

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

INSTALLATION OF INCINERATION UNIT



M/S KARAMAT ULLAH UNIT

JAHANIAH ROAD DISTRICT KHENWAL

JANUAR 2018

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List of Abbreviations

AHs	Affected Houses/Households
AOI	Area of Impact
RT	Retention Time
ST	Septic Tank
APs	Affected Population
BHU	Basic Health Unit
BOD	Biochemical Oxygen Demand
BOQ	Bill of Quantity
CBO	Community Based Organization
CCR	<i>community complaint register</i>
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COD	Chemical Oxygen Demand
dB	Decibel
DO	District Officer
ECM	Entitlement and Compensation Matrix
ED	Environment Department
SI	Soil Investigations
IEE	Initial Environment Examination
EMMP	Environment Management and Monitoring Plan
EPA	Environment Protection Act\Agency
ERP	Environmentally Responsible Procurement
GIS	Geographical Information System
GOP	Government of Pakistan
Govt.	Government
GST	General Sales Tax
IES	International environment specialist
ILO	International Labor Organization
LAA	Land Acquisition Act
MBBS	Bachelors in Medicine Bachelors in Surgery
NCS	National Conservation Strategy
NEQS	National Environment Quality Standards
NGO	Non-Government Organization

NO2	Oxides of nitrogen
OP	Operational Procedure
PAI	Project Area of Impact
Pak-EPA	Pakistan Environmental Protection Agency
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environment Protection Council
PEPO	Pakistan Environmental Protection Ordinance
PKR	Pakistan Rupee
PPM	Parts per Million
SWM	Solid waste Municipal
S IEE	Summary of IEE
SEIMP	Social Environment Impact Assessment
SOP	Survey of Pakistan
TOR	Terms of Reference

Annexure

Annexure I	Term Of Reference
Annexure II	Lab Reports
Annexure III	Photo log
Annexure IV	Survey Questionnaire
Annexure V	Ownership Document
Annexure VI	Consultant Firm Profile
Annexure VII	Glossary
Annexure VIII	References
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Executive Summary

The executive summary presents an overview of the main findings of Environmental Impact Assessment (EIA) of the project of M/s Karamat Ullah S/o Inyat Ullah Tehsil kabirwala District Khenwal, The project mainly deals with the storage, handling & Incinerate of various type of Industrial waste and plan to incinerate these waste by installing three chambers of incinerator in project area Waste, by definition, is something that the producer no longer requires and therefore discards. In many industrial economies, the traditional approach to waste has been to dispose of it as cheaply as possible, without much concern as to what happens once the waste leaves the producer's premises. **Incineration** of **waste** materials converts the **waste** into ash, flue gas, and heat. Ash may be used for composting in future. The ash is mostly formed by the inorganic constituents of the **waste**, and may take the form of solid lumps or particulates carried by the flue gas.

This attitude is now changing as greater environmental awareness is reflected in more stringent waste management legislation and a genuine desire on the part of industry to improve environmental performance and meet customers' expectations. The environmental risks associated with poor waste management are well known and understood. Carelessly disposed of wastes, such as solvents, can leach into the groundwater and contaminate drinking water supplies. Poorly planned and managed landfills will create a significant neighborhood nuisance, and where landfill gas and leachate are not properly treated there will be a serious threat to the safety of local residents. Old, closed dumps and landfills are likely to be contaminated land which may be difficult or dangerous to remediate and redevelop. Incinerators operated without adequate pollution abatement equipment will release highly toxic dioxins. Even recycling and composting facilities can be a source of litter and unpleasant odor if not properly regulated. Waste producers carry their share of responsibility to ensure that such polluting incidents do not occur.

Total proposed project cost includes Rs 30, 00,000. This includes the cost of land, machinery, fabrication and erection. Where environmental budget includes 100,000. Good waste management protects the environment and improves profitability – but for those who are not sufficiently motivated by these incentives, increasingly stringent national and international legislation is compelling many producers to review their waste procedures

Category of Project:

The project falls under Schedule II (list of projects requiring EIA category G-1), according to the Environmental protection agency, Government of Punjab Lahore and EIA / EIA Regulations 2000 made under section 12 of Pakistan Environment Protection Act 1997 (Amended 2012) under which the Environmental Impact Assessment (EIA) is mandatory for getting Environmental Approval. The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project.

Location:

M/s Karamat Ullah S/o Inyat Ullah Jahanian Road ,Tehsil kabirwala District khanewal
108, E-Block Sabzazar, Lahore.

Detail of Consultant

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Objectives/outline of the Project:

Installation of Incineration Unit for

- Source Reduction and waste minimization
- Proper handling and storage of industrial waste
- Substitute less hazardous chemicals whenever possible.
- When planning experiments or demonstrations, examine all wastes generated and ask if they could be minimized and how.
- Reduce the scale of processes so that less waste is generated.
- Minimize the volume of waste solutions.

The purpose of this report, environmental and social baseline data and conditions at/ around the project site has been undertaken. The data has been gathered from different sources of information including consultation with the project proponent, private visits, fields surveys, desktop studies, existing information sources, interviews with the people near the project has been conducted to collect their opinion regarding to the project after findings it has been concluded that project will not have any adverse impact on the socio economic environment of the exiting community or environment. As the project is in industrial area so the functioning of the project would not be the reason of nuisance for the nearby community. More ever project will have and positive impact in term of employment opportunities, will create jobs during construction and operational and will contribute to the national economy by meeting the demands. Most of the predicted impacts are insignificant and other are of limited nature, so far this regard necessary mitigation measure and improvement have been suggested and proposed.

Although there will be no exploitation and depletion of nature resources due to this project. The oversee the Environmental performance of the project through its lifecycle enforcing

the NEQS and environmental monitoring program has been conducted which ensures effective surveillance of environmental parameters at the various stages of project development and compliances with the NEQS and legal obligations.

2. Operation Phase

Potential Negative	Recommended Mitigation Measures	Monitoring Responsibility	Parameters For
Solid Waste	Wastes will not be disposed off in the open and on-site burning of waste materials will be eliminated. Dedicated waste segregation units / containers will be built or Placed.	Proponent	Solid Waste Management
Noise Pollution	Generators and vehicles used during the operation will be properly tuned and maintained to minimize noise and air emissions. The access road will be watered regularly to minimize dust emissions (If required).	Proponent	Noise Level
Waste Water	Contaminated water will be disposed off into natural flowing nullah Flowing nearby.	Proponent	Water Quality

Environmental Management approach for the project has been presented for the design, construction phase and to mitigate the adverse impact during design and construction phase, essential mitigation measures has been recommended and for their sound implementation and environmental management plans (EMPs) has been frame out.

More over some recommendations have been suggested to the project foe making the further improvements

Summary of Impact and mitigation

Proper Storage site design area

- Protection from climate
- Good ventilation
- Minimum risk of explosion or unplanned released
- Impermeable base material to control leak and spill contamination
- Not subject to flooding
- Away from residential area
- Ideally in industrial area
- Good access to emergency services
- Good drainage system and adsorption material for spill
- Comply with regulation

Mitigation Plan

The mitigation plan is a key component of the EMP. It lists all the potential effects of the project and their associated mitigation measures identified in the EIA. For each impact, the mitigation measures are suggested as below

1. Construction Phase

Potential Negative	Recommended Mitigation Measures	Monitoring Responsibility	Parameters For
Dust Emissions	On construction during periods generation be Spraying of water. exposed Surface dry/windy fugitive dust will be suppressed by	Proponent / Contractor	Air Quality
Soil Erosion	Exposed be resurfaced stabilized as soon as possible Surface will and	Proponent / Contractor	Soil
Solid Waste Generation	Dedicated segregation units will be Provided. Recyclable items will be provided to recycling contractors waste e be to	Proponent / Contractor	Solid Waste Management
Vehicular Traffic and Noise	Vehicles and other noisy equipment's should be in good Conditions. Noisy construction activities will be carried out only during normal Working hours.	Proponent/contractor	Noise Level

Environment and Landscape	Creation of landscape by tree planting, species Introduction or landscaping Condition will be done.	Proponent	Environment and Landscape
Odor	This impact can be mitigated by installation of the misting systems with deodorants to mask or neutralize odors with the seasonal Adjustments. At the end of the day cover all the SW with the soil to reduce odor and air-blown Movement of litter.	Proponent	Through smell
Leachate	Collect leachate in the leachate pond and spray the leachate on the landfill site by using sprinkler and transport the leachate to the specific industry for further use	Proponent	Leachate

Waste Storage

The project site will be available with the liquid storage tanks and store for temporary waste storage. This facility could create impacts of major significance if not properly handled and supervised The tanks have inlet and outlet valves to dump and emptying the tank. This storage facility would help:

- To prevent scavenging of waste
- Scattering of waste with wind
- * Nuisance from smell and odor
- * Protect the waste from sunlight and rain
- * Recommended Mitigation Measures
- The storage facility requires following measures to be adopted for safe and healthy working conditions without affecting personnel's health and environment-
- Medical waste should be incinerated the on the day it is received, if not possible, the medical waste (yellow hag) won't be stored for more than 24 hrs. The storage tank must be marked as hazardous storage facility. The workers must wear personal protective equipment like Gas mask, gloves, overall and safety shoes before entering the storage tank
- * Ensuring the housekeeping of area around the storage tanks and especially inside the facility
- * Waste will come from different sources which may includes from Hazardous/Non-Hazardous Solvents, waste/scrap, WWTP Sludge from all kind of industries like beverages, food,

Agri, petrochemical, pharmaceutical, paint, fertilizers, pesticides, chemical, and hospital are approximately 3-5 tons which will usually come from truck under the proper cover which avoids the pollution during the movements or transportation. Hospitals or hazardous waste segregated on the source by the competent persons & transportation will be enclosed container for transport. Storage of waste NOC also applied in EPD for approval. Whereas, there temperature will be normal or room temperature. In case of any chemical it will be settled according to the MSDS of the relevant chemical which will be provide by vendors. No Hazardous waste will be stored more than 1 hour it will be incarnated according to the nature of the waste. Warehouses are in placed with approx. 14000 sq ft,

Type of industrial waste

Waste will come from different vendors which may includes from Hazardous/Non-Hazardous Solvents, waste/scrap, WWTP Sludge from all kind of industries like beverages, food, Agri, petrochemical, pharmaceutical, paint, fertilizers, pesticides, chemical, and hospital are approximately 3-5 tons which will usually come from truck under the proper cover which avoids the pollution during the movements or transportation. Hospitals waste segregated on the source & the competent persons will use enclosed container for transport

Hospital Waste

. Hospitals or hazardous waste segregated on the source by the competent persons & transportation will be enclosed container for transport. It depends on the generation of the waste from industrial or other clinical waste. This will operate in 3 shifts where incarnation of the organic waste waste will be going on 24 hours & hazardous waste will be incarnated on immediate basis when received in the facility. Whereas, proper enclosed & designated storage also placed.

Usually 20 ft enclosed container used for hospital waste, which will be incinerated on immediis. All of transportation will be done by different size Truck or trolleys depends on the size of the waste.

Land scaping

Following excavation planting pits shall be filled with the sweet soil mixture. Three days prior to planting pits must be filled with water for consolidation of soil.

The dimensions of the planting pits are following:

- A. Trees : 3 *3*3
- B. Shrubs 2*2*2
- C. Hedges 2 wide * 2 deep
- D. Creeps and vines : 2 wide * 2 deep
- E. Edges and flowering beds
- F. Perforated drainage pipes
- G. Planting mixture
Plant preparation

The contractor shall be responsible for the preparation of the lawn area and planting lawn. The lawn area is to be brought up within 4th of the existing grades.

Cover the sweet soil with the decomposed organic matter. The prepared surface shall be free .The lawn beds shall be fine graded to remove all ridges and depressions. Surface irregularities resulting from other operations shall be leveled to prevent depressions. Grades shall be adjusted to assure that the after settlement and light rolling.

Rolling shall be done at two directions at right angle to each other. Rolling shall be in such a manner to climate the necessity for walking on the finished grades.

Power requirement:

Power requirement is fulfill by (200KW- 250KW) by WAPDA

Proposed monitoring:

The EMP is prepared to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of: (i) providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site;

(ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact (iv) ensuring that safety recommendations.

Conclusion:

After a through Environment Impact Assessment (EIA) of all intended activities and environmental setting it has been concluded that the said project shell no exert any major impact on local environment. The residual impact of the activity are preventable provided all activities are carefully planned and the mitigation discussed herein are adequate considered during the planning and execution phase of the project. So it is requested for the environmental approval for the said project.

CHAPTER NO 1

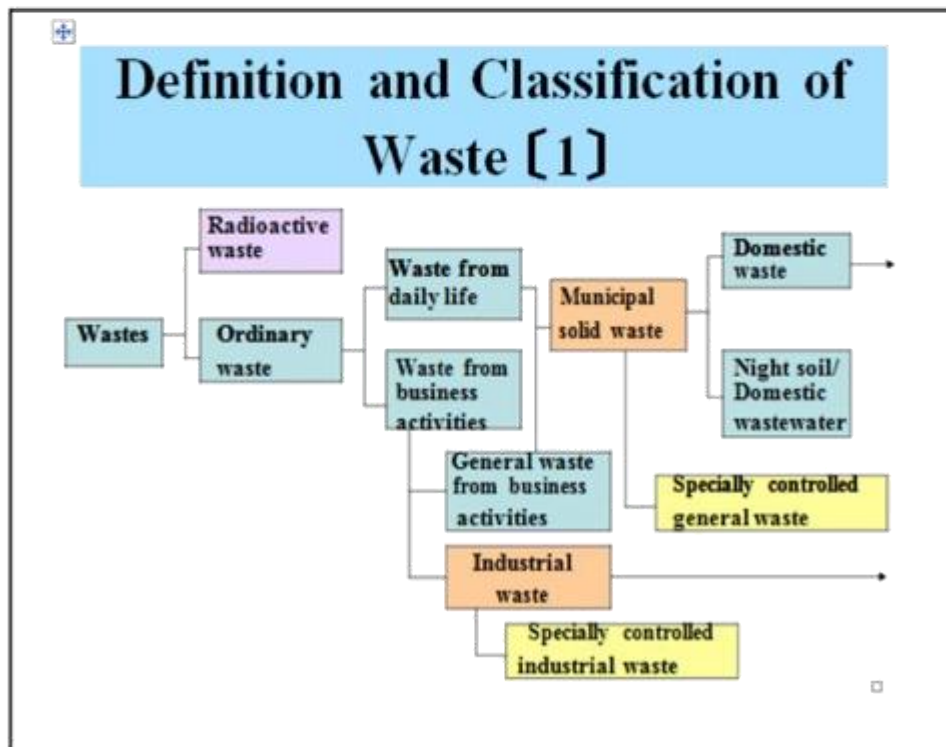
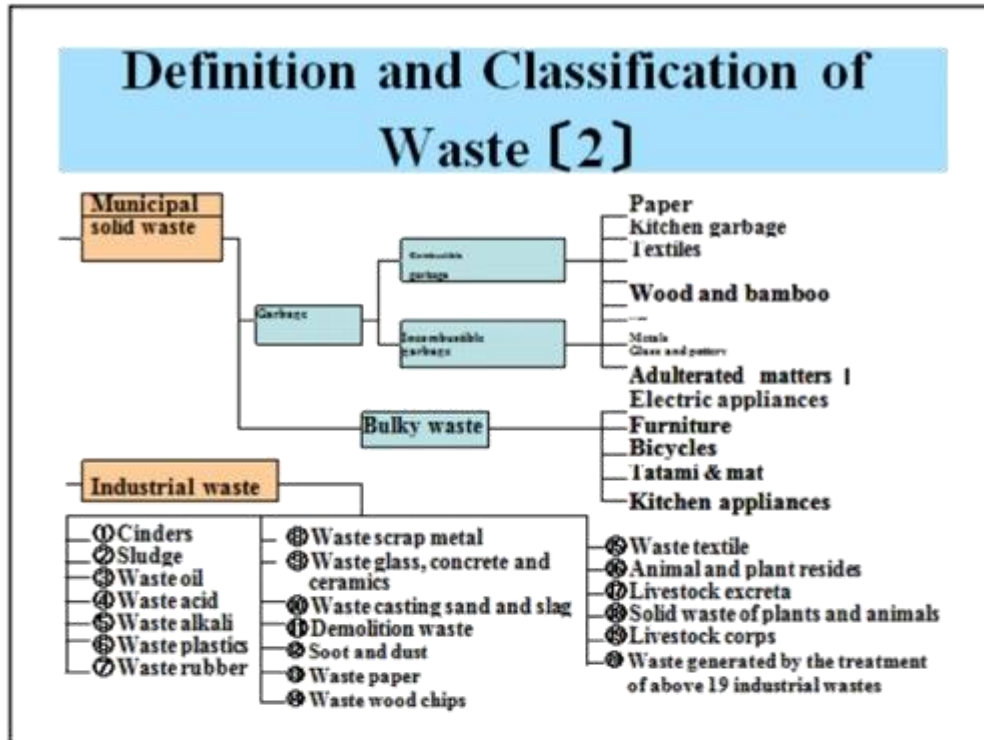
Introduction

This Section of the report provides an overview of the rationale of the Project, objective of project, requirement of the project, purpose of the report and approach adopted to conduct the Initial Environmental Examination (EIA).

The project mainly deals with the storage, handling & Incinerate of various type of Industrial waste. Waste, by definition, is something that the producer no longer requires and therefore discards. In many industrial economies, the traditional approach to waste has been to dispose of it as cheaply as possible, without much concern as to what happens once the waste leaves the producer's premises. This attitude is now changing as greater environmental awareness is reflected in more stringent waste management legislation and a genuine desire on the part of industry to improve environmental performance and meet customers' expectations

The environmental risks associated with poor waste management are well known and understood. Carelessly disposed of wastes, such as solvents, can leach into the groundwater and contaminate drinking water supplies. Poorly planned and managed landfills will create a significant neighborhood nuisance, and where landfill gas and leachate are not properly treated there will be a serious threat to the safety of local residents. Old, closed dumps and landfills are likely to be contaminated land which may be difficult or dangerous to remediate and redevelop. Incinerators operated without adequate pollution abatement equipment will release highly toxic dioxins. Even recycling and composting facilities can be a source of litter and unpleasant odor if not properly regulated. Waste producers carry their share of responsibility to ensure that such polluting incidents do not occur.

Under no circumstances should hazardous wastes be discharged into the environment in an effort to "save money," as a matter of "convenience," or due to carelessness in planning, preparation, operations or design



Specially controlled wastes are wastes that are explosive, toxic, infectious, or otherwise hazardous so that they can cause damage to people's health or living environment. These wastes are to be disposed of in accordance with special disposal standards, control standards, etc. Specially controlled wastes are classified into two kinds those are industrial and general wastes.

Industrial waste management facilities" includes "intermediate treatment facility" and "final disposal facility" prescribed in the enforcement order that may impact on the living environment. On the above facilities, any party, that may be the central or a local government, is requested to obtain the construction permit.

An institutional exception is introduced where a party operating recovery business is able to operate without the permit provided that he has the concerned approval of the Minister of the Environment.

Purpose of the Report:

The purpose of Report is to conduct Environmental Impact Assessment (EIA) of proposed project. The EIA is conducted under the Legal framework of Pakistan Environmental Protection Act, 1997 and Review of IEE/EIA Regulations, 2000 to seek the Environmental Approval. In compliance with the applicable Environmental Regulations, proponent decided to get the NOC of the project, through consultants. In order to fulfill the legal requirement of Punjab Environmental Protection (Amendment) Act 2012, Section 12; for obtaining No Objection Certificate from Environmental Protection Agency (EPA), Government of Punjab, Lahore, this Environmental Impact Assessment (EIA) Report is being submitted to the said agency. The EIA Report, as desired by EPA, has been prepared according to the prescribed by the "Guidelines for the Preparation of Environmental Reports, 1997" and "Review of IEE/EIA Regulations, 2000."

The other relevant regulations and guidelines considered while preparing this EIA report includes:

- ! Policy and procedures for filing, review and approval of the environmental assessments.
- ! Guidelines for the preparation and review of environmental reports.
- ! Guidelines for public participants
- ! Guidelines for sensitive and critical areas.
- ! Detailed sector guidelines.

