EIA-2025

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd

LOCATED AT

7 – Km Manga- Raiwind Road, Tehsil Kot Radha Kishan, District Kasur

PROJECT PROPONENT: MR. MUHAMMAD MUNIR ARSHAD

SUBMITTED BY

ZOOM CONSULTANCY AND SERVICES

LAHORE

LIST OF ABBREVIATIONS

CO_2	Carbon dioxide
dB(A)	A weighted decibel scale
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EPO	Environmental Protection Ordinance
IEE	Initial Environmental Examination
Ltd.	Limited
LTI	Loss Time Injury
LWI	Loss Work Injury
m^3	Cubic meter
m^3/h	Cubic meter per hour
MW	Megawatt
M/S	Messrs
NEQS	National Environmental Quality Standards
No.	Number
NOC	No Objection Certificate
NO_x	Oxides of Nitrogen
PEPC	Pakistan Environmental Protection Council

PEPA, 1997	Pakistan Environmental Protection Act, 1997
PEPA, 2012	Punjab Environmental Protection (Amendment) Act, 2012
PEPO	Pakistan Environmental Protection Ordinance
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipment
Pvt.	Private
SMART	Self-Monitoring and Reporting
SOPs	Standard Operating Procedures
SO_x	Oxides of Sulfur
WAPDA	Water and Power Development Authority

EXECUTIVE SUMMARY

INTRODUCTION

Under the dynamic leadership of the Group and strong Human Resource, Tufail Starchem Industries (Pvt) Ltd previously Tufail Chemicals was founded in 1994. From the day of inception, Tufail Starchem Industries (Pvt) Ltd has been constantly striving to achieve excellence and generate highest value for all of its stakeholders. The company is operating by the trade name of Tufail Starchem Industries from last two years with no change in capacity and project nature.

As the unit was established before 1997, section 12 of PEPA Act, 1997 (amended 2012, 2017) is exempted however now the company intends to increase the product list of chemicals as well as capacity enhancement of existing product portfolio so to full fil the compliance of section 12 of PEPA, Act 1997 (amended 2012 & 2017) Zoom Consultancy and Services has been engaged for conducting Environmental Impact Assessment (EIA). Said project is the Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd. The company is already complied with section 11 of PEPA Act, 1997 (amended 2012, 2017) and submit Environmental Monitoring reports regularly to EPA district office, Kasur.

The main objectives of this EIA are to establish baseline environmental conditions, identify potential impacts and suggest suitable mitigation measures for the execution of the said project. This study has been accomplished in line with the provisions – guidelines and directives of Punjab Environmental Protection Agency.

This executive summary presents an overview of the main findings of the EIA Report for the aforesaid project i-e Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd.

PROJECT OUTLINE (Details are given in Chapter 2)

Salient features of project:

Proponent Name:	**Mr. Muhammad Munir Arshad** Authority Letter has been attached.
Project Owner	Pervez Tufail(CEO)
Project Title:	Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd.
Project Location:	7 – Km Manga- Raiwind Road, Tehsil Kot Radha Kishan, District Kasur
Total Area	77.28 Kanals (420,400 SFT)
Source of Water	Groundwater
Cost of Project	PKR 750 million approx.
Nearest Industry	Wire and Cable Products (Pvt) Ltd (adjacent) Seasons Food Private Limited (230 m)
Source of Power:	WAPDA and power generators
Wastewater:	Wastewater from the process will be treated through waste water treatment plant
Solid Waste Management:	To handle the waste, waste management contract with EPA certified body has been done.
Air Emissions	Controlled through scrubbers and cyclones
Tree Plantation	At designated areas
Finished Products	• Sulfuric Acid • Sodium Sulphate Anhydrous • Formic Acid • Alum Sulphate • N-Butyl Acetate • Acetex Plus • Sodium Sulphide Flakes • Ethyl acetate • Methyl acetate • Water based emulsions • Glue & adhesives • Textile Auxiliaries

<table>
<tr><td></td><td>and some other sanitation, lab, Health and Food and Textile Industry chemicals</td></tr>
<tr><td colspan="2">Capacities</td></tr>
<tr><td>Product Capacity (overall)</td><td>225 MT/ month</td></tr>
<tr><td>Individual Capacities</td><td>
<table>
<tr><th>Product</th><th colspan="2">Capacity (MT/month)</th></tr>
<tr><th></th><th>Existing Capacity</th><th>New Capacities</th></tr>
<tr><td>Sulfuric Acid</td><td>15</td><td>5</td></tr>
<tr><td>Sodium Sulphate Anhydrous</td><td>15</td><td>5</td></tr>
<tr><td>Formic Acid</td><td>15</td><td>5</td></tr>
<tr><td>Alum Sulphate</td><td>15</td><td>5</td></tr>
<tr><td>N-Butyl Acetate</td><td>15</td><td>5</td></tr>
<tr><td>Acetex Plus</td><td>15</td><td>5</td></tr>
<tr><td colspan="3">Indented Extension of Chemicals Manufacturing</td></tr>
<tr><td>Sodium Sulphide Flakes</td><td>-</td><td>20</td></tr>
<tr><td>Ethyl acetate</td><td>-</td><td>20</td></tr>
<tr><td>Methyl acetate</td><td>-</td><td>20</td></tr>
<tr><td>Water based emulsions</td><td>-</td><td>25</td></tr>
<tr><td>Glue & adhesives</td><td>-</td><td>15</td></tr>
<tr><td>Textile Auxiliaries</td><td>-</td><td>5</td></tr>
</table>
</td></tr>
<tr><td>Boiler Capacity (02)</td><td>5.5 TPH
4 TPH</td></tr>
<tr><td>ETP</td><td>200 m^3/ day</td></tr>
<tr><td>Solar Power</td><td>500 KVA</td></tr>
<tr><td>Fuel of Boiler</td><td>Coal Fired Boilers</td></tr>
</table>

MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

Beneficial/Positive Impacts:

- The establishment of the said project will contribute to enhancing Pakistan's domestic productivity, and help diversify Pakistan's economy
- Provision of employment and stimulation of local economy.

- Provision of high-quality chemicals to be used in sanitation, lab and textiles etc
- Potential of improvement for social and cultural values of local people's exchange of values and standards through positive social interactions. Positive changes in lifestyles will occur due to availability of income when the natives take up Company jobs.

Negative Impacts:

Impacts	Mitigation measures
Construction phase	
Dust emissions	Most of the dust generating activities during construction will last for a brief period, when excavation works will be executed. Thereafter, vehicular movement will generate most of the dusts. Dusts will be suppressed using water bowser to spray exposed land surfaces and particularly areas likely to be disturbed by trucks and other vehicles during the construction of the factory premises. Vehicular speed limits of 20 km/h will be ensured in order to minimize dust generation. Further mitigation measures will be: • Covering haulage vehicles transporting aggregate, soil and cement • Covering onsite stockpiles of aggregate, cement, soil, etc. • Providing workers with the necessary Personal Protective Equipment (PPE) e.g. dust masks and ensure that they are worn • Operating well maintained vehicles and equipment
Wastewater	Existing toilets with septic tanks will be provided to workers during construction phase of extension of project.
Impacts of accidental spillages	• The integrity of storage facilities will be ensured • Drip pans will be made available where necessary
Safety	• Safety signage will be put in relevant places within the construction site • Reckless driving by construction workers will be prohibited and monitored.

	• Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, safety goggles, safety jackets, harnesses etc. and its use was strictly enforced • Workers will be trained on regular basis regarding personal safety • Incidents will be reported directly to the concerned authority
Solid waste management	• Recycling or reuse of waste wherever possible. • Application of a good strategy to collect, remove and safely dispose of waste on daily basis to ensure a clean environment in the factory site • Integrated waste management system will be adopted for the proper management of the waste at site • At the end of the construction phase, left-over waste will be removed as per practices of area • All the idle machinery and equipment will be immediately removed from the site • Scrap and the debris will be removed from the site at the end of the construction stage after appropriate segregation of the material
Operation Phase	
Air Emissions, Particulate emissions and stack emissions	• Emissions from boiler are controlled by equipping with cyclone, scrubber and room • Power Engines will be equipped with air emission control technology. • Emissions from process will also be controlled by installing absorption towers and excessive gaseous loss will be captured and utilized again in the manufacturing process. • Monitoring of Ambient air parameters (Particulate matter, SOx, NOx) emissions should be carried out on regular basis to ensure compliance with the PEQS.

	• The inspection and the maintenance of the boiler and generator, process chambers will be done on regular basis. • Plantation of indigenous trees within the premises and along the boundary.
Noise Emissions	• Effective noise suppression design and plan will be made for all noise producing equipment i.e. high noise generating machines will be kept in isolation from other machines to minimize the overall cumulative noise. • Noise barriers should be implanted • Noise area will not be open site. The source of noise will be in closed and covered place. Where the OSH standard will be applied. • The repairing and the small source of noise will be removed if it will possible. • PPEs are provided to workers • Proper tree plantation has been done • Noise monitoring will be carried out periodically.
Degradation of surface waters quality due to process water and sewage direct disposal	• For treatment of wastewater, effluent treatment plant will be installed which is the part of the extension. • The capacity of treatment plant will be 200 m^3/ day. • The technology of wastewater will be Chemical based treatment along with biological oxidation. • Wastewater will be disposed off in Urban Drain, the management has obtained approval and submits fees regularly for renewal for disposal NOC. Recent fee receipt is attached with the report.

	• The operational maintenance of ETP will be monitored on daily basis. • EPA certified laboratory will be engaged for analysis of wastewater from outlet against PEQS.
To minimize loss work injury/hazards/incidents/accidents	• Proper training will be provided for the proper usage of machineries and personal protective equipment (PPE) will be provided. It will be ensured that the individual who has received the correct training is operating a particular machine. • Site supervisor or health and safety should be present on site • Risk Assessment will be done on daily basis • Emergency response plans will be remained active. • Monitoring cameras and sensors will be implanted at the work site • OSHA polices will be implemented on site • Regulation of the health and safety polices will be done on regular basis • Regular housekeeping practices will be ensured by keeping the floor dry and during washing; proper protective equipment are being used. Restricted entry should be ensured during processing. • Training of staff in the handling of lifting materials. • Timely maintenance and repair of electrical equipment will be conducted. • Implementation of work rotations, provision of regular work breaks. • At workplace, first aid facilities will be maintained at readily accessible places.

To minimize disturbance of communities due to noise	• All the machinery will be installed and operated in a closed hall and from operation of machinery noise will not be a problem for the residents in the area nearby. Further Administration of the unit will take the precautionary measures to avoid the noise emissions. There is no possibility of Noise pollution • A thick greenbelt will be developed all around the plant which will be acting as noise barrier. • All the workers will be provided with ear plugs. • All the transporters will be advised to carry out regular maintenance of their vehicles.
Solid waste management	• There will be separated bins for segregation of different type of waste • Proper waste collection system will be ensured. For this purpose, waste bins are placed inside the boundary. • The recyclable waste will be sent to waste contractors. • The sludge of from the ETP plant will sold out to waste companies. • The site in charge will ensure the separation of waste at production line. • Proper person will be hired for the collection and removal of waste from the site. • Records of generated waste should be maintained. • All non-hazardous waste that can be recycled or reused will be handed over to the contractors. • All hazardous waste from process will be sold to EPA certified contractor. • Training will be provided to personnel for identification, segregation and management of waste.

	• All containers of waste will be labeled properly. • All the container should be caped clean, making sure no Oster will produce in it. • The proper waste management system will be applied. • Small bins and large containers will be provided on every waste producing site at defined place causing no risk to worker and machinery. • In-house audits of the waste management will be undertaken on regular basis.
Traffic	• Nighttime driving of project vehicles will be limited where possible. • Vehicles will remain confined to defined access. • The route of the vehicles will be defined and given to drivers and security system. • The road will be labeled according to the rules and regulations. • Speed limits will be maintained. • The timetable and schedule of the vehicles will be defined and the monitoring of vehicles will be done every time. • Road signage relevant to the project traffic will be placed, where necessary. • Community complaint register and other means will be adopted for the community to complain about non-adherence of traffic to speed limits, safe driving and other safety related concerns. • All vehicle drivers will be trained in community safety aspects. Drivers will be trained in responsible and safe driving practices; safe speed limits for vehicles will be followed.

ENVIRONMENTAL MANAGEMENT & MONITORING PLANS:

During construction, ambient air quality for dust level in particular noise level (tests), solid waste management and soil contamination, and community and workers' safety (visual) need to be monitored. During operation, stack emissions, noise level, air quality, wastewater quality and workers' safety will be monitored. Plan has been included in **Chapter-7** of this EIA Report.

CONCLUSION & RECOMMENDATION

It can be concluded that all the major and minor adverse environmental impacts from the construction/ Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd has been mitigated in environmental friendly manner and the Environmental Impact Assessment is being done in the light of guidelines recommended by Punjab EPA. Hence Environmental Approval may be accorded to the subject chemical industry for construction phase.

Recommendations:

Following Recommendations are suggested:

- Wastewater produced from process should be treated through Effluent Treatment Plant
- All the workers should be given with proper PPE's during operation phase
- All the concerns of stakeholders should be catered before construction
- EMP should be properly implemented
- The construction and installation should be completed in guidelines of accorded Environmental Approval.

LIST OF ANNEXURE

Following Documents are attached as annexure.

ANNEXURE I:	PROPONENT CNC
ANNEXURE II:	PROPERTY DOCUMENTS
ANNEXURE III:	LAYOUT MAP
ANNEXURE IV:	GLOSSARY
ANNEXURE V:	ENVIRONMENTAL MONITORING REPORTS
ANNEXURE VI:	HAZARDOUS CHEMICALS MANAGEMENT PLAN
ANNEXURE VII:	AUTHORITY LETTER IN FAVOR OF CONSULTANT
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INTRODUCTION

CHAPTER 1: INTRODUCTION

1.1 GENERAL

Under the dynamic leadership of the Group and strong Human Resource, Tufail Starchem Industries (Pvt) Ltd previously Tufail Chemicals was founded in 1994. From the day of inception, Tufail Starchem Industries (Pvt) Ltd has been constantly striving to achieve excellence and generate highest value for all of its stakeholders. The company is operating by the trade name of Tufail Starchem Industries from last two years with no change in capacity and project nature. The company complies with all international and national regulations for chemical supply, storage and manufacturing.

As the unit was established before 1997, section 12 of PEPA Act, 1997 (amended 2012, 2017) is exempted however now the company intends to increase the product list of chemicals as well as capacity enhancement of existing product portfolio so to full fil the compliance of section 12 of PEPA, Act 1997 (amended 2012 & 2017) Zoom Consultancy and Services has been engaged for conducting Environmental Impact Assessment (EIA). Said project is the Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd. The company is already complied with section 11 of PEPA Act, 1997 (amended 2012, 2017) and submit Environmental Monitoring reports regularly to EPA district office, Kasur.

This Report presents the Environmental Impact Assessment (EIA) for aforesaid unit. For this purpose, the proponent has engaged Zoom Consultancy and Services**.** The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the construction and operation phase of the project with the aim to find out appropriate measures for their mitigation, to either eliminate those impacts or to bring them to acceptable level and formulate Environmental Management Plan (EMP) for implementation of the project in environment-friendly manner.

The report provides relevant information, as required under the officially approved format, to facilitate the decision makers i.e. EPA Punjab for the issuance of Environmental Approval.

1.2 THE PROPONENT

Name	Mr. Muhammad Munir Arshad (authorized Person)
CNIC	35201-1340436-7
CEO	Pervez Tufail
Address	Tufail Starchem Industries (Pvt) Ltd Head Office, Office No 8, Floor No 11 Haly Tower 301, Sector S Sector R DHA Phase 2, Lahore
Contact Number	0314-4999563

1.3 THE PROJECT

1.3.1 Nature of Project

The said project is the Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd. Tufail Starchem Industries (pvt) Ltd previously Tufail chemicals is working in same nature business since 1994. Its salient features have been described later in this Chapter, Chapter 3 and briefly in Executive Summary of this EIA Report.

1.3.2 Size of Project

As the unit is operational since 1994, the enhanced capacity and addition of new products will result in the infrastructure development. The total area of plot is 77.28 Kanal. No additional space will be acquired. The factory has admin block, QA lab, operator room, generator room, Engineers sections and warehouses for storage of raw materials and finished products however along with new process sections, engineer

rooms will be constructed. 500 KVA solar system will also be installed in the said unit. Total capacity of chemicals manufacturing will be 225 MT/month.

Product	Capacity (MT/month	
	Existing Capacity	New Capacities
Sulfuric Acid	15	5
Sodium Sulphate Anhydrous	15	5
Formic Acid	15	5
Alum Sulphate	15	5
N-Butyl Acetate	15	5
Acetex Plus	15	5
Indented Extension of Chemicals Manufacturing		
Sodium Sulphide Flakes	-	20
Ethyl acetate	-	20
Methyl acetate	-	20
Water based emulsions	-	25
Glue & adhesives	-	15
Textile Auxiliaries	-	5

1.3.3 Location of Project

Said Project is located at 7 – Km Manga- Raiwind Road, Tehsil Kot Radha Kishan, District Kasur.

1.3.4 Total area

Total area required for said project is approx. 77.28 Kanals (420,400 SFT).

1.3.5 Cost of the Project

Cost of project has been estimated at Approx. PKR 750 million.

1.4 DETAILS OF CONSULTANTS

For the preparation of the Initial Environmental Examination report of the said project, the proponent has hired the services of the environmental consultants; M/**S Zoom Consultancy and Services**. Team comprising of environmental engineers, chemical

engineers, environmental experts and environmentalists has worked on this report. Team comprising of environmental engineers, chemical engineers, environmental experts and environmentalists has worked on this report.

Environmental Compliance Studies

- Initial Environmental Examination
- Environmental Impact Assessment
- Socio-Environmental Impact Assessment
- Green House Gas Estimation
- Environmental Management Plan

1.5 PURPOSE OF REPORT

The development of any Project leads to positive and adverse changes in environmental and change in social settings of the Project Area. The intensity and level of change, however, depends upon the nature of the Project and the baseline environmental conditions of the area. The development and commencement of said project will cause minor to moderate adverse environmental and social impacts on the surrounding area. Thus, an environmental and social study is mandatory to establish the baseline conditions, evaluate the possible adverse impacts if any, and devise the mitigation measures.

Section 12 of Pakistan Environmental Protection Act, 1997 (PEPA, 1997) states ***"No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an Initial Environmental Examination (IEE) and, where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA), and has obtained approval from the Provincial Agency in respect thereof."*** Later on, Punjab Environmental Protection Agency (Review of IEE and EIA) Regulations, 2022 provided the guidelines for categorizing the Projects. The main objectives of this EIA study were:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the said project in that area.
- To identify pre-construction, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would strengthen environment, improve ecological resilience, eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an EIA Report for submittal to the Environmental Protection Agency, Punjab for according Environmental Approval.

1.6 Structure of Report

This EIA reviews information on existing environmental attributes of the Study Area. Geological, hydrological and ecological features, air quality, noise, water quality, soils, social and economic aspects and cultural resources are included. The report predicts the probable impacts on the environment due to the said project. This EIA also proposes various environmental management measures. Details of all background environmental quality, environmental impact/pollutant generating activities, pollution sources, predicted environmental quality and related aspects have been provided in this report. The structure of the assessment report will be as follow;

- Description of the Project
- Alternatives
- Scoping & Screening

- Description of Environmental and Social Conditions
- Assessment of Environmental Impacts and Mitigation Measures
- Mitigation Measures for Identified Impacts
- Public Consultation
- Environmental Management and Monitoring Plan (EMMP)
- Recommendations and Conclusions

CHAPTER 2

SCREENING & SCOPING

CHAPTER 2

SCREENING AND SCOPING

2.1 General

This section of the study concentrates on details of the project and its salient features; such as location, site layout, objectives, selection of alternatives, cost and magnitude of operation and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials, etc. have also been examined as a response to possible environmental concerns.

2.2 Type and Category of Project

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000 the Project of Establishment of Project fall in "**B (2)" Category of Schedule II i-e Chemical Manufacturing Units including Pharmaceuticals and cosmetics.**

2.3 Objectives of Project

Following are the main objectives of said chemical manufacturing unit:

1. To produce quality chemical products for sanitation, labs and textiles etc.
2. To provide employment to the people
3. To change the social life style of the area
4. To upgrade the socio-economic condition of the area
5. Minimization of environmental impacts by adopting best management practices.
6. To support the local economy through significant investment and upgrades to infrastructure.

2.4 Alternatives

The analysis of the alternatives is a part of the EIA process to select the best among all possible project options. The alternatives of a project are defined as the options that can help to meet the objectives of a project by different means including alternative project sites, Environmental alternative etc. The key criteria when identifying alternatives is that they should be feasible and reasonable.

Selection of preferred alternative is based on scores of factors including cost, schedule of delivery, environmental and social impact and the cost for their redressal. The drivers that affect potential alternative options and scenarios include: availability of project sites, current technologies; design changes that need to be introduced, operational situation, capital & recurrent costs, environmental & social issues, their potential impacts, and costs of mitigation.

The details of the site alternatives and project alternatives are discussed below

2.4.1 Site Alternatives

No other site alternative was available to be considered as feasible option for the installation of the plant as proposed project site is owned by the M/S Tufail Starchem Industries (Pvt) Ltd and the project is the extension of already existing unit. The proposed site was selected because of the following reasons;

- The selected site is located in the proximity of other relevant industries
- The site is well connected to the other parts of the country through National Highway.
- No human settlements displacement or relocation is associated with the project development and operation
- Operation of the aforesaid unit in the respective zone will provide job opportunities to local people and will improve their socio-economic status of the study area.

- The expansion shall produce high quality chemical products to meet the demand of community.
- The drain for effluent discharge is nearby.

No important religious, archaeological, recreational site or ecologically/declared protected area and human settlement exists within close proximity of the selected site. In view of these facts, it can be concluded that the selected site is best suited for the project, and will not pose any adverse impact or threat on any component of the environment.

2.4.2 Project Alternative

2.4.2.1 Labor

Cheap labor has always been the backbone of the economy of Pakistan. Cheap and ample supply of labor strengthens the industrial and agriculture sector of the country. There are approximately 7 upstream and 6,000 downstream production units in the country which provide employment directly and indirectly to ~ 600,000 people. Of the downstream units, only 700 belong to the organized sector while the remaining 5,300 units operate in the unorganized sector. Also, this project will emphasize to hire local labors as many as possible increasing the occupational status of the area.

Considering the above-mentioned factors, no project alternative can be envisaged.

2.4.3 Environmental alternatives

2.4.3.1 Wastewater Treatment

Wastewater, or sewage, originates from human and home wastewaters, industrial wastes, animal wastes, rain runoff, and groundwater infiltration. Generally, wastewater is the flow of used water from a neighborhood. The wastewater consists of 99.9% water by weight, where the remaining 0.1% is suspended or dissolved material. This solid material is a mixture of excrements, detergents, food leftovers, grease, oils, salts, plastics, heavy metals, sands, and grits. Types of wastewaters include: municipal wastewater, industrial wastewaters, mixtures of industrial/domestic wastewaters, and agricultural wastewaters.

Typical agricultural industries include: dairy processing industries, meat processing factories, juice and beverage industries, slaughterhouses, vegetable processing facilities, rendering plants, and drainage water of irrigation systems.

Subsequent to primary treatment of wastewater, large amounts of dissolved and colloidal material must be removed. Secondary treatment, i.e., biological treatment, can transform dissolved materials into larger particles. Chemical treatment, or tertiary treatment, using chemical materials will react with a portion of the undesired chemicals and heavy metals. Biological treatment tends to be a biological process with chemical treatment implemented for the removal of toxic compounds. The cost of chemical additives and the environmental problem of disposing of chemical sludge make this treatment process deficient, so the biological treatment must be implemented. In fact, the microorganisms utilize the dissolved organic matter as food for themselves.

Different technologies are being used to treat industrial wastewater like activated sludge process, Aeration lagoons, chlorination, ozonation, wetlands. Aeration lagoons are profound (3–4 m) compared to oxidation ponds. The aerators keep the microbial biomass suspended and provide sufficient dissolved oxygen. The hydraulic retention time (HRT) ranges from 3 to 8 days based on a treatment level, strength, and temperature. Lagoon systems require more land than other treatment methods. They are less efficient in cold climates and may require additional land or longer detention times in these areas. Odor can become a nuisance during algal blooms or with anaerobic lagoons and lagoons that are inadequately maintained.

Constructed wetlands are used for wastewater treatment or for greywater treatment. They can be used after a septic tank for primary treatment (or other types of systems) in order to separate the solids from the liquid effluent. Some constructed wetland designs however do not use upfront primary treatment. Disadvantages of constructed wetlands include high land area requirements (depending on the design, they may require a relatively large land area compared to a conventional facility), the need

for a preliminary treatment before the wastewaters treated by the system (normally they do not used to treat raw wastewaters).

The system of ETP plant which is going to be installed in the said unit will treat wastewater to PEQS. This is the approach which helps the investor to even reuse the water for horticulture activities.

2.4.4 **Economic Alternative**

It is cleared that if such huge investment is being done, it will impact the resources as well. If it is considered that as per the capacity of the unit, the electricity is being supplied from WAPDA, it will impact the national supply. To deal with this issue Tufail Starchem Industries (Pvt) Ltd has planned to generate and use in-house power generation through solar. As well as energy efficient machineries will be installed.

CHAPTER 3
DESCRIPTION OF PROJECT

CHAPTER 3: DESCRIPTION OF PROJECT

This section of the study concentrates on details of the project and its salient features; such as its location, objective, site layout, cost and magnitude of operation at various phases and process employed for the subject process.

3.1 **Objectives of Project**

The main objective of this project is the Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd for supplying chemicals as per consumer demand.

3.2 **Particulars of Project Site**

Details of location of project are provided in table below:

Table 1: Particulars of Project Site

Particulars	**Details**
Latitude	31°15'10.92"N
Longitude	74° 7'22.54"E
Location Address	7 – Km Manga- Raiwind Road, Tehsil Kot Radha Kishan, District Kasur
District	Kasur
Nature of area	Industrial
Road connectivity	Kot Radha Kishan Road

3.3 Location and Layout of Project

3.3.1 Location of the Project

Project site is located at 7 – Km Manga- Raiwind Road, Tehsil Kot Radha Kishan, District Kasur. Google map is given below:

Figure 3.1 Location Map of Project Site

3.4 Nature of Area

Said area is industrial in nature.

3.5 Land Ownership

The land is owned by Tufail Starchem Industries (Pvt) Ltd. Property documents have been attached as **Annexure II.**

3.6 **Government Approvals**

Management has applied for the approvals from different concerned departments. The management has obtained approvals from Rescue 1122, Civil defence and other applicable departments.

3.7 **Land Use on Site**

The land use on the site will be industrial in nature. There is no settlement, grassland or preserved area in the proximity of the project area that could be damaged or dismantled.

3.8 **Road Access**

The said Project area has road accessibility as it is accessible through Kot Radha Kishan Road which is attached to the link road in front of the factory .

