Finishing	Effluent Flow, Temperature, pH, COD, TSS, BOD5, Sulfide, Oil and Grease, Chromium (trivalent), Chromium (hexavalent), TDS, phenolic compounds	Effluent Flow, Temperature, pH, TSS,
12.	Textile Processing	Effluent Flow, Temperature, pH, COD, TSS, TDS, BOD5, Copper, Chromium	Effluent Flow Temperature, pH, TSS,

S.No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis,	Priority Parameters for Start-up and Upset Conditions to be Recorded on an Hourly Basis
13.	Pigments and Dyes	Effluent Flow, pH, Temperature, COD, lead, Copper, Zinc.	Effluent Flow, Temperature, pH,
14.	Thermal Power Plants (Oil fired and coal fired)	Effluent Flow, Temperature, pH, TSS, Oil and Grease	Effluent Flow, Temperature, pH, TSS
15.	Rubber Products	COD, Cadmium TSS	TSS
16.	Paints, Varnishes & Lacquers	PH, TSS, COD, Lead, Chromium, Cadmium, Zinc, Barium.	PH, TSS
17.	Pesticides	COD, Mercury, Pesticides	COD,
18.	Printing	COD, Lead	COD,
19.	Industrial Chemicals	PH, COD, TDS, Phenolic Compounds, Cyanide, Ammonia, Cadmium*, Chromium*, Mercury*, Nickel*, Zinc*, Arsenic*,	PH, COD, TDS,
20.	Oil and Gas Production	Effluent Flow, Temperature, pH, COD, TSS, Oil and Grease, Chloride, BOD5, Phenolic Compounds	Effluent Flow, Temperature, pH, TSS, TDS,
21.	Petrochemicals	Effluent Flow, Temperature pH, COD TSS, TDS, Oil and Grease, BOD5, Phenolic Compounds	Effluent Flow, Temperature, pH, TSS, TDS,
1.	Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.		
2.	Steel Industry includes steel-re-rolling mills, electric furnaces, and foundries.		
*	Priority parameters will be limited to those occurring in chemicals and raw-materials used.		

Schedule IV
[See rule 6(a) and (b)]
Table A
Category "B"

Priority Parameters for Monitoring of Liquid Effluents

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a quarterly Basis ¹
1.	Dairy Industry	Effluent Flow, Temperature, pH, BOD ₅ , TSS, TDS, Oil and Grease
2.	Fruit and Vegetable Processing	Effluent Flow, Temperature, pH, BOD ₅ , TSS, COD
3.	Glass Manufacturing	Effluent Flow, Temperature, pH, TSS, COD, Oil and Grease
4.	Sugar	Effluent Flow, Temperature, pH, BOD ₅ , TSS, COD, Oil and Grease
5.	Detergent	pH, COD, Oil and Grease, An-ionic Detergent
6.	Photographic	pH, COD, Silver, Cyanide, Fluoride
7.	Glue Manufacture	BOD, COD, pH.
8.	Oil and Gas Exploration	Effluent Flow, Temperature, pH, COD, TSS, TDS, Oil and Grease, Chloride, BOD ₅ , Phenolic compounds
1.	Industry using chromium in its cooling water system will also report Chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector	

Table B
Category "A"
Priority Parameters for Monitoring of Gaseous Emissions

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be reported on a Monthly basis		
		<u>Process Emission</u>	<u>Emission from fired Equipment</u>	
1.	Cement	Particulates	CO, *SO _x , NO _x , Particulates	
2.	Glass Manufacturing	Particulates	CO, *SO _x , NO _x , Particulates	
3.	Iron and Steel	Particulates, Fluorides CO, NO _x , SO _x	CO, *SO _x , NO _x , Particulates	
4.	Nitrogenous Fertilizers	Ammonia, Particulates	CO, *SO _x , NO _x , Particulates	
5.	Phosphate Fertilizers	Ammonia, Fluoride, Particulate	CO, *SO _x , NO _x , Particulates	
6.	Oil and Gas Production	CO, *SO _x , NO _x , H ₂ S and Particulates.	CO, *SO _x , NO _x , Particulates	
7.	Petroleum Refining	H ₂ S, NO _x , SO _x , Particulates	CO, *SO _x , NO _x , Particulates	
8.	Pulp and Paper	Chlorine, SO _x	*SO _x , NO _x , CO, Heavy Metals and Particulates	
9.	Thermal Power Plants (Coal and Oil based)		CO, NO _x , *SO _x , Particulates.	
10.	Boilers, Ovens, Furnaces and Kilns (Coal and Oil fired)		CO, Particulates	
11.	Brick Kilns (Firewood and Bagasse)			
1.	Metal analyses of all gaseous emission would be carried out once in two years. *Only where fuel contains hydrogen sulphide (H ₂ S) more than 20ppm			

Table B
Category "B"
Priority Parameters for Monitoring of Gaseous Emission
Category "B"

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be reported on a Quarterly Basis ¹	
		Process Emission	Emission from fired Equipment
1.	Sugar	Particulates	CO, *SO _x , NO _x , Particulates
2.	Textile		CO, *SO _x , NO _x , Particulates
3.	Chloralkali Plants	Chlorine	
4.	Dairy Industry		CO, NO _x , *SO _x , Particulates
5.	Fruits and Vegetables		CO, NO _x , *SO _x , Particulates
6.	Metal Finishing and Electroplating	Particulates	
7.	Boilers, Ovens, furnaces and Kilns (Gas-fired)		CO, NO _x

1. Metal analyses of all gaseous emission would be carried out once in two years.

*Only where fuel contains hydrogen sulphide (H₂S) more than 20ppm

Schedule V
(See rule 7)
Category "C"
Priority Parameters for Monitoring of Liquid Effluents

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a quarterly Basis ¹
1.	Pharmaceutical (formulation industry, marble crushing, Cement, and any other industry as notified by EPAs	Effluent Flow, Temperature, pH, COD, TSS, TDS,

1. Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.

Schedule VI

FORM A

Liquid Effluents Monitoring Report

SMART Plant Database ×

Monitored Effluents

Normal Conditions SMART

Sampling Information

Stream Sampling Date Sampling Time

Location Temp. (C) Flow [m3/hr]

Reported Data

Period

Reported Days Hrs Per Day

Laboratory

Name Address

Sample Analysis

Ammonia mg/l	Chlorine mg/l	Lead mg/l	Silver mg/l
Anionic Detergents mg/l	Chromium (Hexavalent) mg/l	Manganese mg/l	Sulphides mg/l
Arsenic mg/l	Chromium (Trivalent) mg/l	Mercury mg/l	TDS mg/l
Barium mg/l	COD mg/l	Nickel mg/l	Total Chromium mg/l
BOD5 mg/l	Copper mg/l	Oil and Grease mg/l	TSS mg/l
Boron mg/l	Cyanides mg/l	Pesticides mg/l	Zinc mg/l
Cadmium mg/l	Fluorides mg/l	pH	
Chlorides mg/l	Iron mg/l	Phenolic Compounds mg/l	

Province/Plant ID

PUNJAB IAAV

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Schedule VI

FORM B

Gaseous Effluents Monitoring Report

SMART Plant Database

Monitored Emissions

×

Normal Conditions

SMART

Sampling Information

Process Emission Stack Sampling Date Time
Location Flow [m3/hr]