This EIA identifies, describes and evaluates the potential environmental impacts that could result from the implementation of the project, and include possible cumulative impacts from all the activities. It also identifies required environmental permits relevant to the project. As appropriate, the affected environment and environmental consequences of the project may be described in terms of regional overview or site-specific descriptions. The Report also identifies measures to prevent or minimize environmental impacts. The report highlights existing environmental, social, physical and

environmental impact. The monitoring plan is also described in the report.

The EIA Report describes environmental, socio- economic, physical, and environmental, land use, crops, forestry, water bodies, bio diversity and other relevant aspects associated with this project. It also describes mitigation measures to be adopted.

The EIA Report also provides information as desired under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired NOC.

a. Detail of Proponent

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members have extensive experience in their fields with international agencies like Asian Development Bank, World Bank, JICA, UNDP, JICB etc. and are familiar with the policies and guidelines of these agencies.

Pak Enviro team of professional environmental and social consultants provides superior solutions for environmental, natural, cultural and sustainable resource needs in private and public sectors. Recognized for excellent customer service and modern-leading technical expertise, Pak Enviro specializes in Environmental Laws and Regulation of the local, state and federal agencies;

- economic development including; developing, monitoring and evaluation of environmental and social issues of engineering projects.*
- b. To carry out Feasibility studies and preparation of feasibility reports regarding establishment of Environmental Project, EIA (Initial Environmental Examination) and EIA (Environmental Impact Assessment) process as per and subject to laws of land, Risk Assessment of Hazardous Chemical Storage and Post Project Monitoring.*
 - c. To do, run, operate and establish the biogas plant, bio-digesters, environmental control Plants and Projects.*
 - d. To develop household, community, agriculture and industrial solar energy plans, wind mills and water efficient technologies and develop infrastructure and run and operate all alternate energy technologies.*
 - e. To carry out the consultancy services in the field of Environmental Audits and Compliance in industries.*
 - f. To render the consultancy services in the field of HSE (Health, Safety and Environmental) services for human being in their communities and industries in order to protect the general public and industrial workers against the environmental hazards.*
 - g. To work for the conservation of habitat, soil, energy, water and biodiversity, Supporting Rural Economic development by introducing Aquaculture and providing Training Service (General Environmental Awareness Training) for Public Awareness in Pakistan.*
 - h. To study the solid waste management systems, air and water pollution and industrial waste water treatments.*
 - i. To carry out the planning for contaminated land remediation, drinking water monitoring and fresh water assessment.*

1.1 Size or magnitude of the project:

The project mainly deals with the storage, handling & Incinerate of various type of Industrial waste under the name of M/S Karamat Ullah S/o Inyat Ullah Jahanian Road Khenwal. There are no other associated activities regarding to the project.

1.2 Need of IEE/EIA Study:

According to the section 12 of the Punjab Environmental Protection Act 2012, no proponent of a project shall commence construction or operation unless he has filed with the Federal 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 Federal

Agency approval.

Subject to the provision of this Act, Proponent Karamat Ullah must get a NOC for construction of proposed project. under section 12 of PEPA-2012 from Provincial Agency in order to start

construction, for which an Initial Environmental Examination (EIA) Report is mandatory for getting Environmental Approval as this project comes under the Schedule II (list of projects requiring EIA), Category.G-1

The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project. The EIA report has been prepared under the format of guidelines issued by EPA.

The applicable laws for the environmental study of the project are briefly given below:

- Punjab Environment Protection Act, 2012
- National Environmental Policy, 2005
- Review of EIA and EIA Regulations, 2000
- Guidelines for Preparation and Review of Environmental Reports, 1997.
- Solid Waste Management Rules 2005
- National Environmental Quality Standards 2000
- Punjab Land Use Rules 2009

1.3 Objectives of Environmental Impact

Assessment The objectives of EIA are as follows:

- To access and establish the existing environmental condition of the area.
- To implement and execute environmental safeguards.
- To propose mitigation and monitoring measures that can be incorporated into the operation of the project to remove or reduce any damaging effects as far as possible.
- To prepare an EIA Report as per the relevant guidelines for submittal to the concerned EPA.

1.4 Extent of EIA Study

Following factors have been taken in the account to assess the Environmental Impacts of the proposed project:

- Environmental impacts due to land use, location, waste generation, utility services consumption and emergency spillage etc.
- Environmental impacts of physical resources i.e. soil, topography, geology, climate, air quality etc. ecological resources i.e. flora and fauna as well as health and safety of workers.

1.5 Scope of the Study

- Scoping identifies the key issues of concern at an early stage of planning process to assess range of impacts and need for EIA. Scoping is a process of interaction. Scoping identifies boundaries of the EIA study, important issues of concern
- It identifies concerns, evaluates them, organizes and presents them to assist analysis and decision making. For achieving the above objective, the study is mainly divided into the following sub tasks.
- Identification of the various legal/statutory requirements as set forth by the Punjab Environmental Protection Act, 2012 and the guidelines for preparation of EIA Reports and Review of existing regulatory framework in the country with reference to the development projects
- Collection of data related to physical, ecological and socio-economic resources of the project area
- Review the available data, drawings and report to ascertain their adequacy and need for collection of additional data
- Identification and evaluation of salient environmental impacts
- Identification of necessary mitigation measures to minimize the adverse impacts.
- Preparation of Environmental Management Plan (EMP)
- Review of applicable existing environmental Legislation and National Environmental Quality Standards (NEQS)

1.6 Study Methodology

This study has been completed using a common template for project, through a qualified team. Key steps followed while conducting the study were screening, scoping, data collection and compilation, environmental screening and impact assessment, documentation and consultation. Screening process comprised compilation and review of information on the project. Most of this information was obtained from the proponents and added to data on relevant legislation, regulations, guidelines and standards. Documentation was the last step of the study, which comprised collation of data and preparation of this report along with requisite appendices in proof of the study and its findings.

1.7 Inception Procedures

In order to complete the study within the time span desired by the proponents, a team was assembled to carry out the study and specific assignments were entrusted to each member of the

team, each of whom were armed with the resources, tasks, instructions and checklists to carry out nominated tasks.

1.8 Document Resources

The purpose of discussions with the proponents was to collect documentation and background information on the project. The reliability of a study depends on authenticity and depth of baseline information to assess possible impacts on existing environment.

1.9 Public Consultation

The object of identification of stakeholders and affected persons was basically to pave the ground for public consultation in order to enlist the views of all concerned with, or about the project.

1.10 Socio-Economic Baseline Survey

A socio-economic survey was carried out to gather data about demographic characteristics of the project area, education and literacy, nature of businesses expenditure patterns, value of assets and possible impact of the project under review on all such parameters. Assessment of Environmental and Social Impacts

While assessing environmental and social impacts of the project, the factors considered included, firstly, the nature, magnitude or degree of the impact; secondly, the extent of impact on development works; thirdly, time, duration and frequency of the impact; fourthly, probability of occurrence of the impact and finally, importance or the sensitivity of impact.

1.11 Screening of potential Environmental Impacts and mitigation Measures

After a thorough review of the field notes, data collected extent of the operational project activities and detailed discussion with design team, the potential impact of the project were assessed and safety measures were proposed to mitigate the negative impacts and to enhanced the positive impacts. The potential impacts and mitigation measures were assessed covering the following parameters:

- Environmental problems due to project location
- Environmental problems related with design
- Environmental problems associated with the construction

CHAPTER NO: 2**POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK****2.0 General**

This chapter describes the current legal responsibilities of the proponent in context of environmental and sustainable development, and the institutions that exist in the country that may influence the environmental management of the project.

This section deals with the current policy as well as legal and administrative framework related to carrying out of Initial Environment Examination (IEE) of the project. An efficient and effective organization structure is essential for successful implementation of the mitigation measures identified for the project. Like other projects, the project, before its implementation, is required to go through an Environmental Assessment, in accordance with the provisions of the Punjab Environmental Protection (Amendment) Act, 2012.

2.1 Existing Regulation and Framework

This EIA study has been carried out in the light of the policy guidelines of the preparation of IEE/EIA Reports under the procedure and practices formulated by the Provincial Environmental Protection Agency (EPA).

2.2 Relevant Legal / Institutional Framework

The applicable laws for the environmental study of the project are briefly given below. The proponent of the project will abide by the applicable laws and regulations.

2.3 National Conservation Strategy, 1992

On March 1, 1992, the Cabinet of Pakistan approved the National Conservation Strategy. It describes the stark reality of the country's deteriorating resource base and its implications for what is still largely a natural resource-based economy. It sets forth the beginnings of a plan to integrate environmental concerns into virtually every aspect of Pakistani economic life.

The strategy has three overriding objectives: conservation of natural resources, sustainable development, and improved efficiency in the use and management of resources.

2.4 PEPO, 1983 and PEPA, 1997 (Amended 2012)

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO), which was replaced by the Pakistan Environmental Protection Act (PEPA) 1997, through an Act of Parliament. Now the PEPA 1997 has been replaced by Punjab Environmental Protection Act 1997 (Amended 2012) on 18 April, 2012.

IEE / EIA for all development projects, but there were no IEE / EIA regulations under that ordinance.

Under section 12 of the Punjab Environmental Protection Act, 1997 (Amended 2012) it is mandatory to take an Environmental Approval Environmental Protection Agency for commencement of any construction of project.

National Environmental Policy 2005

Government of Pakistan (GOP) has notified National Environmental Policy 2005, for different projects / aspects in which guidelines/priorities have been given to undertake / commence the projects having significant environmental impacts.

2.6 Review of IEE and EIA Regulations, 2000

The GOP has issued Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, to review the Initial Environmental Examination (IEE/EIA) / Environmental Impact Assessment (EIA) Reports.

2.7 Guidelines for the Preparation and Review of Environmental Reports, 1997

The GOP has also framed guidelines for the preparation and review of IEE/EIA of projects in various developmental sectors.

2.8 Environmental Quality Standards (NEQS)

According to PEPA, 1997 (Amended 2012), National Environmental Quality Standards (NEQS) were established for municipal and industrial effluents and air emissions. The latest revision of NEQS carried out in year 2001

2.9 Guidelines for Sensitive and Critical Areas

GOP has issued Guidelines for Sensitive and Critical Areas in October, 1997. The objective of the guideline is to provide guidance to project proponents and other stakeholders in the environmental assessment process, so that the proposed projects are planned and sited in way that protects the values of sensitive and critical areas.

2.10 Policy and procedures for the Filing, Review and Approval of Environmental Assessments, November-1997

Environmental Assessment is the Primary means of managing the approval of new development proposals in Pakistan. Environmental Assessment allows for the systematic examination of proposals, clear procedures which provide for the interests of relevant Government Departments and other stakeholders to carefully consider.

Guidelines for Public Consultation, Pakistan Environmental Protection Agency October, 1997

- This guideline is part of a package of regulations and guidelines which include:
- Environmental Protection Act, 1997 (Amended 2012)
- Guidelines for the preparation and review of Environmental Reports
- Guidelines for sensitive and critical areas

- National Environmental Quality Standards (NEQS)
- Detailed sectoral guidelines

2.11 Punjab Wildlife Protection Act, 1974

This act was framed in 1974 by the Province Punjab and is about of protection and conservation of Wildlife.

2.12 Forest Act, 1927

This act was framed in 1927. The Forest Act, 1927 is still the basic charter for the forest departments in Pakistan. This law empowers provincial governments to manage forest areas.

2.13 Explosive Act, 1884

This act deals with explosives in prohibiting either absolutely or subject to conditions, the manufacture, possession or importation of any explosive which is so dangerous in character that, in the opinion of the appropriate Government, it is expedient for public safety to issue the notification.

2.14 Punjab Local Government Ordinance, 2001

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. Under the Ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate schemes for improving the environment.

2.15 Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 268 to 291 are about offences affecting public health. The offences relating to public health safety and environment are as under;

- Sec 268: Public Nuisance
- Sec 269: Negligent act likely to spread infection of disease dangerous to life:
- Sec 270: Malignant act likely to spread infection of disease dangerous to life:
- Sec 278: Making atmosphere noxious to health:
- Sec 284: Negligent conduct with respect to poisonous substance:
- Sec. 290. Punishment for public nuisance in cases not otherwise provided for:
- Sec. 291. Continuance of nuisance after injunction to discontinue

2.16 Punjab Land Use Rules 2009

In January 2009 the Punjab Government notified “Punjab Land Use Rules 2009” for the clarification of Lahore Master Plan. In these rules permissible land use according to area type is

2.17 Antiquities Act 1975

The law relates to protection of Antiquities / monuments / National / International heritage. The compliance of this Act is mandatory for the Installation of Generators. Under section 22 of the Act no development plan or scheme or new construction can be done within distance of 200ft from the boundary of the monuments/ National Heritage. There is no Historical Site / Monuments in the proximity of the project.

2.18 Solid Waste Management Rules 2005

The Solid Waste Management Department, CDGL has notified these rules for proper waste management.

2.19 Labor Laws

The labor laws apply on child labor and measuring instruments.

2.20 Safety & Civil Defense Laws

The civil defense laws provide details about safety, fire protection and civil defense.

2.21 Guidelines for Critical and Sensitive Area

These guidelines have been prepared under section 12 of PEPA-97 (Amended 2012) for protection and safety of critical and sensitive localities.

2.22 Hazardous Substances Rules, 2003

Section4:A license will be required to import or transport a hazardous substance.

Section5:EIA of the industrial activity involving generation, collection, consignment, transport, treatment, disposal,storage,handlingorimportofhazardoussubstancewillberequiredalong with safety and waste management plan.

The rules provide information on validity, renewal and cancelation of license; packing and labeling safety precautions: entry, inspection and monitoring: safety plan waste management plan: import; and transport of hazardous substances.

2.23 Hospital Waste Management Rules, 2005

Ministry of Environment, Government of Pakistan has prepared the Hospital waste management Rules in August 03, 2005.The rules are attached as

ANNEXURE

There are Guidelines for Hospital Waste Management since 1998 prepared by the Environmental Health Unit of the Ministry of Health, Government of Pakistan, giving detailed information and covering all aspects of safe hospital waste management in the country including the risk associated with the waste, formation of a waste management team in hospitals, its responsibilities, plan, collection, segregation, transportation, storage, disposal methods, containers, and their color coding, waste minimization techniques etc. However, these guidelines are not being properly implemented. There are still no systematic approaches to medical waste disposal. Hospital wastes are simply mixed with the municipal waste in collecting bins at roadsides and disposed of similarly. Some waste is simply buried without any appropriate measure. A common practice in Pakistan is the reuse of disposable syringes. People pick up used syringes from the hospital waste and sell them, which is very danger According to these rules, every hospital shall be responsible for the proper management of the waste generated by it till its final disposal in accordance with the provision of act and the rules 16 to 22. The rules provide information on the roles and responsibilities of waste management team waste management plan, waste segregation ,waste collection, waste transportation, waste storage, waste disposal, accidents & spillages, waste minimization & reuse, inspection and hospital waste management advisory committee.

Waste segregation.- (1) Risk waste shall be separated from non-risk waste at the ward bedside, operation theatre, laboratory, or any other room in the hospital where the waste is generated by a doctor, nurse, or other person generating the waste.

bottles, drips and infusion bags shall be cut or broken and rendered non-reusable at the point of use by the person using the same, or in case any such used by such person.

(3) All risk waste other than sharps, large quantities of pharmaceuticals, or chemicals, waste with a high content of mercury or cadmium such as broken thermometers or used batteries, or radioactive waste shall be placed in a suitable container made of metal or tough plastic, with a pedal type or swing lid, lined with a strong yellow waste bag. The bags shall be removed when it is not more than three quarters full and sealed, preferably with self locking plastic sealing tags and not by stapling. Each bag shall be labeled, indicating date, point of production, ward and hospital, quantity and description of waste and prominently displaying the biohazard symbol. The bags removed should be immediately replaced with a new one of the same type.

(4) Sharps including the cut or broken syringes and needle shall be placed in metal or high density plastic containers resistant to penetration and leakage designed so that items can be dropped in using one hand and no item can be removed. The containers shall be coloured yellow and marked "DANGER! CONTAMINATED SHARPS". The sharp container shall be closed when three- quarters full. If the sharp container is to be incinerated, it shall be placed in the yellow waste bag with the other risk waste.

(5) Large quantities of pharmaceutical waste shall be returned to the suppliers.

Small quantities shall be placed in yellow waste bag preferably after being crushed, where

this can be done safely.

(6) Large quantities of chemical waste, and waste with a high content of mercury or cadmium shall not be incinerated, but shall be placed in chemical resistant containers and sent to specialized treatment facilities.

(7) Radioactive waste which has to be stored to allow decay to background level, shall be placed in a waste bag, in a large yellow container or drum. The container or drum shall be labeled, showing the radionuclide's activity on a given date, and the period of storage required, and marked "RADIOACTIVE WASTE", with the radiation symbol. Non-infectious radioactive waste which has decayed to background level, shall be placed in white waste bags. Infectious radioactive waste which has decayed to background level, shall be placed in yellow waste bags. High level and relatively long half-life radionuclide's shall be packaged and stored in accordance with instructions of the original supplier under supervision of the Radiology Officer and sent back to the supplier for disposal.

(8) Non-risk waste shall be placed in a suitable container lined with a white waste bag. Adequate numbers of non-risk waste containers shall be placed in all areas of the hospital and notices affixed to encourage visitors to use them.

17. Waste collection.-(1) Waste shall be collected in accordance with the schedules specified in the Waste Management Plan.

(2) Sanitary staff and sweepers shall, when handling waste, wear protective clothing at all times including face masks, industrial aprons, leg protectors, industrial boots and disposable or heavy duty gloves, as required.

(3) Sanitary staff and sweepers shall ensure that,

(a) waste is collected at least once daily;

(b) all waste bags are labeled before removal, indicating the point of production, ward, hospital and contents;

(c) the removed waste bags and containers are immediately replaced with new ones of the same type; and

(d) where a waste bag is removed from a container, the container is properly cleaned before a new bag is fitted therein.

18. Waste Transportation.- (1) For on-site transportation, a waste collection trolley shall be free of sharp edges, easy to load, unload and to clean, and preferably a stable three or fourwheeled

design with high sides. The trolley shall be cleaned regularly.

(2) The sealed waste bags shall be carefully loaded by hand onto the trolley to minimize the risks of punctures or tears.

(3) Yellow-bagged risk waste and white-bagged non-risk waste shall be collected on separate trolleys which shall be painted or marked in the corresponding colours.

(4) The collection route shall be the most direct one from the final collection point to the central storage facility designated in the Waste Management Plan. The collected waste shall not be left even temporarily anywhere other than at the designated central storage facility.

(5) Transportation off-site shall, unless otherwise agreed, be the responsibility of the local council which shall ensure that,-

(a) all yellow-bagged waste is collected at least once daily;

- (b) all staff members handling yellow-bagged waste wear protective clothing;
- (c) yellow-bagged waste is transported separately from all other waste;
- (d) vehicles or skips are only used for the carriage of yellow-bagged waste and are free of sharp edges, easy to load and unload by hand, easy to clean and disinfect, and fully enclosed, preferably with hinged and lockable shutters or lids, to prevent any spillage in the hospital premises or on the highway during transportation;
- (e) all concerned staff members are properly trained in the handling, loading, unloading, transportation and disposal of yellow-bagged waste, and are fully aware of emergency procedures for dealing with accidents and spillages;
- (f) all vehicles carry adequate supply of empty waste bags, protective clothing, cleaning tools and disinfectants to clean and disinfect any spillage;
- (g) the transportation of waste is properly documented and all vehicles carry a consignment note from the point of collection to the incinerator or land-fill or other final disposal facility; and(h) all vehicles are cleaned and disinfected after use.

19. Waste Storage.-(1) A separate central storage facility shall be provided for yellow-bagged waste with a sign prominently displaying the biohazard symbol and clearly mentioning the facility stores risk waste.

(2) The designated central storage facility shall,

(a) be located within the hospital premises close to the incinerator, if installed, but away from food storage or food preparation areas;(b) be large enough to contain all the risk waste produced by the hospital with spare

capacity to cater for collection or incinerator breakdowns;

(c) be easy to clean and disinfect with an impermeable hard standing base, plentiful water supply and good drainage, lighting and ventilation;

(d) have adequate cleaning equipment, protective clothing, waste bags and

containers located nearby; and(e) be easily accessible to collection vehicles and authorized staff, but totally

enclosed and secure from unauthorized access including inaccessible to animals, insects and birds.