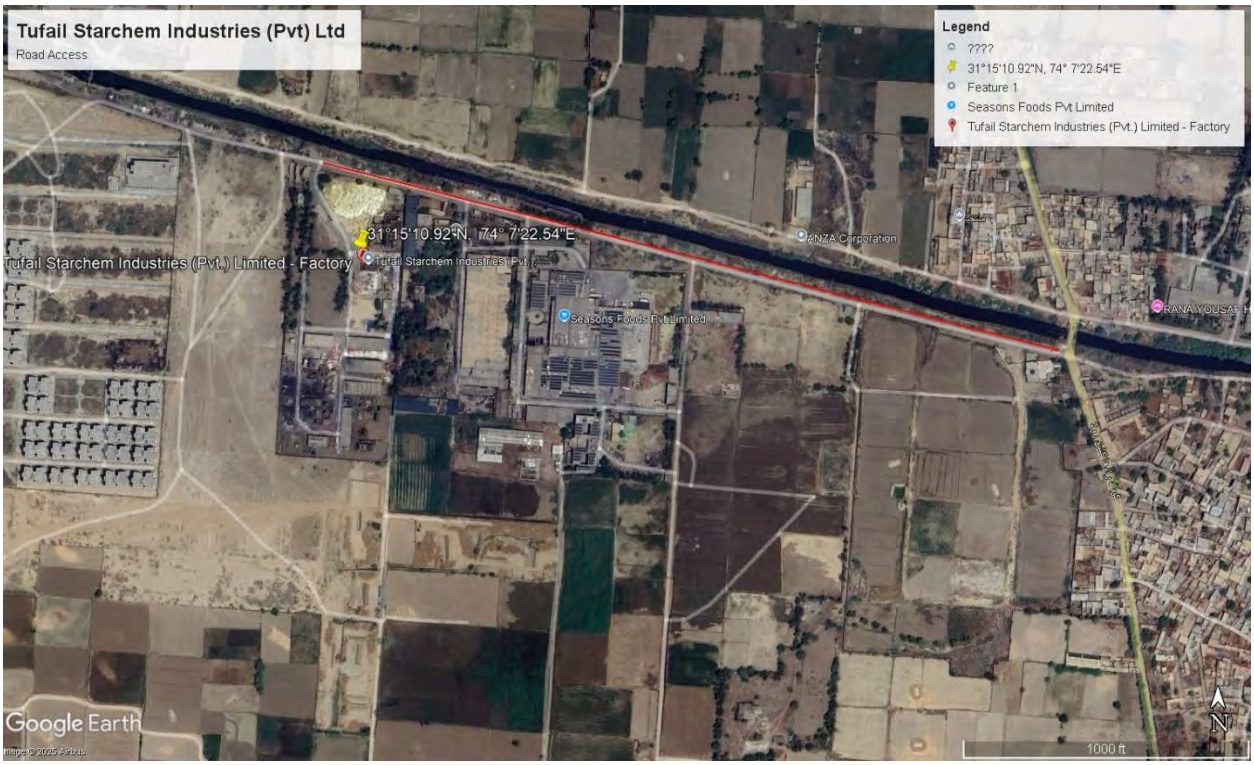


Figure 3.2 Road Access

3.9 **Vegetative Features on Site**

The area around the project area is industrial, the vegetative features of the area include; green open fields safeda, bari, neem and kikar.

3.10 Cost and Magnitude of Operation

Cost includes land cost, Building & Infrastructure cost, machinery cost, land scaping cost and running cost. Total cost of the project is PKR 750 Million (Approx.).

3.11 Schedule of Implementation

The schedule of implementation for the commencement of the civil work involved for the installation construction and operational maintenance is approximately 12 months and the detail timeline of the construction period is given in Table below:

Table 2: Timeline for Project Development

Sr. #	Activities	3 Months			3 Months			3 Months			3 Months		
		4W	4W	4W	4W	4 W	4W	4W	4W	4W	4 W	4 W	4W
1	Detailed Designing												
2	Mobilization of Contractors												
3	Lean Development Period												
4	Peak installation Period												
5	Commissioning												*
W=48 Weeks													

3.12 Description of the project:

Project description is given in details in the preceding. Additional information is provided as under:

3.12.1 **Products:**

Capacity of the Unit will be 225 MT/month of chemicals product. The details of capacity are as follows:

Product	Capacity (MT/Month)	
	Existing Capacity	New Capacities
Sulfuric Acid	15	5
Sodium Sulphate Anhydrous	15	5
Formic Acid	15	5
Alum Sulphate	15	5
N-Butyl Acetate	15	5
Acetex Plus	15	5
Indented Extension of Chemicals Manufacturing		
Sodium Sulphide Flakes	-	20
Ethyl acetate	-	20
Methyl acetate	-	20
Water based emulsions	-	25
Glue & adhesives	-	15
Textile Auxiliaries	-	5

3.12.2 **Manufacturing process:**

Major steps of manufacturing process are described as under:

3.12.2.1 Production of Butyl Acetate

Raw Material Charging

Acetic acid and n-butanol will be charged into the reactor vessel under controlled conditions.

Reaction Phase

Inside the reactor, the esterification reaction between acetic acid and n-butanol will be initiated and maintained at the required temperature and pressure. A condenser will be connected to recover and recycle unreacted vapors.

Neutralization and Washing

After completion of the reaction, the reaction mixture will be transferred to the washing vessel. Here, a mixture of sodium hydroxide and sodium carbonate will be added to neutralize the unreacted acid and to wash out any impurities.

Distillation

The neutralized mixture will then be sent to the distillation unit, where butyl acetate will be separated based on its boiling point.

Phase Separation

The distillate will enter a settling tank to allow for separation of butyl acetate (organic phase) from water (aqueous phase).

Product Collection

The butyl acetate will be collected from the top layer of the settling tank and transferred to product storage.

Water Treatment

The water (bottom layer) separated from the settling tank will be collected and assessed. If needed, acid will be added to adjust the pH.

3.12.2.2 Production of Sodium Sulphate

Dissolving Stage

Raw materials will be introduced into the dissolving tank, where they will be dissolved in water to form a homogeneous solution.

Settling

The solution will then be transferred to settlers, where solids will settle, and the pH will be adjusted using sodium hydroxide to maintain the required chemical conditions.

Filtration – Filter Press

The settled mixture will pass through a filter press to remove any remaining solid particles. During this filtration, sludge will be generated, which will be separated from the filtrate.

Sludge Disposal

The separated sludge will be dried and then disposed of according to the waste disposal SOP to ensure environmental compliance.

Storage

The filtered solution will be collected and stored in dedicated storage tanks for further processing.

Evaporation

From the storage tanks, the solution will undergo evaporation to concentrate the sodium sulphate.

Recycling

Washing water from the evaporator will be recycled back into the dissolving tank to optimize resource usage and minimize waste.

Nutsche Filtration

The concentrated solution will then pass through a Nutsche filter, where final solid separation will occur, forming a cake of sodium sulphate.

Drying

The filtered sodium sulphate cake will be moved to a dryer to remove moisture and prepare it for final packaging.

Packing

The dry sodium sulphate will finally be sent to the packing unit, where it will be weighed, packed, and labeled for dispatch or storage.

3.12.2.3 Production of Formic Acid

Chemical Reaction Initiation

The process will begin with a chemical reaction between Sodium Formate and Sulphuric Acid, producing formic acid slurry.

Slurry Handling

The resulting formic acid slurry will be either: Sent to storage tanks for further processing, or directly transferred to the absorption towers where vapors are formed.

Vapor Formation

From the slurry, formic acid vapors will be generated and passed into absorption towers. This step ensures controlled vapor management and process efficiency.

Distillation

The slurry will undergo distillation. This step will be conducted under vacuum to minimize energy consumption and ensure no environmental impact from emissions.

Purification

The distilled formic acid will then be sent through a purification unit to enhance product quality.

Separation of Impurities

Post-purification, the remaining impurities will be separated, ensuring the final product meets quality standards.

Condensation

Purified vapors will then pass through a condensation system, still operating under vacuum conditions to avoid environmental exposure.

Final Storage

The final condensed formic acid will be collected in storage tanks, ready for further handling, packaging, or dispatch

3.12.2.4 Production of Sulphuric Acid

Raw Material Handling

Sulphur will be extracted from sulphur pits and transferred as a raw material to the combustion system.

Combustion in Furnace

The elemental sulphur will be fed into a furnace where it will undergo combustion in the presence of excess air to form sulphur dioxide (SO_2) gas.

SO_2 Gas Handling

The generated SO_2 gas will be captured and transferred through a closed-loop system to ensure minimal environmental release.

Catalytic Conversion

The SO_2 gas will be passed through a converter containing vanadium pentoxide (V_2O_5) catalyst, where it will be oxidized to sulphur trioxide (SO_3) under controlled temperature and pressure conditions.

Drying Tower Circulation

The SO_3 gas will be directed to a drying tower where moisture will be removed using concentrated sulphuric acid. The resulting dry air will be recycled back into the furnace, maintaining a continuous closed-loop cycle for energy efficiency and emissions control.

Absorption Tower Operation

The dry SO_3 gas will be moved into the absorption tower, where it will react with concentrated sulphuric acid to form oleum or more concentrated sulphuric acid, depending on the plant design.

Flue Gas Management

Any flue gases released from the process will be directed towards the chimney. Before final release, these gases will be scrubbed in a scrubber system.

Scrubber Functionality

In the scrubber, sodium hydroxide (NaOH) solution will be used to neutralize acidic gases, converting NaOH into sodium sulphate (Na_2SO_4) as a by-product.

By-product Transfer

The resulting sodium sulphate solution will be transferred to the sulphate production plant for further processing.

Acid Cooling

The produced sulphuric acid will be passed through acid coolers to reduce its temperature and stabilize it for safe handling and storage.

Final Storage

Finally, the cooled sulphuric acid will be transferred to dedicated storage tanks for use in downstream processes or dispatch.

3.12.2.5 Boiler

Two boilers has been working currently which will be sufficient for extension as well. The salient features of boiler is as follows: .

Specification of Boilers

Sr.#	Parameter	Capacity	Fuel of Boiler
1	Capacity of Boiler (01)	5.5 TPH.	Coal fired
2	Capacity of Boiler (02)	4 TPH	Coal Fired

3.12.2.6 Construction of Warehouses

Warehouse for storage of raw chemicals, middle product, waste storage, discarded material and final product different storage sections will be constructed. Before constructing the storage halls, the section of process will be noted and storage hall for each section will be constructed near to same process. The purpose of the construction is to provide adequate space for storage of materials and final product. Proper ventilation, emergency exits and storage/ stacking SOP's will be followed.

Engineers section

In this section some rooms will present for the engineers.

Utility section

In this section the manger and supervisors will present to maintain the power and process of industry. They will monitor all type of machinery, boilers, generators and electricity.

Quality section

This section will also contain of some rooms and cabins where the quality inspectors and mangers will present to inshore the quality of raw material and final product.

Compliance department

This department will contain of rooms and cabin also. Some compliance officers, management of compliance, HSE officers will work from hare. They will ensue the environment, health and safety police of industry.

3.12.3 Wastewater Treatment

The capacity of treatment plant will be 200 m3/ day. The technology of wastewater will be Chemical based treatment along with biological oxidation.

3.12.4 Solar System

Solar system of having 500 KVA will also be installed. Solar system installation will help the industry to move towards sustainable measures for energy conservation and dependance on renewable energy resources.

3.13 Relocation and Rehabilitation Plan

There exists no human settlement within premises of the selected project site to be displaced as a result of the proposed project. Moreover, no structure of any significance stands at the site is proposed to be relocated. The project area is owned by the proponent and is going to be constructed within the plant vicinity. So, no restoration and rehabilitation are required.

3.14 List of Machinery

List of Machinery is as under:

Table 3: List of Machinery

SR NO.	Equipment	Quantity
1	Cooling Tower Water Tank	1
2	Cooling Tower	3
3	Water Pump	6
4	Sulphuric Storage Tank	6

5	Sulphuric Shifting Pump	3
6	Reactor	6
7	Sulphuric Dosing Tank	6
8	Condenser	13
9	formic Vapour recovery Towers	2
10	Vacuum Surging Tank	1
11	Vacuum Pump	3
12	Mini RO	1
13	Soft Water Unit	1
14	Pumps at Sulphuric acid plant	10
15	Formic Storage Tanks	10
16	Formic filling section Pump	5
17	Auto filling machines	2
18	Alum Reactors	2
19	Alum Crusher	1
20	coal Boilers	2
21	Waste Heat Recovery Boilers	2
22	Evaporatos	5
23	Oil Heating Unit	1
24	Sucrubbers	2
25	Absorption Towers Sulphuric	2
26	Air blower system	2
27	Acid circulation Pump	2
28	Generators	3

3.15 **Amenities**

The following social amenities are present at site and the management of the waste (construction waste, solid waste and effluents) is explained in sub-sections below:

3.15.1 **Electricity Consumption**

Electricity consumption will be fulfilled by WAPDA and Power engines. The WAPDA Connection is 600 KW. Power Engines (Backup) are total 3 in numbers having capacity 1 MW, 550 KVA and 100 KVA In future the management has planned to move towards energy efficient way of solarization and for this purpose 500 KVA solar system will be installed.

3.1.1. **Water Resource**

During constructional and operational phase ground water will be consumed. The water will be pumped from ground through turbine. the water consumption will be 400 m3/ day. Water conservation plan has also been prepared. For this purpose rain water harvesting will be done. The management has constructed rain water storage tanks which will be further utilized after passing through filtration process. RO plant of 7.5 Tons/day is also present at site.

3.15.2 **Management Plans**

Following management plans will be employed to reduce the impact of the proposed activity:

3.15.3 **Air Emissions**

Air emissions will be generated while continuous operation of generator, process and boiler etc. may deteriorate the quality of air in the open area. No other emissions will be generated from process related activities.

To deal with the pollution generated from these activities, regular monitoring and testing of generators and boiler will be carried out to ensure compliance. The workers dealing with the process activities will be provided with masks, safety shoes and all other necessary PPEs. To reduce the public nuisance native trees will be planted on the boundary to reduce the nuisance and to reclaim the disturbed soil effectively. Scrubbers

with double absorption technique on chambers, cyclones and scrubbers on boilers are installed.

3.15.4 **Wastewater Management and Disposal**

In the proposed project the wastewater will be generated from washing of reactors and other machineries, municipal and process activities. This wastewater will be transfer to the waste water treatment plant where the water will be treated and the results of the final discharge water will be maintained according to the PEQS and then discharge to Urban Drain near by the industry. The management has obtained approval for discharge of wastewater and regular fee is submitted to the concerned department. Fee receipt for recent renewal of disposal approval is attached with the report.

It is proposed that tree plantation will be carried out around the premises of project area. The generated wastewater will also be consumed for on-site horticultural activities after treatment.

3.15.5 **Waste Management**

The solid waste will be generated during the cooking in the worker's mess and during processing like batch preparation and other packaging waste. The solid waste which will produce during process activities which will be sold out to EPA certified contractor. Regular training will be given to the workers dealing with the waste management it will include identification, segregation and management of waste. Other waste producing from the admin block, warehouse will go to the municipal waste committee

3.15.6 **Emergency Preparedness**

Emergency response preparedness committee will be formulated consisted of heads of all departments and nominated members. Project Manager will be the head of the team who will chair the Committee. In the case of emergency, he will immediately inform the concerned authorities. HSE Manager will be responsible for on-site HSE management.

First aid facilities will be available at facility which will include; blankets, hot water bottles, sterilized dressing, snake bite kit, cotton and iodine (2% alcohol).

3.15.7 Safety Trainings

Skilled, semi-skilled and un-skilled staff will be provided with proper training about the work and safety practices that need to adopt during the process activities.

3.15.8 Use of Drugs and Narcotics

Drugs and narcotics are strictly prohibited during working hours in working area. Smoking will be only allowed during rest timings at properly isolated places.

3.15.9 Hazardous Chemicals Management Plan

All hazardous chemicals, whether used as raw materials or generated as final products, shall be managed under a structured chemical safety program to ensure safe handling, storage, use, and disposal. Material Safety Data Sheets (MSDS) for each chemical will be maintained and readily accessible. Hazardous materials will be clearly labeled and stored in designated, ventilated areas with secondary containment to prevent leaks or spills. Personnel handling these substances will receive appropriate training in chemical hazard identification, emergency response, and use of personal protective equipment (PPE). Regular audits and inspections will be conducted to verify compliance with local regulations and to prevent unauthorized access or environmental release. Emergency procedures will include spill response protocols and first-aid measures, and appropriate fire safety systems will be in place based on chemical compatibility and reactivity.

3.15.10 Personal Protective Equipment

Following Personal Protective Equipment (PPEs) will be provided to the workers:

- Safety Helmet
- Coveralls
- Safety Shoes
- Dust Mask
- Safety Gloves

- Safety goggles
- Ear plugs/ muffles

CHAPTER 4
DESCRIPTION OF ENVIRONMENT

CHAPTER 4: DESCRIPTION OF THE ENVIRONMENT

4.1 General

An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. The EIA of the proposed Project covers a comprehensive description of the project area, including environmental attributes which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. Site visits were conducted to survey the field area and to collect environmental data on physical, biological and socioeconomic parameters. Further, consultations were held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project

4.2 Methodology

The methodology employed to collect the baseline data and information regarding the social structure and various related parameters as discussed in sub-sections below:

4.2.1 Data Collection

The primary data was collected by visiting the project area and its communities in its nearby vicinity. The secondary data regarding physical parameters (topography, geology, seismology, and climate) was obtained by visiting relevant various government departments and their official websites. The biological parameters such as flora and fauna were studied by preparing a floristic list based on visual observation and fauna was studied by using opportunities approach. The species were recorded with reference to their existence in the project area. Information on wildlife fauna species (mammals, amphibians, reptiles, birds, etc.) in the assessment area was compiled based on

opportunistic observation, gathering the existing information and consultation with local experts, community members and government and Non-Government Organizations (NGOs). The socioeconomic aspects were studied and analyzed by studying detailed village profile and by conducting household surveys.

4.2.2 Social Survey

The purpose of social survey was to record the present condition of the people living in the project area and to assess the expected project impacts on their life, subsistence systems and socio-cultural conditions. Prior to conducting the field surveys, the following steps were taken:

- Clear boundaries of the project area were identified
- Decided the sampling procedure in order to draw a representative sample size of the target population and households
- Developed the tools for data collection i.e. questionnaires to access the socio-economic status of the area

4.2.3 Sampling Design

Social baseline data of the persons residing in the study area has been estimated and collected through random sampling by using pre-developed questionnaires.

4.2.4 Questionnaires

In order to test the validity and reliability of the proposed questionnaires, they were reviewed to assess whether questions needed to be clarified, changed or re-sequenced and then a final editing of questionnaires was conducted prior to their application in the project area.

4.3 Data Editing and Analysis

The filled questionnaires and recorded information were compiled by the same field investigators who were involved in the data collection. This was done immediately after completing the field investigations. Data sets were processed. Analysis of the data and preparation of conclusions in the minimum possible time was done using statistical techniques of data analysis.

4.3.1 Review of Legal and Administrative Framework

The objective of reviewing legal and administrative framework is to obtain information on all legislation pertaining project development. The Socio-Environment Team of Zoom Consultancy & Services reviewed the environmental policies, national, international and provincial laws and guidelines relevant to the development of project which helped in systematic identification of impacts.

4.3.2 Baseline Conditions

Baseline conditions refer to the existing physical, environmental and socio-economic status of the project area. On the basis of baseline information, the project interventions are assessed and mitigation measures are proposed. The baseline information also helps to indicate the specific issues to be monitored during construction and operational phases. The baseline data (physical, biological and socio-economic parameters) related to the project area is described below. Information provided is based on primary and secondary data collected by site visits, desk studies and consultation with locals respectively. This section gives the overview of the topology, geology, seismology and meteorological conditions of whole city whereas, it gives detailed information about the surface water, ground water and air quality of the project area. The detail of each parameter is discussed in sub-sections below:

4.4 Physical Resources

The physical resources consist of existing land form and land use at the project site including geology, hydrology, meteorology and climatology. The pre-project condition (i.e., baseline) of these components of the physical environment is described in detail. To identify the potential impacts on the physical, biological and socio-economic environment that is likely to arise from the project activities.

4.4.1 Geography and Geology

Kasur district is located in the Lahore Division of the Punjab Province, Pakistan Kasur town is situated, on the border of India about 30 miles (50 km) south of Lahore. The district lies from 300 -40' to 310 - 20' north latitudes and 730 - 38' to 740 - 41' east longitudes.

The surrounding area consists of a flat alluvial plain bordered by the Ravi River to the northwest and the Sutlej River to the southeast. Five canals, used for irrigation, flow through the district. Agriculture is the principal occupation; wheat, rice, sugarcane, cotton, fruits, and vegetables are grown in the region. A forestry plantation was started at Chhanga Manga in 1864 and now produces silk, honey and beeswax, and turmeric, as well as seasoned timber. Pop. (1998) 245,321.

Figure 4-1 Location of Project

4.4.2 **Topography**

Kasur District lies between the river Satluj which flows along its boundaries with India and river Ravi which flows its boundary with Nankana Sahib District. The districts may be divided into two parts, a low lying or riverine area along the two bordering rivers and upland, away from the rivers. The riverine area is generally inundating during monsoon season. The water level in this area is higher than in the upland. The soil is sandy. The upland is flat plains sloping from north-west to south-west. The general height of the area is from 150 to 200 meters above the sea level.

4.4.3 Hydrology

Groundwater from depth of 200-250 ft can be used for drinking and other purpose. Groundwater is the major source of water in the study area, which is extracted with the help of pumps and motors. The groundwater extracted is used to fulfill various domestic, irrigation and industrial needs. Ground water quality report of area is annexed.

4.4.4 Climate

4.4.4.1 Temperature

The District Kasur has extreme climate conditions and summer season starts from April and continues till October. During the summer season, temperature ranges from 30 °C to 48 °C. The winter season starts from November and continues till March. December and January are the coldest months with a mean minimum temperature of about 3-5 °C. The dust storms occur occasionally during the hot season, June, July and August.

Climate of District Kasur is very hot and dry in summer and cool in winter. At an average temperature of 33.5 °C | 92.4 °F, June is the hottest month of the year. The lowest average temperatures in the year occur in January, when it is around 12.3 °C | 54.1 °F.

Average temperature in Kasur over the years. Average Weather in Kasur, Pakistan. Climatological information about changes of temperature over the years in Kasur.

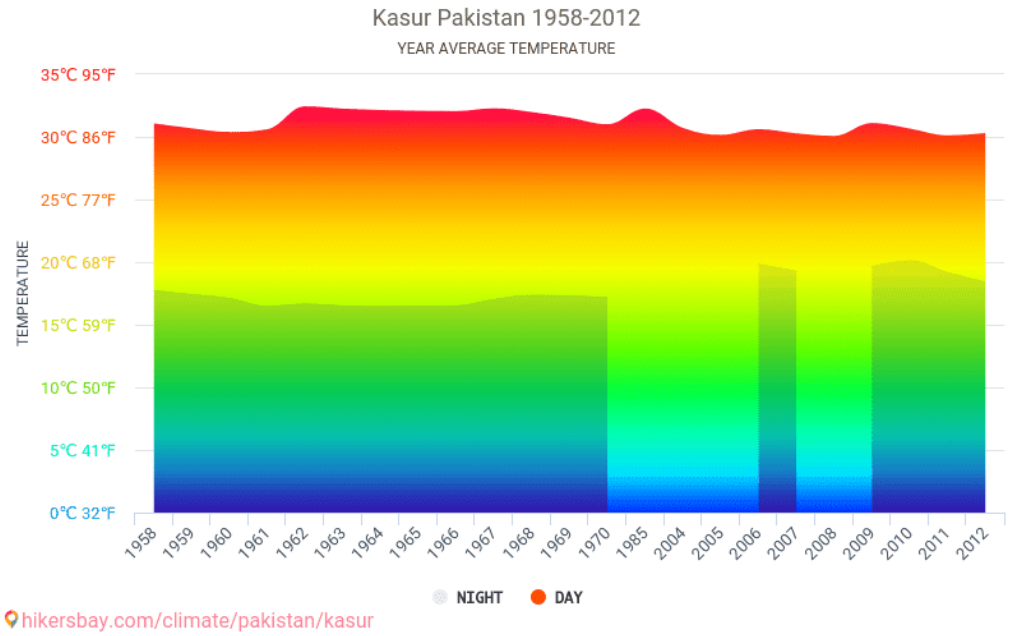


Figure 4-2 Yearly average temperature of District Kasur, Pakistan from 1958 to 2012

(Source: hikersbay.com)

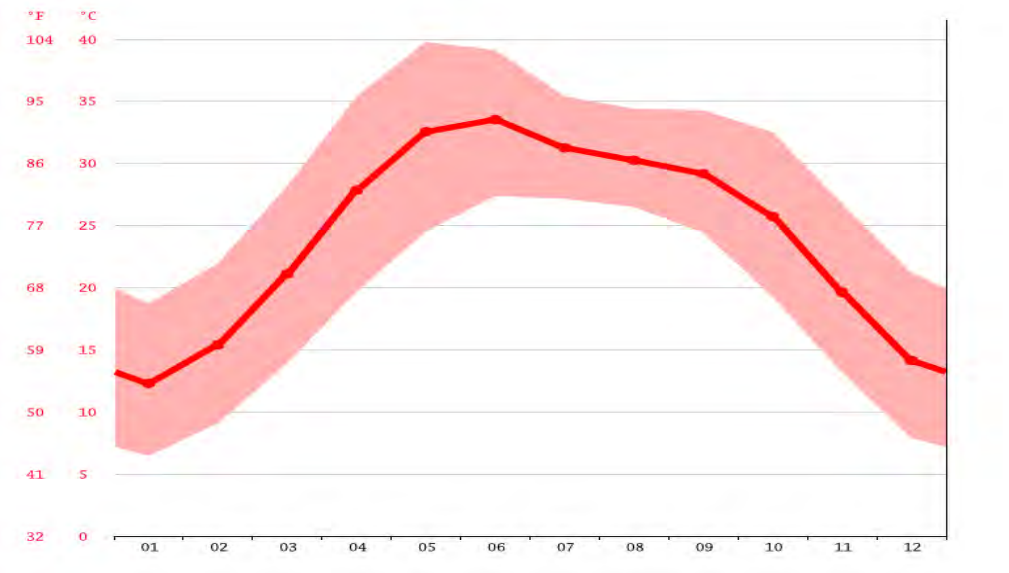


Figure 4-3 Average Annual Temperature of District Kasur (Source: Climate-data.org)

Table 4: District Kasur Weather Averages by Month

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	12.3 °C (54.1) °F	15.4 °C (59.7) °F	21.1 °C (70) °F	27.9 °C (82.1) °F	32.6 °C (90.6) °F	33.5 °C (92.4) °F	31.3 °C (88.3) °F	30.3 °C (86.5) °F	29.2 °C (84.5) °F	25.7 °C (78.3) °F	19.6 °C (67.3) °F	14.1 °C (57.5) °F
Min. Temperature °C (°F)	6.4 °C (43.6) °F	9.1 °C (48.3) °F	13.9 °C (57.1) °F	19.7 °C (67.4) °F	24.5 °C (76.2) °F	27.4 °C (81.3) °F	27.2 °C (80.9) °F	26.5 °C (79.7) °F	24.4 °C (76) °F	19.3 °C (66.7) °F	13.2 °C (55.7) °F	7.9 °C (46.2) °F
Max. Temperature °C (°F)	18.7 °C (65.7) °F	22 °C (71.5) °F	28.2 °C (82.7) °F	35.4 °C (95.8) °F	39.8 °C (103.6) °F	39.2 °C (102.5) °F	35.4 °C (95.7) °F	34.4 °C (93.9) °F	34.3 °C (93.7) °F	32.5 °C (90.5) °F	26.8 °C (80.2) °F	21.2 °C (70.2) °F
Precipitation / Rainfall mm (in)	25 (1)	37 (1.5)	28 (1.1)	22 (0.9)	21 (0.8)	61 (2.4)	151 (5.9)	131 (5.2)	67 (2.6)	13 (0.5)	6 (0.2)	11 (0.4)
Humidity(%)	70%	64%	53%	33%	30%	43%	67%	72%	64%	52%	56%	64%
Rainy days (d)	3	4	3	3	5	7	13	12	7	2	1	1

4.4.4.2 Rainfall

District Kasur is 150 to 200 meters above sea level The climate here is considered to be a local steppe climate. In Kasur, there is little rainfall throughout the year. Months with the largest precipitation are August, July, September with 293 mm precipitation. Most precipitation occurs in August with an average precipitation 120 mm. The annual amount of precipitation in Kasur is 432 mm. The average annual temperature is 31℃ in Kasur. The warmest month of the year is June, with an average temperature: 37℃. Usually January is the coldest month in Kasur, with average temperature 22℃. The difference between the hottest month: June and the coldest month: January is: 15℃. The difference between the highest precipitation (August) and the lowest precipitation (November) is 114mm.