Reported Data

Period
Reported Days Hrs Per Day

Laboratory

Name Address

- Sample Analysis

Ammonia mg/nm3	Copper mg/nm3	NOx mg/nm3
Antimony mg/nm3	Hydrogen Fluoride mg/nm3	Particulates mg/nm3
Arsenic mg/nm3	Hydrogen Sulphide mg/nm3	Smoke Ringelman Scale
Cadmium mg/nm3	Hydrogen Chloride mg/nm3	SOx mg/nm3
Chlorine mg/nm3	Lead mg/nm3	Zinc mg/nm3
CO mg/nm3	Mercury mg/nm3	

Province/Plant ID

PUNJAB 1AAV

Edit

Save

Cancel

Main

FORM C

Environmental Monitoring Report Cover Sheet

SMART Plant Database

×

Registration Information

SMART

Company

Company Name	Chief Executive
Address 1	Designation
Address 2	City Code
City	E-mail
Post Code	Phone
	Fax

Plant

Plant Name	Contact Person
Address 1	Designation
Address 2	City Code
City	E-mail
District	Phone
	Fax

Type

Plant Type		
Total Number of Streams	Total Number of Combustion Stacks	Total Number of Process Stacks
Plant Uses Chromium Based Chemicals for Water Treatment ? ☐ Yes ☐ No		

Province/Plant ID

PUNJAB 1AAV

Edit

Save

Cancel

Main

Schedule VII
[See rule 9(3)]
Priority Parameters for Monitoring of Gaseous Emissions

S. No.	Emission source	Priority Parameters 2 for Reporting
1.	Boiler, Ovens Furnaces and Kilns	
	Gas Fired	CO, NO _x
	Oil Fired	CO, NO _x , SOX, Particulates
	Coal	CO, NO _x , SOX, Particulates
	Bagasse and Firewood	CO, Particulates
2.	Brick Kilns	CO, NO _x , SOX, Particulates
3.	Thermal Power Plants	Sox, NO _x , Particulates
4.	Process Emission ¹	Particulates Ammonia, Chlorine, H ₂ S, fluoride, SO _x , NO _x , Co, Mercury*, Lead*, Zinc*, Cadmium*, Arsenic*, Antimony*

1. Process emissions involving fuel combustion will also include parameters as for Boilers, Ovens, furnaces and Kilns.
2. Metal analyses of all gaseous emissions would be carried out once in two years.
* Priority parameters will be limited to those occurring in chemicals and raw-materials used.

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(SAEED ATHAR)
Section Officer

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Annexure 3.2

MASTER PLAN OF VIE

LEGEND	AREA (Acres)	AREA (% AGE)	Landuse % AGE
INDUSTRIAL PLOTS			
4 KANAL			
8 KANAL			
8+ KANAL	201.73	72.75	78.47 %
COMMERCIAL	12.97	4.68	
PETROL PUMP	1.47	0.53	
HOTEL	1.42	0.51	
DISPENSERY	0.27	0.09	
RESCUE 1122	0.44	0.16	
FIRE BRIGADE	0.63	0.23	
JAMIA MOSQUE	1.92	0.70	
VOCATIONAL TRAINING CENTRE	0.53	0.19	21.53 %
PARKS & OPEN SPACES	3.12	1.12	
GRID STATION	3.39	1.22	
TREATMENT / DISPOSAL SITE	1.50	0.54	
SITE OFFICE	0.83	0.30	
ROADS	47.06	16.98	
TOTAL	277.28	100.00	100.00 %

4-K PLOTS	118
8-K PLOTS	28
16-K PLOTS	55

PLOT SIZE	PLOT QUANTITY	PLOT NUMBERINGS
4 KANAL	118	3-15, 49-76, 105-118, 123-162, 179-201,
8 KANAL	28	93-104, 163-178,
16 KANAL	55	1-2, 16-48, 77-92, 119-122,

80' WIDE ROAD

(FUTURE EXPANSION)

80' WIDE ROAD

80' WIDE ROAD

120' WIDE ROAD

80' WIDE ROAD

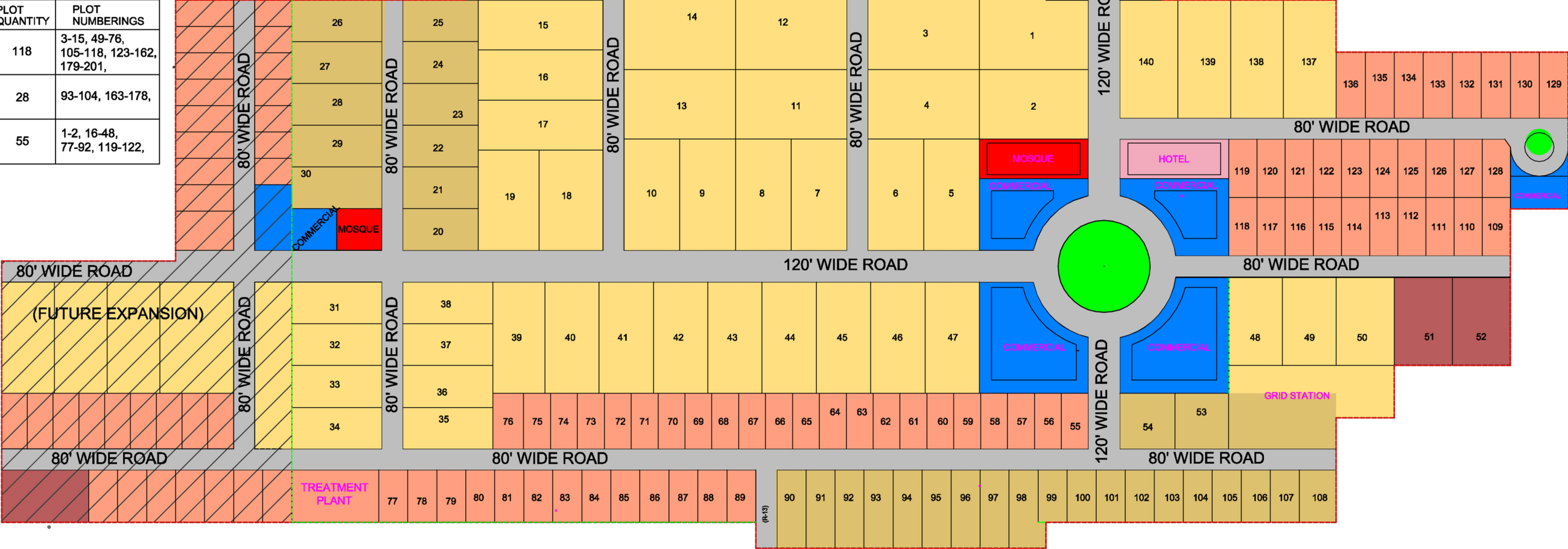
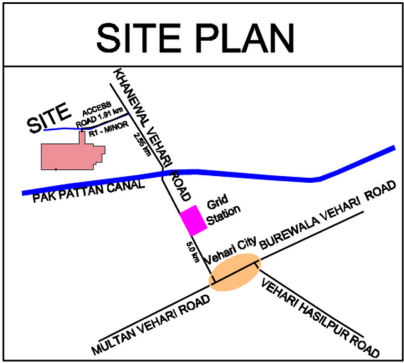
80' WIDE ROAD