(3) No materials other than yellow-bagged waste shall be stored in the central storage facility.

(4) No waste shall be stored at the central storage facility for more than twenty-four hours:

Provided that in case of emergency where infectious waste is required to be stored for more than twenty-four hours, it shall be refrigerated at a temperature of 3° C to 8° C.

(5) Containers with radioactive waste shall be stored in a specifically marked area in a lead- shielded storage room.

(6) Containers with chemical waste which are to be specialized treatment facilities shall also be stored in a separate room.

(7) The central storage facility shall be thoroughly cleaned in accordance with procedures stipulated in the Waste Management Plan.

20. Waste disposal.- (1) Depending upon the type and nature of the waste material and the organisms in the waste, risk waste shall be inactivated or rendered safe before final

disposal by a suitable thermal, chemical, irradiation incineration, filtration or other treatment method, or by a combination of such methods involving proper validation and monitoring procedures. Effluent from the waste treatment methods shall also be periodically tested to verify that it conforms to the National Environmental Quality Standards before it is discharged into the sewerage system.

(2) Yellow-bagged waste shall be disposed off by burning in an incinerator, by burial in a landfill or by any other method of disposal approved by the Federal Agency or a Provincial Agency concerned.

(3) Sharps containers which have not been placed in yellow waste bags for incinerator, shall be disposed of by encapsulation or other method of disposal approved by the Federal Agency or a Provincial Agency concerned.

(4) The method of disposal, whether by burning in an incinerator or by burial in a landfill or otherwise, shall be operated by a hospital only after approval of its Environmental Impact Assessment in accordance with the provisions of section 12 of the Act:

Provided that hospitals, local councils or other persons already using an incinerator or landfill on the date of commencement of these rules shall submit an Initial Environmental Examination in respect thereof to the Federal Agency or a Provincial Agency concerned within two

months from the said date, and may continue to use the incinerator or landfill pending decision on the EIA.

(5) All risk waste delivered to an incinerator shall be burned within twenty-four hours.

(6) Ash and residues from incineration and other methods shall be placed in robust, noncombustible containers and sent to the local council's designated risk waste landfill site.

(7) Landfills shall be located at sites with minimal risk of pollution of groundwater and rivers. Access to the site shall be restricted to authorized personnel only. Risk waste shall be buried in a separate area of the landfill under a layer of earth or non-risk waste of at least one meter depth which shall then be compacted. The landfill shall be regularly monitored by the local council to check groundwater contamination and air pollution. The local council shall also ensure that the landfill operators are properly trained, especially in safe disposal procedures, use of protective equipment and hygiene and emergency response procedures.

(8) Daily collection of risk waste from hospitals shall be taken by the vehicles of the local council immediately to the designated landfill site or incinerator by the most direct route in accordance with prior scheduling of collection times and journey times.

(9) Radioactive waste which has decayed to background level shall either be buried in the landfill site or incinerated.

Explanation. - An incineration facility for radioactive waste shall require, in addition to approval of its EIA by the Federal agency or a Provincial agency concerned, registration with and issue of license by PNRA, and reconciled with the requirements of the Pakistan Nuclear Regulatory Authority Ordinance 2001 (III of 2001) and the guidelines made there under in connection with management and disposal of radioactive waste.

(10) All liquid infectious waste shall be discharged into the sewerage system only after being properly treated and disinfected.

Explanation I. - Liquid radioactive waste shall be discharged into the sewerage system only

after it has decayed to background level and after it has been ensured that the radioactive materials are soluble and dispersible in water, failing which it shall be filtered.

Explanation II.- Radioactive waste containing Tritium and Carbon-14 isotopes shall be stored separately and shipped to the disposal site of the Pakistan Atomic Energy Commission, Karachi Nuclear Power Plant (KANUPP), Karachi or Pakistan Institute of Science & Technology (PINSTECH), Islamabad.

(11) In the case of gaseous radioactive waste, portable filter assemblies shall be used to extract iodine and xenon. The used filters shall be treated as solid radioactive waste.

21. Accidents and spillages.- (1) In case of accidents or spillages, the following action shall be taken, namely:-

(a) the emergency procedures mentioned in the Waste Management Plan shall be implemented immediately;

(b) the contaminated area shall be immediately evacuated, if required;

(c) the contaminated area shall be cleared and, if necessary, disinfected;

(d) exposure of staff members shall be limited to the extent possible during the clean-up operation, and appropriate immunization may be carried out, as required; and

(e) any emergency equipment used shall be immediately replaced in the same location from which it was taken.

(2) All hospital staff members shall be properly trained and prepared for emergency response including procedures for treatment of injuries, clean-up of the contaminated area and prompt reporting of all incidents of accidents, spillages and near-misses.

(3) A Waste Management Officer shall immediately investigate, record and review all such incidents to establish causes and shall submit his report to a Waste Management Team.

(4) The Waste Management Team shall review the report, and where necessary shall amend the Waste Management Plan to prevent recurrence of such incidents, and take such further action as may be required.

22. Waste minimization and reuse.- (1) To minimize hospital waste, each hospital shall introduce,-

(a) purchasing and stock control, involving careful management of the ordering process to avoid overstocking, particularly with regard to date-limited pharmaceutical and other products, and to accord preference to products involving low amounts of packaging;

(b) waste recycling programmes, involving return of unused or waste chemicals in quantity to the supplier for reprocessing, return of pressurized gas cylinders to suppliers for refilling and reuse, sale of materials such as mercury, cadmium, nickel and lead-acid to specialized recyclers, and transportation of high level radioactive waste to the original supplier; and

(c) waste reduction practices in all hospital departments.

(2) To encourage reuse, each hospital shall separately collect and sterilize, either thermally or chemically in accordance with approved procedures, surgical equipment and other items which are designed for reuse and are resistant to the sterilization process

2.24 Specifications of Incinerator (Pakistan)

In Pakistan, Environmental Protection Agency, has prepared specifications and guidelines for incinerator in June 2005. The Guidelines are attached as annexure.

The main features of the document are summarized below:

- All incinerators must be of multiple chamber type; minimum of two chambers.
- According to the guidelines, emissions from incinerator, irrespective of the operation mode, shall comply with the standards as specified in the EPA of Pakistan PEQS Schedule II Air Emission.
- Fuel for incinerator may be natural gas/diesel/LPG.
- Primary chamber temperature ranges 600-800°C and secondary chamber ranges 900- 1200°C.
- The fuel to be supplied by the hospital may be Natural gas/Diesel/LPG

CHAPTER NO: 3

DESCRIPTION OF THE PROJECT

3.0 General

This section covenants with the prevailing environmental conditions of the project area. Information that has been collected from different sources, including public literature, reports of other studies conducted in this area, knowledge with the proponent and the concerned government departments and the first-hand surveys and field measurements has been presented in this section. This encompasses all the important aspects of local environment; such as biological resources, socioeconomic development and quality of living values.

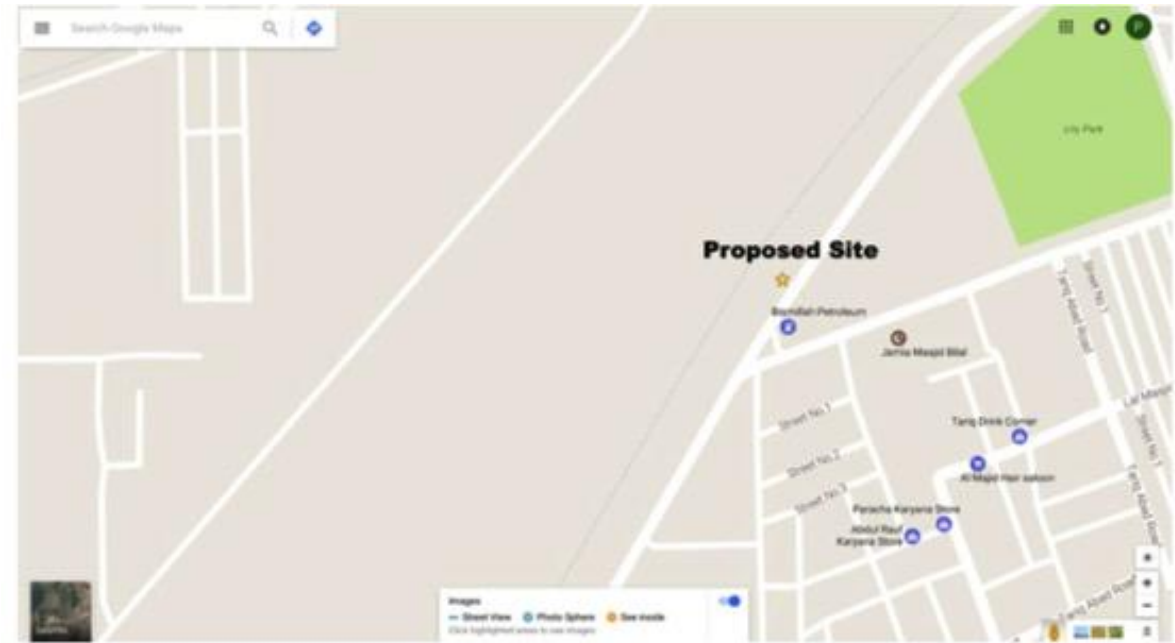
3.1 Type and category of the project

As the development of an Incinerator Facility project falls in Schedule-II, Part-I of Punjab Environmental Protection Agency's (Review of IEE and EIA) Regulations, 2000, the Guidelines for the Preparation and Review of Environmental Reports, an Environment Impact Assessment (EIA) of "Incinerator Facility" is required. Proponent of the project has engaged Pak Enviro Consultants to undertake Environment Impact Assessment (EIA) study of "Incinerator Unit"

3.2 Location of the project

The proposed site for Karamat Ullah S/o Inyat Ullah for Incinerator unit is Jahaian Road Tehsil kabirwala District Khanewal.

Figure 1 Proposed Site Map



3.3 Cost of the project:

Material & Civil Cost Work Cost (Fabrication + Erection) & Mechanical Equipment Cost Total Cost which includes the cost of land is Rs. 30,00,000. Where the Environment budget is Rs. 100,000.

3.4 Objectives of the Project

The ultimate goals for the project remain:

- To demonstrate the commercial viability of the project.
- To engage the processes with environment in such a way that its quality will not be impaired due to construction of incineration plant.
- To create more economic activities in the project area.
- To demonstrate practical example of sustainable development.

3.4 Project Administrative Jurisdiction

The proposed project falls in the administrative jurisdiction of district Khenwal administration.

3.5 Current status of the project

As proponent is seeking for environmental approval so they can start their construction on immediate basis. No activity is performed in the premises till the approval of the environmental NOC except some kind of scrap, Vehicles and container is placed in the premises of the proposed project site. This will be removed after acquiring the environmental NOC from EPA. Machinery in the form of incinerator is to be purchased locally. Their documentation in terms of invoices & other will be furnished when it will be purchased. After getting EPA NOC, Proponent will purchase incinerator locally. Till now there is no any kind of purchasing documents. However, Their drawings & specifications are mentioned in chapter 03 & their drawings are attached in annexure as well.



Figure 2 Proposed Site

3.6 Location Alternatives

The site was evaluated in terms of availability of land, electricity, water supply, sewerage system, road network and accessibility to disposal drain for process effluent, in view of cost effectiveness to make the facility accessible for concerned persons like proponents, employees, suppliers and purchasers as well as general public. The proposed site is already in the ownership of owners at Jahaian Khanewal, Road Tehsil kabirwala District Khanewal. This site was evaluated in terms of all aspects. A detailed discussion on all aspects is given here under.

No Development Option

No-Project option means there would be no project at all. The No-Project option, if taken, would stop the community from an important and necessary project, which is the need for today as per alarming situation of waste generated from industries and hospitals.

Other impacts of the 'No-Project' option would be loss in employment and social welfare in the project area, as the project is bound to create jobs and improve the existing condition of the community of the area through different community development and social welfare projects.

From the environmental point of view, this option would result in a loss of opportunity in further improvement of the environmental management of the area, environmental baseline data, and the mitigation and compensatory programs.

Site Availability

There was no incinerator facility nearby Khenwal, where waste has to be disposed improperly into land which may cause degradation of the environment. Further, the main reason for selection of this site is that the land was already in the ownership of the proponents of the project. The land of this project site is located in Khenwal District. This land when initially purchased by the proponents of this project was very much cheaper and still it is comparatively cheaper. Basic facilities like groundwater, electricity, sewerage system, Sui gas, etc. are available here. Sui Northern Gas pipeline has provided a general industry gas connection on project site. The land of this project is of agricultural value, and then it was purchased and occupied by its proponents. Agricultural activity is observed in the nearby area. Due to industrial growth this area has attained dual characteristics i.e. industrial and agriculture. Incinerator facility will cause economic development of the area hence the impact on the agricultural land will be minimal; therefore, this site was considered the most suitable for the proposed project.

Access to the Site

This site is situated at such a location that is easily accessible. The site has been ideally chosen as situated on the main road Multan Khenwal Road.

Basic Infrastructure

Basic infrastructure like roads, transport, Sui gas, electricity, sewerage system, etc. are already on hand of people of most of the localities and there is a great potential for the expansion of the same. All categories of the labor required for the project construction are available conveniently and plentifully on affordable cost at the present site.

Environment

There is not any environmentally sensitive site or critical zone present in the study area. Also, there is not any important ecological habitat, historical site, religious place, cultural heritage or archeological resource around the facility. Therefore, the land acquired by M/s Karamat Ullah is best suitable for the development of the project.

3.7 Nature of the project

Nature of the project includes the storage, handling and incarnation of the industrial waste, where there ash may be disposed at Government TMA Approved dumping site Chak # 169 behind industrial estate. Whereas, Monthly consumption water is **300 Gallons**/Month. Which is treated & drained TMA main sewerage Treatment plant of the Khenwal.

Waste will come from different sources which may includes from Hazardous/Non-Hazardous Solvents, waste/scrap, WWTP Sludge from all kind of industries like beverages, food, Agri, petrochemical, pharmaceutical, paint, fertilizers, pesticides, chemical, and hospital are approximately 3-5 tons which will usually come from truck under the proper cover which avoids the pollution during the movements or transportation.

Hospitals or hazardous waste segregated on the source by the competent persons & transportation will be enclosed container for transport. It depends on the generation of the waste from industrial or other clinical waste. This will operate in 2 shifts where incarnation of the organic waste will be going on 24 hours & hazardous waste will be incarnated on immediate basis when received in the facility. Whereas, proper enclosed & designated storage also placed.

Usually 20 ft enclosed container used for hospital waste, which will be incinerated on immediate basis. All of transportation will be done by different size Truck or trolleys depends on the size of the waste

Alternatives considered and reason for their rejection

The establishment of incineration plant is commercial. To fulfill the commercial aspects of the project under reference of this EIA report, It is to be sited at the place having commercial processing activity is either already going on or there are bright prospects of the same Concurrently. It must also meet the legal requirement of the Pakistan Environment Protection Act, 1997(amendment 2012). Availability of the land at the best convenient place is equally important among other consideration for the site selection. Availability of the access roads, Communication facilities, Electricity, basic infrastructure, sewerage etc. is yet the other necessary requirement. Obviously, environmentally sound, neat and clean Environment are the other consideration for site selection. The project will also facilitate the people of the area with increasing the opportunity of employment and other related facilities. Keeping these requirements and there feasibility and other basic infrastructural requirements are also available at the selected site accordingly, the selected site is preferable for construction of incineration plant.

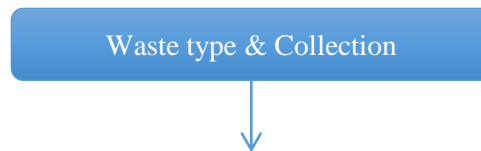
3.8 Proposed Incinerator Specifications:

Serial Number	Technical specifications (Proposed)	
Type of waste	Solid Waste (Organic & Inorganic)	
1	Capacity	100 kg
2	Type of waste	Solid waste
3	Retention Time	02 seconds
4	Fuel	Natural Gas
5	Power	3 phase 440-V
6	Number of chambers	3 Chamber
7	Incinerator Design	Controlled Air
8	Temperature Combustion Chamber	600 ^o C – 800 ^o C
9	Temperature Retention Chamber # 1	600 ^o C – 800 ^o C
10	Temperature Retention Chamber # 2	600 ^o C – 1000 ^o C
11	Control Panel	Relay Logic + Micro Control System

12	Feeding System	Manual/Batch Type
13	Solid Waste Capacity/Batch Load	20 kg/charge
14	Burner 1 Capacity	300 kw
15	Burner 2 Capacity	200 kw
16	Burner 3 Capacity	200 kw
17	Water Feed	Multistage Centrifugal Pump
18	Paint	Heat Resistant Enamel
19	Skin Temperature	+/- 20 ^o C from Room Temperature
20	Negative Pressure	5 – 15 mm WC
21	Flue Gas Washer	Built in Wet Scrubber
22	Stack height	25ft
23	Burner control	Flame safety system Auto starts
24	Primary clean out door	18"x24"
25	Secondary clean out door	18"x15"
21	Water Injection Capacity	50L/hour
22	Flue Gas Emission Temperature	90 ^o C - 130 ^o C
23	Chamber Plate Thickness	6 mm

24	Chimney Plate Thickness	6 mm
25	Composition of Thermal Insulator	Calcium Silicate Slab
26	Composition of Refractory	High Alumina Castable 46% AL2 O3
27	Secondary Insulation Type	Ceramic Fiber Blanket
28	Over Load Safety	Overload Relay (Each Motor)

3.9 Process Flow Diagram with inflows & outflows of the material.



Waste will come from different vendors which may includes from Hazardous/Non-Hazardous Solvents, waste/scrap, WWTP Sludge from all kind of industries like beverages, food, Agri, petrochemical, pharmaceutical, paint, fertilizers, pesticides, chemical, and hospital are approximately 3-5 tons which will usually come from truck under the proper cover which avoids the pollution during the movements or transportation. Hospitals waste segregated on the source & the competent persons will use enclosed container for transport. Transportation routes all depends on the potential vendors within Khenwal city. It can be proposed once formal agreement finalized with any potential party. Hospitals waste segregated on the source & the competent persons will use enclosed container for transport.