Precipitation is the lowest in November, with an average of 6 mm | 0.2 inch. The greatest amount of precipitation occurs in July, with an average of 151 mm | 5.9 inch.

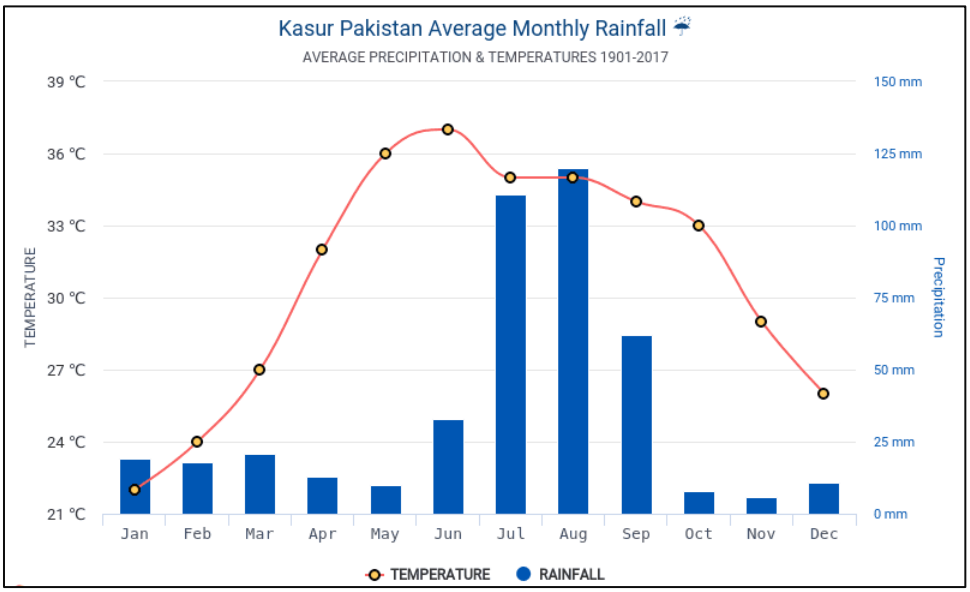


Figure 4-4 Average Annual Precipitation of Kasur (Source: hikersbay.com)

4.4.4.3 Seismicity

According to Seismic Zoning of Pakistan, the project area lies in Zone 2A and represents minor to moderate damage due to earthquakes.

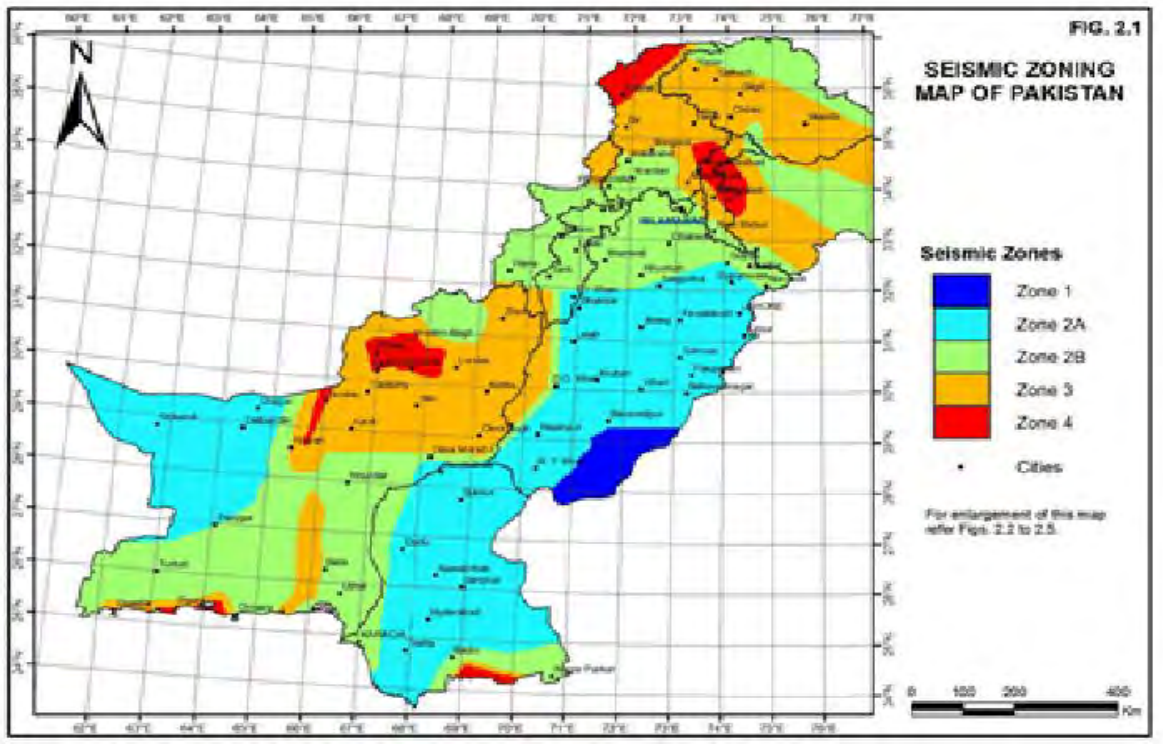


Figure 4-5 Seismic Zones of Pakistan

4.5 **Ecological Environment**

District Kasur is not rich with biological and ecological resources. However, the flora and fauna of the district includes; shrubs, herbs, mammals, birds, reptiles, amphibians and insects are found. They are discussed in detail below:

4.5.1 **Aquatic Flora and Fauna**

There is canal present in the study area which is being used for the irrigation purpose is Upper Chaneb Canal. No aquatic life is reported in Upper Chaneb Canal that can be at the verge of demage and disturbance. Moreover, no aquatic ecosystem (i.e., steam, river or pond) observed within or around the study area, which omits the possibility of any kind of aquatic species that may be harmed due to the establishment of stiching unit.

CHAPTER 5

STAKEHOLDER CONSULTATION

4.5.2 **Flora**

Flora of the district has been greatly modified by human agency of the old open forests of small trees and shrubs; there remains only a few Rakhs or portions of forest which are kept as gazing ground for cattle etc. Amongst trees the most important are Kikar (Acacia arabica), Shisham or Tahli (Dalbergia sissoo), Beri (Zizyphus jajaba), Toot (Morus marlaccae), Sharin (Albizzia lebbek), Dharek (Malia azerdaracb), Phulahi (Acacia modesta), and Nim (Melia indica), Piple (Ficus indica) are planted for shade. The growth in Rakhs is composed mainly of three kinds of trees Jand (Prosopis spicigera), Karril (Capparis aphylla), and van or Jal (Salvadora obeoides). Occasionally pelu (acacia Loucophhloea) and Farash (Tamarix articulate) are also found. Pilchi (Tamarix gallio) is found on moist sandy soil along the rivers and is used for wicker-work, basket making etc.

4.5.3 **Fauna**

For study of fauna in the project area, field guides and books were consulted. On the other hand field observations were conducted along with the interviews of local community members about the fauna of the area. The equipment used in field included cameras, binoculars and GPS device (wherever required). It is important to note that there is a number of factors which can change the findings of such survey. It may be pointed out that the pattern of seasonal migration of small birds varies depending upon each specie. During the construction activity in project area, no important biological feature will be damaged or disturbed.

The fauna commonly found in District Kasur includes; Hares, Falcon, Eagle, Quail, Starling, Jungle Pigeon, Russian Sparrow, Doves, King Fisher, Parrot, Crow and Local Sparrow.

Commonly found mammals in the area include; dogs, cats, horses, house-rats, squirrels, porcupines and bats. However, Small Indian Mongoose and Indian Palm Squirrel are also found in the District Kasur.

Table 5: Mammals in the Study Area

Sr. #	Common Name	Scientific Name
1	Rat	*Rattus*
2	Bat	*Chiroptera*
3	Small Indian Mongoose	*Herpestes javanicus*
4	Indian Palm Squirrel	*Funambulus palmarum*
5	Porcupines	*Erethizon dorsatum*
6	Squirrels	*Sciuridae*

The commonly found birds species include; House Sparrow, Crow and some of them are mentioned below with scientific names:

Table 6: Birds in the Study Area

S#	Common Name	Scientific Name
1	House Sparrow	*Passer domesticus*
2	House Crow	*Corvus splenders*
3	Pigeon	*Columbidae*
4	Bulbul	*Pycno notidae*
5	Teetar	*Francolinus francolinus*
6	Parrot	*Psittaci forms*
7	Titodi	*Vanellus indicus*

In District Kasur reptiles such as Snakes (Cobra and Kraits), Spiny Tailed Lizard and Fringed Toed Lizard are common in the tract, but cases of snake bites are very rare, as these reptiles have been either killed by expanding urbanization or they have moved away.

Table 7: Reptiles in the Study Area

S#	Common Name	Scientific Name
1	Snake	*Serpentes*

2	Spiny Tailed Lizard	*Uromastix hardwickii*
3	Fingered Toed Lizard	*Acanthodactylus cantoris*
4	Earthworm	*Lumbricina*

The amphibians commonly seen around the project area, especially during the rainy season includes;

Table 8: Amphibians in the Study Area

S#	Common Name	Scientific Name
1	Common Frog	*Rana temporaria*
2	Indus Valley Toad	*Bufo stomaticus*

A large number of insects are present due to open fields in the project site. Few of these insects are known to cause diseases in local population. Following is a list of commonly observed insects at the site:

Table 9: Insects in Study Area

S#	Common Name	Scientific Name
1	Black Ants	*Paratracheaiognicornis*
2	Dragon Fly	*Dragon Fly*
3	House Flies	*Musca domestica*
4	Butter Flies	*Parnassiusbalucha*
5	Honey Bees	*Apismellifera*
6	Wasps	*Anagyrus pseudococci*
7	Grasshopper	*Melanoplus differentialis*
8	Mosquito	*Anophlese sp.*

No endangered species are found at the site. The area has not been identified as ecologically sensitive area by wildlife department.

4.6 Environmental Monitoring

Laboratory analysis for environmental monitoring of proposed site is done in order to check the baseline conditions and pollution load. In this connection EPA certified laboratory, was engaged to carry out environmental monitoring of wind speed, air quality, drinking water quality, noise level and particulate matter concentration in the project area.

4.6.1 Sampling Sites

Samples of water, noise and air for testing according to the testing guidelines of Punjab-EPA.

4.7 Socio-Economic Resources

This section provides collective information about the existing socio-economic and environmental condition of the project area within the AOI. The different types of socio-economic aspects were covered such as demographic profile, occupation, education and health facilities. This data helped in identifying major interventions for the development of Environmental Management and Monitoring Plan (EMMP). The study also helped to assess the positive or adverse impacts on local community.

4.7.1 Cultivated Crops

The main crops that are being cultivated in the study area include; Rice, Wheat, Sugarcane, Onion, Tomato and Potatoes as well as fodder crops. The area is famous for best Basmati rice production in the world.

4.7.2 Socio-Economic Profile of Study Area

This topic provides an overview of the baseline information relating to the socio-economic environment of the project area and the AOI. The socio-economic study gives information about the demographic profile, occupation, education and health facilities in the project area.

4.7.3 Nearby Residential Areas

The proposed project site nearby residential area is Bhail at distance of 1 Km.

4.8 Social and Public Amenities Available

The social and public amenities present in the area are given below:

4.8.1 Physical structures

The land use on the project site is industrial. The people in this area are deprived of basic facilities like health, proper sewerage and sanitation facility, medical facilities, provision of safe drinking water, etc.

4.8.2 Religious Structure

There is no shrine, structure or any other religious infrastructure present in the said project site that could be damaged and dislocated due to the project establishment.

4.8.3 Protected Structures

There is no protected site, structure or any other social infrastructure present near project site.

4.8.4 Cultural Heritage and Community Structure

Zoom Consultancy & Services team also visited the study area but did not find any cultural heritage and community structure within the study area that could be impacted due to the proposed project.

4.9 Quality of Life Values

Socio-Economic Questionnaire and Environmental Checklist were used as survey tools by the Zoom Consultancy & Services survey team to collect desired information. Graphical representation of results of Socio-Economic Survey is given below:

4.9.1 **Occupation of Respondents**

Majority of the respondents (50%) are private Employee, 15% have their own business, 10% attached with agriculture, 10% attached with Transportation, 10 % are shopkeepers and remaining 5% are government employees. During survey, efforts were made to interact with people representing all walks of life. The detailed graphic representation of occupational status is given below:

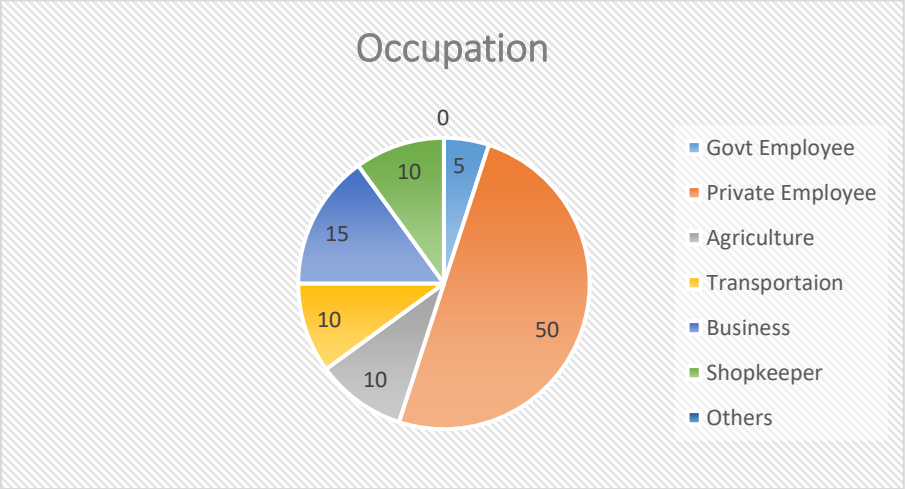


Figure 4-6: Occupation of Respondents

4.9.2 **Literacy Rate**

From survey results, it was found that 10% of the studied population was illiterate, 5% studied up to middle level, 15% of the respondents studied up to higher secondary level, 15 % respondent studied upto Higher Secondary level and 55 % respondents studied upto Graduation level.

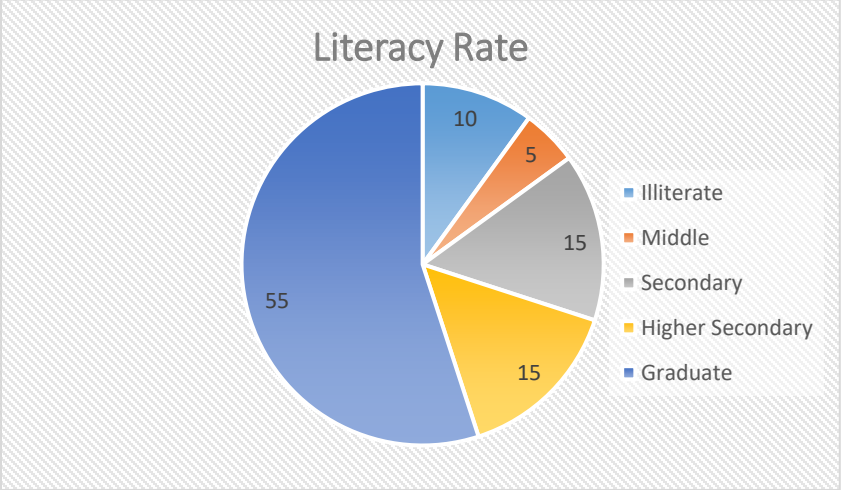


Figure 4-7 Literacy Rate of Respondents

4.9.3 Industries

There has been a steady expansion of industries in and around District Kasur since independence. Wire and Cables (Pvt) Ltd is present adjacent to the unit site:

4.9.4 Educational facilities

Various government and private educational institutes are present near project site,

4.9.5 Health facilities

Various hospitals are present near the project site. Social Security Hospital is adjacent to the site.

4.10 Facilities Available

Facilities available at the houses, shops and factories are depicted here. It shows that electricity, water supply, telecommunication, sewerage, gas supply and every other routine facility is available in study area.

CHAPTER 5: STAKEHOLDER CONSULTATION

5.1 GENERAL

Public consultation refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. According to the IEE and EIA Review Regulations, public consultation is mandatory for any socio-environmental study.

Impact assessment survey and public consultation sessions held with different stakeholder groups that may be impacted by the said project development. The consultation process was carried out in accordance with the guidelines laid by EPA. The objectives of this process were to:

- Share information with stakeholders on said project installation and operation
- To access the impacts on the physical, biological, and socio-economic environment
- Understand stakeholder concerns regarding various aspects of the project
- Understand the perceptions, assessment of social impacts and concerns of the communities of the project area
- Find out the awareness level and situation of acceptability to identify any issues for the implementation of the said project
- To invite people to express their views about the positive/negative impacts on their life styles and environment

This report includes all the comments, which were taken into account in preparing the definitive development concept for the establishment of said project. Public consultation performa is attached as Annexure of this EIA Report.

5.2 OBJECTIVES OF CONSULTATION

Public consultation plays a vital role in studying the impacts said project on stakeholders in its successful implementation and execution. It provides an opportunity to exchange

knowledge with theall stakeholders. 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 specific 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.

5.3 IDENTIFICATION OF STAKEHOLDERS

All the people who are directly or indirectly affected or concerned with the project are the stakeholder. Besides the living population of the surrounding areas, some other stakeholders were identified and contacted. They are the key players including; shops owners, vendors, public offices, school, university, hospitals,. Not only published material (Both brief and comprehensive literature were obtained on request) but also noted their views and the concerns. Following stakeholders are identified for this project:

Project stakeholders include the settled families, either property owners or the tenants, businessmen (land owners, traders, shopkeepers, vandors, transporters, restuarent owners etc.), employees of the commerical entities. PAPs are of two types, for instance:

5.3.1 **Direct**

In this case, the PAPs are those who will be benefited directly by project. No disturbance on the local community is being foreseen due to the installation of the said plant.

5.3.2 **Indirect**

Indirect impact will occur on those who are living or doing business within project area of influence. Indirect respondents include;

- ✓ Government agencies responsible to deal with the project related activities
- ✓ Government Agencies directly, indirectly or widely involved in the execution and monitoring of the said project

- ✓ Workers of political, cultural, religious or social scientific bodies, directly or indirectly related

5.4 PUBLIC DISCLOSURE

Public disclosure is the outcome of all such activities where public is involved at least in the information sharing process. This is an integral part of that process so before the proponent applies for NOC to the EPA, this disclosure will be distributed properly among all stakeholder. It is the responsibility of the proponent and the consultants to display public disclosure document at prominent places where community has easy access.

5.5 CONSULTATION PROCESS

Information disclosure, public consultation and discussion regarding the various aspects of the project with the people of the area are necessary. This process is intensified during the EIA Studies, and separate rounds of public consultations were held. Surveys were carried out in order to investigate physical, biological and socio-economic resources falling within the immediate area of influence of the project. Primary data collection included:

- Data collection regarding the socio-economic condition of the study area
- Pretesting of socio-economic survey tools in the field
- To consult the locals for collection of information on biological environment

Various meeting with the stakeholders were held the following objectives:

- Share information with stakeholders on the said project and expected impacts on community in the vicinity of the project
- Understand stakeholders' concerns regarding various aspects of the project, including the existing condition of the upgrading requirements, and the likely impact of construction and operation activities
- Provide an opportunity to the public to influence the project design in a positive manner
- Obtain local and traditional knowledge, before decision making

- Increase public confidence about the proponent, reviewers and decision makers
- Reduce conflict through the early identification of controversial issues, and work through them to find acceptable solutions
- Dissemination of information through discussions, education and liaison
- Documentation of information narrated by the stakeholders and mitigation measures proposed by the stakeholders
- Incorporation of public concerns and their address in the EIA; and eliciting their comments and feedback

5.5.1 Consultation Methodology

The methodology adopted for consultations is summarized below.

5.5.1.1 Consultation Material

The main document for distribution to stakeholders during the consultations was Social Impact Assessment Interview. The filled Survey forms of stakeholders are annexed

5.5.1.2 Consultation Mechanism

Primary stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in the Urdu language. During these meetings a simple, non-technical, description of the project was given, with an overview of the project's likely human and environmental impact. This was followed by an open discussion allowing participants to voice their concerns and opinions. In addition to providing communities with information on the said project, their feedback was documented during the primary stakeholder consultation. The issues and suggestions raised were recorded in field notes for analysis, and interpretation.

By reaching out to a wider segment of the population and using various communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews, and participatory rural appraisal EIA involved the community in active decision-making. This process will continue even after this EIA has

been submitted, as well as during future EIA in which similar tools will be used to create consensus among stakeholders on specific environmental and social issues.

Secondary stakeholder consultations were more formal as they involved government representatives and local organizations, consulted during face-to-face meetings. They were briefed on the EIA process, the project design, and the potential negative and positive impact of the project on the area's environment and communities. It was important not to raise community expectations unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflict with community's leaders or local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report.

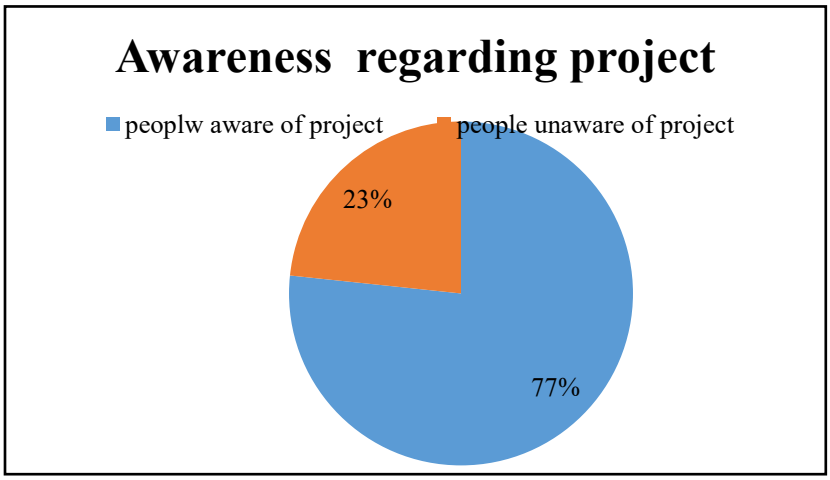
5.5.2 **Primary Stakeholders Consultation**

The community consultations were conducted with the community members outside their settlements to encourage and facilitate their participation.

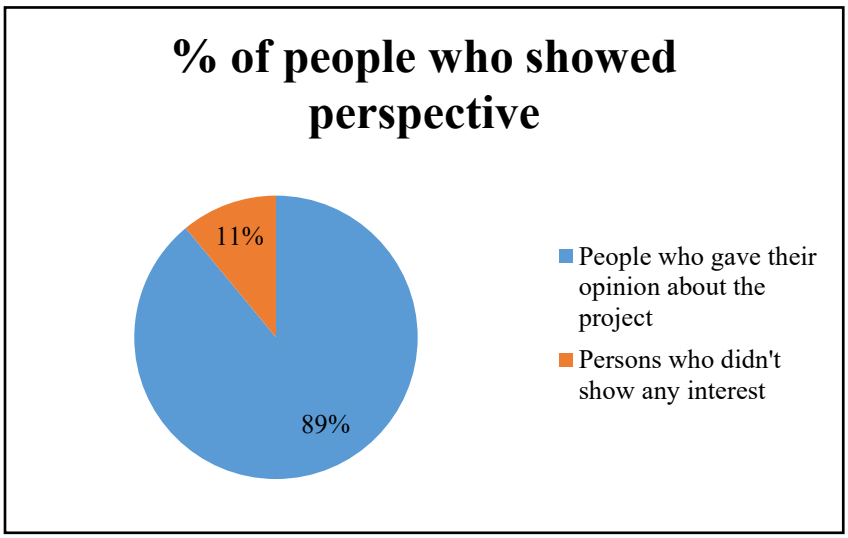
5.5.2.1 STAKEHOLDER CONCERNS AND RECOMMENDATIONS

The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below

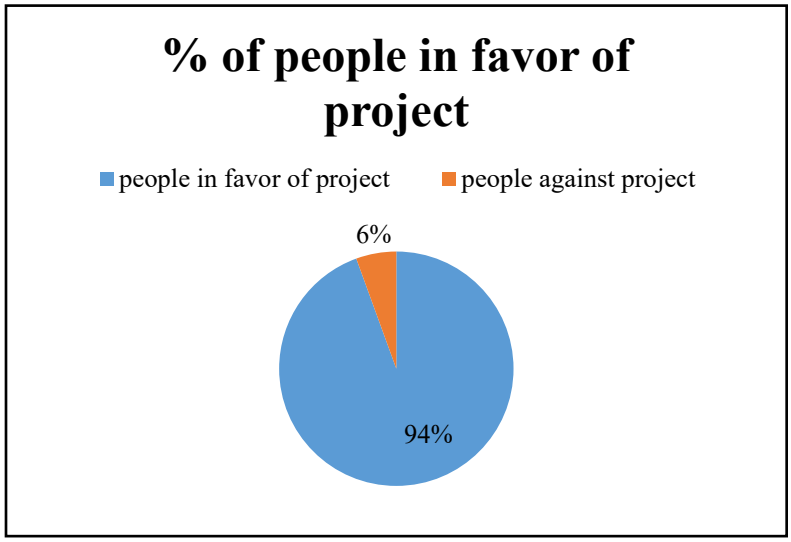
Out of total respondents of, 77% knew about the project whereas 23% were not aware of the project planning and implementation. All people were then briefed about the project.



89% commented their views about the project and 11% didn't respond.



Out of 89%, majority of the people (about 94%) favored the construction of the project keeping in view its importance and 6% people showed pessimistic views in general but mitigation measures and solutions to their concerns were provided.



Majority of people were in favor of project. They said that project will result not only in direct jobs opportunities for locals but also will enhance subsidiary business, trade, education, and agriculture and community development. The people were of the view that industry might also elevate education standards, struggle for career enhancement besides improvement in standard and quality of living in area. People were also of the

view that industry may also be instrumental in connecting the local people with major cities and will result in increase in GDP.