80' WIDE ROAD

120' WIDE ROAD

80' WIDE ROAD

ROAD
ROAD



Chak 26 WB

MASTER PLAN OF VEHARI INDUSTRIAL ESTATE

DESIGNED BILAL AKRAM REVIEWED ASHFAQ A. Ch. PROJECT MANAGER	PUNJAB INDUSTRIAL ESTATES DEVELOPMENT AND MANAGEMENT COMPANY					
	PROJECT	DEVELOPMENT OF VEHARI INDUSTRIAL ESTATE				
	TITLE	APPROVED MASTER PLAN OF VEHARI INDUSTRIAL ESTATE				
S. SAQIB HUSAIN		ASSOCIATED CONSULTING ENGINEERS ACE (Pvt) LTD Architectural and Town Planning Services Division Regional Office (North) 57 - A, Block G, GULBERG III - LAHORE - PAKISTAN				
		JOB NO.	SCALE AS SHOWN	TYPE TP	DRG NO: VIE-MP-TP-001	REVISION
		DATE FEB, 2014				

Annexure 4.1

**VILLAGE PROFILE AND HOUSEHOLDS,
HOUSING AND SOCIO-ECONOMIC
QUESTIONNAIRES**

Socio-Economic Census Survey

A. HOUSEHOLD AND ECONOMIC PROFILE

[illegible]

B. SOCIAL PROFILE

Social Organization						
Family			Period of Stay	Caste	Religion & Sect	
Nuclear	Joint	Extended				

C. PROPERTY AND INCOME PROFILE

Property & Income										
House Area	Land Owned** (Agriculturists)	No of Rooms	CATTLE	Income	Housing			House Tenure		
					Kacha	Pakka	Semi Pakka	Owned	Tenant	Other
			Buffaloes: Cow: Goat: Donkeys: Horses:							

D. DISEASE PROFILE

Common Diseases						
Chest Infections	Skin Infections	Eye Infections	Asthma	Diarrhea	Malaria	Others

E. SOCIAL AMENITIES

1. Fuel

Availability of Gas: Yes: _____ No: _____ (If No then domestic fuel to be used _____)

2. Domestic Water Supply

Sr. No.	Source	Depth (ft)
1	Government Water Supply System	
2	Hand Pump	
3	Motor Pump	
4	Community Tap	
5	Others	

3. Quality of Drinking Water

Quality of Water				Pre treatment of Water		
Clean	Salty & Smelly	Oily	Others	Boiling	Filtering	None

4. Solid Waste Management

- a. Burn _____
- b. Dump (Where)? _____
- c. Others _____

5. Telephone Connection

Yes:_____ No:_____

5. Internet Connection

Yes:_____ No:_____

6. Cable TV

Yes:_____ No:_____

Questionnaire

- 1) What are the benefits of the existing development projects/industries in the area? What will be the benefits of the proposed project in the area?
Discuss in terms of livelihood and general economic uplift.

- 2) What are the Hazards of the existing development projects/industries in the area? Discuss health and environmental hazards; discuss impacts on agriculture and general environment. Also discuss impacts on health, rise of noise levels, water contamination and air pollution?

- 3) Any hazards or fears the respondents may have regarding the proposed project?

- 4) Gather information on the basic knowledge about environmental issues and gather any important suggestion that the respondents may give to improve the existing environment? Propose any changes that may make the project more acceptable.

Village:_____

Union Council:_____

Tehsil:_____

District:_____

Q1. Total Population of the Village:_____

Q2. Total Area of the Village:_____

Q3.Total Number of Houses in the Village:_____

Q4. Distance from the Main Road:_____

Q5. Accessibility to the Village?

i. Kacha Track:_____ ii. Concrete Track:_____, iii. Metalled Road:_____, Brick PavedTrack:_____

Q6.Utility Services:

a) Electricity:

Yes:_____ No:_____ (If No then source of electricity:_____)

b) Water Supply System (Source of Drinking Water):

c) Drainage/ Sewerage System (Existence of Drainage Channels):

Drainage System				Drain Condition		Ultimate disposal of wastewater		
Open Drain	Covered Drain	Sewer	Others	Kacha	Pakka	Pond	Field	Others

d) Solid Waste Disposal:

1. Burn_____
2. Dump (Where)?_____
3. Others_____

e) Gas

f) Telephone (PTCL, Mobile Connection):

g) PCO:

h) Internet:

i) Cable Television:

j) Street Condition (Concreted, Paved or Dirt):

k) Transport Facilities:

l) Nearest Bus/Wagon Station (Distance):

Q7. Educational Institutes? Mark the Indicated. Also write the number.

Type of School	Private				Government			
	School	Teachers	Students	Other	School	Teachers	Students	Other

	(No)	(No)	(No)	Staff(No)	(No)	(No)	(No)	Staff(No)
Primary Boys								
Girls								
Coed								
Middle Boys								
Girls								
Coed								
High Boys								
Girls								
Coed								
Madrassas								
Boys								
Girls								

Q8. If high school is not located in the village, where do students go for higher level education? Ask separately for boys and girls; also ask about the distance of the schools from the village?

Q9. Which is the nearest: (also inquire about the distance of the following from the village)

- a) Police Station:
- b) Post Office:
- c) Bank:
- d) Newspaper Agency:
- e) Fire Station

Q10. Health Facilities accessible to the residents, write the number and Distance?

Type of Health Facility	Number	Distance from the Village
District Headquarter (DHQ)		
Tehsil Headquarter (THQ)		
Rural Health Centre (RHC)		
Basic Health Unit (BHU)		
Qualified Practitioner (MBBS)		
Lady Health Worker (LHW)		
Lady Health Visitor (LHV)		
Dispensary (Compounder)		
Homeopath		
Traditional Healer (Hakeem)		
Mid Wife (Dai)		
Others		

Q11. Major Religions?

- a)
- b)

Q12.Occupational structure of the village: (Farmers, Govt. Employed, Private Employed, labour, Unemployed)

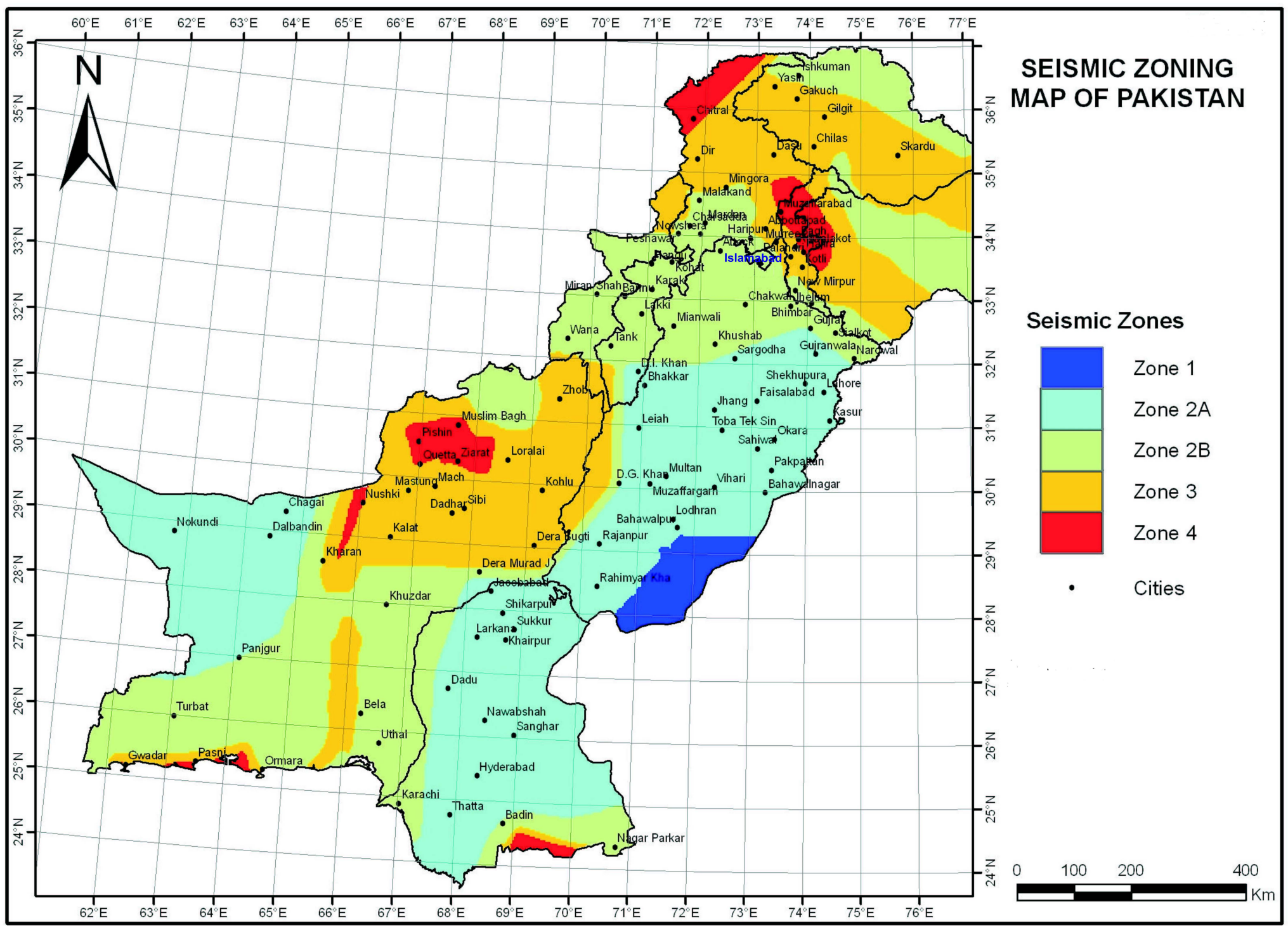
Q12. Major Castes residing in the Village:_____