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graph TD; A[Segregation] --> B[Incineration]; B --> C[Waste Feed and De-Ashing]; C --> D[Controls]; D --> E[Dust Collection];
```

Segregation

Primary segregation will be done on the source. Whereas secondary segregation will be done manually on the facility, in case of hospital or clinical hazardous waste which will be segregated on the source by the competent persons & transported in the enclosed containers & incinerated on immediate basis when reached on the facility by competent persons

Incineration

Capacity 100 Kg/hr It consists of three chambers, which are interconnected. The primary chamber is for burning solid and liquid waste. The secondary chamber is for burning Hydrocarbons carried over from the primary chamber. The third chamber is for settling the ash and cooling of flue gases. The three chambers are constructed on steel structure with 45% Alumina Refractory bricks lining.

Waste Feed and De-Ashing

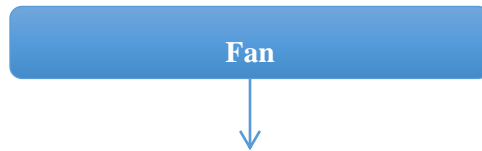
The feed system of incinerator is manual (batch); the waste is typically batch-fed into a charging hopper or directly into the furnace Residue generated after combustion is removed manually. Ash removal and cleaning is conducted through Ash doors. The doors are steel fabricated with firebrick lining from inner side. Non-Hazardous ash will be introduced for composting purpose too.

Controls

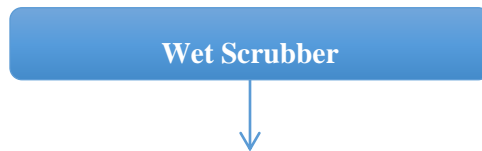
Controls The burner has provision for pre-purge, automatic sequencing, automatic ignition and flame supervision. Temperature Controller is provided to automatically maintain the temperature of the secondary chamber. In case temperature in secondary chamber rises or falls down beyond safe limit both primary and secondary burners will shut down and alarm will sound. Temperature Controller is provided in the primary chamber to cut off the burner at set temperature for fuel saving. A temperature gauge monitors the fuel temperature.

Dust Collection

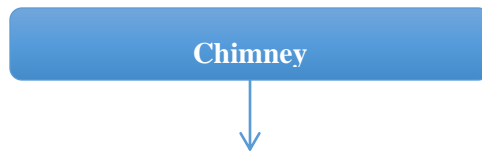
Dust Collection The cyclone dust collector made with S.S. casing has been provided to convey exhaust gases through chimney.



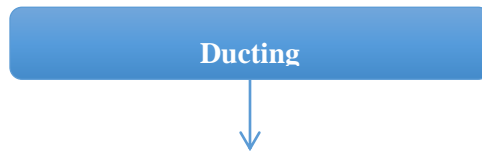
I.D. Fan Induced Draft Fan made with S.S. impeller and SS. casing has been provided to convey exhaust gases through chimney.



Wet scrubber will be installed which helps to remove harmful materials from industrial exhaust gases before they are released into the environment. Alum is mixed in the water to settle down the heavy particulate matters which prevents to release in the forms of NO_x, Sox & carbon into the air.



Chimney The chimney is 25 feet high with 3" thick brick lining up to eight feet height conveys the flue Gases to the atmosphere.



Ducting SS Ducts have been provided to connect incinerator with dust collector and further to connect dust collector to I.D. Fan and then to chimney.

Incarnation Principal



Most modern large incinerators operate on the 'starved air principle, in which the waste is gasified and partially burnt using a support fuel (e.g. gas or fuel oil), in primary chamber. Gaseous phase reactions are completed in a secondary chamber and the remnant solids are then burned as completely as possible in an air rich zone, or a tertiary chamber, at the discharge end of the incinerator. The gases and airborne particulates are then subjected to complex (and often expensive) 'clean up' before being emitted to atmosphere.

For this hazardous waste incinerator, the focus of this project is to achieve optimal emissions without the USC of sophisticated gas cleaning equipment, if costs are to be kept to a reasonable level. Given careful design, construction and operation. However, it should be possible to achieve acceptable levels of emissions without the need for gas cleaning, by using the starved air principle.

A significant proportion of hazardous waste has valued as fuel, but the waste composition could be such that it might become often very difficult to achieve complete combustion using this alone. Therefore the incinerator is designed to operate using a support fuel such as Natural Gas. The selection of a support fuel depends on its availability and the implications on operating costs.

Characteristics of Waste Suitable for Incineration



- Content of combustible matter above 60%
- Content of non-combustible solids below 5%
- Content of non-combustible fines below 20%
- Moisture content below 30%

3.10 Storage of waste

Non-treated will be unloading through trucks by employees using appropriate PPE's. The project site will be available with the liquid storage tanks and store for temporary waste storage. This facility could create impacts of major significance if not properly handled and supervised. The tanks have inlet and outlet valves to dump and emptying the tank. Their storage temperature & pressure depends on the type of waste & according to MSDS for chemicals. This storage facility would help:

- To prevent scavenging of waste
- Scattering of waste with wind
- Nuisance from smell and odor
- Protect the waste from sunlight and rain

Recommended Mitigation Measures

- The storage facility requires following measures to be adopted for safe and healthy working conditions without affecting personnel's health and environment:
- Medical waste should be incinerated the on the day it is received, if not possible, the medical waste (yellow bag) won't be stored for more than 24 hrs. The storage tank must be marked as hazardous storage facility. The workers must wear personal protective equipment like Gas mask, gloves, overall and safety shoes before entering the storage tank
- Ensuring the housekeeping of area around the storage tanks and especially inside the facility

Waste will come from different sources which may includes from Hazardous/Non-Hazardous Solvents, waste/scrap, WWTP Sludge from all kind of industries like beverages, food, Agri, petrochemical, pharmaceutical, paint, fertilizers, pesticides, chemical, and hospital are approximately 3-5 tons which will usually come from truck under the proper cover which avoids the pollution during the movements or transportation. Hospitals or hazardous waste segregated on the source by the competent persons & transportation will be enclosed container for transport. Whereas, there temperature will be normal or room temperature. In case of any chemical it will be settled according to the MSDS of the relevant chemical which will be provide by vendors. No Hazardous waste will be stored more than 1 hour it will be incinerated according to the nature of the waste. Containers are in placed with approx. 20 sq ft,

3.11 Waste Disposal

No major hazardous effluent will be produced from grey & black water which may degrade the groundwater table & surroundings. It can be drained into nearby nullah by the authorization of Government approved TMA approval which will be heading towards the treatment plant of the Khenwal. Ash will be dumped on the dumping site of the Khenwal approved by government chak # 169 Whereas, Solid waste includes paper and kitchen which will be collected by tehsil municipal corporation by means of trucks & drums. Where, waste quantity is very nominal

3.12 Disposal by Incineration

Incineration can treat Industrial waste at the same time Incineration is a high-temperature dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and results in a very, significant reduction of waste volume and weight. This process is usually selected to treat wastes that cannot be recycled, reused, or disposed of in a landfill site

Initially the ash could be collected in plastic bags and stored in a confined and restricted government approved Chak # 169 behind industrial estate Khenwal location. Thereafter the ash would be mixed with mortar and blocks shall be made which could be used for civil work.

If the ash is not collected in bags then the heap should be properly wetted or covered so that there are no fugitive dust emissions.

If to be land filled, Ash can be stabilized and solidified by encasing in concrete prior to disposal, thereby significantly reducing the potential for the contaminant to migrate.

In addition to land filling, incinerator ash has also been used in the production of road bedding, concrete, brick, cinder block, and curbing

3.13 Advantages of Incinerator

Consequently, whilst recycling has an important part to play, incineration frequently forms part of an overall strategy for the management of waste. Landfill will always be required for the residue, which typically amounts to about one-third of the initial mass of waste. Incineration of wastes offers the following advantages.

Volume reduction, especially for bulky solids with a high combustible content, toxic organic compounds, or biologically active materials Socio-environmental compliance, especially for fumes containing odorous compounds, carbon monoxide or other combustible materials subject to regulatory emission limitations Environmental impact mitigation, especially for organic

materials that would leach from landfills or create odor nuisance Reducing atmospheric pollution caused by smoke emitted during combustion

3.14 Design & Construction of Incinerator

The objective of project is to construct an incinerator to promote cleaner practices and complete combustion of industrial wastes with a view to waste volume reduction and amelioration. Incinerations can industrial waste at the same time minimizing impact on the environment.

3.15 Waste Types not to be incinerated

The proposed Incinerator is designed to incinerate industrial waste at the rate of 100 kg/hr. Incineration of materials unsuitable for incineration can result in the release of pollutants into the air. Occupational risks may be associated with the operation of certain disposal facilities.

- Pressurized gas containers
- Large amounts of reactive chemical waste
- Silver salts and photographic or radiographic wastes.
- Halogenated plastics such as polyvinyl chloride (PVC)
- The incineration of materials containing chlorine can generate dioxins and furans, which are classified as possible human carcinogens and have been associated with a range of adverse effects
- Waste with high mercury or cadmium content, such as broken thermometers, used batteries and lead-lined wooden panels
- Sealed ampoules or ampoules containing heavy metals. Incineration of heavy metals or materials with high metal contents (in particular lead, mercury and cadmium) can lead to the spread of heavy metals in the environment
- Dioxins, furans and metals are persistent and accumulate in the environment. Materials containing chlorine or metal should therefore not be incinerated

3.16 Factors affecting Design of Incinerator

Incineration of waste is an operation that includes feeding the furnace, burning the waste, exhausting the gases to the atmosphere, and removing the residue from the furnace. Factors, which directly influence the detailed design of the incinerator, include:

- Combustion temperatures, combustion gas residence time.
- Capital, operational and maintenance costs
- Current and future quantities of waste

- The waste composition and its calorific value
- The infrastructure of the area chosen for the field trials (roads, electrical power)
- Attitudes and legislation relating to emissions control
- Public concerns about incineration
- The degree to which an integrated waste management strategy has been prepared and the incinerator's role within it
- Locally available materials (refractory bricks or other insulation materials)
- Locally available manufacturing skills

3.17 Incinerator Operators

Incinerator operators should be trained for smooth operation of incinerator. They should be specifically trained regarding the following subjects:

- Functioning of the incinerator facility
- Health, safety and environment implications of their operations.
- Technical procedure for operation of incinerator

The conditions which operator has to face at the site are:

- Incinerator working at a high heat, which put the operators at a risk of burning,
- The heat may lead to fire, carbon monoxide poisoning, etc
- During burning refuse may yield substances that may be hazardous or even poisonous.
- The Operators job is physically hard and may lead to pain and other problem in hands, arms, lower back and other body parts.
- operators work in a noisy, hot and humid environment that may cause tiredness and general ill feeling.

3.18 Safety Precautions

Every stakeholder should follow the following safety instructions:

- Read & Comply with all safety instructions.
- Never enter incinerator or loader when power is "on" or incinerator is hot.
- Always remove power (LOCK-Out/Tag out) during the maintenance.
- Make sure all guards and safety devices are in place secured and in proper operating condition before starting equipment.
- At initial burner start up make sure incinerator doors are closed and lacted.
- Keep all areas around incinerator and loader clean to reduce the fire hazards for easy operator movement.
- Do not wear loose clothing around operating equipment.
- Do not incinerate explosives or highly volatile materials.
- Do not overload equipment

- When opening the incinerator charging door during operation stand behind the door . a full face shield is recommended
- Do not open ash removal door during the operation. Wait until ash cooled to comfortable temperature.
- Do not remove the cap from spark igniters without first shutting off power. Spark igniters can arc and cause electrical shock and possible severe injury. The jobs and tasks of the operator would be:
 - Activating/firing (burners)
 - Adjusting air (Primary air requirement with louvers)
 - Cleaning/removing (ash, debris)/ shoveling/sweeping.
 - Detecting (malfunctions).
 - Feeding (waste).
 - Loading and unloading (waste).
 - Maintaining (equipment).
 - Measuring/monitoring/observing/ recording.
 - Opening and closing (Incinerator doors).
 - Regulating (flow, temperature).
 - Turning on/off.

3.19 Life cycle assessment & Staffing and Supplies

Local people will be hired for construction and operation phase of the Incinerator. It is expected that approximately 5-8 people will be required during construction phase and 2-3 people during operation phase of the incinerator. During operational phase, waste will be collected from industries through local contractors.

The supplies will be transported to the project site in pickups/trucks. General supplies to be transported will include the construction material and equipments. Project personnel will travel to and from the site in smaller vehicles, mostly four wheel drive pickups.

Water during construction and operation phase will be transported to the project facilities from ground water supplies. A maximum of 1000 liters of water will be required per week during the construction phase.

During operational phase the waste to be incinerated will be collected by vehicles owned by the Incinerator Facility proponent.

- The properties of site includes: proximity to raw materials (waste to be incinerated), easy access, provision of services (water, electricity & gas etc), away from human settlement.
- Removal of vegetation has an impact of a minor significance and there is no significant habitat identified in the area.
- Guidelines for sensitive and critical area were reviewed, so that the proposed project is planned and sited in a way that protects the values of sensitive and critical areas. These

guidelines include critical ecosystems including wildlife reserves and forests, archaeological sites, monuments, buildings, Antiques, or cultural heritage sites.

- Protected areas in Pakistan can be broadly categorized into two groups; they are:
 - a. Ecosystems
 - b. Archaeological and Cultural sites
- The Ecosystems includes protected areas such as wildlife, national parks, and game reserves, archaeological sites, monuments, buildings and cultural heritage (includes world heritage).
- The site of the proposed project seems to have no visual impact on historical, archaeological, and cultural resources and on landscapes, as the site does not fall near or in the boundaries of the protected areas. The project area around 300m radius is uninhabited. Hence resettlement and rehabilitation requirements are non-existent.

Recommended Mitigation Measures

- As far as project location is concerned, it cannot be categorized, as being ecologically sensitive or environmentally sensitive. The proposed facility will cause no specific adverse effect on the existing landscape. Structures must be laid out as to blend with the natural settings and plant trees at regular intervals.
- It is crucial to avoid air turbulence and potential back pressure which can interfere with the design balance of primary and secondary air flow within the incinerator as well as possibly creating odorous emissions and paper char
- Proper access must be available to the incinerator.

3.20 Duration of Project

Total duration of construction phase is about 3-4 months.

3.21 Road access:

As project is located Jahaian Road Tehsil kabirwala District Khanewal. Main Gate covers the Railway Lines & owned by railway authorities. Where Road is under construction.



3.22 Land Use on site:

03 Kanal is used for proposed site. Proposed incinerator going to be building on the land which is owned by the proponent (Documents attached for reference). Whereas, surrounding covers with land & railway lines & other side there are houses for proponent family.



Figure 4 Land Use on Site

3.23 Restoration & Rehabilitation Plan:

The proposed site for incinerator is located in Main Jahnain road at some populated area and also there is no chance of human population displacement to acquire the land. The site of the proposed project seems to have no visual impact on historical, archeological, and cultural resources and on landscapes, as the site does not fall near or in the boundaries of the protected areas. The project area is uninhabited. Hence resettlement and rehabilitation requirements are non-existent.

There will be no any matter of rehabilitation as the proposed site is already owned by the project proponent. There will any let regarding safety factors as applicable from time to time for such buildings on all accounts. However, at the end of the life of the building, it will be bully dismantle with special precautions to avoid/minimize pollution and at the same time taking all safety precautions to protect human life and property around the project site. Debris or any other wastes resulting from demolishing will be disposed of in environmentally sustainable session. The material capable of recycling/reuse will be either sold in the market or be re-used for other suitable purposes. While dismantling all government rules and regulations as applicable to such activities will be strictly adhere to. During entire construction period, nessecary precautions will be taken to ensure that no damage is done to the basic infrastructure like several systems, power transmission lines road, private or public property and daily human life as well. Safety measures as desired under the cod of demolition will be adopted to avoid any harm to human, property around, or the environment in the project area. Dust to be generated to be minimized by constant sprinkling of water. After completion; all construction matrix, debris and garbage will be remove off immediately from site within the minimum possible time under safe conditions. Any minus pill over of these material will be cleared adequately, the land, if and where pitted will be adequately leveled. On the hole, the project site and the area in its near vicinity will be made neat and clean.

3.24 Power requirement:

Power requirement is fulfill by (200KW- 250KW) by WAPDA



3.26 Government approvals:

Tehsil Municipal Administration (TMA) has approved the building plan; a copy of the same is attached in the EIA report. The Environmental Approval According to section-12 of Pakistan Environmental Protection Act-1997 is the mandatory requirement of the project.

3.27 Conclusion (Feasibility)

The final choice of treatment system i.e. Incineration is made carefully, on the basis of various factors, many of which depend on local conditions:

- Disinfection sufficient.
- Volume and mass reduction.
- Occupational health and safety considerations.
- Quantity of wastes for treatment and disposal/capacity of the system.
- Types of waste for treatment and disposal.
- Locally available treatment options and technologies.
- Options available for final disposal.
- Training requirements for operation of the method.
- Operation and maintenance considerations.
- Available space.
- Location and surroundings of the treatment site and disposal facility.
- Investment and operating costs.
- Public acceptability.
- Regulatory requirements

Certain treatment options may effectively reduce the hazards of healthcare and Industrial waste but, simultaneously, give rise to other health and environmental hazards. Land disposal may resulting round water pollution if the landfill site in adequately designed. In choosing a treatment or disposal method the health-care and Industrial waste, particularly if there is a risk of toxic emissions or other hazardous consequences, it could therefore be carefully evaluated in the

light of local circumstances. So Incineration is the best option to be opted for the Hazardous Waste Management in Pakistan.

Chapter 04

Physical-Social & Environmental Baseline

4.0 Physical Environment

This part examines the physical resources such as topography, soil, climate, surface and ground water resources and quality, ambient air quality and geology of not only the project site but also the city as a whole to assess whether the project under assessment can or does have any impacts on any of these parameters. The description of physical environment of kabirawala and the project site is presented in the following sub sections.

4.1 Geological Formation

Khanewal District is a district of the Punjab province of Pakistan. Its capital is Khanewal the host city to the second-largest railway station in the country. According to the 1998 census of Pakistan, the district had a population of 2,068,490, of which 17.42% were urban. The district of Khanewal is spread over an area of 4,349 square kilometres (1,679 sq mi) and comprises 4 tehsils: Jahanian, Kabirwala, Khanewal, Mian Channu. Its boundaries meet the districts of Jhang and Toba Tek Singh in the north, Sahiwal in the east, Vehari in south and with Multan in the west. Underground water resources are generally adequate throughout the district. The subsoil water is sweet and suitable for industrial purposes. However, effluent of industry can be disposed of in the rivers, namely Chenab and Ravi, after pretreatment, with permission from the Irrigation and Power Department, Government of the Punjab. It lies from 31° 55' to 32° 30' north latitudes and 74° 35' to 75° 21' east longitudes.

4.3 Seismicity

Seismic Zoning Map of Pakistan showing Proposed Project site area is presented as Figure indicating zones according to the Building Code of Pakistan - 2007. The proposed project area falls in Seismic Zone 2A zone according to the Seismic Zoning Map of Pakistan.

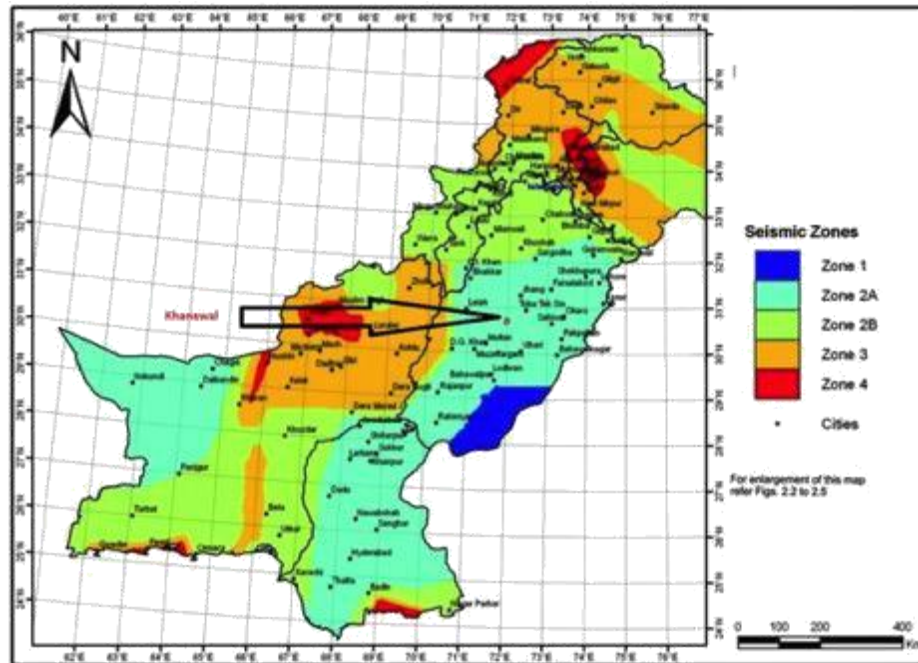


Figure 1: Seismic Zones of Tehsils of Pakistan

4.4 Climate

The district has extremes of climate. The district is irrigated by a network of canals from various sources on the Ravi and Chenab rivers. Climate temperature ranges between 21°C and 5°C in January, and 42°C and 29°C in June respectively. The summer season starts from April and continues till October. The hottest months are May, June and July. The mean maximum and minimum temperature during these months are 40 and 24 degrees respectively.

The driest month is November, with 7 mm of rainfall. With an average of 213 mm, the most precipitation falls in August. The difference in precipitation between the driest month and the wettest month is 206 mm. During the year, the average temperatures vary by 21.3 °C.

4.5 Topography

The general aspect of the district is a plain slopping down from the uplands

at the base of Himalayas to the level country to the south west, and the general altitude is 266 metres above the sea level. Bounded on south - east by the river Ravi, the district is fringed on

either side by a line of fresh alluvial soil, about which rise the low banks that form the limits of the riverbeds. At about a distance of 24 kilometres from chenab, another stream, the Dake

which rises in the Jammu hills traverses this district. There are differences in water level, which facilitates in well irrigation. But generally, the physical aspects of the district present little variety. It is fertile and its dense population ensures that almost every available acre is brought under the plough.

4.5 Soils

Soils form major relation with environment. They influence environment by their special qualities and more so through fertility. Types of soils besides providing food, clothes or housing population serve with special food and lumber products, medicinal plants etc.