Very few near to 6 % only shows concerns over power house emissions, noise, wastewater and health impacts. Majority of the concerns were changed in the favor of installation after communicating the participants proper solutions and mitigation measures

5.6 STAKEHOLDERS CONSULTED

Names of consulted stakeholders are given in table below:

Table 5-1: List of consulted stakeholders

Sr. No	Stakeholder name
1.	Muhammad Naeem
2.	Farman Ali
3.	Bashir Ali
4.	Shehzad Saleem
5.	Parvez Hussain
6.	Muhammad Fayyaz
7.	Muhammad Ikhlaq
8.	Muhammad Asif
9.	Muhammad Anwar
10.	Muhammad Asad
11.	Muhammad Adeel
12.	Abdul Rehman
13.	Allah Ditta
14.	Arif Khan
15.	Basheer Hussain
16.	Ghulam Nabi

17.	Nasrullah
18.	Muhammad Aslam
19.	Hameed Ahmad
20.	Muhammad Zafar
21.	Muhammad Maqsood
22.	Muhammad Farooq

5.6.1 Secondary Stakeholders Consultation

The consultations were carried out with the local government officials and officials of the following departments:

1. District Office Environment
2. Proponent
3. Environmental Precautionar

Comments and recommendations of all government representatives are presented in table below:

S#	Participant	Designation	Concerns/Remarks
Responsible Authority			
1	Mr. Rafiq	Inspector Environment	• Environmental enhancement measures such as; Tree plantation, monitoring and safety should be ensured • WWTP should be installed • HSE plan should be enforced strictly • Should work for local people benefit • Preventive measures should be adopted to avoid any unfortunate incident
Proponent			
1	Munir Arshad	Representative of Proponent	• Local employment will be ensured • Tree plantation will be done to make project environment friendly • No waste will be dumped improperly • Quality will be ensured
Environmental Practitioners and Experts			
1	Dr. Muhammad Faqir Irfan	PhD. Environment Lawyer	• Health and safety arrangements must be provided

CHAPTER 6

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

CHAPTER6: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 GENERAL

This chapter describes the potential environmental and social impacts of the proposed activities, predicts the magnitude of the impact and assesses the significance. The main intention of this section is to provide the mitigation measures that need to be adopted wherever necessary, to reduce, minimize, or compensate for the negative impacts.

6.2 IDENTIFICATION OF POTENTIAL IMPACTS

In the first step, potential impacts of the project are identified by desktop screening exercise, using checklists during field visits for collection of baseline data, professional judgment, published literature on environmental impacts of similar projects and standard environmental guidelines. Potential impacts are also identified through discussion with project proponent, consultation with stakeholder and community to identify their concerns. The main aspects associated with potential impacts are as follows:

- Water resources
- Ambient Air Quality
- Waste discharges
- Noise pollution
- Ecology of the area, including flora and fauna
- Vehicle movement
- Socio-economic conditions
- Archaeology

6.3 CLASSIFICATION OF IMPACTS

According to the type of potential receptors, the potential impacts are classified. The following receptor categories were used.

Category of Receptor	Description
Community	People their social and cultural values, aspirations and archaeological sensitivity
Land and Soil	Land resources, soil resources
Air Quality	Ambient air quality
Water Resources	Ground and surface water resources
Ecosystem	Vegetation, wildlife and biodiversity

6.4 SCOPING CRITERIA FOR IMPACTS

The identified potential impacts of the project are evaluated on the basis of following criteria;

- The present baseline condition, the change in environmental parameters likely to be affected by the project related activities;
- Is there any impact that environmental standards or environmental guidelines applicable to the project will be breached?
- Is there a high risk of permanent, irreversible, and significant change to environmental condition due to particular project activity?
- Did the community express any concern about this aspect?

6.5 METHODOLOGY FOR IMPACT ASSESSMENT

The impact assessment methodology defines three levels of consequences (or severity) and likelihood (chance of occurrence) i.e. Low, Moderate/Medium or High. The significance of an impact is determined on the basis of the level of consequence and likelihood of the impact.

Table 6-1: Definitions of severity and likelihood of impacts

Level	**Severity of Impact (Consequence)**	**Likelihood**
High	Serious / catastrophic damage to local and regional environment Serious threat to corporate reputation/ profitability / ability to do business	High likelihood of occurrence during lifetime of operation Regular / continuous part of operations
Moderate	Measurable damage to the environment Potential to affect reputation / cost Reduced efficiency	Moderate possibility of occurrence during lifetime of operation Periodic / occasional part of operations
Low	Negligible damage to the environment No risk to business	Unlikely to occur during lifetime of operation

Table 6-2: Impact Significance Matrix

		Likelihood (Probability of occurrence)		
Impact (Consequence)		**High**	**Medium**	**Low**
	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

The prediction of impacts also includes the duration of impacts in terms of short-term or long-term, nature of impact, geographical location of the impact, reversibility of the impact. The criterion for impact assessment is illustrated in the Table

Table 6-3: Impact Assessment Criteria

Impact Characteristics	Categories
Nature of the Impact	**Direct:** The environmental parameters that are directly affecting by this project. **-Indirect:** The environmental parameters change due to the combinational effect by project and environmental impacts
Duration of the Impact	**Short term:** Lasting only till the duration of the project **Medium term:** Lasting from a few months to a year **Long term:** Lasting for a period much greater than medium term impacts
Geographical Location of the impact	**Local:** Within the area of project i.e. operation site and access roads **Regional:** Within the boundaries of the project area **National:** Within the boundaries of the country
Reversibility of the impact	**Reversible:** When a receptor resumes its pre-project condition **Irreversible:** When a receptor cannot resume its pre-project condition

6.5.1 What is the problem?

The project is about chemical manufacturing industry, namely "Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd". The major impact associated with the construction and operation of said industry includes solid waste management, wastewater management, noise emissions, tree plantation and fire-fighting arrangements.

6.5.2 When problem will occur and when it should be addressed?

The impacts from the said industry mainly occur during the construction and operational phase of the project. These issues include; noise generation, fugitive dust emissions, solid waste management, wastewater disposal, top-soil removal, Health and Safety issues and change in the geographic features of the area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts. The tell the description and impacts to Government and public by reports and public hearing.

6.5.3 Where problem should be addressed?

The problem will be generated from site development and operation of the industry. So, it should be addressed on source, i.e. at site within the same timeframe.

6.5.4 How the problem should be addressed?

Problem should be addressed with its full detail i.e. its magnitude, possible impacts and problem, long time effect, environmental impacts, and proper mitigation measures will be provided according to the nature of the impacts/problems.

6.5.5 Ways of Achieving Mitigation Measures:

Following ways will be adopted to reduce the impacts of the said project:

6.5.5.1 Changing in Planning Design

The design of industry is developed considering environmental risk and hazards. As the area is industrial lot of industries are present there. Moreover, there is no endangered and threatened species present in the project area. Any human settlement or infrastructure was not dislocated or dismantled due to the project development. The proper roads and transportation system along with migration measures is there. The project is fare away from urban development. Not any impact will affect the urbanization. Hence, there is no need to change the design of the project.

6.5.5.2 Improved Management and Monitoring Practices

The anticipated impacts will be reduced significantly by adopting better management activities, as it will be carried out for the betterment of the society. While environmental

monitoring will be conducted on the regular basis to keep the sources of the air pollution, wastewater generation, noise and public nuisances in-check. All the migration measure and advance technology will be implanted to mitigate the impact. All the practices will meet the Punjab environmental standards and international standard like OSHA.

6.5.5.3 Compensation in Money Terms

Due to the development of the project, no tree cutting is involved, however, there is no protected or environmentally sensitive area present within 3.0 km vicinity of the project that could be impacted. Hence, no compensation in the monetary terms is required.

6.5.5.4 Replacement/Relocation/Rehabilitation

The project site is owned by the proponent and reserved for the said industry. No replacement, relocation and rehabilitation is required for the commencement of the aforesaid project.

6.6 Impact Summary

Environmental Parameters	Impact Assessment during Different Phases	
	Construction	Operational
A: Physical		
Land Resources		
Soil Erosion and Contamination	0	0
Transportation	-1t	-1 t
Solid Waste and By-Products	-1t	+1p
Land Use	NA	NA
Air Resources		
Noise Pollution	-1t	-1p
Air Emission	-2t	-1p
Dust	-1t	-1t
Water Resources		
Ground Water	-1t	-1p
Surface Water	NA	NA
Wastewater	-1t	-1p
B : Ecological		
Flora		

Tree Cutting	N/A	N/A
Fauna		
Terrestrial Fauna	N/A	N/A
C: Socio-Economic		
Employment Opportunities	+1t	+1p
Land Value Appreciation	N/A	N/A
D: Hazards		
Physical Hazards	-1t	-1p
Health and Safety	-1t	-1p
Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible		

6.7 IMPACTS DUE TO PROJECT LOCATION

The said project site is located in area surrounded by other industries. As all the rules and migration procedure is applied. The project site is owned by the company. Further, the project site is devoid of any human habitation hence evacuation of the project-affected persons will not be involved in this project. Thus, no resettlement and rehabilitation issues will be involved in the said project. This project will be developed while undertaking minimum cutting for making terraces for construction while making minimum modifications in the terrain conditions and implementing environmental measures.

The topsoil removed from the site will be restored in dumps during construction period and in the post construction phase. The top soil will be spread on the unbuilt area of the plot and tree plantations and green belt development will be taken up. As the top soil removed from the site will be reused for the growth of plants, no adverse impact will be envisaged due to removal of topsoil from the site.

6.8 DESIGN PHASE

In general, the design of the said project optimized the use of best available technology in order to prevent or minimize potentially significant environmental impacts associated with the project as well as to ensure high level business and environmental performances.

In pre-construction / design phase, a management system will be provided at design level for the reduction of impacts. Design of the said project will adhere to all standard technical requirements in order to avoid adverse impacts on the environment and human health. Efficient infrastructure will be developed. Procurement of construction materials from approved dealers will be ensured.

6.9 IMPACTS ASSOCIATED WITH CONSTRUCTION PHASE

Sr. No	Aspect	Impacts	Mitigation Measures
1	Economy Improvement	During construction phase, employment opportunities for local people will be generated. Raw material will be obtained locally increasing the economic value of area.	No specified mitigation measure is required. The contract is signed with the authorized construction companies. All of labor rules will applied on them.
2	Air Quality	During construction phase, suspended particulate matter are the main pollutants during the site development activities such as leveling of land, filling activities, transportation of construction material to the project site from various places. Fugitive emissions will be observed due to vehicular movement. But it will be	Dust emissions will be minimized through strict enforcement of onsite speed controls. The routes will be sprinkled with water regularly to reduce the amount of dust generated by construction vehicles. Construction machinery will be kept away from the walkways. All the vehicles carrying the construction material will be

		negligible or temporary phenomenon.	fully covered and well maintained. The inspection of the vehicles and construction machinery will do on regular basis. All vehicles and construction machinery will be properly tuned, serviced and monitored on regular basis.
3	Water Quality	During construction phase, water will be required for construction of structures, sprinkling on roads for dust suppression, domestic uses of construction workers	During this phase, water conservation practices will be given proper consideration.
4	Relocation of Utilities	The project site is already near other industries. The construction will not relocate the existing public utilities.	No mitigation measure is required.
5	Solid Waste Generation	During excavation of the site for foundation works and landscaping, solid waste will be generated. The waste consisted of metal cuttings, rejected materials, surplus material, paper bags, cement bags, empty cartons and broken glass pieces.	Recyclable material will be separated at source. The cement bags and other such items will be handed over to approve contractors on weekly basis. Other waste will be accumulated at waste area and

			will be taken by the municipal waste management company.
6	Noise Pollution	During construction phase, the major sources of noise will be due to operation of construction equipment. The anticipated noise will be mostly confined to the facility itself.	Several mitigation measures will be considered. For this purpose, most of the construction works will be done in day time. The advance machinery will be recommended to lower the noise and work efficiency. Proper PPEs (ears plugs and ears muffles) will be given to workers so that expose less to noise.
7	Ecology	The project site is located in industrial area. It was devoid of thick forest and vegetation.	After the construction, tree plantation will be done to act as pollution barrier as well as to enhance the aesthetic beauty of the area.
8	Worker's Health, Safety and Environment	The construction activities had the potential to pose negative impact on the health and safety of workers in case of unfavorable working conditions.	The contractor ensured that the workers and labors will be trained in safety procedures for all relevant aspects of the construction. Workers will be provided with proper safety equipment which

			were required on the basis of nature of the work. First aid kits will be kept available on the site to ensure safe working environment for the labors and workers. As per the requirement warning signs will be displayed in local language. Proper fencing will be done around the site. A safety officer will be appointed at the site for risk assessment and ensure the safety of workers.

6.10 IMPACTS ASSOCIATED WITH OPERATION PHASE

During the operation phase different type of the process will be done. The possible impacts of the process, Boiler, etc is being evaluated as down here.

In this section, the combined environmental and socio-economic impacts associated with the said process of this project in operation phase are discussed. The impacts that are discussed are as follows:

Environmental Impacts

- Air emissions
- Noise
- Traffic

- Solid waste and by-products
- Wastewater
- Resource Consumption
- Abnormal conditions
- Occupational Health and Safety

Socioeconomic Impacts

- Employment Opportunity
- Community Development

6.11 ENVIRONMENTAL IMPACTS

6.11.1 AIR EMISSIONS

POTENTIAL IMPACTS

Air emissions from the project are relatively small and specified. Fugitive dusts and emissions may result during raw material handling and storage which is relatively less likely to occur. Some volatile organic compounds may present due to miss-handling and unfortune events. Other potential sources for air emissions are combustion products (nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide) from standby diesel generators, boilers and combustion products from vehicles used for project activities. The chances of air emissions are from process as well which should be mitigated properly. Air Emissions from boilers and generator include Smog producing compounds like nitrogen oxides and volatile organic compounds. The smoke of boilers and generator produce other compounds like, Particulate matter, Carbon monoxide, Sulfur dioxide, Air Toxins (Toxics), Greenhouse Gases, Wastewater (once-through cooling water, cooling system blowdown, boiler blowdown, water-side boiler cleaning and demineralizer regenerant. The emissions from standby generators will be less in concentration. The emission levels depend on the type and quality of fuel and the manner in which it is burnt.

MITIGATION MEASURES

The following mitigation measures will be implemented. The proposed mitigation measures to reduce the impacts on air quality during the operation activities are:

- Emissions from boiler are controlled by equipping with cyclone, scrubber and room
- Emissions from the admin block and warehouse also pass through the ventilation system including filters
- Emissions from process will be captured by installing absorption towers and no fumes will be allowed to release into the air.
- Monitoring of Ambient air parameters (Particulate matter, SOx, NOx) emissions should be carried out on regular basis to ensure compliance with the PEQS.
- The inspection and the maintenance of the boiler and generator will be done on regular basis.
- Plantation of indigenous trees within the premises and along the boundary.

RESIDUAL IMPACT

If proper mitigation measures are effectively implemented, the residual impact of the proposed activities on the area's air quality is expected to be low in terms of significance, reversible.

6.11.2 NOISE

POTENTIAL IMPACTS

The main sources of pollution from noise are during raw material and finished good loading and unloading, vehicle movements, operation of machines. The increased noise may be a source of disturbance to workers, working near to the machines. The main source of the noise is boiler. But this area is closed and separated from other operational areas. So, the Noise level during operation phase of unit will be limited to specific site. Concerned staff will be working in the area with required personal protective equipment (PPE) to minimize or reduce the noise exposure.

MITIGATION MEASURES

The following mitigation measures will be undertaken in order to further reduce the noise levels:

- Effective noise suppression design and plan will be made for all noise producing equipment i.e. high noise generating machines will be kept in isolation from other machines to minimize the overall cumulative noise.
- Noise barriers should be implanted
- Noise area will not be open site. The source of noise will be in closed and covered place. Where the OSH standard will be applied.
- The repairing and the small source of noise will be removed if it will possible.
- PPEs are provided to workers
- Proper tree plantation has been done
- Noise monitoring will be carried out periodically.

RESIDUAL IMPACTS

Implementation of the mitigation measures proposed above will result in negligible to no residual impact due to unit noise on the surrounding environment.

6.11.3 TRAFFIC

The operational phase of the unit will result in increased traffic. However, the impact will be minimal. Vehicles will be well maintained to prevent unnecessary exhaust emissions and drivers will be appropriately trained.

MITIGATION MEASURES

The following mitigation measure will be implemented.

- Nighttime driving of project vehicles will be limited where possible.
- Vehicles will remain confined to defined access.
- The rote of the vehicles will be defined and given to drivers and security system.
- The road will be labeled according to the rules and regulations.
- Speed limits will be maintained.

- The timetable and schedule of the vehicles will be defined and the monitoring of vehicles will be done every time.
- Road signage relevant to the project traffic will be placed, where necessary.
- Community complaint register and other means will be adopted for the community to complain about non-adherence of traffic to speed limits, safe driving and other safety related concerns.
- All vehicle drivers will be trained in community safety aspects. Drivers will be trained in responsible and safe driving practices; safe speed limits for vehicles will be followed.

6.11.4 SOLID WASTE

Solid waste generated will be generated from batch making process, empty packets, bottles and raps of chemical from ETP (solid sludge), organic and domestic solid waste from admin block will produce. Most of the generated waste will be recyclable. The generated domestic solid waste will be handled as per area practices. If the waste management is not carried out properly, it can affect health of workers, pollution of soil, surface or ground water. All waste generated from the project will be managed by proposed controls. The environmental impacts will be minimized after the implementation of the proposed mitigations. All process waste will be handed over to certified contractor.

MITIGATION MEASURES

The following mitigation measures will be implemented:

GENERAL WASTE MANAGEMENT PRACTICES

During operational phase of the project, a proper waste management plan will be devised and implemented. Key elements of the waste management system will include the following:

ON-SITE HANDLING

- There will be separated bins for segregation of different type of waste
- Proper waste collection system will be ensured. For this purpose, waste bins are placed inside the boundary.
- The recyclable waste will be sent to waste contractors.
- The sludge of from the ETP plant will salad out to waste companies.
- Waste from process will be sold to EPA certified contractor.
- The site in charge will ensure the separation of waste at production line.
- Proper person will be haired for the collection and removal of waste from the site.
- Records of generated waste should be maintained.
- All non-hazardous waste that can be recycled or reused will be handed over to the contractors.

OTHER MANAGEMENT MEASURES

- Training will be provided to personnel for identification, segregation and management of waste.
- All containers of waste will be labeled properly.
- All the container should be caped clean, making sure no Oster will produce in it.
- The proper waste management system will be applied.
- Small bins and large containers will be provided on every waste producing site at defined place causing no risk to worker and machinery.
- In-house audits of the waste management will be undertaken on regular basis.

RESIDUAL IMPACTS

Proper implementation of the mitigation measures will minimize the residual impact from waste. Monitoring and inspection will be undertaken to ensure the implementation of mitigation measures.

6.11.5 WASTEWATER

Wastewater will be produced from process and domestic uses. The wastewater may include different type of chemicals.

Mitigation Measures

- For treatment of wastewater, effluent treatment plant will be installed which is the part of the extension.
- The capacity of treatment plant will be 200 m^3/ day.
- Priority parameters will be tested on monthly basis and all parameters on quarter basis.
- Wastewater will be disposed off in urban drain, the management has obtained approval.
- The operational maintenance of ETP will be monitored on daily basis.
- Wastewater after treatment will also be used for horticulture purposes.

RESIDUAL IMPACTS

Implementation of the proposed mitigation measures and regular monitoring is not likely to leave any significant impact of the waste water from the unit.

6.11.6 Hazardous Chemicals

As the unit involves handling, transportation and manufacturing of sensitive and hazardous chemicals, mitigation measures are required for transportation, handling and storage of hazardous chemicals.

Mitigation Measures

- A detailed chemical hazard assessment will be conducted for all materials handled on site.
- An up-to-date chemical inventory will be maintained, and Material Safety Data Sheets (MSDS) will be reviewed to classify risks.
- Chemicals will be categorized based on their reactivity, toxicity, flammability, and environmental impact.
- Job hazard analyses (JHA) will be performed for all operations involving hazardous chemicals.

- Engineering controls such as fume hoods, local exhaust ventilation, and gas detection systems will be installed.
- Closed-loop transfer systems will be used to prevent exposure during liquid chemical handling.
- Storage areas will be designed with secondary containment, fire-rated barriers, and explosion-proof installations.
- Emergency shut-off valves and alarm systems will be installed and tested regularly.
- Standard operating procedures (SOPs) for handling, storage, and disposal of chemicals will be developed and enforced.
- Clear labeling and hazard signage will be displayed in all relevant areas.
- Worker rotation schedules will be implemented in high-exposure zones to limit individual exposure.
- Routine chemical safety audits and risk reviews will be conducted periodically.
- Appropriate personal protective equipment (PPE) such as gloves, goggles, aprons, and respirators will be provided.
- PPE selection will be based on the chemical's hazard profile as per the MSDS.
- Workers will be trained in proper PPE use, inspection, and maintenance procedures.
- Damaged or contaminated PPE will be replaced immediately and disposed of according to hazardous waste rules.
- Spill kits and absorbents will be placed in all areas where chemicals are used or stored.
- Employees will be trained in spill containment, neutralization, and clean-up techniques.
- Evacuation procedures and muster points will be established for large-scale chemical incidents.
- Emergency response drills and mock spill scenarios will be conducted regularly.

- Flammable chemicals will be stored away from oxidizers and ignition sources.
- Fire extinguishers and fire suppression systems will be installed and inspected periodically.
- Grounding and bonding procedures will be followed to control static buildup during transfers.
- Flameproof electrical fittings will be installed in hazardous areas.
- Eyewash stations and safety showers will be installed near all chemical handling zones.
- First-aid responders will be trained to manage chemical burns, inhalation, and ingestion cases.
- All incidents, near misses, and exposures will be documented and investigated.
- Corrective actions will be implemented to prevent recurrence of similar incidents.
- Regulatory bodies will be notified in case of major chemical spills or exposures.
- Hazardous waste will be segregated, labeled, and stored in compatible containers with secondary containment.
- Waste will be handed over to licensed hazardous waste disposal contractors.
- Disposal records and manifests will be maintained for regulatory compliance.
- Illegal dumping or unsafe waste practices will be strictly prohibited.
- Certified vehicles with proper labeling and documentation will be used for transporting hazardous chemicals.
- Drivers and transport personnel will be trained in emergency response and spill control.
- Vehicles will be marked with hazard placards and carry relevant MSDS and permits.
- Chemical transport during high-risk conditions or through sensitive areas will be avoided.

- Employees will receive regular training on chemical hazards, emergency procedures, PPE, and safe practices.
- Training attendance and competency records will be maintained.
- Chemical hazard signs and labels will be displayed in local languages where required.
- All practices will be aligned with applicable occupational health, safety, and environmental regulations.
- Documentation for inspections, MSDS, incident reports, permits, and disposal records will be maintained and reviewed.

6.11.7 ABNORMAL CONDITIONS

Abnormal events might include loss of power and diesters. The unit will have its own backup power supply using diesel generator to protect against a loss of power. This site is fare from river so no changes of flood. As the project will be constructed above to the ground and high liniment so when the heavy rain occur the water flow will stand on project site.

6.11.8 OCCUPATIONAL HEALTH AND SAFETY

This section discusses the occupational health and safety impacts of the operation of said unit. Physical hazards may include exposure to same-level fall hazards due to slippery conditions. In a variety of situations, a worker can be exposed to lifting, carrying, and repetitive work and work posture injuries.

MITIGATION MEASURES

In order to reduce the physical hazards and other health and safety issues that may be encountered at workplace, following will be followed.

- Proper training will be provided for the proper usage of machineries and personal protective equipment (PPE) will be provided. It will be ensured that the individual who has received the correct training is operating a particular machine.
- Site supervisor or health and safety should be present on site

- Risk Assessment will be done on daily basis
- Emergency response plans will be remained active.
- Monitoring cameras and sensors will be implanted at the work site
- OSHA polices will be implemented on site
- Regulation of the health and safety polices will be done on regular basis
- Regular housekeeping practices will be ensured by keeping the floor dry and during washing; proper protective equipment are being used. Restricted entry should be ensured during washing.
- Training of staff in the handling of lifting materials.
- Timely maintenance and repair of electrical equipment will be conducted.
- Implementation of work rotations, provision of regular work breaks.
- At workplace, first aid facilities will be maintained at readily accessible places.

6.12 SOCIOECONOMIC IMPACTS

A summary of potential socio-economic impacts of the project is presented in Table below.

Table 6-4: Potential Socioeconomic impacts of the project

Impact	**Beneficial**	**Adverse**
Economic	• Employment generation • Procurement of equipment and services • Local authority business tax / rates revenue • Increase in property value	Negative economic Impacts are not anticipated
Social	• Indirect beneficial community impacts from employment • Provision of training to employees and workers	Risks of occupational and environmental health issues.

By implementing the following mitigation measures, impact to community can be minimized.

- All vehicle drivers will be trained in community safety aspects.
- The company will maintain a social complaint register at the site to document all complaints received from local communities. The register will also record the measures taken to mitigate these concerns.
- It will be ensured that generators, vehicles, and other potentially noisy equipment used are in good condition. Noise from generators, vehicles and other equipment will be kept to the minimum through regular maintenance.
- Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities.

6.12.1 EMPLOYMENT OPPORTUNITIES

The project is expected to have positive impact on economic condition of locals. Employment opportunities will be generated due to project activities.

Similarly, the operation of the project will create far greater number of indirect income resources for example income resource for transporters for the transportation of the raw materials, procurement of required goods from local market etc.

Overall, the project will have a positive impact on the employment opportunities of Pakistan.

6.13 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

6.13.1 GREENBELT DEVELOPMENT

Apart from functioning as a pollutant sink, green belts provide other benefits like:

- Green belt helps in noise abatement for the surrounding area. Thus, it is recommended as noise barriers.
- Green belt will help to regulate the air quality
- Green belt also absolves extra heat help to maintain the change of enthalpy

- Green belt will provide natural refreshment to workers
- It will increase the ornamental beauty of the industry
- Green belt helps in achieving bio diversity by providing possible habitats for birds and animals.
- Green belts increase the aesthetic value of the site.

Tufail Starchem Industries (Pvt) Ltd has already developed a greenbelt. Adequate number of small plants and trees are planted along the periphery of the unit and available open spaces.

CHAPTER 7

ENVIRONMENTAL MANAGEMENT PLAN

CHAPTER 7: ENVIRONMENTAL MANGEMENT AND MONITORING PLANS

7.1 GENERAL

This EIA provides the Environmental Management Plan (EMP) of the project to keep it environment benign as well as the monitoring plan to ensure the compliance of the established EMP.

Outline and key features of the EMP for construction and operations phase is presented in sub-sections below. As per the environmental legislation in Pakistan, the EMP for the operations phase, along with other documents, is to be submitted to the environmental protection agency to obtain confirmation for compliance and Environmental Approval for project operation. Even after implementation of the suggested mitigation measures, the impact may remain significant, and require regular monitoring. This section also underlies the monitoring framework for both construction and operation phases to check compliance of the EMP and to take timely actions for correction in case any accidence of significant criteria, requirements or goals are found.

7.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.
- To apply the rules and regulation of the Punjab Environmental laws and international standards

- Making of environmental managemental polices
- Reviewing, regulating and improving of environmental policies on regular basis.

7.3 MANAGEMENT APPROACH

The organizational roles and responsibilities of the key players are summarized below:

Proponent*:* The project proponent will undertake overall responsibility for compliance with the EMP. Concerned Departments will carry out verification checks to ensure that the contractors are effectively implementing their environmental and social requirements.

Contractors*:* The contractors will implement the majority of environmental and social mitigation measures. The contractors will carry out field activities as part of the project. The contractors are subject to certain liabilities under the environmental laws of the country, and under its contract with proponent.