Q11. Mosques/ Shrines/Graveyards in the village:

Mosques/Shrine/Graveyard	Number	Name
Mosque		
Imam Bargah		
Shrine		
Church		
Graveyard		

Q14. Crops Cultivated:

Annexure 5.1
SEISMOLOGY MAP



Annexure 5.2

LABORATORY TESTS REPORTS

TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/PIE/15/4809		Date of Issue	June 10, 2015
Customer	Punjab Industrial Estate (PIE) Commercial Area (North), Sundar Industrial Estate Sundar, Raiwind Road, Lahore Ph:042-35297203			
Sample dates	Date of sampling:	May 22, 2015		
	Date of sample received:	May 23, 2015		
Sampling carried out by	EIA team			
Sampling location	Vehari Industrial Estate (VIE), Vehari			
Sample description	Type of sample	Drinking water		
	Source of Sample	Ground Water, Hand pump (70 ft)		
	Sampling point	Hand pump		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standards
A. Physico-chemical Testing						
1	APHA 4500-H ⁺ -B	23/5/2015	pH	-	7.12 ± 0.07	6.5-8.5
2	HACH-1670	27/5/2015	Color	Pt-Co	28 ± 1	15 (TCU)
3	Turbidity Meter	27/5/2015	Turbidity	NTU	14.4 ± 0.5	5
4	APHA 2150-A	27/5/2015	Odor	-	Odorless	Acceptable
5	APHA 2160-A	27/5/2015	Taste	-	Tasteless	Acceptable
6	APHA 2540-D	1/6/2015	Total Suspended Solids (TSS)	mg/L	3 ± 1	NGV
7	APHA 2540-C	2/6/2015	Total dissolved solid (TDS)	mg/L	630 ± 6	1000
8	APHA 2340-C	4/6/2015	Total Hardness as CaCO ₃	mg/L	348 ± 5	500
9	APHA 3500-Ca-B	4/6/2015	Calcium as Ca	mg/L	93 ± 2	200
10	APHA 3500-Mg-E	4/6/2015	Magnesium	mg/L	28 ± 1	100
11	HACH-1900	5/6/2015	Fluoride	mg/L	0.17 ± 0.02	1.5
12	HACH-2530	26/5/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	1.9 ± 0.2	50
13	HACH- 3450	4/6/2015	Sulfate (SO ₄ -2)	mg/L	112 ± 2	400
14	APHA 4500-Cl-B	4/6/2015	Chloride	mg/L	36 ± 1	250
15	HACH-8008	9/6/2015	Total Iron	mg/L	0.64 ± 0.04	0.3
16	Arsenic Kit	26/5/2015	Arsenic	mg/L	BDL	0.01
B. Bacteriological Testing						
1	APHA 9221-B	27/5/2015	Total Coliform	MPN/100mL	5.1	NIL
2	APHA 9221-E	26/5/2015	Fecal Coliform	MPN/100mL	<1.1 (Absent)	NIL

APHA: American Public Health Association
 - No Unit
 NTU Nephelometric Turbidity Unit
 Pt-Co Platinum-Cobalt Standard
 BDL Below detection limit

NIL Must not be detectable in any 100mL sample
 NGV No Guideline Value
 MPN Most Probable Number
 BDL For Arsenic 0.01 mg/L

Note:

- Results relate only to the sample tested,
- Integrity of sample lies with EIA team.



M. Zia-ul-Haq
 Manager (Technical & Quality)



Shafqat Ullah
 General Manager

(End of the Report)

TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/PIE/15/4810		Date of Issue	June 10, 2015
Customer	Punjab Industrial Estate (PIE) Commercial Area (North), Sundar Industrial Estate Sundar, Raiwind Road, Lahore Ph:042-35297203			
Sample dates	Date of sampling:	May 22, 2015		
	Date of sample received:	May 23, 2015		
Sampling carried out by	EIA team			
Sampling location	Vehari Industrial Estate			
Sample description	Type of sample	Drinking water		
	Source of Sample	Ground Water, Water Turbine (300-400 ft)		
	Sampling point	Water Tap		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standards
A. Physico-chemical Testing						
1	APHA 4500-H ⁺ -B	23/5/2015	pH	-	7.79 ± 0.07	6.5-8.5
2	HACH-8025	27/5/2015	Color	Pt-Co	6 ± 1	15 (TCU)
3	Turbidity Meter	27/5/2015	Turbidity	NTU	12.5 ± 0.4	5
4	APHA 2150-A	27/5/2015	Odor	-	Odorless	Acceptable
5	APHA 2160-A	27/5/2015	Taste	-	Tasteless	Acceptable
6	APHA 2540-D	1/6/2015	Total Suspended Solids (TSS)	mg/L	2 ± 1	NGV
7	APHA 2540-C	2/6/2015	Total dissolved solid (TDS)	mg/L	330 ± 4	1000
8	APHA 2340-C	4/6/2015	Total Hardness as CaCO ₃	mg/L	96 ± 1	500
9	APHA 3500-Ca-B	4/6/2015	Calcium as Ca	mg/L	28.5 ± 0.5	200
10	APHA 3500-Mg-E	4/6/2015	Magnesium	mg/L	7.5 ± 0.3	100
11	HACH-8029	5/6/2015	Fluoride	mg/L	0.32 ± 0.03	1.5
12	HACH-8039	26/5/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	1.2 ± 0.2	50
13	HACH- 8051	4/6/2015	Sulfate (SO ₄ -2)	mg/L	50 ± 1	400
14	APHA 4500-Cl-B	4/6/2015	Chloride	mg/L	23 ± 1	250
15	HACH-8008	9/6/2015	Total Iron	mg/L	0.28 ± 0.04	0.3
16	Arsenic Kit	26/5/2015	Arsenic	mg/L	BDL	0.01
B. Bacteriological Testing						
1	APHA 9221-B	27/5/2015	Total Coliform	MPN/100mL	16	NIL
2	APHA 9221-E	26/5/2015	Fecal Coliform	MPN/100mL	<1.1 (Absent)	NIL

APHA: American Public Health Association

- No Unit

NTU Nephelometric Turbidity Unit

Pt-Co Platinum-Cobalt Standard

BDL Below detection limit

NIL

Must not be detectible in any 100mL sample

NGV

No Guideline Value

MPN

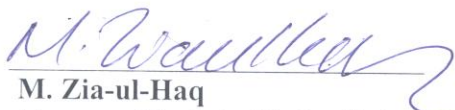
Most Probable Number

BDL

For Arsenic 0.01 mg/L

Note:

- Results relate only to the sample tested,
- Integrity of sample lies with EIA team.