Soil should not be taken as a lifeless residual layer but it is a very dynamic element of environment in which very complicated physical, chemical and biological activities are constantly proceeding. In this way it is a dynamically changing and developing body. Soil scientists restrict the word soil or solum merely to the surface material, which has come to have distinct layers or horizon over the extended period of time.

Soils have different meanings for different people. To a soil scientist it means the upper a few layers created through weather effect in which plants are grown. The solid portion of soil is both organic and inorganic. The organic part consists of both living and decayed plant and animal materials.

The pattern of the temperature and rainfall is spread over two seasons; Rabi and Kharif. The main crops of the area are wheat and rice. The soil is mostly loamy clay and loamy. Soil texture plays a crucial role in its water holding capacity.

4.6 Noise Level

Noise is described as an unwanted sound emitted from un-avoidable sources of anthropogenic activities. Daily based natural induced sources of noise are rare to none but human induced noise sources are plenty and un-avoidable. Physically, there is no distinction between sound and noise. Sound is a sensory perception and the complex pattern of sound waves is labeled noise, music, speech, low altitude aero plane flying etc. The noise pollution in the project area is source of pollution and nuisance. Among eight noise measurement locations in the cities, the study says,

on average, the noise level ranged from 59-63 dB(A) in and around the project site recorded at temperature varying between 6 & 9

C and

slow wind 0.1-0.3 m/s blowing.

4.7 Ambient Air Quality

Atmospheric pollution means the imbalance in the normal air chemistry. It can occur due to the addition of a new chemical into atmosphere or by the change in concentration of the chemicals already existing in the atmosphere. Atmospheric pollution particularly in urban area has a strong impact upon daily life. The reasons of such changes can both be natural as well as anthropogenic.

Ambient air quality is a key to measure the concentration of the various chemicals in atmosphere; especially of the chemicals, which pose detrimental effects on health, safety and environment, to have a comparison with their safe concentrations, as established in WHO Standards and NEQS.

It was observed during the visit that Petrol and Diesel operated vehicles are emitting smoke and exhaust gasses in excessive quantity which are the leading sources of environmental pollution and are responsible for the air quality worsening. In fact, exhaust emissions (including dangerous gases such as carbon monoxide, oxides of nitrogen, hydrocarbons and particulates) and Evaporative emissions (including vapors of fuel which is released into the atmosphere, without being burnt) are the prime reasons of deterioration of air quality.

The following table is presenting the measured parameters of the ambient air look from the center of the proposed project area for assessment of air quality.

Parameters		C	SO	N	P	SP	C	O3	Hum	Te
Un		p	µg/	µg/	µg/	µg/	P	µg/	%	O
It		p	m3	m3	m3	m3	p	m3		C
Proposed Site		1	31	40	2	53	53	3.3	82	11
NE		9	12	80	1	50	N	13	NS*	NS

Table 2 Ambient Air Quality monitoring

The above table shows the concentration of atmospheric pollutants to be well within NEQS limits.

4.8 Water Resources

4.8.1 Surface Water and Ground water

There are no surface water resources like canal or ponds, near the project area. The area surrounding the project site is poorly drained.

Ground water is the principal source of municipal water supply in Khanewal. This is also the case in the Immediate vicinity of the site. The City's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area. Groundwater is pumped from 400-800 feet and is generally good for direct consumption.

4.9 Biological Environment

Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form Natural capital of a country. Both collectively and within each level, the range or variety of the Resources is referred to as the

“Biological Diversity”. The contribution of the “Natural capital” is recognized at

Three distinct levels including genera, species, and community -habitat and ecosystem.

Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province, and particularly country. The greater the number of genera, species and habitats and ecosystems present within these units, the greater is the Biodiversity. It is in this background that the biodiversity of the area is discussed below:

Khanewal is enriched with the presence of natural flora and fauna; although with the growing population and development activities, the presence of some has been somewhat affected.

There are however no significant or well-shaped trees and shrubs on the project site. There are some trees only along the main roads.

4.9.1 Flora:

The flora of the district include: Jand trees (*Prosopis spicigera*), Karir (*Capparis aphylla*), Beri (*Ziziphus jujuba*), Van (*Salvadora abeoides*), Kikar (*Acacia arabica*), Shisham (*Dalbergia*) and Aak (*Calotropis hamiltoni*) are found within the district. The main species of shrubs are Kahi *Saccharumspontanum*, Kana *S. munja*, Frash *Tamarix aphylla*, Aak, *Calotropis procera*, Lai *Tamarix dioica* and Dila *Capparis decidus*. Ground flora consists mainly of Bhakhra *Tribulius oratus*, Medhana *Dactyloctenium aegyptium*, Hermal *Peganum hermela*, Bathu *Chenopodium album* and Mako *Solanum nigrum* which provide forage to wild animals.

Major crops cultivated in agricultural lands are Bajra *Pennisetum typhoides*, Chari *Sorghum vulgare*, Rice *Oryza sativa*, Wheat *Triticum indicum* and Mash *Phaseolus radiatus*. These crops provide food to the grainivorous wild birds found in the area

4.9.2 Fauna

No tigers or leopards are found in the district. Jackal, black cats, Indian hare and house rat are common. Ducks are found along the rivers and marshes.

No endangered or rare species of flora or fauna are present in the project areas.

4.10 Socio Economic Assessment

Social change is the consequence of almost any intrusion into the community life of any society. The intrusion can be in the form of any developmental projects or nonspecific, less tangible forms such as increased exposure to other cultures, technological changes and so on. The social change that results from intrusion into community life can also be beneficial, but can have undesirable or negative outcomes. Even that change in the long run may have positive effect on the social well-being of a community.

Social Impact Assessment is a methodology used for examining social change due to external sources, especially specific developmental projects, but also government policies, technological changes and social processes or anything that has a social impact.

The objectives of the given study are outlined as follow:

- " To carry out the assessment of social impact.
- " Acquire socioeconomic data to evaluate and identify the project interventions.
- " Assess needs of community related environmental concerns.
- " To assess adverse and beneficial socioeconomic and health impacts of the activity.
- " To suggest remedial measures and solutions to improve socio economic conditions.
- " To analyze socio economic conditions of community, with special reference to Environment and conservation of natural resources.

4.11 Demographic Profile

The population of Khanewal is approximately 2763485 according to the 1998 census which includes many people who come from Punjab villages looking for work in the city. About 63% of population of district speaks Punjabi language. Saraiki is the second most widely spoken language by 26% of population. Others languages spoken are Urdu, Pushto & Hindko.

Annual growth rate

2.45 %

Population density 666 people per sq. km

4.12 Health Facilities

Medical facilities are readily accessible in city in a 100 kilometer radius, being the district headquarters and due to its importance as a military headquarters. DHQ is one of the main hospitals in the area.

4.13 Quality of life Values:

4.14 Religion

The population of Khanewal is over 99% Muslim.

4.15 Customs

The peoples are very much concerned about castes and beliefs, visiting shrines is very common among them.

4.16 Languages and Major Casts

Punjabi, and Urdu are spoken in the city. Main castes are chishty, Rehmani, LAK, Chadhar, Jatt, Tagga, Ansari, Butt,Dulu, Sayal, Kamboh, Bhadru, Mughal, Dogar, Sanpal, Gujjar, Arain, Rajput, Tajra, Hiraj and Shaikh Awan.

4.17 Dress

Majority of the people wear Qameez and Shalwar. English dress, shirt and Trousers are also common in khanewal as well like other big cities of Pakistan.

4.18 Electric Supply

WAPDA power supply will be available at the site.

4.19 Telephone Facilities

Both Landline and Cellular telephone facilities are present in the project area.

4.20 Educational Facilities

No educational facility is present in the vicinity of the project area.

4.21 Agriculture

Major crops of the town are wheat, grain, peas, barley are the important crops of Rabi season, while Kharif crops are cotton, sugarcane, potato, bajra, oil seeds which are shipped by rail and road to other parts of the country

4.22 Site of physical, cultural heritage:

There are no documented or protected sites of archaeological, cultural, historical & religious significance in the project area. No visible signs were observed of such sites while conducting the field work

CHAPTER.NO. 05 ANALYSIS OF ALTERNATIVE

5.0 General:

This Chapter deals with an analytical overview of the different alternatives that have been considered in the project. The analysis has been carried out critically so as to justify the need of the Project. Besides the economic viability, environmental sustenance and social soundness of the proposed project should also be considered when analyzing various alternatives. The various alternatives, which have been considered during the conduct of the study, are as under:

No project option

Alternative Construction Methods

Alternative Geometry

5.1 No Project Option:

Proponent owns proposed site. Site is already under district Khanewal. Therefore, no option other than this project is considered.

Location of the Project

M/s Karamat Ullah S/o Inyat Ullah Jahanian Road, Tehsil kabirwala District Khanewal

5.2 Alternatives of Location:

5.2.1 Development of Environmental Site Selection Criteria:

The site selection criteria were based on a number of parameters as indicated below:

- ! *Land Availability*
- ! *Environmental Issues*
- ! *Social Issues*
- ! *Any other Facility*

A .Land Availability

Proponent has been its own land and need no addition site to be constructed or to acquire.

B. Environmental Issues

Due consideration has to be given to the sensitive issues related to the environment, forest, wet lands, wildlife reserves, agricultural land, etc. while assessing the alternative sites for development of the this cotton industry.

C. Social Issues

Social issues form an important element in the assessment criteria. Different socially sensitive elements like graveyards, mosques, playgrounds, which can create social issues have to be given due consideration while assessing the different sites. This side is best for Installation of Incinerator.

5.3 Alternative Construction Methods:

The feasibility and constructability of the project is well established. The process basically includes the transportation of equipment to site and the assembly of pre-fabricated unit. Thus, the impacts from construction activities are very manageable from the environmental viewpoint.

5.4 Alternative Geometry:

The design is as short as it can be and avoids the local villages and all settlements.

5.5 Technological Alternatives

All the technologies being used are specific to operation and most suited. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of appropriate option that was required to ensure optimal results within defined set of economic, environmental, health and safety constraints. In particular it outlines the following project options:

Alternative technology.

5.5.1 Technology Alternatives

Incineration of wastes has been widely practiced, but alternatives are becoming available, such as autoclaving, chemical treatment and microwaving, and may be preferable under certain circumstances. Incineration is the method of choice for most hazardous healthcare wastes and is widely used all over the world. However some recently developed alternative treatment methods are also becoming increasingly popular.

Alternatives to incineration are available in many developed countries. As these techniques are either too complicated or very expensive, they are not being used in Pakistan. However some techniques used for the hospital waste disposal are explained below:

5.5.1.1 Steam Autoclaving

Steam Autoclaving is the most widely used and most efficient alternative medical-waste- treatment technology. Most available autoclaves are designed to handle both biohazard and normal hospital wastes simultaneously. However they cannot treat pathological animal wastes, chemotherapy wastes,

and low Level radioactive wastes. These wastes have to be treated separately.

Medical waste autoclaves usually jointly operate with a shredder and a compactor (to minimize the waste volume). In autoclaves the effects of heat from saturated steam and increased pressure decontaminate medical waste by inactivating and destroying microorganisms. There are two types of autoclaves, gravity displacement and pre-vacuum. Those designed for medical waste are mostly pre-vacuum.

Advantages

- Can treat most types of biomedical waste
- High level of microbial inactivation of biomedical waste
- Does not create hazardous combustion by-product³ (dioxin, furans, etc.)
- Produces far fewer emissions than incinerators
- Treated wastes can be land filled along with normal municipal solid waste
- Autoclaves are the most widely used alternative to incineration of biomedical waste
- Autoclaves have extensive field/historical experience in the medical industry
- Many autoclaves require low capital investment
- Easier to operate than incinerators

The most profitable investment unless there are no regulations at all on incineration emissions.

Limitations/Draw backs

- Inappropriate for Industrial waste
- Most autoclaves do not handle recognizable anatomical wastes
- Do not handle chemotherapeutic or other toxic chemical and radiological wastes
- Large volumes of liquids in sealed containers may not be adequately treated
- Offensive odors can be generated

- May exhaust volatile organic compounds (VOCs)
- May require hospital to alter method of separating waste

5.5.1.2 Microwaving

The process combines shredding, steam injection and conventional microwaves to disinfect biomedical waste. The microwave process begins when an operator fills the loading bucket with waste. An automatic hoist dumps the material into a hopper at the top of the unit. Before opening, the hopper air is treated with high temperature steam, and then extracted with a high-efficiency particulate air filter to capture airborne pathogens. Computers control the entire process, prompting the operator to feed more waste. Material feeds evenly into a shredder and emerges as small bits, unrecognizable as medical waste. The granules are automatically conveyed into a treatment chamber where they're moistened by high— temperature steam. This mixture runs under a series of conventional microwave generators that disinfect each granule. The treated end product is ready for municipal solid waste landfills or waste-to-energy plants.

Advantages

- Microwave system is easier to get permitted because it doesn't generate potentially toxic air emissions
- No obnoxious odors, its quiet
- It eliminates needle sticks and back problems
- Consequently there is no need for pollution control devices
- The cost for microwaving is about the same as for incineration

Limitations/Drawbacks

- In appropriate for industrial waste
- Not a co-generation process like incinerators

5.5.1.3 Microwave Radiation

In microwave radiation, medical waste is wetted with steam or water and heated by microwave irradiation to decontaminating temperatures.

Advantages

- This method has good disinfections efficiency under appropriate operational conditions
- It is environmental friendly

Limitations/Drawbacks

- Microwave radiation requires high capital investment with higher operation and maintenance cost
- In appropriate for Industrial waste
- This method also has potential operation and maintenance problems

5.5.1.4 Verifications

A vitreous state is a non crystalline solid or rigid liquid formed by super cooling a melt. It's also called a glassy state. For hazardous or radioactive wastes, verifications is the process of cooling a liquid fast enough to prevent crystallization. This process turns waste material, even high- level and low-level radioactive wastes, into glass. During verification, contaminants are subjected to extremely high temperatures in the melter. The organic compounds are destroyed and the remaining organic elements become part of the glass's molecular structure. Hazardous metal components in the waste are converted to nonhazardous oxides. Radioactive elements can't leach out, so they won't pollute the environment.

Advantages

- It converts a waste product into recyclable, reusable glass that has value
- With verification clean air, clean water, and glass are end product rather than ash

Limitations/Drawbacks

- In appropriate for Industrial waste
- Too much cost to treat low-level wastes

- **5.5.1.5 Chemical Treatment** In chemical treatment systems an anti-microbial chemical such as sodium hypo chloride, chlorine dioxide, or per acetic acid decontaminates the waste. Most chemical treatment systems currently in use operate at ambient temperature.

Limitations/Drawbacks

- This kind of treatment could become costly if the waste generated is in a large quantity and would require greater amount of chemical
- Chemical treatment requires highly qualified technicians for operation of the process
- Use of hazardous substances also requires comprehensive safety measures
- Chemical treatment is inadequate for pharmaceutical, chemical and some types of infectious wastes

5.5.1.6 Thermal Systems Some systems use a combination of infrared radiation and forced hot-air convection to treat the waste. The waste then is compacted, preparing it for landfill. Other systems use gamma radiation to heat the waste to disinfecting temperatures. A portion of the solid residue obtained is recycled while the remainder is disposed. Several other thermal systems currently under development use steam, oil, electricity or some form of irradiation as their source of heat.

5.5.1.7 Land Disposal If a municipality or medical authority genuinely lacks the means to treat wastes before disposal, the use of a landfill has to be regarded as an acceptable disposal route. Allowing healthcare waste to accumulate at hospitals or elsewhere constitutes a far higher risk of the transmission of infection than careful disposal in a municipal landfill, even if the site is not designed to the standard used in higher-income countries.

The primary objections to landfill disposal of hazardous health-care waste, especially untreated waste, may be cultural or religious or based on a perceived risk of the release of pathogens to air and water or on the risk of access by scavengers. Land filling can potentially result in contamination of drinking water.

5.6 Conclusion

The final choice of treatment system i.e. Incineration is made carefully, on the basis of various factors, many of which depend on local conditions:

- Disinfections efficiency
- Volume and mass reduction

- Occupational health and safety considerations
- Quantity of wastes for treatment and disposal/capacity of the system
- Types of waste for treatment and disposal
- Locally available treatment options and technologies
- Options available for final disposal
- Training requirements for operation of the method
- Operation and maintenance considerations
- Available space
- Location and surroundings of the treatment site and disposal facility
- Investment and operating costs
- Public acceptability
- Regulatory requirements Certain treatment options may effectively reduce the hazards of healthcare and Industrial waste but, simultaneously, give rise to other health and environmental hazards. Land disposal may result in groundwater pollution if the landfill site inadequately designed. In choosing a treatment or disposal method the health-care and Industrial waste, particularly if there is a risk of toxic emissions or other hazardous consequences, it should therefore be carefully evaluated in the light of local circumstances. So Incineration is the best option to be opted for the Hazardous Waste Management in Pakistan.

CHAPTER NO: 6

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.0 General

This section presents likely positive and negative environmental impacts to gather with the proposed mitigation measures top relevant and/or aliatet hem to the extent possible during the design, construction and operational phases of the proposed project.

The potential environmental impacts related to the Project. Environmental protection measures are recommended to eliminate adverse impacts on environment or to reduce them to an acceptable level within the prevailing legislative and regulatory framework. These Impacts are evaluated on the basis of magnitude, immediacy and sustainability. Evaluation criteria are as follow:

- Magnitude
- Type of impact (direct, indirect, and cumulative)

- Immediacy
- Temporal extent (during construction, after construction)
- Spatial extent (local, widespread)
- Sustainability and Reversibility
- Immitigability (fully, partially)
- Monitoring (fully, partially)

6.1 Objectives

- Objectives of screening out all possible impacts and then providing their mitigation measures are:
- To find different alternatives and ways of carrying out the project activities.
- To enhance the Environmental and Social benefits of proposal.
- To avoid, minimize and remediate adverse impacts.

- To ensure that residual adverse impacts are kept in acceptable limits

6.3 Extent and Evaluation of Impacts and Mitigation Measures

Incinerators can generate impacts on the surrounding natural environment if not properly monitored. The major impact on the natural environment includes oil contained air quality deterioration. There is however, a number of technical, social and environmental problems associated with incineration. These arise from the potential pollutants contained in the emissions and residual solids remaining from the combustion process. In Europe the standards imposed for incineration are very high, leading to higher costs of incineration, depending on economies of scale. This is because the employment of Best Available Technology (BAT) requires the completed extraction of the waste to completely burned, sterile ash and the control of emissions by gas cleaning technique store duce particulates, acid gases and dioxins to the very low levels specified din European legislation. BAT, however, is clearly not affordable for developing countries .Simple incineration that leads to dramatic improvement in the quality of air emissions compared to the continuation of open burning dumps, must therefore offer a major environmental melioration. The assignment of significance to various impacts issued to develop an environmental mitigation and management plan by highlighting significant potential impacts for which prevention, mitigation and control measures need to be implemented as required. The following basis of mitigation and management will be used.

6.4 Impact Identification

Few impact identification methods are used to perform his job. These include Assessment through the stages of the Project, Checklists, Matrices and Networks. All of these methods have few advantages, is advantages and limitations, therefore number of methods and techniques are employing.

6.4.1 Thinking through the Stages of the Project

This method has to have the advantage of thinking logical mental approach and linking actions with Impact. To categorize the impacts, the magnitudes of impacts are designated as:

- 1. Impacts of Minor Significance: Limited measures** and controls are required.
- 2. Impacts of Limited Significance:** Additional and specific mitigation measures and controls are required. Generally monitoring will be required for these.
- 3. Impacts of Major Significance: These** are considered in tolerable, alternatives will he sought to avoid the possible consequence and preventive measures and multiple Controls will be implemented to reduce likelihood and associated consequence.

6.5 Location of the Project