7.4 COMPONENTS OF THE EMP

THE EMP CONSISTS OF THE FOLLOWING:

- Management plan
- Monitoring Plan
- Communication and documentation
- Institutional capacity
- Environmental training

7.5 ENVIRONMENT MANAGEMENT PLAN

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspect in line during operational phase with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures. It enhances project benefits by reducing its impacts and making it environmental friendly.

Table 7-1: Environmental Management Plan

Objective	Management Action	Responsibility	Time framework	Residual impact
Construction phase				
Employment Opportunities				
To promote the employment of local persons	Recruitment of local workers will be undertaken without discrimination and in accordance with company recruitment policy by contractors involved in construction	Contractor	On commencement of construction activities	Unemployed people of area will get job opportunities and their standard of living improved
To promote the use of local service providers	Local procurement of goods and services will be undertaken wherever possible and cost effective and where practicable to the project	Contractor	On commencement of construction activities	Indirect job opportunities
Safety during construction				
To ensure safety on construction site	• Safety signage will be put in relevant places within the construction site	Contractor/Environmental	On commencement of	Safety of workers will be ensured by implementing

	• Site Health and Safety officer is present • Construction drivers are subjected to public safety awareness • Reckless driving by construction workers will be prohibited and monitored • Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc. and its use will be strictly enforced • Workers will be trained on the regular basis regarding personal safety • Incidents will be reported directly to the concerned authority	manager/HSE manager	construction activities	proposed mitigation measures.
Construction waste management				
To prevent the contamination of soils and water resources	• The construction site will have litter bins for waste collection	Contractor	Throughout construction stage	Waste was disposed of/reused/ recycle or resale as per practices of area.

due to inappropriate management and disposal of waste	• Recycling or reuse of waste wherever possible. • Application of a good strategy to collect, remove and safely dispose of waste on daily basis to ensure a clean environment in the factory site • Integrated waste management system will be adopted for the proper management of the waste at site • At the end of the construction phase, left-over waste will be removed by using the standard waste management procedures • All the idle machinery and equipment will be immediately removed from the site • Scrap and the debris will be removed from the site at the end of the construction stage after			

	appropriate segregation of the material • All the domestic waste produce by the worker will be given to the municipal waste management company			
Pollution control management				
To contain spillages	• Proper maintenance of construction vehicles and equipment will be undertaken • Appropriate environmental security measures including shovels and plastic bags etc will be provided to prevent accidental release to ground. • Appropriate procedures and protocols will be established and monitored for materials transport and handling whilst on the site.	Contractor	On-site establishment	Potential for accidental release of materials during transport and handling on the site should be minimized.

	• Emergency response plan will be developed for any incident.			
To manage sewage	Existing toilets will be used at site.	Contractor	On commencement of construction	Portable toilets will be cleaned properly and regularly
Protection of biodiversity				
To avoid unnecessary disturbance of and quick recovery of biodiversity in the plant site	• Avoid destruction of biodiversity outside the designated factory construction site • Minimize clearing of vegetation during construction • Surface soil excavated during construction to be placed back on the sub-soil to fast vegetation recovery • Prepare and implement an appropriate landscaping programme to help in re-	Contactor	Throughout construction phase	Although the land is industrial in nature but vegetation loss cannot be avoided, but successful restoration, improvement and long-term management of the surrounding areas and maintenance of planted trees will be provided

	vegetation of affected project areas after construction • The flora of the site will be restored at the end of the construction phase by landscaping and planting native vegetation • Defining the route for vehicles and machinery transport, defining the work area, the pathway for the worker area will also be defined and policy will form for the minimum use of outer land during construction.			
Air quality & dust management				
To minimize the dust entrainment during construction	• Regular surface wetting will be implemented on dusty sections in the factory construction site • Strict on-site speed controls will be enforced for construction vehicles	Contractor	On commencement of construction activities	Dust propagation will be limited to construction area and will not influence local community. However, workers were supplied with

	• All trucks hauling soil, sand and other loose materials will be covered • No excavation activity will be carried out during windy days • The watering of the route will be done on regular basis • Specified routes will also help to overcome the dust to evolve. • Fuel-efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions • Construction workers will be sensitized on measures to reduce air pollution			dust masks especially on dry days.
Noise				
To minimize disturbance due to noise	• Loading and unloading of materials will be done carefully to reduce	Contractor	On commencement of	within PEQs

	noise disturbances to surrounding households • Residences are at a safe distance from site so no disturbance will be envisaged. • Drivers will be instructed to avoid unnecessary gunning of vehicles, hooting and buzzing. • Regular maintenance of the machinery will be done to reduce the noise • Vehicles will be tuned on regular basis • The inspection of the vehicles will be done by health and safety officer on regular interval		construction activities	
Occupational health & safety				
To ensure healthy and Secure/safe environment in the	• Management will ensure that fire extinguishers should be located in strategic and visible places	Contractor	Throughout construction phase	Record of all incidents will be maintained and reported to HSE manager.

construction site for all workers	• Health and Safety data sheet will be design and formed by Safety officer. • All vehicles and construction equipment will be under control of competent personnel • Inspection of material and harmonization to the occupational health and safety standards. • Adequate security for workers will be provided during construction • Sensitize workers to operate in teams			
Operation phase				
Wastewater management				
Degradation of surface waters quality due to process water and sewage direct disposal	• For treatment of wastewater, effluent treatment plant will be installed which is the part of the extension.	Tufail Starchem Industries (Pvt) Ltd	Throughout project life cycle	None

	• The capacity of treatment plant will be 200 m^3/ day. • Priority parameters will be tested on monthly basis and all parameters on quarter basis. • Wastewater will be disposed off in Urban Drain, the management has obtained approval. • The operational maintenance of ETP will be monitored on daily basis. • After treatment the wastewater will also be used for horticulture activities.			
Air quality management				
Particulate emissions and stack emissions	• Emissions from boiler are controlled by equipping with cyclone, scrubber and room	Tufail Starchem Industries (Pvt) Ltd	Throughout operation phase	Local air quality will be virtually unaffected and will be based on PEQs

	• Emissions from the admin block and warehouse also pass through the ventilation system including filters • Power Engines will be equipped with air emission control technology. • Emissions from process will be collected through adsorption chambers (double showering absorption technique) scrubbers • Monitoring of Ambient air parameters (Particulate matter, SOx, NOx) emissions should be carried out on regular basis to ensure compliance with the PEQS. • The inspection and the maintenance of the boiler and generator will be done on regular basis. • Plantation of indigenous trees within the premises and along the boundary.			

	• Biomass as fuel will be used in boiler.			
Noise & vibration				
To minimize disturbance of communities due to noise	• All the machinery will be installed and operated in a closed hall and from operation of machinery noise will not be a problem for the residents in the area nearby. Further Administration of the unit will take the precautionary measures to avoid the noise emissions. There is no possibility of Noise pollution • A thick greenbelt will be developed all around the plant which will be acting as noise barrier. • Introduction of control and monitoring rooms having good sound insulation properties. • All the workers will be provided with ear plugs. • Latest technology will be implanted which has low level of noise. The boiler and power house (closed	Tufail Starchem Industries (Pvt) Ltd	Throughout project life cycle	Noise level will be based on PEQs

	system) will be planted away from the admin and the work area.			
Traffic & transport				
Increased heavy vehicles traffic both locally and nationally.	• Maximize the use of the rail network, when available, for bulk deliveries and abnormal loads. Restricting delivery hours to reduce noise nuisance; avoid heavy truck movements in the night hours will be considered whether deliveries should be scheduled to avoid peak times to reduce congestion • Routes for the transport and speed limits will be defined for vehicles and machinery	Management of Tufail Starchem Industries (Pvt) Ltd	Throughout project operation	The traffic has the potential to contribute to congestion and lead to complaints due to noise/vibration nuisance on a local basis. However, the study indicates that there will not be a significant impact.
HSE				

To minimize loss work injury/hazards/incidents/accidents	• Training regarding HSE should be given on the regular basis • Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc. • Risk assessment will be done on daily basis by HSE officer • Permits and safety data sheets will be filled on regular basis and record will be maintained • It should be strictly enforced to wear PPEs while working • Workers will be trained on the regular basis regarding personal safety and disaster management • Incidents should be reported directly to the concerned authority	Environmental manager/HSE of Tufail Starchem Industries (Pvt) Ltd	Throughout life cycle of project	Potential of injuries will be minimized
First aid				
To ensure safety and health	• First aid box will be available at the site	Environmental manager/HSE	Throughout life cycle of project	None

	• First aid training will be given to the employees on the regular basis • Numbers of all the concerned/authorized persons that will be contacted in the case of emergency will be displayed on-site	of Tufail Starchem Industries (Pvt) Ltd		
Fire hazard				
To prevent any disaster	• Firefighting equipment including DCP type fire extinguisher, CO2 Type extinguisher, sand buckets, sand drums with spade and hose pipe cabinet will be installed inside the plant • All the equipment will be placed at strategic locations where the risk of out-burst of the fire is high. List of fire posts is annexed. • Smoking will not be permitted in the vicinity of the plant	Environmental manager/HSE	Throughout life cycle of project	Potential of disaster will be minimized by suggested mitigation measures implementation

	• Regular site inspection will be done to eliminate all the chances of the hazards • Checking and maintenance of the fire-fighting equipment will be carried out on the regular basis			
Hazardous Chemicals Management				
To handle, storage, transportation of hazardous chemicals	• A detailed chemical hazard assessment will be conducted for all materials handled on site. • An up-to-date chemical inventory will be maintained, and Material Safety Data Sheets (MSDS) will be reviewed to classify risks. • Chemicals will be categorized based on their reactivity, toxicity, flammability, and environmental impact. • Job hazard analyses (JHA) will be performed for all operations involving hazardous chemicals.	Environmental manager/HSE	Throughout life cycle of project	Potential of disaster will be minimized by suggested mitigation measures implementation

	• Engineering controls such as fume hoods, local exhaust ventilation, and gas detection systems will be installed. • Closed-loop transfer systems will be used to prevent exposure during liquid chemical handling. • Storage areas will be designed with secondary containment, fire-rated barriers, and explosion-proof installations. • Emergency shut-off valves and alarm systems will be installed and tested regularly. • Standard operating procedures (SOPs) for handling, storage, and disposal of chemicals will be developed and enforced. • Clear labeling and hazard signage will be displayed in all relevant areas. • Worker rotation schedules will be implemented in high-exposure zones to limit individual exposure.			

	• Routine chemical safety audits and risk reviews will be conducted periodically. • Appropriate personal protective equipment (PPE) such as gloves, goggles, aprons, and respirators will be provided. • PPE selection will be based on the chemical's hazard profile as per the MSDS. • Workers will be trained in proper PPE use, inspection, and maintenance procedures. • Damaged or contaminated PPE will be replaced immediately and disposed of according to hazardous waste rules. • Spill kits and absorbents will be placed in all areas where chemicals are used or stored. • Employees will be trained in spill containment, neutralization, and clean-up techniques.			

	• Evacuation procedures and muster points will be established for large-scale chemical incidents. • Emergency response drills and mock spill scenarios will be conducted regularly. • Flammable chemicals will be stored away from oxidizers and ignition sources. • Fire extinguishers and fire suppression systems will be installed and inspected periodically. • Grounding and bonding procedures will be followed to control static buildup during transfers. • Flameproof electrical fittings will be installed in hazardous areas. • Eyewash stations and safety showers will be installed near all chemical handling zones. • First-aid responders will be trained to manage chemical burns, inhalation, and ingestion cases.			

	• All incidents, near misses, and exposures will be documented and investigated. • Corrective actions will be implemented to prevent recurrence of similar incidents. • Regulatory bodies will be notified in case of major chemical spills or exposures. • Hazardous waste will be segregated, labeled, and stored in compatible containers with secondary containment. • Waste will be handed over to licensed hazardous waste disposal contractors. • Disposal records and manifests will be maintained for regulatory compliance. • Illegal dumping or unsafe waste practices will be strictly prohibited. • Certified vehicles with proper labeling and documentation will be used for transporting hazardous chemicals. • Drivers and transport personnel will be trained in emergency response and spill control.			

	• Vehicles will be marked with hazard placards and carry relevant MSDS and permits. • Chemical transport during high-risk conditions or through sensitive areas will be avoided. • Employees will receive regular training on chemical hazards, emergency procedures, PPE, and safe practices. • Training attendance and competency records will be maintained. • Chemical hazard signs and labels will be displayed in local languages where required. • All practices will be aligned with applicable occupational health, safety, and environmental regulations. • Documentation for inspections, MSDS, incident reports, permits, and disposal records will be maintained and reviewed			
Employment				

To provide job opportunities and helping in improving living standard of people	• During this phase, skilled and unskilled labour will be required. • Employment opportunities for the un-skilled workers will therefore increase which will enhance the positive benefits for the local people who are in dire need of income for sustenance. ✓ Indirect opportunities for employment will arise from the provision of services to the construction teams, such as sale of raw-material such as cement, bricks, sand etc., as well as food and beverages for the labour and after completion of construction phase serve as a permanent business opportunity.	Tufail Starchem Industries (Pvt) Ltd	During construction and operation phase	Direct and indirect jobs

7.6 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the environmental management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions.

Table 7-2: Environmental Monitoring Plan

Env. Components	Project Stage	Parameters	Instrument	Standards	Monitoring			Institutional Responsibility
					Location	Frequency	Duration	
Air	Construction	PM_{10}, SO_2, NO_2, CO, SPM ,O_3	Air Quality Monitors/Gadgets	PEQS	Project site	Twice during construction	As per approved testing method	Contractor through approved monitoring lab
	Operation	Stack emissions	Air Quality Monitors/Gadgets	PEQs	stack	Quarterly	As per approved testing method	Through approved third party/monitoring lab

Noise Levels	Construction	Noise levels on dB(A) scale	Digital Sound Meter	PEQs	Project site	Twice during construction	Reading to be taken at 15 seconds interval for 15 minutes every hour and then averaged	Contractor through approved monitoring lab
	Operation	Noise levels on dB(A) scale	Digital Sound Meter	PEQs	Project site	Quarterly	Reading to be taken at 15 seconds interval for 15 minutes every hour and then averaged	Through approved third party/monitoring lab
Wastewater	Operation	BOD, COD, TSS etc	Through approved equipments	PEQs	ETP	Monthly	As per approved testing method	Through approved third party/monitoring lab

7.7 INSTITUTIONAL CAPACITY OF THE UNIT

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

7.7.1 Primary Responsibilities

The primary responsibility for implementing different aspects of the EMP within the company lies with the concerned departments of Tufail Starchem Industries (Pvt) Ltd.

7.7.2 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.

7.7.3 Supervision & Monitoring

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

7.7.4 Communications & Documentation

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

7.7.4.1 Meetings

As environment is multidisciplinary subject with environmentalist having a dynamic role therefore In-charge environment would be considered as integral part in both constructional and operational team. Participation of Environmental in-charge in daily morning meeting and any other special meeting is mandatory. Besides internal meeting HSE in-charge/Environment in-charge is also responsible to conduct meeting with local in keeping administration in liaison.

7.7.4.2 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.

7.8 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.

Table 7-3: Training Program

Target audience	Trainers	Contents	Schedule
Selected management staff	Contractors	Key finding of mitigation measure	After every five months
All personnel	HSE Officer	Mitigation measures	Monthly
Technical Staff	HSE Officer	Waste disposal or sale out status, vehicle movement restriction and other mitigation measures	After every three month
Other staff	HSE Officer	Waste disposal, resource conservation and other mitigation workers	Monthly

7.9 EQUIPMENT MAINTENANCE DETAILS

The project is about chemical manufacturing industry namely "Tufail Starchem Industries (Pvt) Ltd". Machines in said unit will be maintained on the regular basis. Following is the maintenance details for the machines and equipments:

Task	Weekly	Monthly	Semi-Annually	Annually
Visual Inspection	✓			
Testing and Inspection		✓		
Maintenance of Machines				
Fire Mains and Nozzles				
Containers/Cylinders				
Control and Section Valves				

7.10 ENVIRONMENTAL BUDGET

Approximately PKR 50 million budget will be reserved for tree plantation, solid waste management, wastewater management and environmental monitoring. Monitoring tests for ambient air quality, noise and groundwater quality will also be conducted.

CHAPTER 8

CONCLUSION AND RECOMMENDATIONS

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

The report presents Environmental Impact Assessment (EIA) of the said unit. EIA of said 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.

The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study will strengthened the environment and promote sustainable development.

Based on overall assessment of the environmental impact of the project, it is concluded that the economic benefit from the project is not at the cost of environment. From the historical records and vast experience in sustainable development keeping environment as integral part of manufacturing system, Tufail Starchem Industries (Pvt) Ltd is worthy of Environmental approval. Further the project is not likely to cause any significant adverse impact on the physical and biological environment but positive impact on social development and economic prosperity 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.

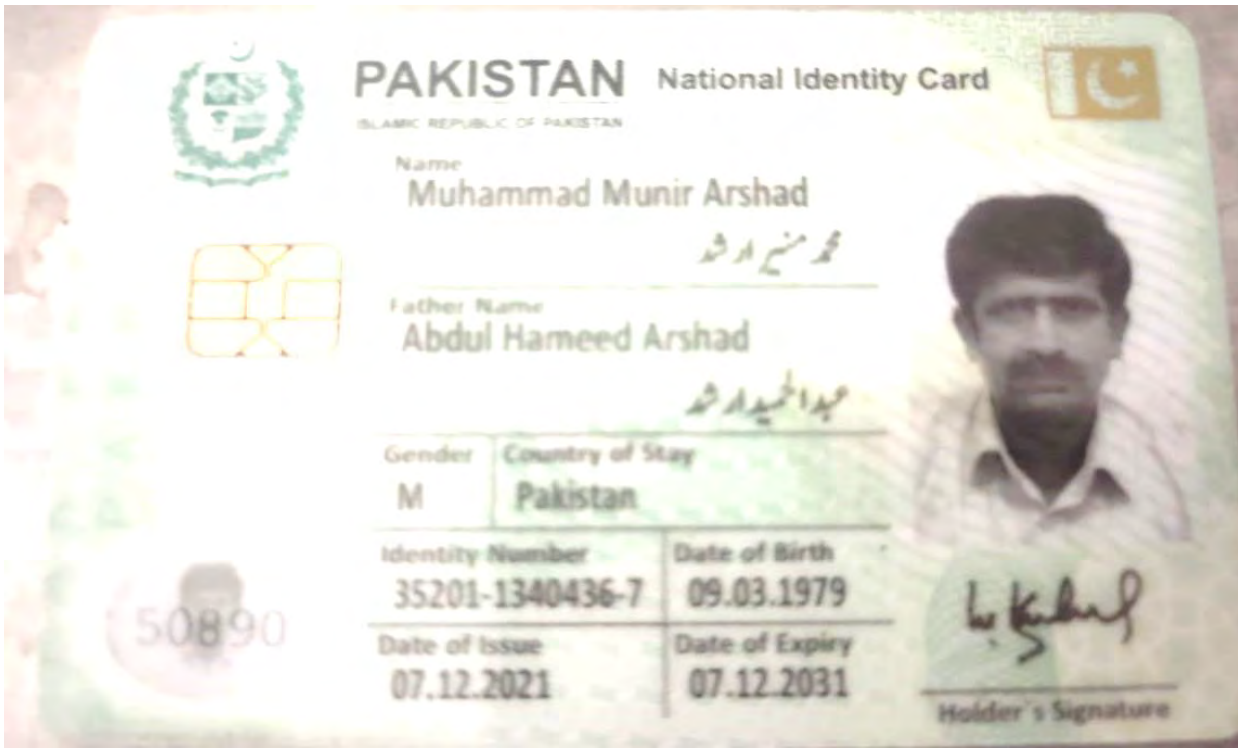
8.2 RECOMMENDATIONS

The Environmental Impact Assessment 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.
- Equipment maintenance and efficiency must be checked.
- No compromise on public health and environment should be allowed.
- Waste minimization practices should be employed and workers should be encouraged to adopt such methods.
- 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 discharge.
- Proper dispensary and first aid box should be provided for workers
- Smoking should be avoided within premises of project site and near fuel storage areas.
- 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.
- The construction and installation should be completed in guidelines of accorded Environmental Approval.

ANNEXURE I

PROPONENT CNIC



PAKISTAN National Identity Card

ISLAMIC REPUBLIC OF PAKISTAN

Name
Muhammad Munir Arshad
محمد منیر ارشد

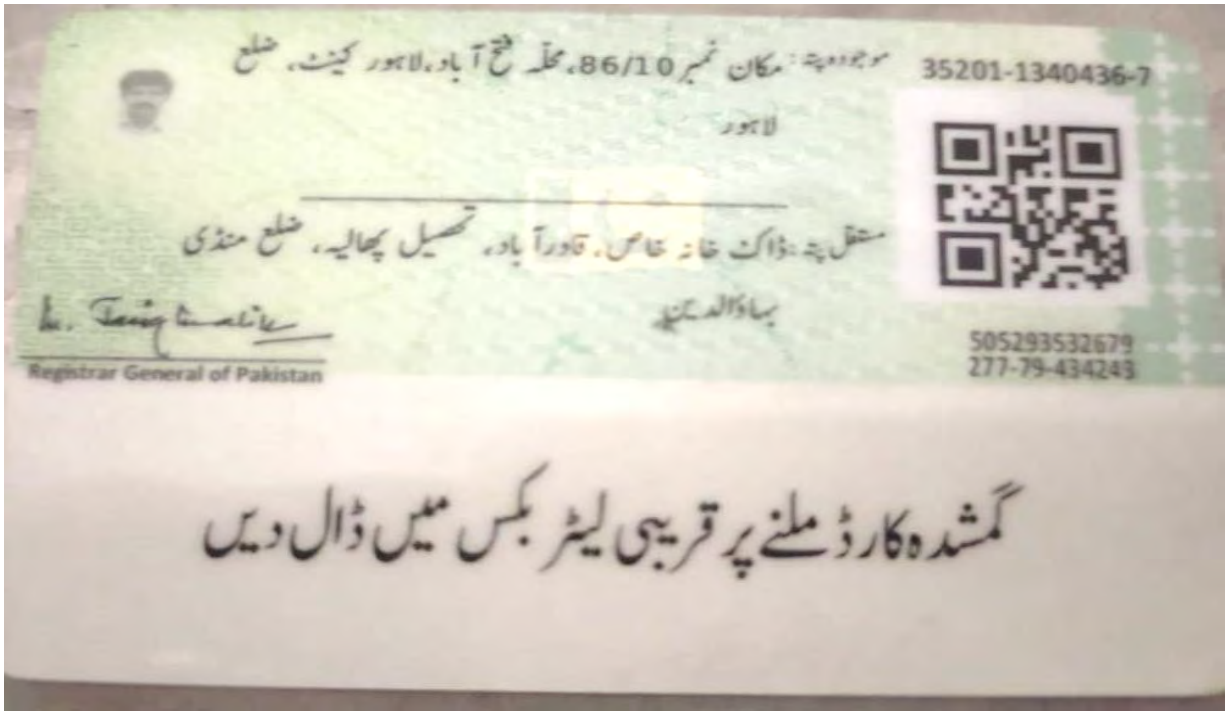
Father Name
Abdul Hameed Arshad
عبدالحمید ارشد

Gender	Country of Stay
M	Pakistan

Identity Number	Date of Birth
35201-1340436-7	09.03.1979

Date of Issue	Date of Expiry
07.12.2021	07.12.2031

Holder's Signature



موجودہ پتہ: مکان نمبر 86/10، محلہ فتح آباد، لاہور کینٹ، ضلع لاہور

35201-1340436-7

مستقل پتہ: ڈاک خانہ خاص، قادرآباد، تحسیل پھالیہ، ضلع منڈی بہاؤالدین

Registrar General of Pakistan

505293532679
277-79-434243

گمشدہ کارڈ ملنے پر قریبی لیٹر بکس میں ڈال دیں

ANNEXURE II

PROPERTY DOCUMENTS

AA168605

LIC. ABDUL KALEEM STAMP VENDOR
LICENCE # 78
Plot No: 217, Shop No: 02, Near 100 Road
Hospital Steel Town Karachi
SR. NO. 13433 DATE
ISSUED TO MR.
THROUGH WITH ADDRESS MR.
PURPOSE
VALUE RS ONE HUNDRED RUPEES ONLY
STAMP VENDOR'S SIGNATURE

13 FEB 2023

RUPEES ONE HUNDRED ONLY

M. AMJAD CHOHAN
Advocate
Ledger # 8979-HC

TENANCY AGREEMENT

This Agreement of Tenancy is made at Karachi this, **1st July, 2023**

BETWEEN

TUFAIL CHEMICAL INDUSTRIES LIMITED, through their CEO **MR. ZUBAIR FARID TUFAIL** S/o MUHAMMAD TUFAIL, holding CNIC No. 42201-9655648-7 Muslim, Adult, resident of House No. 132, P Street, DHA Phase 7, Karachi South, Pakistan, hereinafter called COMPANY. **OWNER [FIRST PARTY].**

AND

TUFAIL STARCHEM INDUSTRIES (PRIVATE) LIMITED, through its CEO **MR. PERVEZ TANVEER TUFAIL** S/o MUHAMAMD TUFAIL, holding CNIC No. 42201-0492270-7 Muslim, Adult, resident of House No 8/12 Khayaban-e-Muhafiz Phase-V, DHA, Karachi, Pakistan hereinafter referred to as the **TENANT [SECOND PARTY].**

Whereas the **OWNER** is sole and absolute owner of **Rosa Village 1.5 Km Off. 7 Km, Raiwind Manga Road, District Kasur, Lahore, and plant & machinery** hereinafter referred to as the **"SAID PREMISES & MACHINARY."**

WHEREAS the **OWNER** has agreed to give, and the Tenant has agreed to take the said premises on monthly rental basis on the terms and conditions hereinafter appearing: -

Continued on Page No.2/.

1. That this Agreement shall remain valid for a period of **Eleven Months**, commencing with effect from **01-July-2023** and expiring on **31-May-2024** and can be extended with mutual consent.

2. That the **TENANT** has not paid any amount to the OWNER as FIXED SECURITY DEPOSIT, and shall not return any amount to the Tenant at the time of vacating the said premises and **TENANT** shall hand over the peaceful and vacant possession of the same to the OWNER subject to payment of any loss/damages or dues if any.

3. That the rent of the said Premises shall be **Rs. 2,000,000/- (Rupees Two Million Only)** per month to be paid to the Owner on or before 5th of day of the calendar month.

4. That the **TENANT** shall use the said Premises & Machinery for industrial, commercial, staff residences, and any other legally allowed and authorized purposes only.

5. That the **TENANT** shall be allowed to make any addition and alteration in present structure of the said premise & machinery as may deem fit and prior notice to the owner.

6. That the **TENANT** shall pay all the charges of electricity, gas, water, telephone (if any) building maintenance, direct to the concern authority, and the photocopies of the paid bills shall be give to the **OWNER.**

7. That both parties shall serve **ONE MONTH PRIOR** and written notice to get the said premises & machinery vacated.

8. That the **TENANT** shall not sell/mortgage/transfer or sublet the said premises or any portion thereof to anybody else under any circumstances.

9. That this agreement is subject to renewal with consent of both the parties if not renewed the **TENANT** shall have to vacate and handover vacant possession of the said premises to the **OWNER.**

10. That the **OWNER** can visit said premises any time and the **TENANT** will facilitate and will not create any hurdle to visit the said premises by **OWNER.**

11. That both the parties have agreed all above-mentioned terms and conditions and undertake to abide the same.

IN WITNESS WHEREOF the parties hereto have hereunto set and subscribed their respective hands at Karachi on the day, month and year first above mentioned.