M. Zia-ul-Haq
Manager (Technical & Quality)


Shafqat Ullah
General Manager

(End of the Report)

TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/PIE/15/4811	Date of Issue	June 10, 2015
Customer	Punjab Industrial Estate (PIE) Commercial Area (North), Sundar Industrial Estate Sundar, Raiwind Road, Lahore Ph:042-35297203		
Sample dates	Date of sampling:	May 22, 2015	
	Date of sample received:	May 23, 2015	
Sampling carried out by	EIA team		
Sampling location	Vehari District, Chack #24 WB		
Sample description	Type of sample	Drinking water	
	Source of Sample	Ground Water, Hand pump (65 ft)	
	Sampling point	Hand pump	

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standards
A. Physico-chemical Testing						
1	APHA 4500-H ⁺ -B	23/5/2015	pH	-	7.80 ± 0.08	6.5-8.5
2	HACH-8025	27/5/2015	Color	Pt-Co	32 ± 1	15 (TCU)
3	Turbidity Meter	27/5/2015	Turbidity	NTU	1.5 ± 0.3	5
4	APHA 2150-A	27/5/2015	Odor	-	Odorless	Acceptable
5	APHA 2160-A	27/5/2015	Taste	-	Tasteless	Acceptable
6	APHA 2540-D	1/6/2015	Total Suspended Solids (TSS)	mg/L	2 ± 1	NGV
7	APHA 2540-C	2/6/2015	Total dissolved solid (TDS)	mg/L	170 ± 4	1000
8	APHA 2340-C	4/6/2015	Total Hardness as CaCO ₃	mg/L	132 ± 2	500
9	APHA 3500-Ca-B	4/6/2015	Calcium as Ca	mg/L	30 ± 1	200
10	APHA 3500-Mg-E	4/6/2015	Magnesium	mg/L	13.6 ± 0.6	100
11	HACH-8029	5/6/2015	Fluoride	mg/L	0.03 ± 0.01	1.5
12	HACH-8039	26/5/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	0.7 ± 0.1	50
13	HACH- 8051	4/6/2015	Sulfate (SO ₄ -2)	mg/L	20 ± 1	400
14	APHA 4500-Cl-B	4/6/2015	Chloride	mg/L	27 ± 1	250
15	HACH-8008	9/6/2015	Total Iron	mg/L	0.62 ± 0.03	0.3
16	Arsenic Kit	26/5/2015	Arsenic	mg/L	BDL	0.01
B. Bacteriological Testing						
1	APHA 9221-B	27/5/2015	Total Coliform	MPN/100mL	>23	NIL
2	APHA 9221-E	26/5/2015	Fecal Coliform	MPN/100mL	23	NIL

APHA: American Public Health Association

- No Unit

NTU Nephelometric Turbidity Unit

Pt-Co Platinum-Cobalt Standard

BDL Below detection limit

NIL Must not be detectible in any 100mL sample

NGV No Guideline Value

MPN Most Probable Number

BDL For Arsenic 0.01 mg/L

Note:

- Results relate only to the sample tested,
- Integrity of sample lies with EIA team.



M. Zia-ul-Haq

Manager (Technical & Quality)



Shafqat Ullah

General Manager

(End of the Report)

TEST REPORT

A. BASIC INFORMATION

Reference No:	LES/PIE/15/4812		Date of Issue	June 10, 2015
Customer	Punjab Industrial Estate (PIE) Commercial Area (North), Sundar Industrial Estate Sundar, Raiwind Road, Lahore Ph:042-35297203			
Sample dates	Date of sampling:	May 22, 2015		
	Date of sample received:	May 23, 2015		
Sampling carried out by	EIA team			
Sampling location	Vehari District, Chack #28 WB			
Sample description	Type of sample	Drinking water		
	Source of Sample	Ground Water, Motor (100 ft)		
	Sampling point	Water Tap		

B. TEST RESULTS

#	Test Method	Testing Date	Parameter	Unit	Test Results	National Standards
A. Physico-chemical Testing						
1	APHA 4500-H ⁺ -B	23/5/2015	pH	-	7.52 ± 0.08	6.5-8.5
2	HACH-8025	27/5/2015	Color	Pt-Co	12 ± 1	15 (TCU)
3	Turbidity Meter	27/5/2015	Turbidity	NTU	10.9 ± 0.4	5
4	APHA 2150-A	27/5/2015	Odor	-	Odorless	Acceptable
5	APHA 2160-A	27/5/2015	Taste	-	Tasteless	Acceptable
6	APHA 2540-D	1/6/2015	Total Suspended Solids (TSS)	mg/L	4 ± 1	NGV
7	APHA 2540-C	2/6/2015	Total dissolved solid (TDS)	mg/L	400 ± 8	1000
8	APHA 2340-C	4/6/2015	Total Hardness as CaCO ₃	mg/L	266 ± 5	500
9	APHA 3500-Ca-B	4/6/2015	Calcium as Ca	mg/L	70 ± 1	200
10	APHA 3500-Mg-E	4/6/2015	Magnesium	mg/L	12.4 ± 0.8	100
11	HACH-8029	5/6/2015	Fluoride	mg/L	0.42 ± 0.03	1.5
12	HACH-8039	26/5/2015	Nitrate (NO ₃ ⁻ -N)	mg/L	1.0 ± 0.1	50
13	HACH- 8051	4/6/2015	Sulfate (SO ₄ -2)	mg/L	80 ± 1	400
14	APHA 4500-Cl-B	4/6/2015	Chloride	mg/L	57 ± 1	250
15	HACH-8008	9/6/2015	Total Iron	mg/L	0.44 ± 0.02	0.3
16	Arsenic Kit	26/5/2015	Arsenic	mg/L	BDL	0.01
B. Bacteriological Testing						
1	APHA 9221-B	27/5/2015	Total Coliform	MPN/100mL	>23	NIL
2	APHA 9221-E	26/5/2015	Fecal Coliform	MPN/100mL	23	NIL

APHA: American Public Health Association

- No Unit

NTU Nephelometric Turbidity Unit

Pt-Co Platinum-Cobalt Standard

BDL Below detection limit

NIL Must not be detectible in any 100mL sample

NGV No Guideline Value

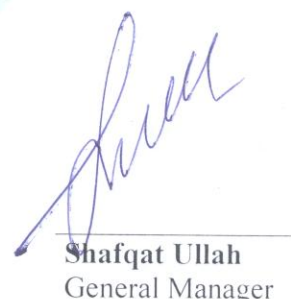
MPN Most Probable Number

BDL For Arsenic 0.01 mg/L

Note:

- Results relate only to the sample tested,
- Integrity of sample lies with EIA team.