This section reviews the impacts of the proposed Incinerator on the surrounding environment from a physical prospective. The concerns regarding siting of the project includes importance of positioning the incinerator away from tall buildings or overhead line obstructions, which may adversely affect draft conditions.

6.6. Screening of Potential Environmental Impacts

- As the site of proposed Incinerator is located 400 to 500 meters away from the human settlement and also the proponent has taken NOC from neighbors industries so there is very less chance of human population displacement to acquire the Land in very future. Similarly the project will have no effect on the demographic pattern and disruption of social and cultural values and pattern. The socio-economic impacts of the siting of the incinerator are anticipated as being positive.
- The properties of site includes: proximity to raw materials (waste to be incinerated), easy access, provision of services (water, electricity & gas etc), away from human settlement.
- Removal of vegetation has an impact of a minor significance and there is no significant habitat identified in the area.
- Guidelines for sensitive and critical were reviewed, so that the proposed projects planned and sited in a way that protects the values of sensitive and critical areas. These guidelines include critical ecosystems including wild life reserves and forests, archaeological sites, monuments, buildings, Antiques, or cultural heritage sites. Protected areas in Pakistan can be broadly categorized in to two groups; they are:

a. Ecosystems

B. Archaeological and Cultural sites

- The Ecosystems includes protected areas such as wild life, national parks, and game reserves, archaeological sites, monuments, buildings and cultural heritage (includes world heritage).
- The site of the proposed project seems to have no visual impact on historical, archaeological, and cultural resources and on landscapes, as the site does not fall near or in the boundaries of the protected areas. The project area around 300 m radius is uninhabited. Hence resettlement and rehabilitation requirements are non-existent.

6.6 Recommended Mitigation Measures

- As far as project location is concerned, it cannot be categorized, as being ecologically sensitive or environmentally sensitive. The proposed facility will cause no specific adverse effect on the existing landscape. Structures must be laid out to blend with the natural settings and plant trees at regular intervals.

- It is crucial to avoid air turbulence and potential back pressure which can interfere with the design balance of primary and secondary airflow within the incinerator as well as possibly creating odorous emissions and paper char
- Proper access must be available to the incinerator

6.7 Design & Construction Phase

It is essential to identify the potential impacts at the planning stage, and at the same time recommend appropriate control measures so as to ensure that these measures are duly incorporated apart of the project design. These impacts may create temporary hazard to the environmental resources of the project are adjuring the projects construction phase.

6.8 Screening of Potential Environmental Impacts

These impacts are related to site preparation activities that include: Clearing, Excavation, Earth moving and Fill areas. Potential Environmental Impact is related with the site selection and development stage of the proposed operation is outlined as follows:

- The projects site and access road construction may lead to soil erosion and alteration of soil quality by removal of top soil in the project site and access road area. The access road is already present therefore such impacts are insignificant. These impacts are found to have minor significance.
- During construction, water is required for numerous construction activities. The impact is found to have minor significance.
- The clearing for access road and project site development will result in removal of vegetation and very limited loss of plant cover and productivity .Also there is very few live stock grazing in the area .As the covered area is very small and inhibit no wildlife and trees, there will be no harm to ecology of the project area. The impact is found to have minor significance.

6.9 Recommended Mitigation Measures

Management of Contractor: The contractor will be required to comply with all existing environmental protection legislation of Pakistan and Pakistan Environmental Protection legislation's Health Safety and Environmental policies. Compliance with these requirements will be made, a condition of contract for the contractor. The contractor will be required to take effective measure for the proper disposal of the wastes generated at the project site during construction activities.

Earth Work:

During construction, the earthwork will be carefully planned and executed to minimize soil erosion, excessive land uptake and unnecessary clearing of vegetation. The area around the incinerator must be surrounded with retaining wall if required.

Water Supply:

Water use will be planned depending upon the supply and timing to avoid and inconvenience.

Design and Construction:

Proper designing and planning the construction activities will reduce environmental Impacts. The material involved in the excavation and filling will be minimized. Adequate drainage and erosion protection will be provided at the site.

Operation Phase

Proper planning is required to minimize environmental impacts, as well as community awareness and involvement that directly address these issues, are essential for successful incineration operation. The training of incinerator staff is quite important for smooth operation, minimum environmental and health impacts.

6.10 Screening of Potential Environmental Impacts

This section reviews the impacts of the proposed incinerator on the surroundings environment as to the operation of the hazardous waste incinerator. An or mal operate on of the incinerator normally generates the following types of emission:

A. Storage of Waste

The projects it well is available with the liquids to rage tanks and store for temporary waste storage. This facility could create impacts of major significance if not properly handled and supervised the tanks have inlet and outlet valves to dump and emptying the tank. This storage facility would help:

- To prevents scavenging of waste.
- Scattering of waste with wind.
- Nuisance from smell and odor.
- Protect the waste from sunlight an drain

6.11 Recommended Mitigation Measures

The storage facility requires following measures to be adopted or safe and healthy working conditions without affecting personnel's health and environment:

- Industrial waste should be incinerated the on the day it is received.
- The storage tank must be marked as storage facility.

- The workers must wear personal protective equipment like Gasmask ,gloves, overall and safety shoes before entering the storage tank
- Ensuring the house keeping of are around the storage tanks and especially inside the facility

B.AirEmissions

Stack Emissions

The combustion of any substance will generate by-product emissions that could be released to the air. Waste burning processes generate wastes, which contain particulates, sulphur and nitrogen oxides, volatile organic compounds, dioxins/furans and acidic gases. The Particulates also includes heavy metals present in the waste. Primary attention needs to be focused on gaseous emissions of particulates less than 10microns in size, dioxins/furans, sulfur dioxide and nitrogen oxides due to associated health concerns and other environmental damage caused by these pollutants.

Incinerator air emissions can have a major impact on the local and regional air quality if not controlled properly. The pollutants can seriously impair human health and damage vegetation and other materials.

6.12 Recommended Mitigation Measures

To limit these emissions the incinerator should be properly operated and carefully maintained. The temperature in the primary chamber should be around 600-800°C and the secondary chamber 900- 1200°C as much as possible of the materials ,which lead to these contaminants, will therefore help to minimize harmful emission \s to atmosphere.

- It has been found that a strong correlation exists between combustion temperature, residence time and dioxin emission. The California air resources board recommends minimum temperatures of 98.22+87.77°C with a minimum residence time of 1 second. The design of incinerator should operate under the conditions as per specifications to minimize the production of dioxins.
- Production of CO and HC are directly related to the combustion efficiency therefore the optimum conditions must be ensured to prevent their production. There as on could be incomplete burning of waste ,due to fuel—rich burning (overloading of the furnace)and insufficient temperature caused by high moisture content of waste.

- Regular and thorough cleaning of the incinerator, including ash removal is absolutely essential for efficient operation. An accumulation of ash/un burnt material/incombustible matter will cause excessive temperatures to be generated and should therefore be avoided. The incinerator should be cleaned and all ash removed regularly. Free passage of air is essential for combustion as well as for the cooling process. Therefore the removal of deposits from within as well as under neat the combustion chamber is critical.
- Good combustion practices can control emissions by ensuring that the temperature in the combustion chamber and the time the Waste remains in the combustion chamber are kept at optimal levels. Major variations in these or other incineration operations could lead to a limited but significant belch of contaminated air emissions.
- Affidative attached in annexure for maintaining temperature between 600-800 to 900-1200 Centigrade.

C. Residual Incinerator Ash

Screening of Potential Environmental Impacts

After recycling ash can be used for compositing purposes whereas Incinerator ash can contain concentrations of heavy metals such as lead, cadmium, mercury, arsenic, copper and zinc, which originate from plastics, colored printing inks, batteries, certain rubber products and hazardous waste from households and small industrial generators.

Recommended Mitigation Measures:

Bottom ash and fly ash are often managed together and referred to as "Combined ash". Incinerator ash is usually disposed of in a Hazardous Waste (HW) land fill or an ash-only landfill known as an Ash Mono fill. Ash Mono fills are specially designed to reduce the ability of heavy metals to migrate from the ash in to the environment. Mono fills are often co-located with HW incinerators or existing landfills to reduce transportation distances and siting difficulties.

The principal environmental concern other public regarding incinerator ash is that when ash is disposed of in a land fill, the metals and organic compounds can leach (i.e. dissolve and move from the ash through liquids in the landfill) and migrate into groundwater or nearby surface water. In addition to possibly contaminating water supplies, Incinerator ash could also affect human health through direct inhalation or ingestion of airborne or settle dust.

Proposed Ash Disposal Plans

Initially the ash could be collected in plastic bags and stored in a confined and restricted location. There after the ash would be mixed with mortar and blocks shall be made which could be used for civil work.

If the ash is not collected in bags then the heap should be properly wetted or covered so that there are no fugitive dust emissions.

If to be land filled, Ash can best be stabilized and solidified by encasing in concrete prior to disposal, thereby significantly reducing the potential for the contaminant to migrate.

In addition to land filling, incinerator ash has also been used in the production of road bedding, concrete, brick, cinder block, and curbing

D. Noise Levels

Increased noise and vibration during operation can cause significant impacts.

Specific Mitigation Measures

Places where workers are exposed to excessive noise provide ear protection to maintain noise levels below 85dB. Ear protections include Molded and cup-type protectors and helmets. Such devices may provide noise reductions ranging from 5 to 35dB.

Mitigation Measures for Occupational Health & Safety

- Wear safety shoes with non-skid soles
- Wear long-sleeve shirts and protective gloves.
- Wear appropriate eye protection; consult a safety supervisor or a supplier
- Arrange for periodic inspection of incinerator structure integrity, to detecting cracking, etc.
- Wear respiratory protection (Gas masks) during maintenance or other working which dust and noxious gases may be released in to the atmosphere

Impact Identification with Checklist

Actions Environment Resources &Values	Damage to Environment	Recommended Feasible Protection Measures	Significance of Impact			
			No	Min	Med	Maj
A. Environmental Problems Due To Project Location						
Disruption of Hydrology	Impairment of other beneficial water uses	Careful site planning and project design	X			
Resettlement	Social inequities	Appropriate resettlement planning and budgeting	X			
Encroachment on historic/cultural values	Loss of Ecological values	Careful site planning and project design	X			
Regional Flooding hazards	Hazard to Plant operations	Careful site planning and project design	X			
Waste emissions related to siting	Intensification of problems of pollution control	Careful site planning and project design		X		

Actions Affecting Environment Resources & Values	Damage to Environment	Recommended Feasible Protection Measures	Significance of Impact			
			N0	Min	Med	Maj
B .Environmental Problems Due To Inadequate Design						
Environmental pollution control operations		Careful design/O&M/ Monitoring and use of appropriate environmental standards	X			
a)Surface waters (fresh/estuarine /marine)	a)Impairment of downstream beneficial water uses	a)same	X			
b)Ground Water	b)Impairment of downstream beneficial water uses	b)same	X			
c) Air Environment	c)Impairment of air quality	c) –same		X		
d)Noise	d) Nuisance of health	d) –same	X			
e)Residual Ash (Special Problem)	e)Impairment of beneficial water/soils uses	e)Ash disposal plan	X			
Impacts on adjacent land economic users including	Impairment of land uses	Careful design/O&M/monitoring and use of appropriate	X			
Occupational Health and Safety hazards	Hazards to workers health and safety	Careful design and operation planning		X		
Bio Hazards/S pills/	Hazards to workers	Careful design and operation planning		X		

CHECKLIST:

The method of checklist has the advantage of being simple to understand and use good for site selection and priority setting but has the disadvantage of not to distinguish between direct and indirect impacts and they don't link actions and impacts.

Checklist of environmental parameters for Incinerator has been developed on experience assist evaluated impacts of various actions affecting the Environmental Resources and values with the recommended feasible protection measures.

This list significant environmental effects known to have occurred in past thermal power development projects. This is arranged to permit (i) ready screening out of non-pertinent items by checking the column 'No significant effects'; and (ii) ready grading of significant environmental effects by degree of effect. The following checklists show Checklists of Environmental Parameters for Waste Incinerator

Actions Affecting Environment	Damage to Environm	Recommended Feasible Protection Measures	Significance of Impact			
			No	Min	Med	Mar
A. Environmental Problems Relating to Inadequate Operations						
Inadequate O&M due to poor management	Failure to achieve protection to workers and environment assumed in design	Careful O&M plus training and monitoring	X			
Occupational health and safety program including	Hazards to workers health and safety	Careful O&M, including readiness for emergency actions		X		
Nuisance from handling/storage of Hazardous	Heat/Odor and noise nuisance	Careful design/O&M/monitoring		X		
Operations Monitoring	Without it operations not likely to observe constrains	Incorporate carefully prepared monitoring program in to O&M plan	X			
Traffic congestion and blockage of access to site	Loss of time and fuel and accidents	Careful construction planning, plus monitoring	X			
Monitoring of deficiencies	Unnecessary damages to environment	Monitoring essential for ensuring careful/competent operation	X			

Actions Affecting Environment Resources & Values	Damage to Environment	Recommended Feasible Protection Measures	Significance of Impact			
			No	Min	Med	Major
B. Environmental Problems Due To Inadequate Design						
Environmental pollution control operations		Careful design/O&M/Monitoring and use of appropriate environmental standards	X			
a)Surface waters (fresh/estuarine /marine)	a)Impairment of downstream beneficial water uses	a)same	X			
b)Ground Water	b)Impairment of downstream beneficial water uses	b)same	X			
c) Air Environment	c)Impairment of air quality	c)same		X		
d)Noise	d)Nuisance of health hazards	d)same	X			
e)Residual Ash (Special Problem)	e)Impairment of beneficial water/soils uses	e)Ash disposal plan	X			
Impacts on adjacent land economic users including recreation/tourism	Impairment of land uses	Careful design/O&M/monitoring and use of appropriate environmental standards	X			
Occupational Health and Safety hazards	Hazards to workers health and safety	Careful design and operation planning		X		
Bio Hazards/Spills/Fires/Explosions	Hazards to workers health and safety	Careful design and operation planning		X		

Potential Environmental Enhancement Measures

The proposed project has a number of positive impacts, which include:

- No residential and commercial structures will be affected.
- The project has a potential to create employment opportunities, and will improve the standard of living/ livelihood of the population in the project area.
- The project will help in economy growth of Pakistan

Impact Identification with Network

Networks, also known as systems diagrams, consist of a number of linked impacts, known to result from initial actions; even mitigation and control measures can be illustrated. If a magnitude and importance score is assigned to each impact and the probability of occurrence of each impact is known, a final index value can be calculated for the network.

The advantage of a network approach is that it shows indirect impacts and the effects of change can be followed through the intermediaries but this approach is excellent for inter linkages. However, there are several problems associated with networks among which are the postulation of indirect effects that do not occur, obtaining reliable data on probabilities of occurrence of effects, and as with all grand index approaches, the final index value may obscure important uncertainties in the effects data. This network shows only the air quality aspect related to incinerator activities.

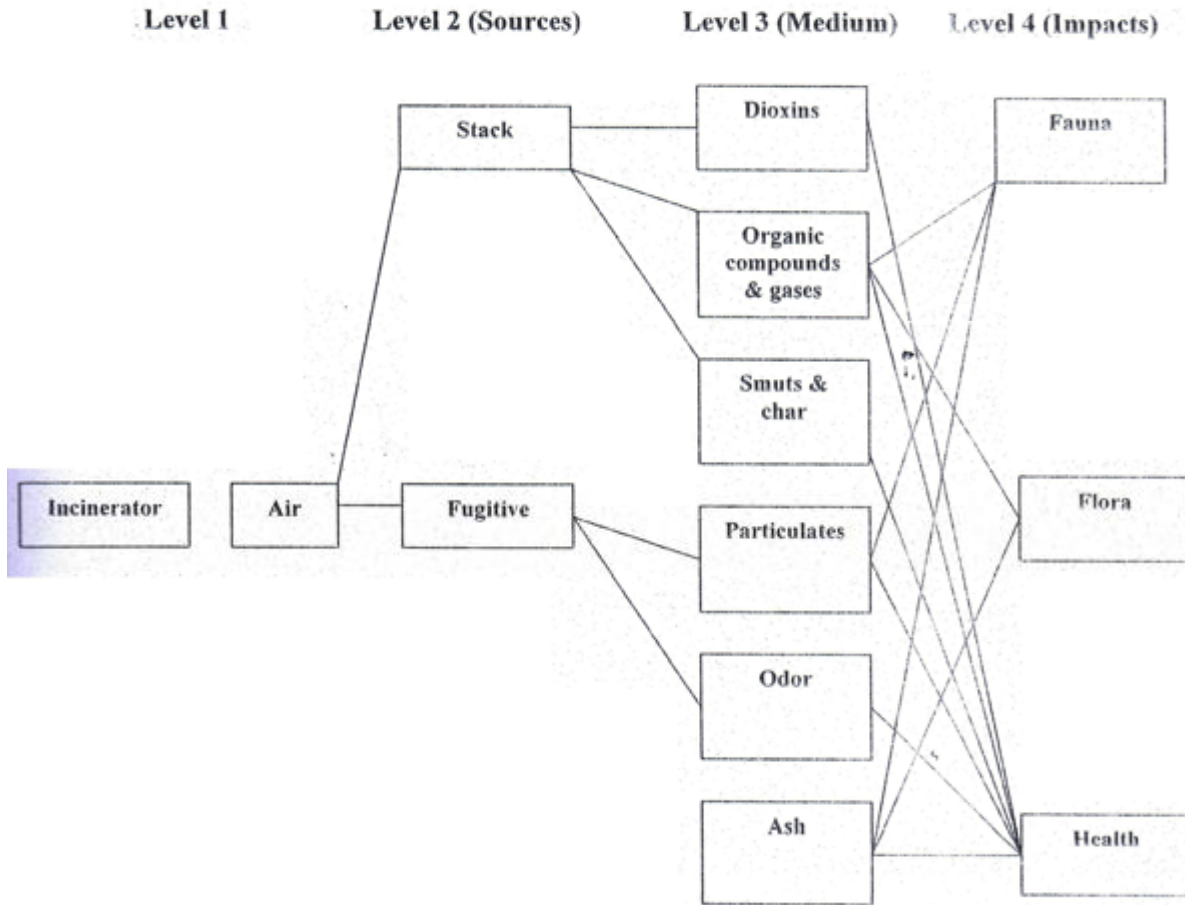


Fig 01: Simplified Network for Air Quality Issues for Incinerator

CHAPTER: 7

CONSULTATION, PARTICIPATION AND DISCLOSURE

7.0 Objectives of Consultation:

Public consultation plays a vital role in studying the effects of any development project on stakeholders and in its successful implementation and execution. It affords an opportunity to exchange knowledge with those who as members of the society are concerned with the Project, immediately or remotely. Referring particularly to a project related to environmental assessment, involvement of public is all the more essential, as it leads to better and more acceptable decision-making. The overall objective of the consultation with the stakeholders is to help verify the environmental and social issues, besides technical ones, that have been presumed to arise and to identify those which are not known or are unique to the Project. In fact, discourse with many who have thoroughly observed the site conditions in the pre-developmental phase, goes a long way in updating the knowledge and understanding.

7.0 The proponent

M/s Karamat Ullah S/o Inyat Ullah Jahanian Road ,Tehsil kabirwala District Khanewal

7.1 Consultative Aspects:

The proposed Project involves stakeholders from various segments of the society, who have direct or indirect interest in the developmental activity. The consultant team has endeavored to hold consultative sessions with a number of prominent stakeholders to evince their views on the proposed Project, inter-alia, their opinions, suggestions, understanding on various issues and concerns. The consultations aimed specifically at:

- Exchange of information related to the Project and its possible utilization in the Project planning and execution.
- Dissemination of information through discussions, education and liaison.
- Collaboratively solving the problems.
- Eliciting the comments and feedback on the proposed Project.
- Documentation of information narrated by the stakeholders.
- Documentation of mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their addressable in the EIA

7.2 Stakeholder's Consultations:

There are two types of stakeholders, i.e. primary and secondary stakeholders. The primary stakeholders are the initial stakeholders, such as affected persons, general public including women residing in villages in the vicinity of the sub-project area. Accordingly, the consultations were made with all primary stakeholders for sharing the information regarding project components, i.e.

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construction of project and community feedback regarding the project. However, the consultative meetings were also held with the secondary stakeholders including the officials/ staff management List of Officials Consulted attached in Annex-V

7.3 Public Consultations:

The consultations were made with the local community to share the information about the project and record their concerns/ feedback associated with project.

7.4 Concerns Regarding the Project:

During the field survey, people were asked about their views regarding the proposed Project. In general, local community has positive attitude towards this proposed Project that this will help to improve the development of the area.

Major Stakeholders identified

In the Project Area, all the possible stakeholders were identified during the survey. Following is the list of potential stakeholders in the Project Area

- Local residents Teachers
- Shop owners
- Office Workers Laborers
- Pedestrians
- Mosque users.
- Transport users
- Environmental Experts
- Responsible authority & other departments

7.5 Schedule of Consultations

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S	Date	Venue	Contact Person
1	12/05/17	Near Site	Muhammad Asif S/o Rana haider
2	12/05/17	Near Site	Muhammad Ameen S/o noor ahmed
3	12/05/17	Near Site	Sharif Qaiser S/o Muhammad toufeeq
4	12/05/17	Near Site	Adil ali S/o M. afzal
5	12/05/17	Near Site	Mustaq ahmed S/o liaquat muneeb
6	12/05/17	Near Site	Bashir babar
7	12/05/17	Near Site	Tanveer khalid
8	12/05/17	Near Site	Karamat Ullah

7.6 Issues Discussed

Following issues were discussed during the stakeholder's consultation:

- Overall activities of the project and their possible impacts.
- Possible impacts on natural vegetation, flora and fauna
- Possible mitigation measures;
- Beneficial factors and involvement opportunities of the local people in the set of activities of Project; and
- Management of traffic during construction and operational phase of the project

7.6.1 General

Majority of stakeholders appreciated the project and taken it as a necessary step towards the current situation of waste problems.

Few people had some reservations regarding the emissions of gases

7.6.2 Environmental

Few people were concerned about the waste that would be left behind after burning and how that waste is going to be handled

Odor due to the waste carrying by trucks/ pickups

Vegetation removal from the project site

7.6.3 Socio Economic

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Expectations about employment opportunities and community development were extremely high among all stakeholders

7.7 Proposed Mitigation Measures for Key Issues of Incinerator Project

7.7.1 General

Project activities shall be confined to the designated project site, minimizing any damage to the macro environment.

This incinerator will be equipped with state of art technologies e.g. scrubbers for control of particulate matter and emissions. Regular monitoring of emissions will be practiced to comply with the NEQS.

The road network is well established within the area of the proposed project. Moreover, if needed, it can be improved. Project will be completed in time

7.7.2 Environmental

There is no removal of trees and habitat destruction due to project activities as there exist no any trees or habitat at the proposed site.

Tree plantation is the part of project to improve the environmental conditions of the site.