Tufail Chemical Industries Limited Karachi

Tufail Starchem Industries (Pvt) Ltd.

TUFAIL CHEMICAL INDUSTRIES LTD	TUFAIL STARCHEM INDUSTRIES (PRIVATE) LIMITED
(Zubair Farid Tufail – CEO)	(Pervez Tanveer Tufail – CEO)
CNIC No. 42201-9655648-7	CNIC No. 42201-0492270-7
OWNER	**TENANT**

WITNESSES

1. Signature:		2. Signature:	
Name:	Muhammad Ahmed Mirza	Name:	Abdul Qadir
CNIC NO:	42201-4205138-9	CNIC NO:	42301-1102822-7

ANNEXURE III

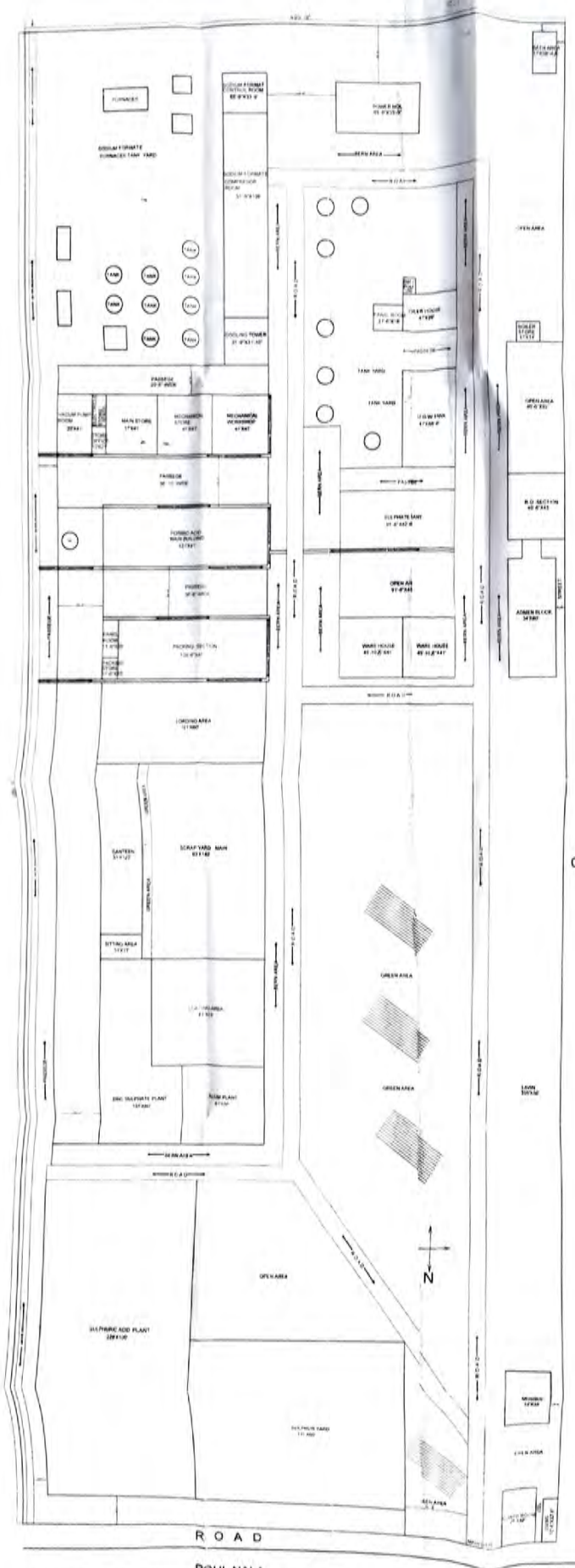
LAYOUT MAPS

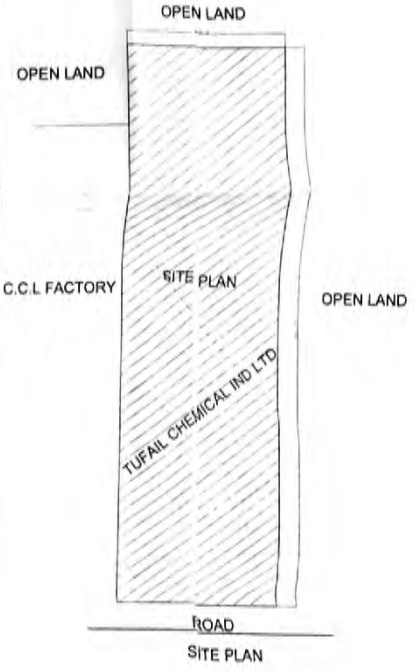
PROPOSED SUBMISSION DRAWING OF THE FACTORY AT TUFAIL CHEMICAL IND LTD 7KM RAIWIND MANGA ROAD

SHADULE OF AREA	
TOTAL AREA OF PLOT	420400
GROUND FLOOR COV AREA	68-%
OPEN AREA OF PLOT	32-%

OWNER NAME

OWNER SIGN.





SITE PLAN

ANNEXURE IV

GLOSSARY

GLOSSARY

Alternatives	The evaluation of alternatives to project development in EIA (timing, location, technologies etc) including the no go, or no development action.
Ambient	Relating to the immediate surroundings of something
Contamination	Pollution
Conservation	The preservation of natural resources for use by future generations
Consultation	A process of communication with those potentially affected by a project, policy, plan or program.
Effluent	means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapor
EMP	An EMP is a site specific or project specific plan developed to ensure that appropriate environmental management practices are followed during a project's construction and operation.
Environment budget	Monitory assets reserve for environmental activity
Environment	means air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; all social and economic conditions affecting community life; and the inter-relationships between any of the factors mentioned
Environmental Audits	An environmental management tool consisting of a periodic and objective evaluation of an organization and installations to assess compliance with regulatory and other requirements, as defined by audit criteria
Environmental	means an environmental study comprising collection of

Impact Assessment	data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed
Extent/ Magnitude	The size or degree of the predicted impact
Fauna	Animal life occurring in particular region or time
Flora	plant life occurring in particular region or time
Geological	Relating to the study of the earth's physical structure and substance.
Impact	The consequence of an action or activity on the human or natural environment. Impacts may be positive, negative or neutral
Issue	A question or concern regarding an environmental impact, consequence or effect
Mitigation	Prescribed actions taken to prevent, avoid, reduce or minimize the impacts or potential adverse effects of a project
Monitoring	A combination of observation and measurement to assess the environmental and social performance of a project and its compliance with EIA/ EMP, or other approvals and regulatory conditions
Particulate Matter	A complex mixture of extremely small particles and liquid droplets that get into the air
Proponent	the person who intends to carry-out a proposed project
Sustainable development	Economic development that is conducted without depletion of natural resources.
Waste	means any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process

ANNEXURE V

ENVIRONMENTAL MONITORING REPORTS

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

ANNEXURE VI

HAZARDOUS CHEMICAL MANAGEMENT PLAN

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

1. Purpose

To establish safe procedures for the handling, storage, use, and disposal of hazardous chemicals in the workplace, ensuring protection of personnel, assets, the environment, and compliance with applicable national and international HSE regulations.

2. Scope

This plan applies to all hazardous chemicals present in the facility, including raw materials, intermediates, and final products involved in manufacturing, processing, storage, and transportation.

3. Responsibilities

- **HSE Manager**: Oversee implementation, training, and audits.
- **Supervisors**: Ensure safe work practices and immediate reporting of incidents.
- **Employees**: Follow procedures and report unsafe conditions.
- **Contractors**: Comply with site-specific chemical safety requirements.

4. Chemical Handling

- Only trained personnel will handle hazardous chemicals.
- Appropriate PPE (gloves, goggles, face shield, respirator) shall be worn based on the chemical's MSDS.
- Chemicals shall be transferred using mechanical aids (pumps, dispensers) rather than manual pouring where possible.
- No eating, drinking, or smoking near chemical handling areas.

5. Storage

- Chemicals shall be stored in labeled, corrosion-resistant containers in designated chemical storage areas.
- Incompatible chemicals (e.g., acids and bases, oxidizers and organics) must be segregated by physical barriers or distance.
- Flammable substances will be stored in flame-proof cabinets with grounding/bonding as needed.
- Storage areas will be ventilated and equipped with secondary containment to manage leaks.
- Temperature-sensitive chemicals will be stored within specified ranges using monitoring systems.

6. Spill Management

- All spills must be reported immediately to the supervisor or HSE department.
- Spill kits appropriate to the chemical class (acid, base, flammable, etc.) must be available and accessible.
- Small spills will be contained and cleaned by trained personnel using appropriate PPE and neutralizers.
- Large or uncontrolled spills will trigger the facility's emergency response plan, including evacuation if necessary.
- Contaminated cleanup materials will be disposed of as hazardous waste in accordance with regulatory requirements.

7. Fire Safety

- Fire extinguishers (Class B, C, or D as appropriate) shall be positioned near chemical storage and handling areas.
- Fire alarms and suppression systems (e.g., sprinklers, foam systems) will be maintained and inspected regularly.
- Flammable chemicals will be stored away from ignition sources and static discharge will be controlled.
- Firefighting procedures must be practiced through periodic drills and documented in the Emergency Response Plan.

8. First Aid and Medical Management

- First aid kits and chemical-specific antidotes (if applicable) will be available near high-risk areas.
- Emergency eyewash stations and safety showers will be installed and tested weekly.
- In the event of chemical exposure, affected persons shall be removed from the area and provided with first aid per MSDS instructions.
- Medical follow-up shall be conducted as per the severity of exposure or injury.

9. Transportation

- Hazardous chemicals will be transported using certified vehicles and trained drivers.
- Containers must be sealed, labeled with UN numbers, hazard symbols, and documentation (e.g., SDS, transport manifest).
- Emergency spill response equipment must accompany the transport vehicle.

- Routes will be planned to avoid populated or sensitive environmental areas where possible.

10. Accident and Incident Management

- All chemical-related incidents (spills, exposures, leaks, near misses) must be reported and investigated within 24 hours.
- Root cause analysis will be conducted using a recognized methodology (e.g., 5 Whys, Fishbone).
- Corrective and preventive actions (CAPA) will be implemented to avoid recurrence.
- HSE statistics (LTIR, spill rate, near miss frequency) will be maintained and reviewed monthly.

11. HSE Compliance and Monitoring

- MSDSs for all chemicals will be updated and available at all relevant locations.
- HSE audits (internal/external) will be conducted to verify chemical safety compliance.
- Regular training sessions will be conducted on chemical safety, spill response, fire safety, and PPE use.
- Waste disposal will follow local environmental laws and licensing requirements (e.g., NEQS, EPA, ISO 14001).

12. Emergency Contacts and Communication

- Emergency numbers (fire, medical, HSE, maintenance) will be displayed at all key locations.
- A Chemical Emergency Response Team (CERT) shall be established and trained.

- Community right-to-know principles will be followed where required by law (e.g., sharing safety information with local authorities).

13. Documentation and Records

- Maintain records of:
    - Chemical inventories
    - MSDSs
    - Training attendance
    - Spill and incident reports
    - Inspection and audit findings
    - Waste manifests and disposal certificates

ANNEXURE VII

AUTHORITY LETTER IN FAVOR OF CONSULTANT

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

Tufail starchem

Appointment & Authorization of Environmental Consultant

In the Provincial Environmental Protection Agency (EPA, Punjab) Lahore

In the matter of Project namely

Establishment/ Extension of Chemicals Manufacturing and Storage Unit by M/S Tufail Starchem Industries (Pvt) Ltd"

Address 7 – Km Manga- Raiwind Road, Tehsil Kot Radha Kishan, District Kasur

To whom these presents shall come that the undersigned appoint

To be the Environmental Consultants for conducting Initial Environment Examination (IEE) and to submit the IEE report, follow-up the same till the final decision: -

1. To conduct the IEE, prepare and submit.
2. To appear and represent the reply to the queries/objections, documents, explanations as shall be deemed necessary or advisable during the Review process of the above cause at all its stages till the final decision of EPA.
3. To withdraw, re-submit, revise the report or any act deemed necessary or advised in any manner relating to the said matter.
4. To prepare (if applicable) and submit the Review Fee instrument/Banker's cheque pay or receive moneys and obtain or grant receipts therefore and to do all other acts and things which may be necessary to be done for the progress in course of proceedings in the matter.
5. To appoint any Environmental Laboratory or other environmental expert authorizing him to conduct monitoring, surveys, data collection etc. whenever deemed fit to do so.
6. To present case before committee of experts and present public hearing.
7. **To receive all the letters and NOC from EPA Punjab on behalf of client.**

Dated: 07-05-2025

Muhammad Munir Arshad
Proponent
Tufail Starchem Industries (Pvt) Ltd

Tufail Starchem (Pvt) Ltd

A part of the Tufail Multichem Group

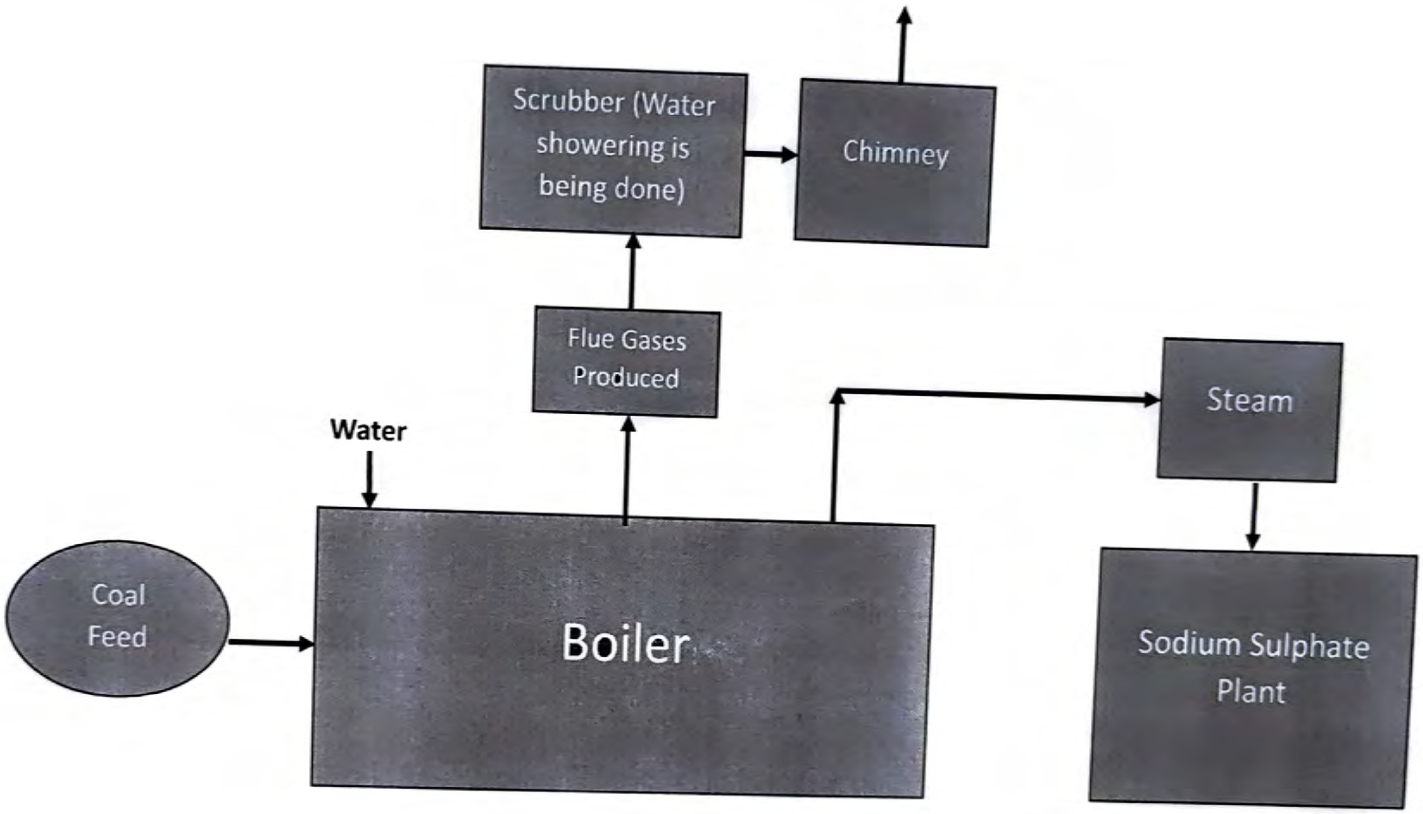
Head Office
4-B, 4th Floor, Dolmen Executive Tower,
Sea View Road, Clifton, Karachi, Pakistan.
+92 213 5360083-86
www.tufailmultichem.co

Lahore Office
1108, 11th Floor, Haly Tower,
Lalik Jaan Chowk, Phase 2 DHA,
Lahore, Pakistan.
+92 42 35898282-86

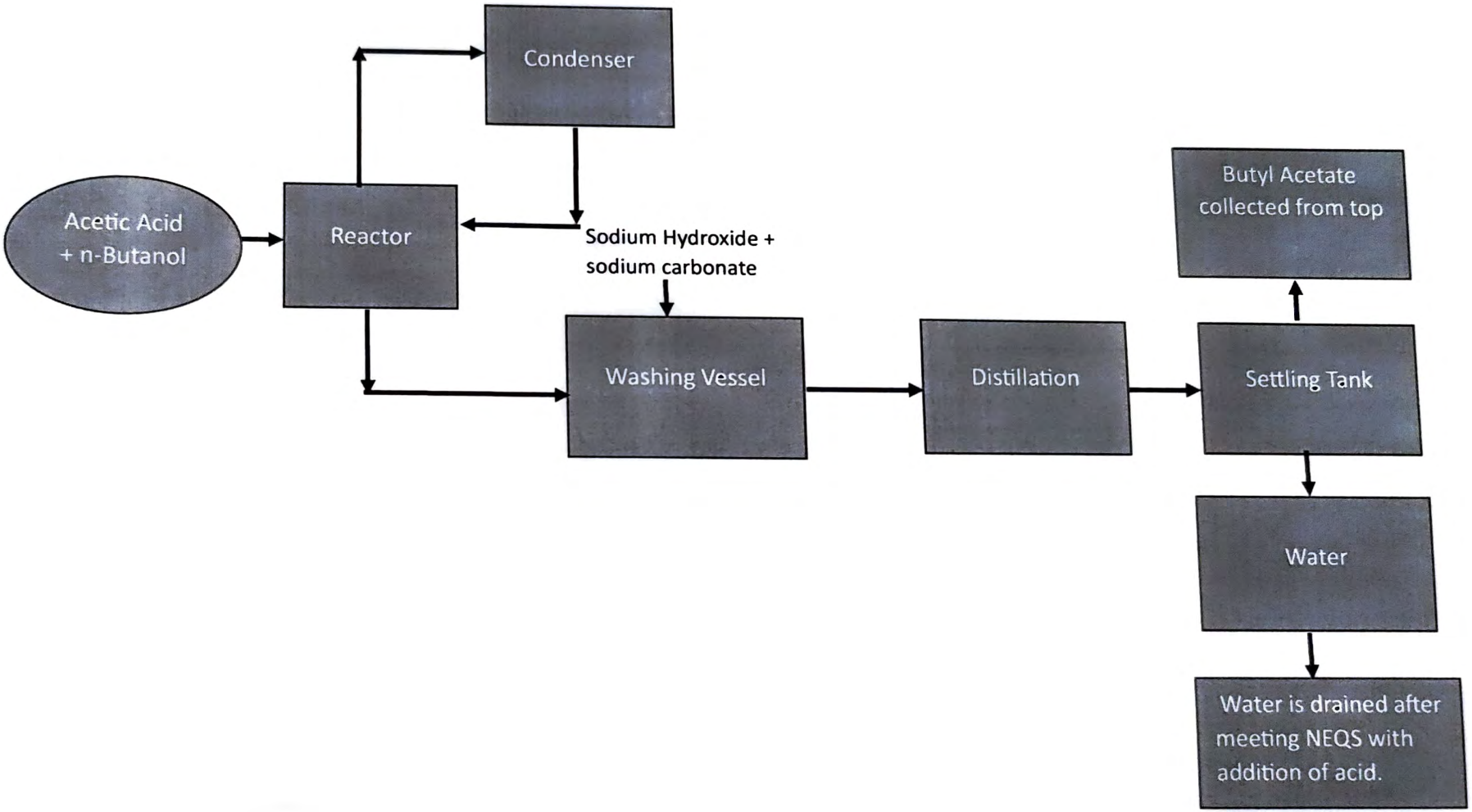
ANNEXURE VIII

PROCESS FLOW DIAGRAMS

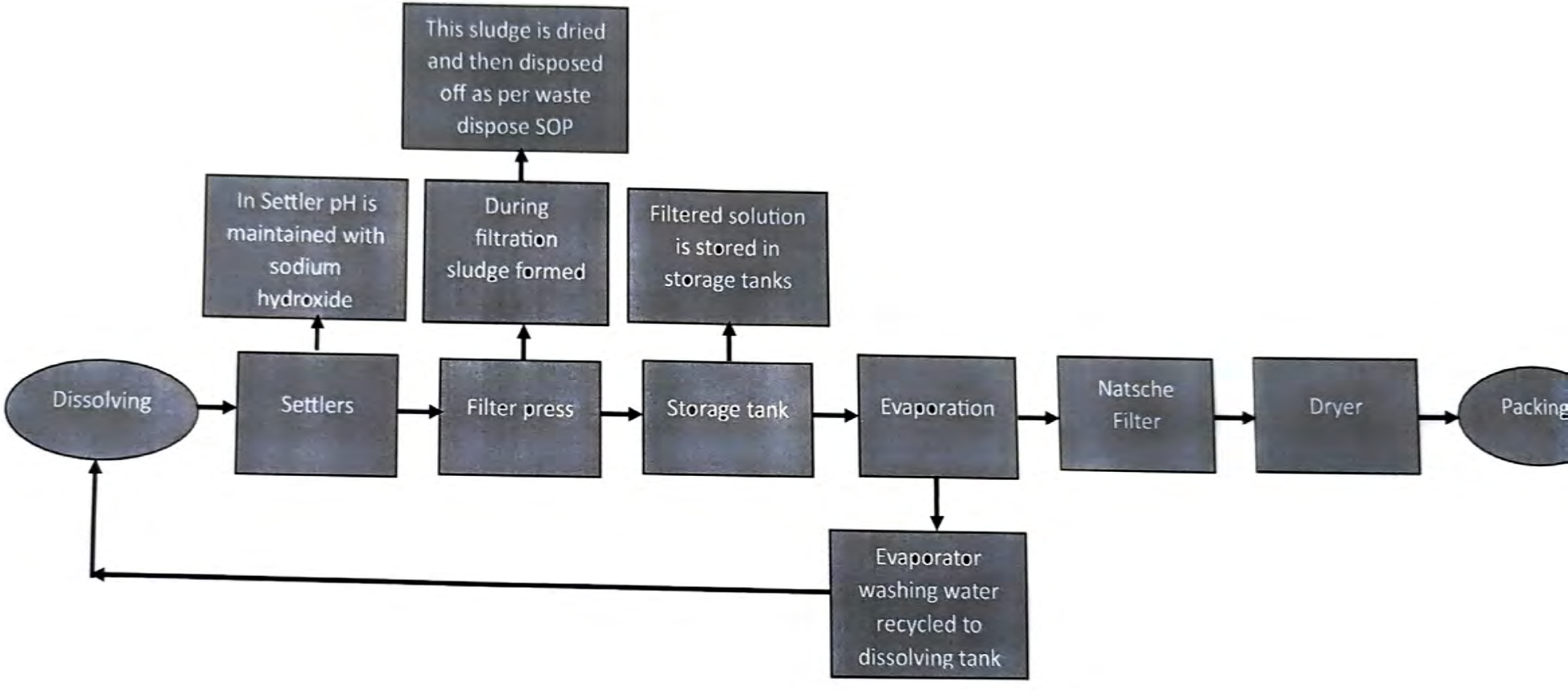
Environmental Protection Plan for the Operations of Coal Boiler



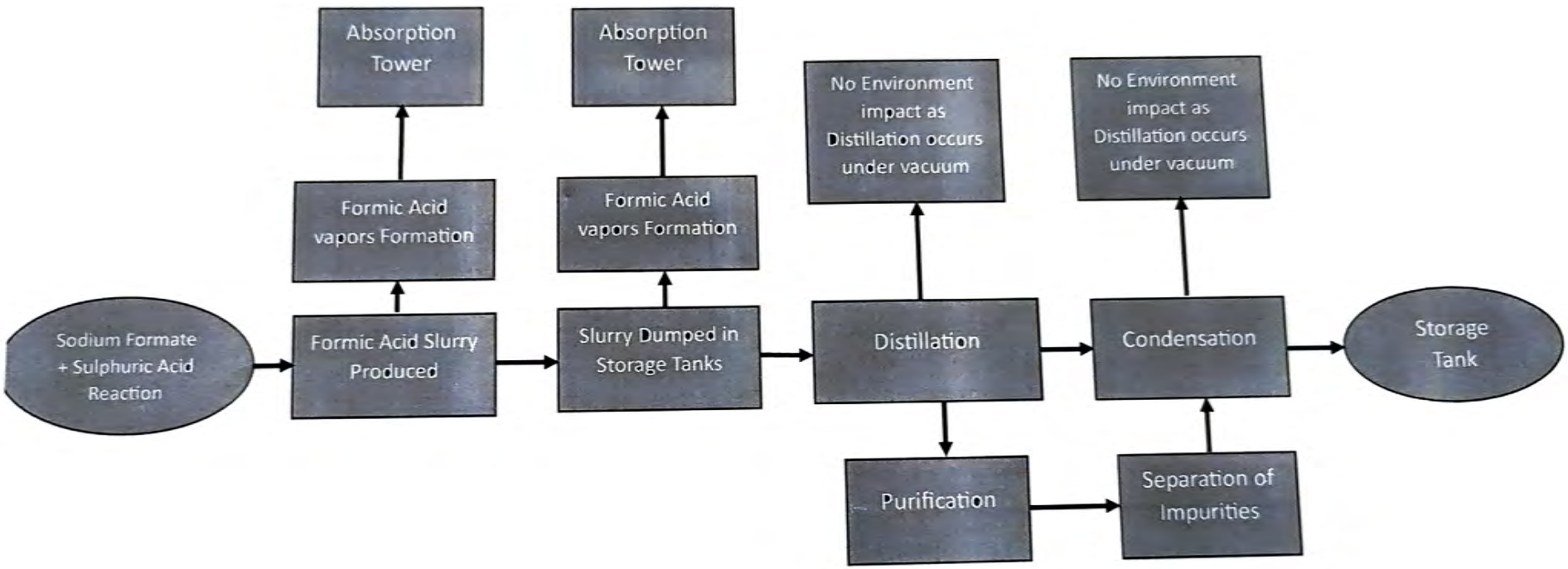
Environmental Protection Plan for the Operations of Unit-3 Butyl Acetate



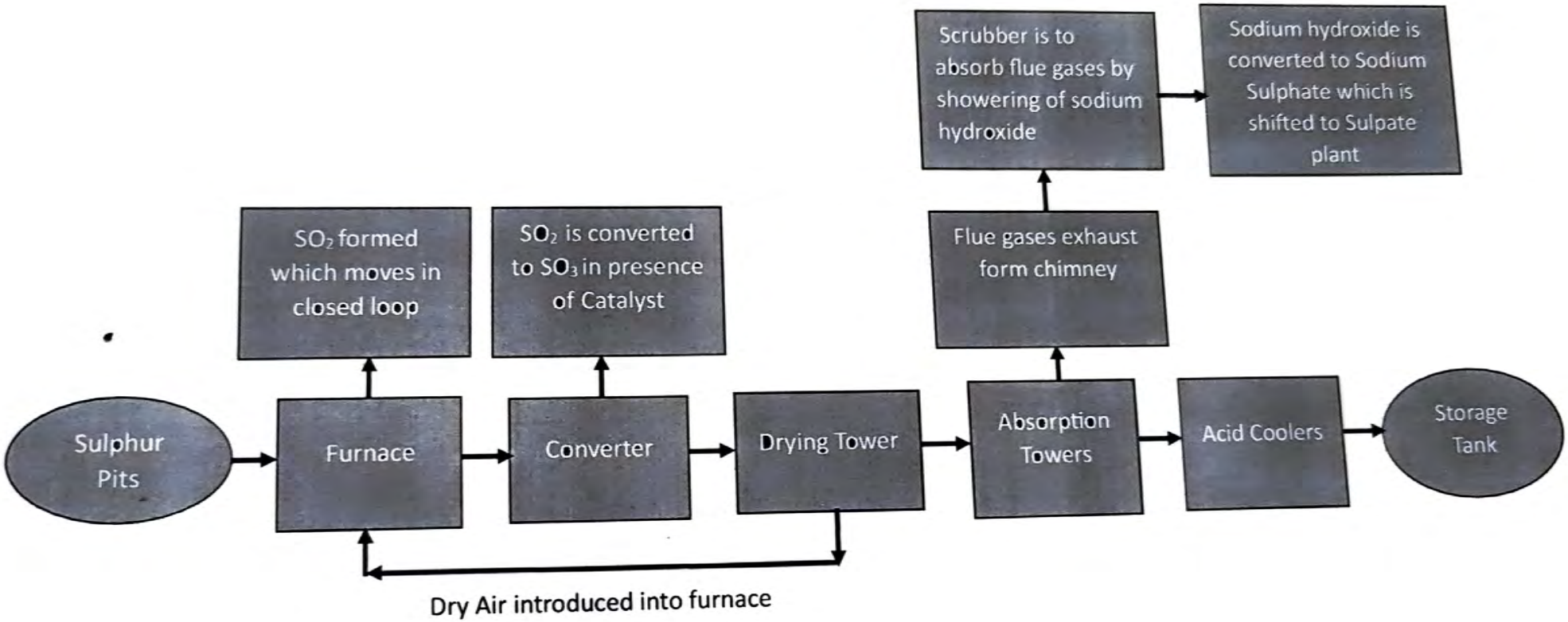
Environmental Protection Plan for the Operations of Unit-1 Sodium Sulphate



Process Flow for the Operations of Unit-1 Formic Acid



Environmental Protection Plan for the Operations of Unit-2 Sulphuric Acid



ANNEXURE IX

FIRE FIGHTING PLAN

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

DOCUMENT STATUS BLOCK		
INTEGRATED MANAGEMENT SYSTEM PROCEDURE	Document # : **TSIL/HSE/P/03**	Status #: **01**
Title: **FIRE FIGHTING PLAN**	Issued On: **01/01/2025**	Page # 1 OF 3

Author: HSE Engineer **Signature**	**Reviewed By:** Management Representative **Signature**	**Approved By:** Chief Technical Officer **Signature**

DOCUMENT DISTRIBUTION

Document distribution as mentioned in master list of documented information

DOCUMENT CHRONOLOGY

Issue No.	Section No.	Description	DCCR No.