M. Zia-ul-Haq
Manager (Technical & Quality)


Shafqat Ullah
General Manager

(End of the Report)



Ambient Air Quality Monitoring Report

For

NEC Consultant (pvt) Ltd.

Our Ref.: ENV – LHR –458 / 2015

Monitoring Dates: June 12-13, 2015

**Miss Rukhsana Shahid
Senior Environmentalist**

Prepared By

**Environmental Services
SGS Pakistan (Pvt) Ltd.**

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Annexes

- Annexure I: Meteorological Data
- Annexure II: Ambient Air Quality Monitoring Data
- Annexure III: Standards



1. INTRODUCTION



1. Introduction

NEC Consultants pvt ltd hired the services of SGS Pakistan (Pvt.) Ltd. to conduct environmental monitoring at Vehari Industrial Estate. Environmental monitoring was conducted at mutually agreed sampling point with the client. This report is prepared on the basis of monitoring conducted at Vehari Industrial Estate. Field survey was carried out on June 12-13, 2015 for monitoring of ambient air quality and metrological conditions.

1.1 Study Objectives

Followings were the main objectives of the study:

- To assess the impact of facility operations on the quality of ambient air.
- To develop the strategies for improvement of environmental performance in the areas where it is exceeding local and international standards.

1.2 Scope of Services

Scope of services covered following main components:

- Ambient Air Quality Monitoring
- Monitoring of Weather Conditions

1.2.1. Ambient Air Quality Monitoring

In accordance to National Environmental Quality Standards (NEQS) the following priority pollutants were monitored in the ambient air.

- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO₂)
- Sulphur Dioxide (SO₂)
- Particulate Matter (PM₁₀)

In addition to above mentioned parameters, the weather conditions were also monitored in order to interpret ambient air quality. For the purpose following parameters were monitored:

- Ambient Temperature
- Relative Humidity
- Barometric Pressure



- Wind Direction
- Wind Velocity

1.3 Schedule

Detailed monitoring was conducted at the advised monitoring point. The monitoring was conducted on June 12-13, 2015 for ambient air quality and weather conditions.

Sr. No	Monitoring Date	Monitoring Location
1	12-13 June, 2015	Vehari Industrial Estate



2. METHODOLOGY



2. Methodology

Following is the brief description of methodology adopted for this environmental monitoring:

2.1. Ambient Air Quality

Ambient air quality was monitored with the help of Mobile Air Quality Station equipped with the state of the art ambient air analyzers. Selection of sampling point was made considering the wind direction at the advised sampling site. Following pollutants were measured during monitoring:

- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO₂)
- Sulphur Dioxide (SO₂)
- Particulate Matter (PM₁₀)

2.1.1. Carbon Monoxide

Carbon monoxide monitoring was carried out using gas filter Correlation CO analyzer. Measurement range of the analyzer is 0-100 ppm. Continuous data was recorded for duration of 24 hrs and hourly average is reported. Reference method used for detection of CO is USEPA Method RFCA-0981-054.

2.1.2. Nitrogen Dioxide

Nitrogen Dioxide at the project site was measured using chemiluminescent analyzer. Measurement range of the analyzer is 0-50 ppb and 0-1000 ppm. Reference method used for detection of NO₂ is USEPA Method RFNA-1289-074.

2.1.3. Sulphur Dioxide

Concentration of Sulphur dioxide in ambient air of the project site is measured by using Pulsed Fluorescent Analyzer. Measurement range of the analyzer is 0-50 ppb and 0-1000 ppm. USEPA Designated Method EQSA-0486-060 was used to measure SO₂ concentrations.

Table 1: Methodology of Ambient Air Quality Monitoring

Air Pollutant	Monitoring Technique	Method	Measurement Range	Lowest Detection Limit
Carbon Monoxide (CO)	Gas Filter Correlation CO Analyzer	USEPA Designated Method RFCA-0981-054	0 – 100	0.01 mg/m ³
Sulphur Dioxide (SO ₂)	Pulsed Fluorescent Analyzer	USEPA Designated Method EQSA-0486-060	0 – 50 µg/m ³ 0 – 100 mg/m ³	1 µg/m ³
Nitrogen Dioxide (NO ₂)	Chemiluminescent Analyzer	USEPA Designated Method RFNA-1289-074	0 – 50 µg/m ³ 0 – 100 mg/m ³	1 µg/m ³
Particulate Matter (PM ₁₀)	High Volume Sampler (Gravimetric Method)	40 CFR 50, App. J (US-EPA)	1 - 1000 µg/m ³	1 µg/m ³

2.1.4. Particulate Matter (PM₁₀)

Particulate matter concentration in terms of PM₁₀ was monitored in the ambient air with the help of high volume sampler (gravimetric method). PM₁₀ sampling was conducted for 24 hours at mutually agreed sampling locations. This method is applicable to measure ambient Particulate Matter PM₁₀ concentration from 01 to 1000 µg/m³.

2.2 Meteorological Conditions

In addition to the advised parameters for ambient air quality, weather conditions were also monitored continuously for 24 hours with the help of Davis Vantage Pro-2 installed in mobile weather station. Selection of monitoring points was made considering the wind direction at the advised sampling points.



3. RESULTS & DISCUSSION

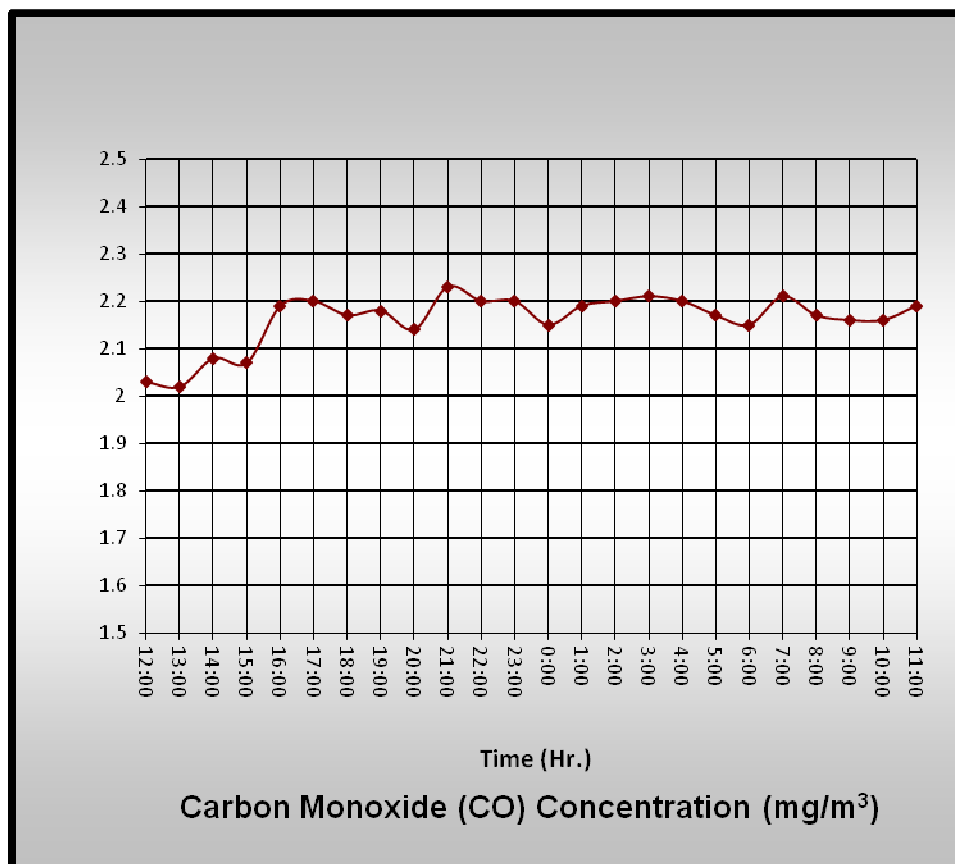
3. Results and Discussion

SGS Pakistan (Pvt.) Ltd. Conducted a monitoring at client's advised sampling point. Scope of this monitoring covered monitoring of ambient air quality and weather conditions. The monitoring results are given as **Annexure I to II**.