Tree plantation activities are carried out by the project proponent on regular intervals.

The vehicles carrying wastes would be properly covered to reduce the odor problem.

Waste produced during the project activities would be properly managed and disposed off.

Regular environmental monitoring would be ensured to meet NEQS.

7.7.3 Socioeconomic

All unskilled jobs (watchmen, laborers) would be given to local people through local contractors. People directly affected by the project would be given priority. Appropriate measures for safety and control of pollution during project activities would be ensured to avoid risk and hazard to the community.

7.8 Environmental Experts & Other Departments Discussion:

When Discussion has been made with Environmental researchers & students and other concerned departments. They were very much interested for this project to be installed in the Khenwal. This incinerator will be equipped with state of art technologies e.g. scrubbers for control of particulate matter and emissions. Regular monitoring of emissions will be practiced to comply with the NEQS. They were very much satisfied about environmental issues because there is no removal of trees and habitat destruction due to project activities as there exist no any trees or habitat at the proposed site. Tree plantation is the part of project to improve the

environmental conditions of the site. tree plantation activities are carried out by the project proponent on regular intervals. The vehicles carrying wastes would be properly covered to reduce the odor problem. Waste produced during the project activities would be properly managed and disposed off. Regular environmental monitoring would be ensured to meet NEQS. Whereas, TMA hasn't any issue or reservation about this project, therefore they issued NOC against this project.



Consultation with respective Stakeholders

CHAPTER NO: 8

ENVIRONMENTAL MANAGEMENT & MONITORING PROGRAMME

8.0 General

This section provides an approach for managing and monitoring environment related issues and describes the institutional framework for monitoring of the proposed Project.

8.1 Roles and Responsibilities

The Executing Agency of the Project will comprise of professional as well as supporting staff. It will be responsible for co-ordination, planning, implementation and overall management of the Project related activities. The specific roles and responsibilities of different institutions/ agencies for implementation and monitoring of environmental mitigation measures for the proposed Project are described here under:

8.2 Institutional Capacity of the Unit

The organizational structure for the Environment Management Plan is outlined below:

8.3 Primary Responsibilities

The primary responsibility for implementing EMP within the company lies with the owner of M/s Karamat Ullah S/o Inyat Ullah

8.4 Operation Management & Control

Conducting the operational activities in environmentally sound manner will be the responsibility of the concerned Manager for which he will be trained.

8.5 Supervision & Monitoring

Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

8.6 Communications and Documentation

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

8.7 Meetings

Two kinds of environmental meetings will take place during the project

- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meeting will be to present the EMP to project staff and discuss its implementation and to discuss any event of environmental significance that has happened in the under-discussion industry or a similar industrial unit to investigate its route causes and develop its

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solutions. The purpose of the weekly meetings will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of weekly environment

8.8 Changes-Record Register

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

8.9 Objectives of EMP

An EMP provides same chains to address the adverse environmental impact of project during its execution. To enhance the project benefits, and to introduce standards of good practice to be adopted for all the project works.

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

8.9 Objectives of EMP

An EMP provides same chains to address the adverse environmental impact of project during its execution. To enhance the project benefits, and to introduce standards of good practice to be adopted for all the project works. The primary objectives of the EMP areas follows;

- To facilitate the implementation of the mitigation measures.
- To define responsibilities of the project proponents, contractors and environmental monitors, and to provide effective means of communication among all.
- To provide monitoring mechanism and identification of its parameters for ensuring the complete implementation of all mitigation measures and the ineffectiveness.
- To provide a mechanism for taking timely action in the place of unanticipated environmental situations.
- To identify training requirements at various levels.
- To ensure project sponsors/owners and contractors to in all environment related obligations.
- To facilitate owner/project sponsors to follow corporate policy on environment.
- To ensure required equipment and human resources for environmental monitoring are in place.
- To ensure personnel are trained to meet accidents and emergencies

Scope of EMP

The Environmental Management Plan is detailed strategy to be implemented for achieving improved environmental performance in the following areas

- Environmental Management
- Water Usage and Disposal
- Recycling and Waste Management.
- Storm Water Management
- Pollution Prevention/Environmental Risk Assessment.
- Bio-Diversity
- Energy Management.
- Transport
- Community Awareness

8.10 Legislation and Guidelines

The EIA for hazardous waste incineration facility has discussed national and international legislation and guidelines that are relevant to the project. Karamat Ullah will also ensure that the key project management staff and contractors are aware of these legislation and guidelines prior to the start of the project activities.

- **PEPA, 1997:** The Pakistan Environmental Protection Act, 1997 (PEPA) is the basic Environmental Legislation in the country. The Act also requires that no person will emit pollutants or noise in amount, concentration or level that is in excess of the National Environmental Quality Standards.
- **EIA Regulation:** The project will be carried out in conformance with EIA regulation and relevant international conventions and that guidance is sought from national and international guidelines. An independent monitoring consultant will be appointed for the project.
- **NEQS Requirements:** NEQS will be followed throughout the project activities and operation. The NEQS are available for industrial gaseous emissions, motor vehicle emissions and noise level, and industrial and municipal effluents.
- **World Bank Guidelines:**
The World Bank guidelines are present EMP. The project designers need to know applicable bank requirements and the environmental implications of the design choices.

8.11 Mitigation Plan

The mitigation plan is a key component of the EMP. It lists all the potential effects of the project and their associated mitigation measures identified in the EIA. For each impact, the mitigation measures are suggested as below:

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- To identify training requirements at various levels.
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ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility and Mitigation
CONSTRUCTION STAGE				
1	Employment of labour	Offer employment opportunities to local population	<ul style="list-style-type: none"> ▪ Maximum efforts should be made to ensure that ample employment opportunities are offered to the local workers 	<p>Construction Contractor/Project Manager</p> <p>The contractor shall be advised to engage local labour to the maximum possible extent</p>
2	Traffic congestion and disturbance to the local people	To mitigate traffic problems during construction	<ul style="list-style-type: none"> ▪ Traffic count be taken to find the impact of construction-related vehicles on local roads ▪ Transportation of raw material and heavy machinery will be done at times convenient to local public ▪ As much as possible, raw material and equipment shall be brought to project site through main roads 	<p>Proponent</p> <p>Traffic counts show that there is low traffic on the local road. The upper limit of additional traffic on such roads during construction shall be insignificant. Moreover, the contractor will be directed to ensure that there is no interference with local traffic patterns. Finally, vehicles will not be parked on local roads</p> <p>Construction Contractor/Project Manager</p> <p>All deliveries of equipment and materials will be during off-peak hours and never at night</p>

			<ul style="list-style-type: none"> ▪ Construction at the project site ▪ Vehicles to be used at the project site should be in good working condition, if not new, to minimise noise pollution and smoke emissions vehicles should not blow horns 	<p>Construction Contractor/Project Manager</p> <p>Only main roads shall be used and heavy project traffic will not pass through any residential area unless unavoidable.</p> <p>Construction Contractor/Project Manager</p> <p>Construction Contractor will issue strong instructions to concerned drivers to abide by traffic laws and rules and to observe road courtesies and not blow horns needlessly</p> <p>Construction Contractor/Project Manager</p> <p>Construction Contractor will deploy vehicles, machinery and equipment that is in good condition and thus there should not be any adverse impacts in this context</p>
3	Transportation of construction material	To ensure that transportation of material does not cause inconvenience	<ul style="list-style-type: none"> ▪ The contractor should transport construction material, as much as possible, without obstructing local traffic 	<p>Construction Contractor/Project Manager</p> <p>Construction Contractor will ensure that local traffic is not put into inconvenience due to movement of project vehicles and shall use routes that bypass local traffic to the extent possible</p>
4	Stocks of construction material	To avoid soil erosion and pollution by an unnecessary stockpile of construction material	<ul style="list-style-type: none"> ▪ It should be ensured that construction materials are ordered subject to need only so that surplus 	<p>Construction Contractor/Project Manager</p>

			material does not create an environmental hazard	Construction Contractor shall order construction materials strictly on need basis and these will not unnecessarily pile up at the project site or on adjoining properties
5	Health and safety of workers and local public	To minimize health and safety related negative impacts on the project	<ul style="list-style-type: none"> ▪ Construction labour be trained in safety procedures for all relevant aspects of construction ▪ Hard hats be worn by workers at all time of work and everywhere on the site ▪ Regular checks be carried out to ensure that the contractor is following safe working procedures and practices ▪ Formal emergency procedures must be developed for construction site in case of an accident. First aid kits and other necessary equipment should be kept available at the project site along with a list of emergency phone numbers to be contacted in case of any emergency or accident. Arrangements be made with the local clinics for help in the event of urgent need 	<p>Construction Contractor</p> <p>Construction Contractor shall impart requisite training to foremen and workers</p> <p>Construction Contractor</p> <p>Hard hats shall be worn by workers</p> <p>Project Manager</p> <p>The contractor's work will be monitored on a regular basis by the Project Manager to ensure that healthy and occupational safety standards are enforced at all times</p> <p>Construction Contractor/Project Manager</p> <p>All such arrangements will be made by the Construction Contractor under supervision of the Project Manager through regular monitoring of the work executed</p>
6.	Disturbance to the local people	To minimize disturbance to everyday life of local people, especially immediate neighbors	<ul style="list-style-type: none"> ▪ Residents of the area be informed about the detail of work, likely disturbances and their duration and to whom they should 	<p>Project Manager</p> <p>A sign shall be posted at the project site for information of the public of</p>

			<p>report complaints</p> <ul style="list-style-type: none"> ▪ The local population to be advised on safety hazards posed by encroaching at the project site ▪ Good community relationship be established so that any disruption can be resolved with due consideration for and involvement of local community 	<p>project activities. The proponents have been advised by the Environmental Consultants to institute a Complaints Redressal Mechanism</p> <p>Construction Contractor/Project Manager</p> <p>Public will not be allowed entry to the project site</p> <p>Construction Contractor/Project Manager</p> <p>The Project Manager will be available to entertain public objections, if any, about project activities. Any complaints received regarding project activities shall be attended to post haste</p>
7	Surface and ground water contamination	To prevent surface and ground water contamination from oil based products and construction waste	<ul style="list-style-type: none"> ▪ Proper arrangement to be made for collection and disposal of oil-based products and construction waste ▪ Surface and groundwater quality be monitored every month during construction 	<p>Construction Contractor/Project Manager</p> <p>A waste management contractor shall be engaged for disposal of all forms of waste and eventual disposal in an environment-friendly manner at an approved garbage disposal site after obtaining approval from the relevant municipal authority. All waste shall be removed from the site on an emergent basis.</p> <p>Construction Contractor/Project Manager</p> <p>Groundwater samples were taken and tested and did not show any abnormality. There is no surface</p>

				water body in the near vicinity of the project site that is under threat from project activities, Groundwater samples shall be taken every three months during the construction phase to detect possible changes in properties of the groundwater
8.	Wastewater discharges	To minimize wastewater discharges at worker's camps and prevent pollution from sanitary waste at site	<ul style="list-style-type: none"> ▪ Proper drainage of wastewater 	<p>Construction Contractor/Project Manager</p> <p>Wastewater will be reused and the rest shall be discharged after appropriate sieving. The residue will be disposed separately through the waste management for disposal in an environment-friendly manner at an approved garbage disposal site</p> <p>Workers shall be provided portable toilets and showers that shall be maintained by the waste management contractor to maintain hygiene standards, and waste shall be carried away on a regular basis for appropriate disposal</p>
9.	Disposal of mucking material	To dispose of excavated material in an environmentally friendly manner	<ul style="list-style-type: none"> ▪ Transportation of mucking material be done in closed containers ▪ Mucking material be filled in layers and properly rolled and sprinkled to avoid any negative 	<p>Construction Contractor/Project Manager</p> <p>Excavated earth will be disposed of through the waste management contractor for appropriate disposal. Much of the excavated earth will be reused thereafter for back-filling and landscaping of open areas</p> <p>Construction Contractor/Project</p>



			<p>environmental or visual impacts</p> <ul style="list-style-type: none"> ▪ Utilization of mucking material be done for construction of temporary access passages 	<p>Manager</p> <p>All mucking material shall be covered and sprinkled with water to minimize dust dispersal Construction Contractor/Manager</p> <p>Excess excavated material will be carried away from the site in closed containers. Much of the excavated earth will be reused for back-filling and landscaping of open areas. No excavated material shall be placed on adjoining plots or in an unauthorized manner that can cause dust pollution in the local area</p>
10.	Dust	To avoid problems resulting from dust pollution	<ul style="list-style-type: none"> ▪ Excavation work be sprayed with water ▪ Stockpiles of excavated material be covered with tarpaulins ▪ Construction workers be provided with masks and trained in their use 	<p>Construction Contractor/Project Manager</p> <p>Project Manager will ensure that there is regular spraying of water on excavated materials Construction Contractor/Project Manager</p> <p>All excavated material will be well covered before disposal Construction Contractor/Project Manager</p> <p>Dust masks shall be available at the site for use by workers whenever required or whenever the nature of work warrants</p>
11.	Air Pollution	To minimize degradation of ambient air quality	<ul style="list-style-type: none"> ▪ Solid waste from the construction camp and project site 	<p>Construction Contractor/Project Manager</p>

			<p>should not be burnt on site</p> <ul style="list-style-type: none"> ▪ Appropriate measures to minimize exhaust emissions from construction machinery, vehicles and generators ▪ Air quality monitoring to be carried out on a monthly basis to assess if project implementation activities are impinging on the environment 	<p>No solid waste will be burnt at the project site. All solid waste will be disposed through the waste management contractor</p> <p>Construction Contractor/Project Manager</p> <p>Use of good quality equipment, machinery and vehicles will ensure that there are minimal emissions and noise</p> <p>Construction Contractor/Project Manager</p> <p>Environmental testing for ambient air has showed that there is presently no alarm for concern in this behalf at pre-project stage as the ambient air quality is well within the PEQS. Fresh readings shall be taken when construction works of heavy nature commence, which will show the impact of construction on the local environment</p>
12.	Noise	To avoid noise pollution	<ul style="list-style-type: none"> ▪ Selection of new plants, machines, equipment and hand tools to be used for containing noise levels ▪ Noisy work be confined to normal daylight hours ▪ Suitable hearing protection and training be provided to construction workers ▪ Noise monitoring will be 	<p>Construction Contractor/Project Manager</p> <p>The contractor shall deploy good quality equipment and machinery that will not generate any excessive noise</p> <p>Construction Contractor/Project Manager</p> <p>No noisy work will be undertaken after normal working hours</p>

			carried out every month	Construction Contractor Ear-muffs will be available for workers whenever demanded Construction Contractor/Project Manager Noise monitoring carried out during pre- construction showed that noise levels are very low. Noise monitoring shall be carried out again when construction is in full swing
13.	Solid waste	To remove solid waste from site before it damages the environment	<ul style="list-style-type: none"> Measures to be taken to ensure that solid waste does not remain at the project site and that it does not mar either the soil or the surface environment 	Construction Contractor/Project Manager Solid waste will be removed regularly through arrangements with the waste management contractor for disposal in an appropriate manner at an approved garbage disposal facility after obtaining prior approval
14.	Liquid effluents	To dispose of all liquid effluents in an environment friendly manner	<ul style="list-style-type: none"> It must be made sure that there are no liquid effluents on account of leakages from equipment and vehicles or the construction camp and that all such effluents are removed before seeping into the ground 	Construction Contractor/Project Manager There should not be such leakages, mainly because no repairs will be undertaken at the project site. Use of good quality machines and vehicles will reduce the possibility of such leakages
15.	Working hours	To avoid over-work	<ul style="list-style-type: none"> Construction workers should not be coerced to work beyond normal daylight hours 	Construction Contractor/Project Manager The contractor will observe all labour laws regarding wages and working hours
16.	Gender issues	To avoid any gender issues created by influx of construction workers	<ul style="list-style-type: none"> Construction workers should not be allowed to enter adjoining 	Construction Contractor/Project Manager

			areas unless absolutely necessary	Workers will be advised not to loiter in adjoining settlements without sufficient cause. However, freedom of movement of the workers cannot be restrained beyond reasonable limits
17.	Flora and Fauna	To protect the fauna and flora of the Project Site	<ul style="list-style-type: none"> Trees and plants be planted to enhance the environment 	Proponents Suitable plantation is built into the project design and shall be carried out at the appropriate time after selection of suitable varieties, and shall remain a continuous process during project life
18.	Vibrations	To reduce vibrations, if any, from use of machinery	<ul style="list-style-type: none"> It should be ensured that there are minimum vibrations from construction work so that no damage or inconvenience is caused to adjoining properties 	Construction Contactor/Project Manager The Project Manager will monitor the work of the contractor regularly to make sure that there are no undue vibrations from machinery and equipment deployed in construction
19.	Environment-friendly building construction materials	To maximize use of green materials	<ul style="list-style-type: none"> Maximum efforts should be made to use Green Materials during construction and to use environment-friendly construction materials, such as lead-free paint etc. 	Proponents Use of Green Materials will be subject to availability and cost-effectiveness. Environment-friendly materials, such as lead-free paint etc., will be used to the extent possible subject to availability in the market
20.	Visual and physical impact of electric sub-station and transformers	To preserve visual impact in the project area	<ul style="list-style-type: none"> It should be ensured that the electric sub-station and transformer(s) are constructed/installed in an environment-friendly manner 	Proponents It will be ensured that all electric installations are erected in compliance of all safety and environmental standards and MESCO standards.

ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility and Mitigation
OPERATION STAGE				
21.	Overall environmental impacts	To reduce overall negative impact of the project on the environment and conserve natural resources	<ul style="list-style-type: none"> ▪ The proponents should take all possible measures to ensure that operation of the proposed project does not harm the local environment 	<p>Proponents</p> <p>The project will be located in an open area and there is not likely to be any such impact. However, the proponents shall ensure that neighbors are not inconvenienced in any manner as a result of project operations</p>
22.	Water Conservation	To conserve water	<ul style="list-style-type: none"> ▪ Obtain access to piped water supply from local sources ▪ Employees should be regularly advised on important of water conservation so as to conserve water 	<p>Project Manager</p> <p>There is no local water supply in the project area. However, in case has excess water capacity, an application shall be made for an industrial water connection and a pipeline shall be laid from reservoir or distribution point</p> <p>Proponents</p> <p>All employees and other users of the facilities will be regularly informed of the importance of water conservation through circulars, and during staff meetings and labour union gatherings</p>
23.	Air Quality	To ensure that the pollution levels do not exceed the limits	<ul style="list-style-type: none"> ▪ No waste should be burnt at the sit 	<p>Proponents</p> <p>No solid waste whatsoever shall be burnt at the project. All solid waste will be carried away from through</p>



ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility and Mitigation
OPERATION STAGE				
			<ul style="list-style-type: none"> ▪ Employees be advised to keep their vehicles and machines in good working order to minimize emissions 	<p>arrangements with a waste management contractor for disposal in an environment-friendly manner. A compactor shall be purchased and placed within the compound to compact solid waste, which will improve ability to remove the waste</p> <p>Proponents</p> <p>Employees and will be advised in this behalf through regular circulars, and during staff meetings and labour union gatherings</p>