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

DOCUMENT STATUS BLOCK		
INTEGRATED MANAGEMENT SYSTEM PROCEDURE	Document # : TSIL/HSE/P/03	Status #: 01
Title: FIRE FIGHTING PLAN	Issued On: 01/01/2025	Page # 2 OF 3

1.0. PURPOSE

1.1. To establish a structured and effective response to fire emergencies within Tufail Starchem Industries plant (Pvt) Ltd (TSIL), minimizing risk to life, environment, and property.

2.0. SCOPE

2.1. This SOP is applicable to all areas of the TSIL plant, including production units, warehouses, laboratories, utilities, and administration sections etc.

3.0. PROCEDURE

3.1. Fire Hazard Identification

3.1.1. **The fire hazard can be identified in following categories.**

a) Flammable liquids and gases (e.g., solvents, fuels)
b) Combustible solids (e.g., packaging materials)
c) Static discharge and hot work
d) Electrical short circuits
e) Chemical reactions/exothermic processes

3.2. To handle the fire emergency following resources are available

3.2.1. Fire Fighting Resources

A. Fixed Installations:

- Fire hydrant system (strategically placed)
- Sprinkler systems (storage and process areas)
- Fire water storage tanks
- Fire pumps (diesel and electric driven)

B. Portable Equipment:

- Fire extinguishers (CO_2, foam, dry powder)
- Fire blankets
- Sand buckets

C. Detection & Alarm Systems:

- Smoke and heat detectors
- Fire alarm

3.2.2. Emergency Response Team (ERT)

a) Fire Response Team – Trained personnel with PPE
b) First Aid Team is available.
c) Evacuation Coordinators are available.
d) Incident Commander – Senior official in charge during fire

3.2.3. The roles of ERT include:

a) Immediate fire control (if safe)
b) Evacuation of affected area
c) Communication with fire services
d) Headcount verification

3.3. Activtites on Fire Emergency

3.3.1. On Fire Detection:

a) Activated the nearest manual call point/fire alarm
b) The HSE office immediately informed which immediately alert emergency services (fire brigade, medical)
c) The evacuation is announced
d) Fire pumps are started and affected zone is monitored.
e) Evacuation via the nearest safe exit is performed.
f) The fuel/chemical supply is isolated if applicable.

3.3.2. ERT Response:

a) Wear appropriate PPE
b) Use suitable extinguishing agents
c) Assist in rescue operations
d) Prevent spread to nearby units

3.4. Evacuation Plan is established with

a) Clearly marked emergency exits
b) Assembly points away from process/storage areas
c) Designated routes mapped and displayed
d) Headcount at assembly points
e) Restrict re-entry until all-clear is given

3.5. Training & Drills

a) Quarterly fire drills (announced and unannounced) are conducted.
b) Fire extinguisher usage training is conducted.
c) Chemical fire hazard awareness is given at appropriate level.
d) SCBA and confined space rescue training is provided.

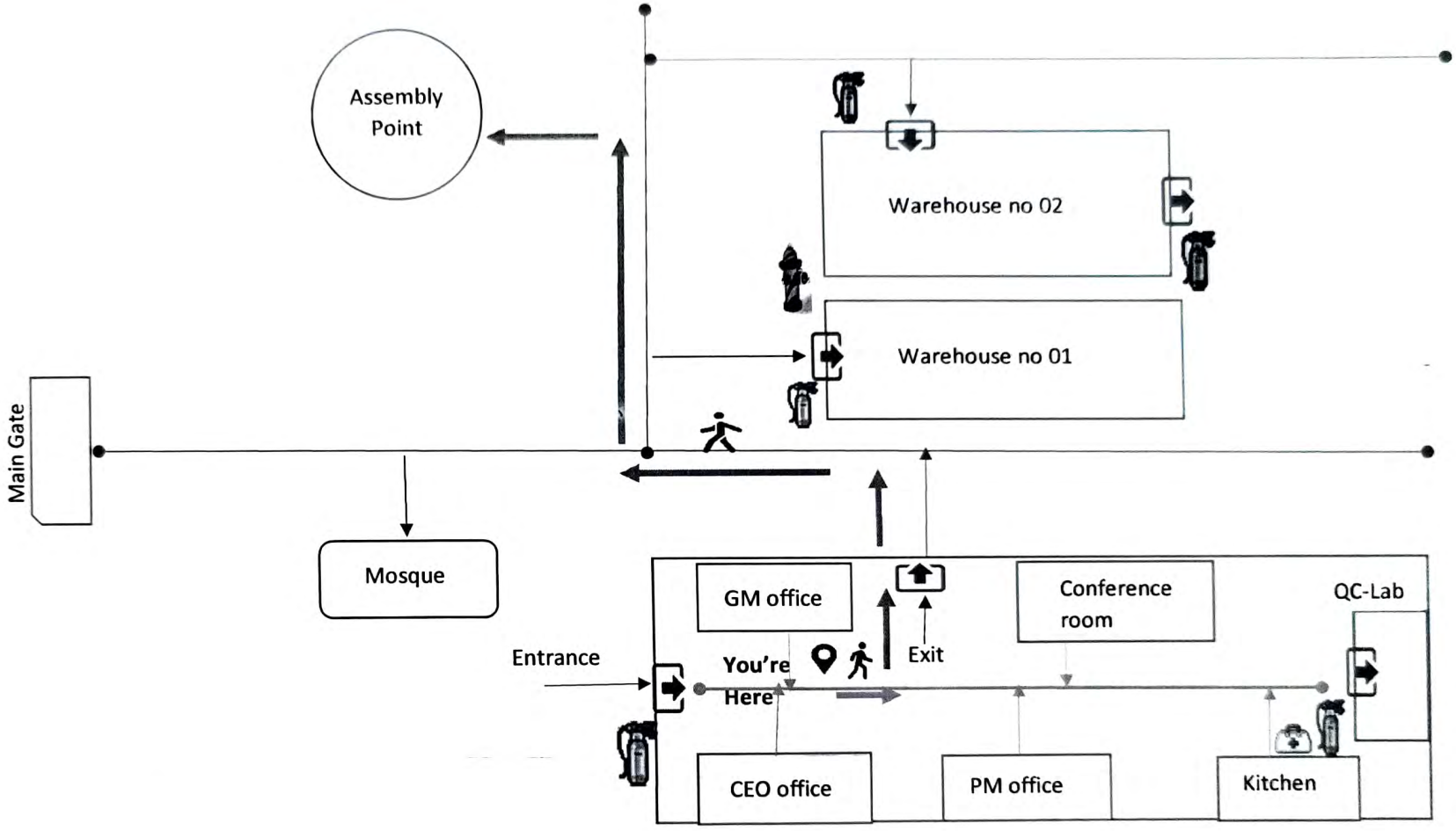
3.6. Maintenance & Inspection

a) Monthly inspection of extinguishers is conducted.
b) Quarterly testing of hydrants and sprinklers is conducted.
c) Alarm system and detector functionality checked quarterly.
d) Fire water tank level and pump operation verification in vigilance activity.

4.0 IMS Records/Forms

The following records shall be generated and maintained in accordance with this procedure.

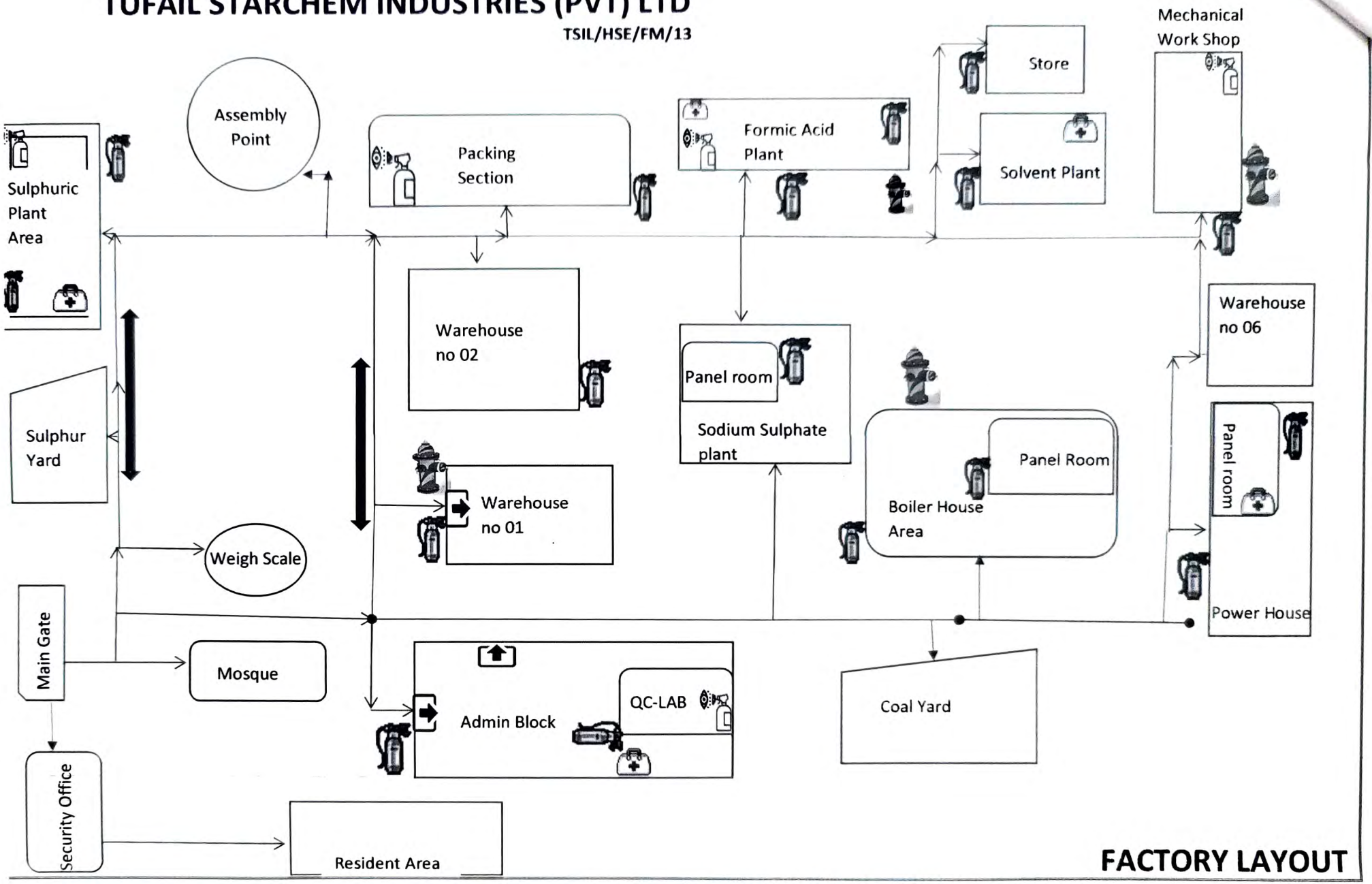
Required Record	Forms Reference No
Evacuation Plan Set	TSIL/HSE/FM/12
Fire extinguisher's location map	TSIL/HSE/FM/13
Emergency preparedness and response drill report	TSIL/HSE/FM/14



EMERGENCY EVACUATION
ADMIN BLOCK

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

TSIL/HSE/FM/13



FACTORY LAYOUT

TUFAIL STARCHEM INDUSTIRES (PVT) LTD

Emergency Preparedness and Response Mock Drill Report

Date: 20 Jan-25 **Location:** TSIL Plant Lahore Manga Road

Time: 2:30 pm – 3:00 pm **Reported By:** Fisal Saleem AM HSE

1. Objective

The objective of this emergency preparedness and response mock drill was to:

a) Evaluate the effectiveness of the emergency response plan.
b) Assess the readiness of employees and emergency response teams.
c) Identify gaps in communication, coordination, and execution.
d) Improve response time to emergency situations.

2. Scenario

Type of Emergency: Fire

Location of Incident: near external wall admin block.

Triggered by: Simulated alarm activation

Weather Conditions: Clean Shining Day

3. Participants

A). Emergency Response Team (ERT):

1. Mr. Shahzaib
2. Mr. Umair
3. Mr. Rizwan
4. Mr. Faisal Saleem
5. Mr. Hafiz Sibtain
6. Mr. Imran
7. Mr. Waqas

B). Plant Employees:

1. Mr. Amanat
2. Mr. Akram
3. Mr. Naseer
4. Mr. Tariq
5. Mr. Shahzad
6. Mr. Akhtar

C). Total number of participants: 13 Nos

D). External Agencies (if any): None

4. Drill Execution

Time of Alarm Activation: 2 pm

Initial Response:

a). The staff moved to assembly area.

b) The AM HSE immediately informed to CTO about this emergency and to security staff and admin.

c). As an evacuation Process, the staff moved to assembly point and stood in rows in the specific line properly labeled.

d). The head count started and was compared with the admin provided attendance number count.

e). As two persons were found short hence the rescue team started to find the missing staff.

f). The first aider also moved with rescue team to find any injured person and to provide the first medical aid.

g). The fire fighting team started to carry the fire extinguishers and reached the fire spot which are artificially created near gate.

5. Observations & Findings

A). Strengths Noted

a). Mainly the movement of staff to assembly point was quickly.

b) The firefighting team move the fire place quickly and mainly the proper PPEs were used while reaching to site.

c). The security staff was found more vigilant at gate.

B). Areas for Improvement

a). Some of the staff was having the confusion where to stand i.e. in line having the departments name in assembly point. The reason was the names of the departments were mentioned in English and having language barrier for staff find their row.

b). Although the fire safety functions were wearing PPEs but two of fire fighting staff was not using the safety helmets and mask.

d) The firefighting team was found to not care about the flow of air and were fighting against fire in opposite side if air flow.

e). Some firefighting team member informed that some blockage to one of the fire extinguishers.

6. Corrective Actions & Recommendations

a) The line labeling should be required in Urdu so to find the departmental line and to park themselves at specific point.

b) The training of fire fighting staff is required considering the use of PPEs, and fire fighting in proper and suitable direction considering the direction of air flow.

c). To assure the easy access to fire extinguishers the daily vigilance will be strengthened on daily basis.

9. Conclusion

The emergency preparedness drill at Tufail Starchem Industries (Pvt) Ltd plant, successfully identified strengths and areas for improvement.

It was concluded that the ERP plan have been assigned to enhance emergency response effectiveness but a compressive training on fire-fighting is required to staff. A follow-up drill is recommended after implementing corrective actions in coming quarter from April-June 25.

Report Prepared by:

Faisal Saleem
AM HSE

Report Reviewed by:

Arsalan Ali
CTO

ANNEXURE X

MSDS OF CHEMICALS

1. Identification

Product identifier

N-BUTYL ACETATE (ULTRA)

Chemical name: N-Butyl Acetate

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: As solvent in Industrial Applications

Details of the supplier of the safety data sheet

Company: Tufail Starchem Industries (Private) Limited, 7KM Raiwind Manga Road Lahore.
Telephone: 00924235898285-6
E-mail address: info@tufailmultichem.co

Emergency telephone number

International emergency number:
Telephone: 00924235898285

2. Hazards Identification

Classification of the substance or mixture

According to UN GHS criteria
Flam. Liq. 3
STOT SE 3 (Vapors may cause drowsiness and dizziness.)
Aquatic Acute 3

Full text classifications can be found in section 16.

Label elements

Globally Harmonized System (GHS)

Pictogram:

Signal Word:
Warning

Hazard Statement:

H226	Flammable liquid and vapor.
H336	May cause drowsiness or dizziness.
H402	Harmful to aquatic life.

Precautionary Statements (Prevention):

P271	Use only outdoors or in a well-ventilated area.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves and eye protection or face protection.
P261	Avoid breathing dust/fume/gas/mist/vapors/spray.
P243	Take action to prevent static discharges.
P273	Avoid release to the environment.
P241	Use explosion-proof electrical, ventilating and lighting equipment.
P240	Ground and bond container and receiving equipment.
P242	Use non-sparking tools.

Precautionary Statements (Response):

P312	Call a POISON CENTER or physician if you feel unwell.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P370 + P378	In case of fire: Use alcohol-resistant foam, carbon dioxide, dry powder

Precautionary Statements (Storage):

P233	Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

Precautionary Statements (Disposal):

P501: Dispose of contents and container to hazardous or special waste collection point.

Labeling of special preparations (GHS):
Repeated exposure may cause skin dryness or cracking.
Other hazards
According to UN GHS criteria

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.
See section 12 - Results of PBT and vPvB assessment.

3. Composition/Information on Ingredients

Substances

Chemical Nature

N-Butyl acetate (Content (W/W): >= 99.5 %)
CAS Number: 123-86-4
Hazardous ingredients (GHS)
According to UN GHS criteria

N-Butyl acetate Content (W/W): >= 99.5 % - <= 99.8 % CAS Number: 123-86-4 EC-Number: 204-658-1 INDEX-Number: 607-025-00-1	Flam. Liq. 3 STOT SE 3 (drowsiness and dizziness) Aquatic Acute 3 H226, H336, H402 EUH066
Butan-1-ol Content (W/W): >= 0.20 % - <= 0.20 % CAS Number: 71-36-3 EC-Number: 200-751-6	Flam. Liq. 3 Acute Tox. 5 (oral) Acute Tox. 5 (dermal) Skin Corr./Irrit. 2 Eye Dam./Irrit. 1 STOT SE 3 (drowsiness and dizziness) STOT SE 3 (Irr. to respiratory syst.) H226, H318, H315, H336, H335, H303 + H313

Mixtures
Not applicable

4. First-Aid Measures

Description of first aid measures
First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.
If inhaled:
Keep patient calm, remove to fresh air, seek medical attention.
On skin contact:
Wash thoroughly with soap and water
On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

Hazards: Danger of drowsiness and dizziness.

Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

(Further) symptoms and / or effects are not known so far

Indication of any immediate medical attention and special treatment needed

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
Dry powder, water spray, carbon dioxide, alcohol-resistant foam
Unsuitable extinguishing media for safety reasons:
Water jet
Additional information:
Use extinguishing measures to suit surroundings.

Special hazards arising from the substance or mixture

Flammable liquid Cool endangered containers with water-spray. See SDS section 7 - Handling and storage.

Advice for fire-fighters

Special protective equipment:
Wear a self-contained breathing apparatus. Special protective equipment for firefighters
Further information:
Evacuate area of all unnecessary personnel. Fight fire from maximum distance.
Extend fire extinguishing measures to the surroundings. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

6. Accidental Release Measures

High risk of slipping due to leakage/spillage of product.
Release of substance/product can cause fire or explosion. Shut off or stop source of leak. Shut off or stop released substance/product under safe conditions.
Pack in tightly closed containers for disposal.

Personal precautions, protective equipment and emergency procedures

Handle in accordance with good industrial hygiene and safety practice.
Avoid all sources of ignition: heat, sparks, open flame. Use antistatic tools.

Environmental precautions

Discharge into the environment must be avoided.

Methods and material for containment and cleaning up

Pick up with suitable appliance and dispose of. Spills should be contained, solidified, and placed in suitable containers for disposal. Dispose of absorbed material in accordance with regulations.

7. Handling and Storage

Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.
Protection against fire and explosion:
Avoid all sources of ignition: heat, sparks, open flame. Ground all transfer equipment properly to prevent electrostatic discharge.

Conditions for safe storage, including any incompatibilities

Further information on storage conditions: Keep container tightly closed in a cool, well-ventilated place.

Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

8. Exposure Controls/Personal Protection

Control parameters

Components with occupational exposure limits

71-36-3: Butan-1-ol
123-86-4: N-Butyl Acetate

Exposure controls

Personal protective equipment

Respiratory protection:
Wear respiratory protection if ventilation is inadequate. Gas filter for gases/vapors of organic compounds (Boiling point >65 °C, e. g. EN 14387 Type A)

Hand protection:
Chemical resistant protective gloves (EN ISO 374-1)
Suitable materials for short-term contact (recommended: At least protective index 2, corresponding > 30 minutes of permeation time according to EN ISO 374-1)
Butyl rubber (butyl) - 0.7 mm coating thickness
Manufacturer's directions for use should be observed because of great diversity of types.
Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wearing of closed work clothing is required additionally to the stated personal protection equipment. Avoid inhalation.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	Liquid
Color:	Colorless
Odor:	Fruity Ester Like
Odor threshold:	Not determined
pH value:	4.0-5.0
Melting point:	-78 °C (Literature data)
Boiling point:	118 - 132°C (1atm)
Flash point:	27 °C (Close Cup)
Flammability:	Flammable.
Ignition temperature:	415 °C (Literature Data) DIN51794
Vapor pressure:	15 HPa (20 °C) (Literature Data)
Density@ 20C:	0.876-0.881 g/cm^3 DIN 51757
Solubility in water:	5.0-6.0 g/L at 20°C
Full Solubility:	Organic Solvents
Self-Ignition:	Product is not classified as self- igniting.
Thermal decomposition:	No decomposition if stored and handled as prescribed in TDS.
Explosion hazard:	Not Explosive
Fire promoting properties:	Not fire-propagating

Other information Nil

10. Stability and Reactivity

Reactivity
When heated can give off ignitable vapors.
Corrosion to metals: No corrosive effect on metal.

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
Reacts with strong oxidizing agents.

Conditions to avoid
Avoid sources of ignition.

Incompatible materials
Substances to avoid:
strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products:
No hazardous decomposition products if stored and handled as prescribed/indicated.

11. Toxicological Information

Information on toxicological effects
Acute toxicity
Assessment of acute toxicity:
Virtually nontoxic after a single ingestion. Virtually nontoxic by inhalation. Virtually nontoxic after a single skin contact.
Experimental/calculated data:
LD50 rat (oral): 10.736 mg/kg (other)
LC50 rat (by inhalation): > 21,1 mg/l 4 h (OECD Guideline 403)
The vapour was tested.
LC0 rat (by inhalation): > 38,32 mg/l > 8000 ppm 6 h (other)
The vapour was tested.
LD50 rabbit (dermal): > 14.000 mg/kg (other)
Irritation
Assessment of irritating effects:
Not irritating to the skin. Not irritating to the eyes.
Experimental/calculated data:
Skin corrosion/irritation rabbit: non-irritant (OECD Guideline 404)
Serious eye damage/irritation rabbit: non-irritant (OECD Guideline 405)
Respiratory/Skin sensitization
Assessment of sensitization:
Skin sensitizing effects were not observed in animal studies.
Experimental/calculated data:
Guinea pig maximization test guinea pig: Non-sensitizing. (other)
Germ cell mutagenicity
Assessment of mutagenicity:
No mutagenic effect was found in various tests with microorganisms and mammalian cell culture.
The substance was not mutagenic in studies with mammals.
Carcinogenicity
Assessment of carcinogenicity:
Study does not need to be conducted.
Reproductive toxicity
Assessment of reproduction toxicity:
The results of animal studies gave no indication of a fertility impairing effect.
Developmental toxicity
Assessment of teratogenicity:
Animal studies gave no indication of a developmental toxic effect at doses that were not toxic to the parental animals.
Experiences in humans
Experimental/calculated data:
High concentrations have a narcotizing effect.
Prolonged contact can result in drying of the skin.

Specific target organ toxicity (single exposure)
Assessment of STOT single:
Possible narcotic effects (drowsiness or dizziness).
Repeated dose toxicity and Specific target organ toxicity (repeated exposure)
Assessment of repeated dose toxicity:
After repeated exposure the prominent effect is local irritation.
Aspiration hazard
No aspiration hazard expected.
Other relevant toxicity information
Has a degreasing effect on skin.