The results of ambient air quality monitored for 24 hrs are given in **Annexure-II** of the report. National Environmental Quality Standards (NEQS) for Ambient given in **Annexure-III** used for comparison.

The average concentration of carbon monoxide (CO) for 08 hrs according to the National Environmental Quality Standards (NEQS) for Ambient Air should not exceed from 5.0 mg/m^3 . The average value obtained at monitoring site was 2.16 mg/m^3 at Vehari Industrial Estate.

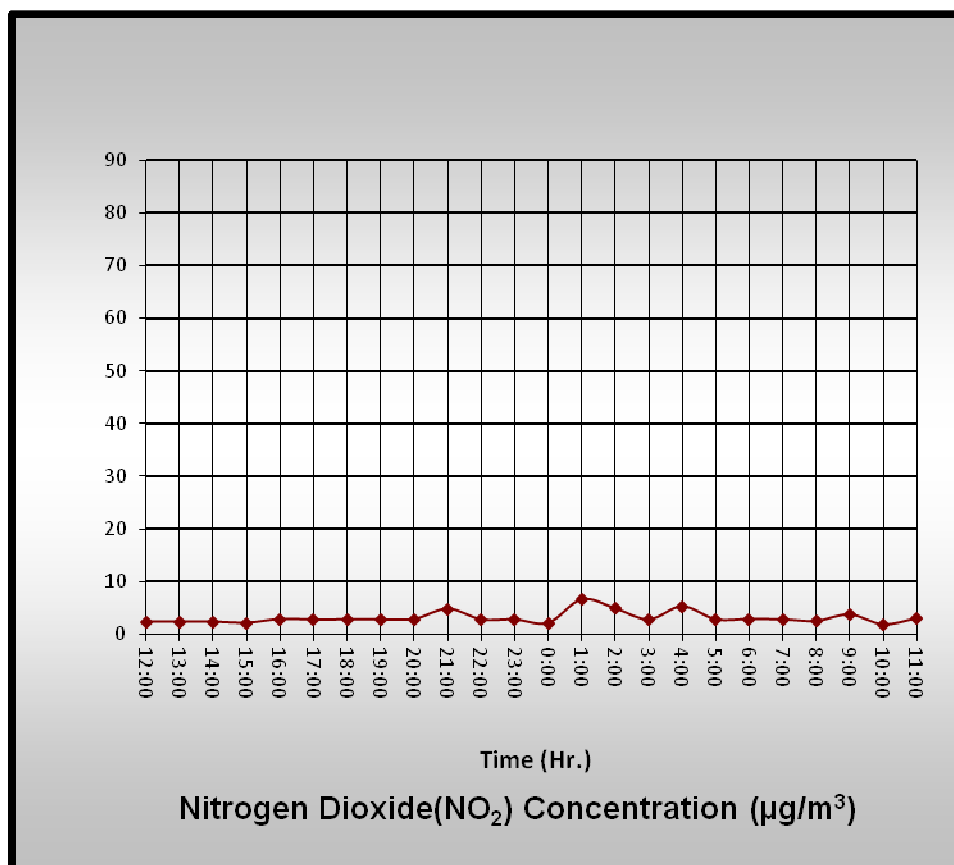
Graph 01 shows prevailing concentrations of CO in mg/m^3 at monitoring point during 24 hrs of monitoring.



Graph 01: CO Concentration during 24 Hrs. Monitoring at Vehari Industrial Estate

Average 24 hrs arithmetic mean mentioned in Environmental Quality Standards (NEQS) for Ambient Air for Nitrogen Dioxide (NO_2) is $80 \mu\text{g}/\text{m}^3$. The average value obtained at monitoring site was found $3.12 \mu\text{g}/\text{m}^3$ at Vehari Industrial Estate.

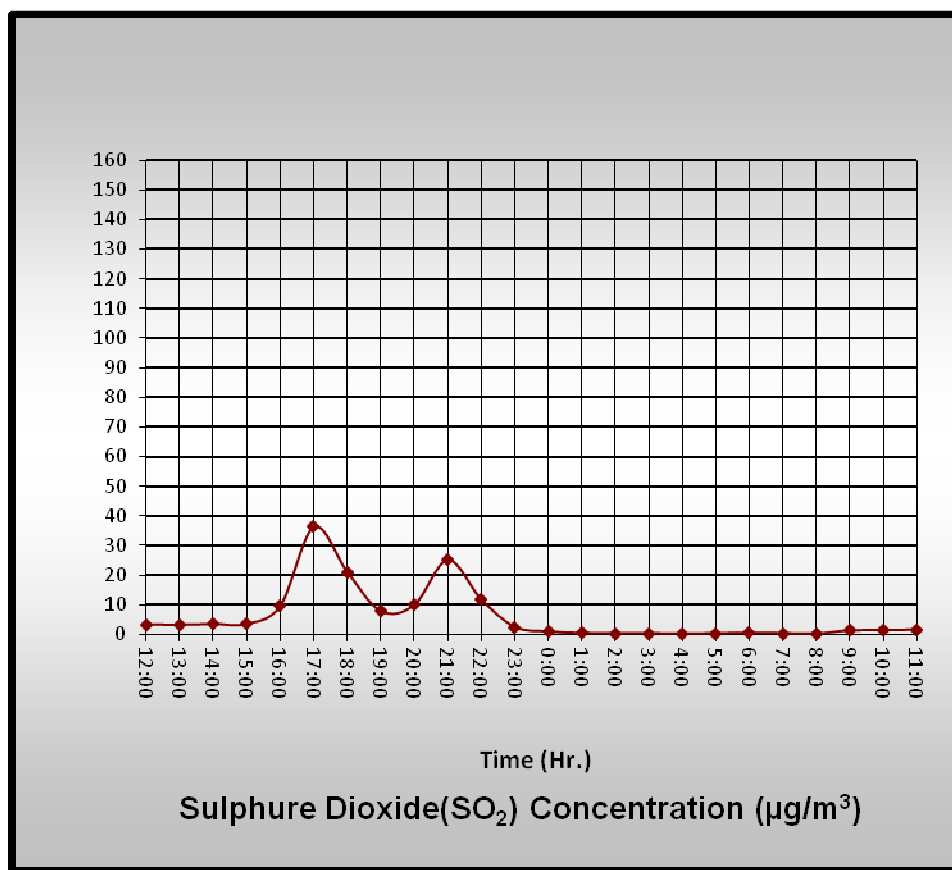
Graph 02 shows prevailing concentrations of NO_2 in $\mu\text{g}/\text{m}^3$ at monitoring point during 24 hrs of monitoring.



Graph 02: NO_2 Concentration during 24 Hrs. Monitoring at Vehari Industrial Estate.

According to standard the 24 hrs concentration of Sulphur Dioxide (SO_2) in ambient air should not exceed from $120 \mu\text{g}/\text{m}^3$ while the average value obtained at monitoring site was found $6.04 \mu\text{g}/\text{m}^3$ at Vehari Industrial Estate.