24.	Noise	To minimise noise levels	<ul style="list-style-type: none"> ▪ Employees be advised to keep all forms of noise levels down 	<p>Proponents</p> <p>Employees will be advised in this behalf through regular circulars, and during staff meetings and labour union gatherings</p>
25.	Traffic congestion	To mitigate traffic congestion problems	There should be prohibition on roadside parking	<p>Proponents</p> <p>There shall not be any roadside parking at the project due to availability of ample spaces within the compound</p> <p>Proponents</p>



ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility and Mitigation
OPERATION STAGE				
			Parking space to be provided at the site	Due to the nature of the site, there are no requirements for pre-designated parking spaces. An area of 1,645,152.9 square feet out of the plot, which is over two-thirds of its size, has been earmarked as open space, much of which can be utilized for vehicle parking
26.	Vibrations	To reduce vibrations from equipment installed in the project	Measures be put in place to control vibrations from equipment installed inside the premises, such as generators, pumps etc.	Proponents The generators shall be properly clamped and under regular maintenance to eliminate possibilities of vibrations. Similar precautions will be taken to ensure that other equipment is under due maintenance
27.	Energy Conservation	To conserve energy and use of environmental-friendly energy sources	Efforts should be made to ensure that energy is conserved and that environment-friendly techniques are adopted to	Proponents Maximum number of energy-savers shall be installed. Secondly, colour schemes that require lighting will be avoided. The proponents will use maximum amount of sunlight to reduce dependence on lights. Solar panels shall not be installed for the present as these are not envisaged in the project design and cost of the project but the proponents shall consider reverting to solar power in good time
28.	Air Pollution	To minimize degradation of ambient air quality	Stack Emissions	Proponents Wet scrubber will be installed which helps to remove

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ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility and Mitigation
OPERATION STAGE				
				harmful materials from industrial exhaust gases before they are released into the environment. Alum is mixed in the water to settle down the heavy particulate matters which prevents to release in the forms of NOx, Sox & carbon into the air
29.	Flora and Fauna	To protect the fauna and flora of the project site	Trees and plants will be planted to enhance the environment	Proponents The proponents shall plant a sufficient number of trees at the site. There shall also be flowerbeds and grassy plots around the compound to enhance the environment in the area
30.	Environmental Monitoring	To ensure that periodic reports on environment at the project are furnished to P-EPA in pursuance of conditions of the environmental approval	A mechanism should be employed for Environmental Monitoring at the project when it comes into operation	Proponents While the proponents shall be responsible for implementing this Environmental Management Plan, the environmental approval to be issued by P-EPA invariably requires environmental monitoring when the project comes into operation. Accordingly the proponents shall entrust the responsibility for environmental monitoring in line with instructions of P-EPA. A responsible employee shall be assigned this task and provided sufficient capacity and resources to carry them out to the satisfaction of P-EPA. The proponents shall, if necessary, engage professional expertise to train the designated employee(s) to conduct

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ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility and Mitigation
OPERATION STAGE				
				regular environmental monitoring
31	Storage of waste	<ul style="list-style-type: none"> • Top prevent scavenging of waste. • Scattering of waste with wind. • Nuisance from smell and odor. • Protect the waste from sunlight and rain 	<ul style="list-style-type: none"> ▪ To ensure minimize the storage waste solution 	<p>Proponent</p> <p>The storage facility requires following measures to be adopted for safe and healthy working conditions without affecting personnel’s health and environment:</p> <ul style="list-style-type: none"> • Industrial waste should be incinerated the on the day it is received. • The storage tank must be marked as storage facility. • The workers must wear personal protective equipment like Gas mask, gloves ,overall and safety shoes before entering the storage tank • Ensuring the housekeeping of area around the storage tanks and especially inside the facility

ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

Sr. No.	Project Component or Impact	Target	Action	Responsibility and Mitigation
OPERATION STAGE				
32	Residual Incinerator Ash	To prevent the concern of the public regarding incinerator ash is that when ash is disposed off in landfill, then metals and organic compounds can leach (i.e. dissolve and move from the ash through liquids in the landfill) and migrate into groundwater or nearby surface water	Ensure to prevent leaching of residual ash into the surface.	Proposed Ash Disposal Plans Initially the ash could be collected in plastic bags and stored in a confined and restricted location. There after the could he used for civil work. If the ash is not collected in bags then the heap should be properly wetted or covered so that there are no fugitive dust emissions. If to be and filled, Ash can be stabilized and solidified by en casing in concrete prior to disposal, there by significantly reducing the potential for the contaminant to migrate. In addition to and filling, incinerator ash has also been used in the production of road bedding, concrete, brick, cinder block ,and curbing

8.12 Environmental Monitoring Plan

Effective implementation of the mitigation measures to mitigate the environmental impacts would require the project to undertake comprehensive monitoring program. The objective of the monitoring program is to ensure that the construction and operation activities are carried out in an environmentally sensitive and responsible manner, and in accordance with their commendations of EIA. Following environmental record should be maintained:

- Periodic inspection reports of the site
- Audit reports
- Incident record of all moderate and major spills and other incidents and accidents.

The record will include:

- Location of spill or battery limit of the accident
- Estimated quantity or the amount of injury (as may be reported in LTI or LWI)
- Spilled material or nature of injury or loss (temporary or permanent)
- Restoration measures
- Photographs.

Corrective measures taken, if any

- Waste Tracking Register that will hold records of waste generated during the construction period. This will include quantities of waste disposed, recycled, or reused.
- Records of water consumption with use wise breakdown

Survey reports, in particular, the following:

- Vehicle and equipment noise.
- Ambient noise survey reports.
- Ambient level of PM
- Vendor data—all vendors disturbed by the project and compensation paid
- Public infrastructure: Record of all damages and repair work undertaken.
- Employment
- Total number of unskilled, semi-skilled, and skilled jobs offered during
- Construction.
- Name and domicile of the employed staff.

- Project and Community Interface
- Record of community plains and the measures taken to address them.
- Number of meeting has done with communities and data of person on attended
- Environmental and social training record

Recommended monitoring activities of the proposed project are presented as follows.

Construction Phase

Monitoring Category	Type of Monitoring	Monitoring Responsibility
Air/Noise Pollution		
Dust emission during site preparation, excavation	Monitoring adequacy of dust suppression measures undertaken	Contractor/Proponent
Storage and transport of construction materials	Monitoring adequacy of measures under taken to prevent fugitive dust	Contractor/Proponent
Noise and emission from construction vehicles	Monitor maintenance of construction vehicles	Contractor/Proponent
Noise and emission from construction activities	Monitor preventive measures being implemented to curb noise	Contractor/Proponent
Solid Waste		
Disposal of solid waste	Monitor to ensure solid waste segregation and proper disposal	Contractor/Proponent
Health And Safety Of Construction Workforce		
Health and safety requirements	Monitor adherence to all occupational land safety requirements	Contractor/Proponent
Provision of health and safety equipment	Monitor availability of adequate number of protective gear	Contractor/Proponent
Sanitary conditions of construction	Monitor provision of shelter, water supply excreta and solid waste management at camp sites	Contractor/Proponent
Community life and Economic Activities		
Access to public and private properties	Monitoring impact of project on dwelling and business in the project area	Contractor/Proponent
Damage to public and private properties	Monitoring construction activities to ensure public and private property is not damaged	Contractor/Proponent
Hardship and inconvenience to public and business	Monitoring to ensure that communities and business face minimal hardship and in convenience due to construction activities	Contractor/Proponent

Public Awareness		
Awareness campaign for public cooperation to overcome short term construction phase inconveniences	Review and monitor effectiveness of the awareness campaigns conducted	Contractor/Proponent

2. Operation Phase

Monitoring Category	Type of Monitoring	Monitoring Responsibility
Operation and Maintenance of the System		
Noise and air emissions due to generators and vehicles	Monitor proper maintenance of the equipments	Proponent
Solid waste segregation, recycling and final disposal	Monitor adequacy of measures undertaken to collect and dispose off solid waste	Proponent
Sewage and wastewater disposal	Monitor disposal of waste water according to the proposed mitigation measures	Proponent
Environment and Landscape		
Onsite wastage material's minimization	Monitor waste minimization activities	Proponent
Creation of landscape by tree planting, appropriated to local conditions	Monitor and implement site restoration and landscaping	Proponent

8.15 Contingency Plan

Explosion and Fire Hazards

Activity	Strategy	Responsibility	Timing
Fire hazards	Proper fire fighting equipments will be available at appropriate places.	Karamat Ullah	Construction and operation
Risk management	Proper equipments and trained staff	Karamat Ullah	Construction and operation

8.16 Communication and Documentation

An effective mechanism for storing and communicating environmental information during the project is an essential requirement of an EMP. This activity will be done by an Independent Monitoring Consultant; the key features of such a mechanism are;

Precise recording and maintenance of all information generated during them on it original predetermined format

- Communicating the information to a central location
- Storing raw information in a central database
- Processing the information to produce periodic reports

Item	Description
Date recording and maintenance	All forms will be numbered and a tracking system will be developed for each. Whenever a form is released for use in the field. Its number will be recorded .The monitors will be required to account for each from after completion .In this manner, it will been sure that all forms are returned to the office, be they filled ,unused ,or discarded
Storage of information	A data base for information collected during the project will be prepared. The database may include information on: <input type="checkbox"/> Training programs <input type="checkbox"/> Staff deployment <input type="checkbox"/> Non-compliance <input type="checkbox"/> Corrective actions <input type="checkbox"/> Water Resources <input type="checkbox"/> Quality <input type="checkbox"/> Results of effects monitoring <input type="checkbox"/> Water usage <input type="checkbox"/> Fuel usage
Meeting	For effective monitoring, management and document of the environmental performance during the operation, environmental matters will be discussed during daily meetings held on-site. Environmental concerns raised during the meeting will be mitigated after discussions be tweenthe project site representatives
Report	The IMC will produce daily, Weekly,monthlyandotherperiodic reports ,as well as a final report of the project base done the information collected .The project site representative and the contractors will also prepare a weekly environmental report.Copiesof the report will be provided to the proponent and the contractor's higher management

8.17 Change Management

An environmental assessment of the proposed project has been made on the basis of the project description available at the time the EIA was conducted. However, it is possible that changes in the project design will be required when the project is implemented.

a. First –Order Change

A first-order change is one that leads to a significant departure from the project described in the EIA and consequently requires an assessment of the environmental impact associated with the change. In such an instance, the IMC will be required to reassess the environmental impact of the proposed change, the results of which will then be sent to the Punjab EPA for approval.

b. Second-Order Change

A second-order change is one that may entail the project activities not significantly different from those described in the EIA, which may result in project effects whose overall magnitude would be similar to the assessment made in this report. In case of such changes, the IMC will be

Required to reassess the impact of the activity on the environment, specify additional mitigation measures if necessary, and report the changes to the Punjab EPA. The EPA will review the change management statement and communicate if any concerns. If EPA agrees with the assessment of the IMC, it does not have to send a formal approval. Seven days after submission of the change management statement, the change will be implemented unless a communication to the contrary has been received from EPA.

c. Third-Order Change

A third-order change is one that is of little consequence to the EIA findings. This type of change does not result in effects beyond those already assessed in the EIA, rather it may be made on site to minimize the impact of an activity, such as realigning a particular section to avoid cutting a tree, relocating construction campsites to minimize clearing vegetation, etc. The only action required for such changes would be to record the change in the Change Record Register.

8.18 Changes to the EMP

The possible categories of changes have been discussed above. The changes in the project design or the results of the environmental monitoring may necessitate changes in the EMP. In this case, the following actions will be taken:

- A meeting will be held between the project proponents, the concerned contractor, and the IMC representatives. During the meeting, the proposed addition to the EMP will be discussed and agreed upon by all parties.
- Based on the discussions during the meeting, a change report will be produced

Collectively, this will include the additional EMP clause and the reasons for the addition.

Reported in the IMC monthly environmental report.

- The changes in the EMP may include either additional or reduced monitoring or reporting requirements.

8.19 Environmental Training

Environmental training will help to ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel in the course of the project.

The primary responsibility for providing training to all the project personnel will be that of the IMC to formulate indicative environmental training program, which will be finalized before commencement of the project. The IMC will train the project proponent's staff, the contractors, and other staff engaged for the project. Training will cover all staff levels, ranging from the management and supervisory to the skilled and unskilled categories. The scope of the training will cover the requirements of the EIA and the EMP, with special emphasis on sensitizing the project staff to environmental, ethnic, and social context of the area.

Staff	Trainer	Contents	Schedule
Selected Management staff from the project proponents and contractors	IMC	Environmental sensitivity of project area Key findings of the EIA Mitigation measures EMP Social and cultural Values of area Leadership dynamics	Prior to the start to the project activities
All sited personnel	Contractors and IMC	Environmental sensitivity of project area Mitigation measures Contingency plan Community issues	Prior to the start to the project activities
Construction crew	Contractors and IMC	EMP Waste disposal	Prior to the start to the project activities
Drivers	Contractors	Road safety Defensive driving	Before and during the construction work

8.20 Environmental Budget

Environmental budget for the M/s Karamat Ullah S/o Inyat Ullah is approximately 100, 00 thousand rupee

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

Components	Objectives of monitoring	Parameters to be monitored		Frequency	Location	Responsibility
Noise level	To determine the effectiveness of noise abatement measure on sound level	Noise level on the site and adjacent area on dB(A) scale	Noise level reading will be taken	at least 3 working days and on week end	At least three locations on the unit boundary and three locations at the receptor end	Environment Officer /manager
Waste Collection, Storage and Disposal	To check the availability of Waste Management System and Implementation	Inspection of Waste Generation, collection, Storage and Disposal at site	Visual inspection	Once daily	Construction site	Environmental officer/manager
Soil contamination	To determine the effectiveness of the	Inspection of equipment	Visual inspection and availability	monthly inspection	all vehicles and equipment's in	Contractor/Environment
Noise level	To determine the effectiveness of noise	Noise level on the site and	Noise level reading will be	at least 3 worki	At least three locations on the	Environment Officer /manager

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	abatement measure on sound level	adjacent area on dB(A) scale	taken	ng days and on week end	unit boundary and three locations at the receptor end	
Waste Collection, Storage and Disposal	To check the availability of Waste Management System and Implementation	Inspection of Waste Generation, collection, Storage and Disposal at site	Visual inspection	Once daily	Construction site	Environmental officer/manager
Soil contamination	To determine the effectiveness of the	Inspection of equipment	Visual inspection and availability	monthly inspection	all vehicles and equipment's in	Contractor/Environment
Noise level	To determine the effectiveness of noise abatement measure on sound level	Noise level on the site and adjacent area on dB(A) scale	Noise level reading will be taken	at least 3 working days and on week end	At least three locations on the unit boundary and three locations at the receptor end	Environment Officer /manager
Waste Collection, Storage and Disposal	To check the availability of Waste Management System and Implementation	Inspection of Waste Generation, collection, Storage and Disposal at site	Visual inspection	Once daily	Construction site	Environment officer/manager



Soil contamination	To determine the effectiveness of the	Inspection of equipment	Visual inspection and availability	monthly inspection	all vehicles and equipment's in	Contractor/Environment
Workers safety	To check and evaluate the effectiveness of the workers' safety plan	Injuries and accident	Recording injuries	Daily	Onsite	HSE/contractor
Water conservation	To determine the effectiveness of the Water Conservation Techniques in Practice	leakages, spills and wastage	Visual inspection and record tracking	On monthly basis	at all points of use	Environment officer/manager
Vehicle & equipment exhaust	To confirm the availability of exhaust control devices with the construction vehicles and equipment and Their	Air quality at different points around the vehicles and equipment	Readings will be taken	on three typical working days	At least three points around the vehicles and equipment and three points at some distance downwind	Administration

8.21 COST ESTIMATES FOR ENVIRONMENTAL MONITORING

The proponents shall assign additional duties to selected employees to be appointed as the Environmental Monitoring Team to oversee environmental monitoring. Accordingly, no cost estimates need to be worked out for manpower, operational expenses, equipment, furniture and furnishings etc. Environmental testing shall be carried out through a certified laboratory and no testing equipment, therefore, needs to be procured.

MANPOWER:

Description	Status	Monthly salary (Rs.)
EHS Manager	Permanent	30,000
Environmental Control Officer	Permanent	20,000
Health and Safety Officer	Permanent	20,000
TOTAL:	----	50,000

ENVIRONMENTAL TESTING:

Description	Frequency	Rate (Rs.)
Testing for noise levels and traffic congestion	Monthly	---
Testing for ambient air and groundwater quality	Quarterly	25,000
Submitting monthly reports to P-EPA either through environmental consultants so as to comply with conditions of environmental approval to be issued	Every month	Rs. 30,000
TOTAL:	----	55,000

Land scaping

Following excavation planting pits shall be filled with the sweet soil mixture. Three days prior to planting pits must be filled with water for consolidation of soil.

The dimensions of the planting pits are following:

- A. Trees: 3 *3*3
- B. Shrubs 2*2*2
- C. Hedges 2 wide * 2 deep

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- D. Creeps and vines: 2 wide * 2 deep
- E. Edges and flowering beds
- F. Perforated drainage pipes
- G. Planting mixture
Plant preparation

The contractor shall be responsible for the preparation of the lawn area and planting lawn. The lawn area is to be brought up within 4th of the existing grades.

Cover the sweet soil with the decomposed organic matter. The prepared surface shall be free. The lawn beds shall be fine graded to remove all ridges and depressions. Surface irregularities resulting from other operations shall be leveled to prevent depressions. Grades shall be adjusted to assure that the after settlement and light rolling.

Rolling shall be done at two directions at right angle to each other. Rolling shall be in such a manner to climate the necessity for walking on the finished

CHAPTER .NO:9 RECOMMENDATIONS AND CONCLUSIONS

9.0 Recommendations

The Initial Environmental Examination study and survey results are finally evaluated to recommend the following:

- Implementation of EMP must be given top priority.
- Proper PPEs including ear plugs, ear muffs, mufflers, goggles, gloves and shoes etc. should be provided to workers
- Train workers to use PPEs
- Advise workers to follow SOPs.
- Installation of fire extinguishers in the premises and their monitoring must be ensured.
- Quality of the feed must be assured.
- Safe pesticides and disinfectant sprays must be used.
- Waste minimization practices should be employed and workers should be encouraged to adopt such method.
- Wages should be distributed on time.
- Proper tree plantation plan should also be developed in order to make the unit environment friendly.
- Small waste storage bins should be installed at different corner for proper waste collection and disposal
- Proper dispensary and first aid box should be provided for workers.
- The Security Guards shall also be trained to act in case of all possible emergency situations. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.
- The proposed Environmental Management & Monitoring Plan should be implemented.

9.1 Conclusion:

The report presents Environmental Impact Assessment (EIA) of the project mainly deals with the storage, handling & Incinerate of various type of Industrial waste and incineration.

EIA of Project is performed according to guidelines of EPA. It includes description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study.

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The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study shall reduce, if not eliminate, these impacts so that these are within acceptable limits. Moreover, no deterioration, depletion or exploitation of local natural resources is expected to be caused by this project.

Based on overall assessment of the environmental impact of the project, it is concluded that the project is not likely to cause any significant adverse impact on the social, physical and biological environment of the area, provided that suitable mitigation measures as identified in this study are implemented.

It is accordingly recommended that Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponent of the project.