Graph 03 shows prevailing concentrations of SO_2 in $\mu\text{g}/\text{m}^3$ at monitoring point during 24 hrs of monitoring.



Graph 03: SO₂ Concentration during 24 Hrs. Monitoring at Vehari Industrial Estate.

However the results of both nitrogen dioxide and sulphur dioxide were found very well within the limits defined in National Environmental Quality Standards (NEQS).

The ambient particulate matter PM₁₀ was found in the range of 102.5 µg/m³ at Vehari Industrial Estate, against standards value 150 µg/m³.

Table 2: Average Obtained Concentrations of Priority Pollutants

Parameters	Unit	Average Concentration (24 hrs. Duration)	NEQS
Oxides of Nitrogen (NO ₂)	µg/m ³	3.12	80 (µg/ m ³) For 24 Hours
Sulphur Dioxide (SO ₂)	µg/m ³	6.04	120 (µg/ m ³) For 24 Hours
Carbon Monoxide (CO)	mg/m ³	2.16	05 (mg/m ³) For 08 Hours
Particulate Matter (PM ₁₀)	µg/m ³	102.5	150 (µg/ m ³) For 24 Hours



Annexure – I

Meteorological Data



Meteorological Data

Client : NEC Consultants pvt ltd.
Monitoring Point : Vehari Industrial Estate
Monitoring Location : Vehari
Date of Intervention : June 12-13, 2015

Time	Ambient Temperature	Wind Direction	Wind Speed	Humidity	Pressure (mm of Hg)
	^o C		m/s	%	
12:00	40	N	7.6	36	747.2
13:00	41	NE	8.4	39	747.1
14:00	41	NE	10.3	35	747.2
15:00	42	NE	8.5	33	746.8
16:00	41	NE	8.5	33	746.3
17:00	41	N	7.6	33	745.7
18:00	39	NE	5.8	36	745.4
19:00	37	NE	4.5	42	745.4
20:00	36	NE	2.2	46	745.7
21:00	33	NE	1.3	54	745.9
22:00	32	N	0.4	62	746.2
23:00	31	N	1.3	68	746.2
00:00	30	N	1.3	70	746.4
01:00	30	N	1.8	67	746.4
02:00	30	NW	2.2	69	746.0
03:00	30	NW	1.8	67	745.8
04:00	31	NW	3.6	62	745.9
05:00	31	N	4.5	61	746.0
06:00	31	N	5.4	62	746.2
07:00	32	N	5.4	59	746.5
08:00	34	N	8.0	56	746.8
09:00	36	N	7.6	51	747.0
10:00	38	N	7.6	46	747.2
11:00	38	N	5.4	47	746.9

- This report is not valid for any negotiation.
- All transactions are rendered by the Company under the General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, Indemnification and Jurisdiction issues defined therein.

For and on behalf of,

SGS PAKISTAN (PVT) LTD

E(QA)

SH



Annexure – II

Ambient Air Quality Monitoring Data



Ambient Air Quality

Client : NEC Consultants pvt ltd.
Monitoring Point : Vehari Industrial Estate
Monitoring Location : Vehari
Date of Intervention : June 12-13, 2015

Sr. #	Time	CO (mg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)
1	12:00	2.03	2.37	3.28
2	13:00	2.02	2.39	3.15
3	14:00	2.08	2.35	3.41
4	15:00	2.07	2.15	3.46
5	16:00	2.19	2.86	9.62
6	17:00	2.2	2.74	36.38
7	18:00	2.17	2.78	21.08
8	19:00	2.18	2.78	7.77
9	20:00	2.14	2.86	9.9
10	21:00	2.23	4.83	25.19
11	22:00	2.2	2.77	11.75
12	23:00	2.2	2.77	2.43
13	00:00	2.15	2.12	0.91
14	01:00	2.19	6.61	0.38
15	02:00	2.2	4.88	0.27
16	03:00	2.21	2.77	0.28
17	04:00	2.2	5.27	0.2
18	05:00	2.17	2.79	0.27
19	06:00	2.15	2.87	0.49
20	07:00	2.21	2.79	0.34
21	08:00	2.17	2.48	0.18
22	09:00	2.16	3.72	1.28
23	10:00	2.16	1.82	1.34
24	11:00	2.19	2.99	1.51
Average Concentration		2.16	3.12	6.04

- This report is not valid for any negotiation.
- All transactions are rendered by the Company under the General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, Indemnification and Jurisdiction issues defined therein.

For and on behalf of,

SGS PAKISTAN (PVT) LTD

E(QA)

SH



Ambient Air Quality

Client : NEC Consultants pvt ltd.
Monitoring Point : Vehari Industrial Estate
Monitoring Location : Vehari
Date of Intervention : June 12-13, 2015

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	NEQS
Nitrogen Dioxide (NO ₂)	µg/m ³	24Hours	1.00	3.12	80 (µg/ m ³) For 24 Hours
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	6.04	120 (µg/ m ³) For 24 Hours
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	2.16	05 (mg/m ³) For 08 Hours
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	2.00	102.5	150 (µg/ m ³) For 24 Hours

µg/m³: microgram per cubic meter

mg/m³: miligram per cubic meter

LDL: Lowest Detection Limit

ppm: parts per million

NEQS: National Environmental Quality Standards

For and on behalf of,

SGS PAKISTAN (PVT) LTD

E(QA)

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Annexure – III

Standards

National Environmental Quality Standards (NEQS) for Ambient Air

Concentration in Ambient Air				
Pollutants	Time- Weighted Average	Effective from 1 st July 2010	Effective from 1 st January 2013	Method of measurement
SO ₂	Annual Average*	80 µg/m ³	80 µg/m ³	-Ultraviolet Fluorescence Method
	24 hrs**	120 µg/m ³	120 µg/m ³	
NO	Annual Average*	40 µg/m ³	40 µg/m ³	Gas Phase Chemiluminescence
	24 hrs**	40 µg/m ³	40 µg/m ³	
NO ₂	Annual Average*	40 µg/m ³	40 µg/m ³	Gas Phase Chemiluminescence
	24 hrs**	80 µg/m ³	80 µg/m ³	
O ₃	1 hr	180 µg/m ³	130 µg/m ³	Non Dispersive UV Absorption Method
Suspended Particulate Matter (SPM)	Annual Average*	400 µg/m ³	360 µg/m ³	High Volume Sampling (average flow rate not less than 1.1 m ³ /minute)
	24 hrs**	550 µg/m ³	500 µg/m ³	
Respirable Particulate Matter (PM ₁₀)	Annual Average*	200 µg/m ³	120 µg/m ³	-β Ray Absorption Method
	24 hrs**	250 µg/m ³	150 µg/m ³	
Respirable Particulate Matter (PM _{2.5})	Annual Average*	25 µg/m ³	15 µg/m ³	-β Ray Absorption Method
	24 hrs**	40 µg/m ³	35 µg/m ³	
	1 hr	25 µg/m ³	15 µg/m ³	
Lead (Pb)	Annual Average*	1.5 µg/m ³	1 µg/m ³	ASS Method after sampling using EPM 2060 or equivalent Filter paper
	24 hrs**	2 µg/m ³	1.5 µg/m ³	
Carbon Monoxide (CO)	8hrs**	5 mg/m ³	5 mg/m ³	Non Dispersive Infra Red (NDIR) Method
	1 hr	10 mg/m ³	10 mg/m ³	

*Annual arithmetic mean of minimum 104 measurements in a year, taken twice a week 24 hourly at uniform interval.

**24 hourly/ 8 hourly values should be met 98% of the in a year. 2% of the time. It may exceed but not on two consecutive days.