12. Ecological Information

Toxicity

Assessment of aquatic toxicity:
Acutely harmful for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.
Toxicity to fish:
LC50 (96 h) 18 mg/l, Pimephales promelas (Fish test acute, Flow through.)
The statement of the toxic effect relates to the analytically determined concentration.
Aquatic invertebrates:
EC50 (48 h) 44 mg/l, Daphnia sp. (Daphnia test acute, static)
Nominal concentration.
Aquatic plants:
EC50 (72 h) 397 mg/l (growth rate), Pseudokirchneriella subcapitata (DIN 38412 Part 9)
The statement of the toxic effect relates to the analytically determined concentration. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.
Microorganisms/Effect on activated sludge:
EC50 (40 h) 356 mg/l, Tetrahymena pyriformis (internal method, aquatic)
Chronic toxicity to fish:
No data available.
Chronic toxicity to aquatic invertebrates:
No observed effect concentration (21 d) 23 mg/l, Daphnia magna (OECD Guideline 211, semistatic)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.
Assessment of terrestrial toxicity:
No toxic effects have been observed in studies with terrestric plants.
Soil living organisms:
No data available.
Terrestrial plants:
EC50 (14 d) > 1.000 mg/kg > 1.000 mg/kg, Lactuca sativa (OECD Guideline 208)
Other terrestrial non-mammals:
No data available.

Persistence and degradability

Assessment biodegradation and elimination (H2O):
Readily biodegradable (according to OECD criteria).
Elimination information:
80 % BOD of the ThOD (5 d) (OECD 301D; EEC 92/69, C.4-E) (aerobic, municipal sewage treatment plant effluent)
Assessment of stability in water:
In contact with water the substance will hydrolyse slowly.
Information on Stability in Water (Hydrolysis):
$t_{1/2}$ 782 d, (calculated, pH 7)

Bioaccumulative potential

Assessment bioaccumulation potential:
No significant accumulation in organisms is expected as a result of the distribution coefficient of n-octanol/water (log Pow).
Bioaccumulation potential:
No data available.

Mobility in soil
Assessment transport between environmental compartments:
Volatility: The substance will slowly evaporate into the atmosphere from the water surface.
Adsorption in soil: Adsorption to solid soil phase is not expected.

Results of PBT and vPvB assessment
According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH): The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative).

Other adverse effects
The substance is not listed in Regulation (EC) 1005/2009 on substances that deplete the ozone layer.

Additional information
Adsorbable organically-bound halogen (AOX):
This product does not contain organically-bound halogen.

13. Disposal Considerations

13.1 Waste treatment methods
Must be disposed of or incinerated in accordance with local regulations.

13.2 Contaminated packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

14. Transport Information

Land transport **ADR**

UN number or ID number:	UN1123
UN proper shipping name:	BUTYL ACETATE
Transport hazard class(es):	3
Packing group:	III
Environmental hazards:	no
Special precautions for user:	Tunnel code: D/E

RID

UN number or ID number:	UN1123
UN proper shipping name:	BUTYL ACETATE
Transport hazard class(es):	3
Packing group:	III
Environmental hazards:	no
Special precautions for user:	None known

Inland waterway transport **ADN**

UN number or ID number:	UN1123
UN proper shipping name:	BUTYL ACETATE
Transport hazard class(es):	3
Packing group:	III
Environmental hazards:	no
Special precautions for user:	None known

Transport in inland waterway vessel

UN number or ID number:	UN1123
UN proper shipping name:	BUTYL ACETATE (N-BUTYLACETATE)
Transport hazard class(es):	3, N3
Packing group:	III
Environmental hazards:	yes
Type of inland waterway vessel:	N
Cargo tank design:	3
Cargo tank type:	2

1. Identification

Product identifier

ALUM SULPHATE

Chemical name: Aluminum Sulphate

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: General use in manufacturing and coagulant.

Details of the supplier of the safety data sheet

Company: Tufail Starchem Industries (Private) Limited, 7KM Raiwind Manga Road Lahore.
Telephone: 00924235898285-6
E-mail address: info@tufailmultichem.co

Emergency telephone number

International emergency number:
Telephone: 00924235898285

2. Hazards Identification

Classification of the substance or mixture

According to UN GHS criteria
Corrosive to metals 1
Serious Eye Damage 1

Full text classifications can be found in section 16.

Label elements

Globally Harmonized System (GHS)

Pictogram:

Signal Word:
Danger

Hazard Statement:

H290	May be corrosive to metals.
H318	Causes serious eye damage.

Precautionary Statements (Prevention):

P234	Keep only in original packing.
P280	Wear protective gloves and eye protection or face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P390	Absorb spillage to prevent material damage.

3. Composition/Information on Ingredients

Substances

Chemical Nature

Aluminum Sulphate (W/W): >= 14.0 %)
CAS Number: 10043-01-3

Hazardous ingredients (GHS)
According to UN GHS criteria

Aluminum Sulphate Content (W/W): >= 14.0 % - <= 18.0 %	Met. Corr. 1; Eye Dam.1 H290 H318

4. First-Aid Measures

Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention.
On skin contact:
Wash thoroughly with soap and water
On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

Most important symptoms and effects, both acute and delayed

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

Indication of any immediate medical attention and special treatment needed

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment
Unsuitable extinguishing media for safety reasons:
For this substance/mixture no limitations of extinguishing agents are given.

Additional information:
Use extinguishing measures to suit surroundings.

Special hazards arising from the substance or mixture

Sulfur oxides, Aluminum oxides.
Not combustible.
Ambient fire may liberate hazardous vapours

Advice for fire-fighters

Special protective equipment:
Wear a self-contained breathing apparatus. Special protective equipment for firefighters

Further information:
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Extend fire extinguishing measures to the surroundings.
Dispose off fire debris and contaminated extinguishing water in accordance with official regulations.

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6. Accidental Release Measures

Release of substance/product can cause severe skin burns. Shut off or stop source of leak. Shut off or stop released substance/product under safe conditions.
Pack in tightly closed containers for disposal.

Personal precautions, protective equipment and emergency procedures

Handle in accordance with good industrial hygiene and safety practice.
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

Environmental precautions

Discharge into the environment must be avoided.

Methods and material for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

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7. Handling and Storage

Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.
Protection against leakage and explosion:
Avoid all sources of ignition: heat, sparks, open flame. Ground all transfer equipment properly to prevent electrostatic discharge.

Conditions for safe storage, including any incompatibilities

Further information on storage conditions: No metal containers, Keep container tightly closed in a cool, well-ventilated place.

Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

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8. Exposure Controls/Personal Protection

Control parameters

Components with occupational exposure limits

Exposure controls

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact Material:
Viton®
Minimum layer thickness: 0,7 mm Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Body protection:

Acid-resistant protective clothing

Respiratory protection

Recommended Filter type: Filter type P2

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures have to be properly documented.

Control of environmental exposure

Do not let product enter drains

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9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical form:	Bulk/Powder
Color:	White
Odor:	Odorless
Odor threshold:	Not determined
pH value:	1.5-3.5 at 50g/L in R.O water
Melting point:	Not determined
Boiling point:	No data available
Flash point:	No data available
Iron Contents (PPM):	Less than 125 PPM
Auto Ignition:	No data available
Vapor pressure:	No data available
Density@ 25C:	2.71-2.75 g/cm^3 Min. DIN 51757
Solubility in water:	Soluble
Full Solubility:	Fully soluble in hot water
Self-Ignition:	Product is not classified as self- igniting.
Thermal decomposition:	No decomposition if stored and handled as prescribed in TDS.
Explosion hazard:	May explode when react with water and strong alkali compound
Fire promoting properties:	No data available

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10. Stability and Reactivity

Reactivity
No data available.
Corrosion to metals: Corrosive effect on metal.

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
No data available.

Conditions to avoid
Avoid exposure to moisture.

Incompatible materials
Substances to avoid:
No data available.

Hazardous decomposition products
Hazardous decomposition products:
In case of fire, see section 5.

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11. Toxicological Information

Information on toxicological effects
Acute toxicity
LD50 Oral - Rat - male and female - 2.0 mg/kg
Remarks: (ECHA)
Inhalation: No data available
Dermal: Burns human / animal skin
Irritation
Assessment on Rabit Skin:
Not irritating to the skin.
Remarks: (IUCLID)
Serious Eye Damage / Eye Irritation
Remarks: Causes serious eye damage
Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Remarks: (HSDB)
Carcinogenicity
Assessment of carcinogenicity:
No data available
Reproductive toxicity
No data available
Developmental toxicity
No data available
Experiences in humans
The substance and its mixtures does not contain components considered to have endocrine disrupting properties.

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12. Ecological Information

Toxicity
Assessment of aquatic toxicity:
Toxicity to Fish: semi-static test LC50 - Danio rerio (zebra fish) - > 87,5 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to Daphnia and other aquatic invertebrates:
Static test EC50 Daphnia Magna (Water flea) - > 200mg/l (48h) OECD Test (Guideline 202)
Toxicity to Aquatic plants:
Static test ErC50 Desmodesmus Subspicatus (Green Algae) - > 0.24mg/l (72 h) OECD Test (Guideline 201)

Persistence and degradability
Methods of determining biological degradability are not applicable to inorganic substances.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

Results of PBT and vPvB assessment
According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH): The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative).

Other adverse effects
No data available.
Discharge into the environment must be avoided.

13. Disposal Considerations

13.1 Waste treatment methods
Must be disposed off in accordance with local regulations.

13.2 Contaminated packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

14. Transport Information

Land transport **ADR**

UN number or ID number:	UN3260
UN proper shipping name:	ALUM SULPHATE
Transport hazard class(es):	8
Packing group:	III
Environmental hazards:	no

RID

UN number or ID number:	UN3260
UN proper shipping name:	ALUM SULPHATE
Transport hazard class(es):	8
Packing group:	III
Environmental hazards:	no
Special precautions for user:	None known

Inland waterway transport **ADN**

UN number or ID number:	UN3260
UN proper shipping name:	ALUM SULPHATE
Transport hazard class(es):	8
Packing group:	III
Environmental hazards:	no
Special precautions for user:	None known

Sea transport
IMDG

UN number or ID number:	UN 3260
UN proper shipping name:	ALUM SULPHATE
Transport hazard class(es):	8
Packing group:	III
Environmental hazards:	no Marine pollutant: NO
Special precautions for user:	E

Air transport

IATA/ICAO

UN number or ID number:	UN 3260
UN proper shipping name:	ALUM SULPHATE
Transport hazard class(es):	8
Packing group:	III
Environmental hazards:	No Mark needed as dangerous for the environment
Special precautions for user:	Not known

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

16. Other Information

Full text of classifications, hazard symbols and hazard statements, if mentioned in section 2 or 3:

H290	May be corrosive to metals.
H318	Causes serious eye damage.
CAS No.	10043-01-3

1. Identification

Product identifier

FORMIC ACID (85%)

Chemical name: Methanoic Acid

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Industrial use.

Details of the supplier of the safety data sheet

Company: Tufail Starchem Industries (Private) Limited, 7KM Raiwind Manga Road Lahore.
Telephone: 00924235898285-6
E-mail address: info@tufailmultichem.co

Emergency telephone number

International emergency number:
Telephone: 00924235898285

2. Hazards Identification

Classification of the substance or mixture

According to UN GHS criteria
Corrosive Liq. 1
Serious Eye Damage 1

Full text classifications can be found in section 16.

Label elements

Globally Harmonized System (GHS)

Pictogram:

Signal Word:
Danger
Hazard Statement:

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H302	Harmful if swallowed.
H331	Toxic if inhaled.

Precautionary Statements (Prevention):

P260	Keep only in original packing.
P280	Wear protective gloves and eye protection or face protection.
P301 + P330 + P331	If swallowed, rinse mouth, do not induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor.

3. Composition/Information on Ingredients

Substances

Chemical Nature

Formic Acid (W/W): >= 85.0 %)
CAS Number: 64-18-6

Hazardous ingredients (GHS)
According to UN GHS criteria

Formic Acid Content (W/W): >= 85.1 % - <= 85.6 %	Flam Liq. 3; Skin Corr.1B Eye Dam. 1; H290 H314, H302

4. First-Aid Measures

Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention.
On skin contact:
Wash thoroughly with soap and water.
On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

Most important symptoms and effects, both acute and delayed

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

Indication of any immediate medical attention and special treatment needed

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
Water spray, alcohol resistant foam, dry extinguishing powder, BC-powder, carbon dioxide (CO_2)
Unsuitable extinguishing media for safety reasons:
Water Jet.

Additional information:
Use extinguishing measures to suit surroundings.

Special hazards arising from the substance or mixture

Carbon monoxide (CO), Carbon dioxide (CO_2), May produce toxic fumes of carbon monoxide if burnt.

Advice for fire-fighters

Special protective equipment:

In case of fire and/or explosion do not breathe fumes. Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus. Wear full chemical protective clothing

Further information:

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

Extend fire extinguishing measures to the surroundings.

Dispose off fire debris and contaminated extinguishing water in accordance with official regulations.

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6. Accidental Release Measures

Release of substance/product can cause severe skin burns. Shut off or stop source of leak. Shut off or stop released substance/product under safe conditions.

Pack in tightly closed containers for disposal.

Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Avoid contact with skin, eyes and clothes. Do not breathe vapour/spray.

For personal protection see section 8.

Environmental precautions

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. The product is an acid. Before discharge into sewage plants the product normally needs to be neutralized.

Methods and material for containment and cleaning up

Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents). Dispose of absorbed material in accordance with regulations. Ventilate affected area.

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7. Handling and Storage

Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.

Protection against leakage and explosion:

Avoid all sources of ignition: heat, sparks, open flame. Ground all transfer equipment properly to prevent electrostatic discharge.

Conditions for safe storage, including any incompatibilities

Further information on storage conditions: Keep container tightly closed in a cool, well-ventilated place.

Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

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8. Exposure Controls/Personal Protection

Control parameters

Components with occupational exposure limits

Exposure controls

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact Material:

CR: chloroprene (chlorobutadiene) rubber
Minimum layer thickness: 0,7 mm Break
through time: 480 min (Permeable level 6)
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Body protection:

Acid-resistant protective clothing

Respiratory protection

Recommended Filter type: Filter type P2

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures have to be properly documented.

Control of environmental exposure

Do not let product enter drains

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9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical form:	Liquid
Color:	Clear @ 25C
Odor:	Pungent
Odor threshold:	Not determined
pH value:	1.0-2.0
Melting point:	Not available
Boiling point:	106-108°C (1atm)
Flash point:	64-65°C
Iron Contents (PPM):	Less than 2 PPM
Auto Ignition:	> 500°C
Vapor pressure:	43 HPa @ 20 °C (Literature Data)
Density@ 25C:	1.185-1.186 g/cm³ Min. DIN 51757
Solubility in water:	Soluble at 25°C
Full Solubility:	Fully soluble in water
Self-Ignition:	Product is not classified as self- igniting.
Thermal decomposition:	No decomposition if stored and handled as prescribed in TDS.
Explosion hazard:	May explode when react with water and strong alkali compound
Fire promoting properties:	No data available

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10. Stability and Reactivity

Reactivity

Corrosion to metals: Corrosive effect on metal.

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

Mixtures of sodium hypochlorite, Metal catalyst, Nitro compound, Hydrogen peroxide.

Conditions to avoid

Avoid spillage.

Incompatible materials

Substances to avoid:
Contact with metals.

Hazardous decomposition products

Hazardous decomposition products:
In case of fire, see section 5.

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11. Toxicological Information

Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 730 mg/kg
Remarks: (ECHA)
Inhalation: Can cause toxicity
Dermal: Burns human / animal skin
Irritation
Assessment on Rabit Skin:
Not irritating to the skin. Extremely corrosive and destructive to tissues.
Remarks: (IUCLID)
Serious Eye Damage / Eye Irritation
Remarks: Causes serious eye damage
Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Remarks: (HSDB)
Carcinogenicity
Assessment of carcinogenicity:
No data available
Reproductive toxicity
No data available
Developmental toxicity
No data available
Experiences in humans
The substance and its mixtures does not contain components considered to have endocrine disrupting properties.

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12. Ecological Information

Toxicity

Assessment of aquatic toxicity:
Not harmful for aquatic organisms in low dose. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.
Toxicity to fish and other aquatic invertebrates:
Static test LC50 fish - > 130mg/l (96 h) OECD Test (Guideline 202)
Toxicity to Aquatic plants:
Static test ErC50 Desmodesmus Subspicatus (Green Algae) - > 1.240 mg/l (72 h) OECD Test (Guideline 201)

Persistence and degradability
98% degradable by biotic/abiotic process in 14 days.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

Results of PBT and vPvB assessment
According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH): This product does not contain a PBT-/vPvB-substance at a concentration of ≥ 0,1%.

Other adverse effects
Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities.
Neutralization possible in waste water treatment plants.
Discharge into the environment must be avoided.

13. Disposal Considerations

13.1 Waste treatment methods
This material and its container must be disposed of as hazardous waste. Must be disposed off in accordance with local regulations.

13.2 Contaminated packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

14. Transport Information

Land transport ADR

UN number or ID number:	UN1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8 (3)
Packing group:	II
Environmental hazards:	no

RID

UN number or ID number:	UN1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8 (3)
Packing group:	II
Environmental hazards:	No
Special precautions for user:	None known

Inland waterway transport ADN

UN number or ID number:	UN1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8 (3)
Packing group:	II
Environmental hazards:	No
Special precautions for user:	None known

Sea transport
IMDG

UN number or ID number:	UN 1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8 (3)
Packing group:	II
Environmental hazards:	No

Marine pollutant: NO

Special precautions for user:	E2

Air transport

IATA/ICAO

UN number or ID number:	UN 1779
UN proper shipping name:	FORMIC ACID
Transport hazard class(es):	8 (3)
Packing group:	II
Environmental hazards:	No Mark needed as dangerous for the environment
Special precautions for user:	Not known

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

16. Other Information

Full text of classifications, hazard symbols and hazard statements, if mentioned in section 2 or 3:

H226	Flammable liquid and vapour.
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes severe eye damage.
H331	Toxic if inhaled.

CAS No. 64-18-6

1. Identification

Product identifier

SULFURIC ACID (98%)

Chemical name: Hydrogen Sulphate

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: General use.

Details of the supplier of the safety data sheet

Company: Tufail Starchem Industries (Private) Limited, 7KM Raiwind Manga Road Lahore.
Telephone: 00924235898285-6
E-mail address: info@tufailmultichem.co

Emergency telephone number

International emergency number:
Telephone: 00924235898285

2. Hazards Identification

Classification of the substance or mixture

According to UN GHS criteria
Corrosive Liq. 1
Serious Eye Damage 1

Full text classifications can be found in section 16.

Label elements

Globally Harmonized System (GHS)

Pictogram:

Signal Word:
Danger
Hazard Statement:

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Precautionary Statements (Prevention):

P234	Keep only in original packing.
P280	Wear protective gloves and eye protection or face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P363	Wash contaminated clothing before reuse.

3. Composition/Information on Ingredients

Substances

Chemical Nature

Sulfuric Acid (W/W): >= 98.0 %)
CAS Number: 7664-93-9

Hazardous ingredients (GHS)
According to UN GHS criteria

Sulfuric Acid Content (W/W): >= 98.0 % - <= 99.8 %	Met. Corr. 1; Skin Corr.1A Eye Dam. 1; H290 H314, H318

4. First-Aid Measures

Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention.
On skin contact:
Wash thoroughly with soap and water
On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

Most important symptoms and effects, both acute and delayed

Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

Indication of any immediate medical attention and special treatment needed

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment
Unsuitable extinguishing media for safety reasons:
For this substance/mixture no limitations of extinguishing agents are given.

Additional information:
Use extinguishing measures to suit surroundings.

Special hazards arising from the substance or mixture

Sulfur oxides
Not combustible.
Ambient fire may liberate hazardous vapours

Advice for fire-fighters

Special protective equipment:
Wear a self-contained breathing apparatus. Special protective equipment for firefighters

Further information:
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Extend fire extinguishing measures to the surroundings.
Dispose off fire debris and contaminated extinguishing water in accordance with official regulations.

6. Accidental Release Measures

Release of substance/product can cause severe skin burns. Shut off or stop source of leak. Shut off or stop released substance/product under safe conditions.
Pack in tightly closed containers for disposal.

Personal precautions, protective equipment and emergency procedures

Handle in accordance with good industrial hygiene and safety practice.
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

Environmental precautions

Discharge into the environment must be avoided.

Methods and material for containment and cleaning up

Pick up with suitable appliance and dispose of. Spills should be contained, solidified, and placed in suitable containers for disposal. Dispose of absorbed material in accordance with regulations.

7. Handling and Storage

Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.
Protection against leakage and explosion:
Avoid all sources of ignition: heat, sparks, open flame. Ground all transfer equipment properly to prevent electrostatic discharge.

Conditions for safe storage, including any incompatibilities

Further information on storage conditions: Keep container tightly closed in a cool, well-ventilated place.

Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

8. Exposure Controls/Personal Protection

Control parameters

Components with occupational exposure limits

Exposure controls

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de)
Full contact Material:
Viton®
Minimum layer thickness: 0.7 mm Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Body protection:

Acid-resistant protective clothing

Respiratory protection

Recommended Filter type: Filter type P2

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures have to be properly documented.

Control of environmental exposure

Do not let product enter drains

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9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical form:	Liquid
Color:	Clear @ 25C
Odor:	Odorless
Odor threshold:	Not determined
pH value:	1.0-1.2 at 5g/L in R.O water
Melting point:	10-11°C (Literature data)
Boiling point:	290°C (1atm)
Flash point:	No data available
Iron Contents (PPM):	Less than 50 PPM
Auto Ignition:	No data available
Vapor pressure:	1.33 HPa (145 °C) (Literature Data)
Density@ 25C:	1.84 g/cm^3 Min. DIN 51757
Solubility in water:	Soluble at 25°C
Full Solubility:	Fully soluble in water
Self-Ignition:	Product is not classified as self- igniting.
Thermal decomposition:	No decomposition if stored and handled as prescribed in TDS.
Explosion hazard:	May explode when react with water and strong alkali compound
Fire promoting properties:	No data available

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10. Stability and Reactivity

Reactivity
No data available.
Corrosion to metals: Corrosive effect on metal.

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
May explode on reaction with water, ammonia, nitrates, strong alkali and alkali metals.

Conditions to avoid
Avoid spillage.

Incompatible materials
Substances to avoid:
Animal/vegetable tissues, contact with metals liberates hydrogen gas.

Hazardous decomposition products
Hazardous decomposition products:
In case of fire, see section 5.

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11. Toxicological Information

Information on toxicological effects
Acute toxicity
LD50 Oral - Rat - male and female - 2.140 mg/kg
Remarks: (ECHA)
Inhalation: Can cause suffocation
Dermal: Burns human / animal skin
Irritation
Assessment on Rabit Skin:
Not irritating to the skin. Extremely corrosive and destructive to tissues.
Remarks: (IUCLID)
Serious Eye Damage / Eye Irritation
Remarks: Causes serious eye damage
Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Remarks: (HSDB)
Carcinogenicity
Assessment of carcinogenicity:
No data available
Reproductive toxicity
No data available
Developmental toxicity
No data available
Experiences in humans
The substance and its mixtures does not contain components considered to have endocrine disrupting properties.

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12. Ecological Information

Toxicity
Assessment of aquatic toxicity:
Acutely harmful for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.
Toxicity to Daphnia and other aquatic invertebrates:
Static test EC50 Daphnia Magna (Water flea) - > 100mg/l (48 h) OECD Test (Guideline 202)
Toxicity to Aquatic plants:
Static test ErC50 Desmodesmus Subspicatus (Green Algae) - > 100mg/l (72 h) OECD Test (Guideline 201)

Persistence and degradability
Methods of determining biological degradability are not applicable to inorganic substances.

Bioaccumulative potential
No data available.

Mobility in soil
No data available.

Results of PBT and vPvB assessment
According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH): The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative).

Other adverse effects
Biological effects:
Harmful effect due to pH shift.
Caustic even in diluted form.
Does not cause biological oxygen deficit.
Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities.
Neutralization possible in waste water treatment plants.
Discharge into the environment must be avoided.

13. Disposal Considerations

13.1 Waste treatment methods
Must be disposed off in accordance with local regulations.

13.2 Contaminated packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

14. Transport Information

Land transport ADR

UN number or ID number:	UN1830
UN proper shipping name:	SULFURIC ACID
Transport hazard class(es):	8
Packing group:	II
Environmental hazards:	no

RID

UN number or ID number:	UN1830
UN proper shipping name:	SULFURIC ACID
Transport hazard class(es):	8
Packing group:	II
Environmental hazards:	no
Special precautions for user:	None known

Inland waterway transport ADN

UN number or ID number:	UN1830
UN proper shipping name:	SULFURIC ACID
Transport hazard class(es):	8
Packing group:	II
Environmental hazards:	no
Special precautions for user:	None known

Sea transport
IMDG

UN number or ID number:	UN 1830
UN proper shipping name:	SULFURIC ACID
Transport hazard class(es):	8
Packing group:	II

Environmental hazards:	no Marine pollutant: NO
Special precautions for user:	E

Air transport

IATA/ICAO

UN number or ID number:	UN 1830
UN proper shipping name:	SULFURIC ACID
Transport hazard class(es):	8
Packing group:	II
Environmental hazards:	No Mark needed as dangerous for the environment
Special precautions for user:	Not known

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

16. Other Information

Full text of classifications, hazard symbols and hazard statements, if mentioned in section 2 or 3:

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
CAS No.	7664-93-9

1. Identification

Product identifier

SODIUM SULPHATE ANHYDROUS

Chemical name: Sodium Sulphate

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: General use in Textile Dyeing & Detergent Industry.

Details of the supplier of the safety data sheet

Company: Tufail Starchem Industries (Private) Limited, 7KM Raiwind Manga Road Lahore.
Telephone: 00924235898285-6
E-mail address: info@tufailmultichem.co

Emergency telephone number

International emergency number:
Telephone: 00924235898285

2. Hazards Identification

Classification of the substance or mixture

According to UN GHS criteria
Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008

Label elements

Globally Harmonized System (GHS)

No label as not a hazardous substance or mixture

3. Composition/Information on Ingredients

Substances

Chemical Nature

Sodium Sulphate (W/W): >= 99.0 %)
CAS Number: 7757-82-6

Hazardous ingredients (GHS)
According to UN GHS criteria

No components need to be disclosed according to the applicable regulations.

4. First-Aid Measures

Description of first aid measures

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air, seek medical attention.
On skin contact:
Wash thoroughly with soap and water
On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

Most important symptoms and effects, both acute and delayed
Symptoms: Information, i.e. additional information on symptoms and effects may be included in the GHS labeling phrases available in Section 2 and in the Toxicological assessments available in Section 11.

Indication of any immediate medical attention and special treatment needed
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media
Suitable extinguishing media:
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment
Unsuitable extinguishing media for safety reasons:
For this substance/mixture no limitations of extinguishing agents are given.

Additional information:
Use extinguishing measures to suit surroundings.

Special hazards arising from the substance or mixture
Sulfur oxides, Sodium oxides.
Not combustible.
Ambient fire may liberate hazardous vapours

Advice for fire-fighters
Special protective equipment:
Wear a self-contained breathing apparatus. Special protective equipment for firefighters

Further information:
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.
Extend fire extinguishing measures to the surroundings.
Dispose off fire debris and contaminated extinguishing water in accordance with official regulations.

6. Accidental Release Measures

Release of substance/product can cause eye irritation due to dust. Shut off or stop source of leak. Shut off or stop released substance/product under safe conditions.
Pack in tightly closed containers for disposal.

Personal precautions, protective equipment and emergency procedures
Handle in accordance with good industrial hygiene and safety practice.
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

Environmental precautions
Discharge into the environment must be avoided.

Methods and material for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

7. Handling and Storage

Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice.
Protection against leakage and explosion:
Avoid all sources of ignition: heat, sparks, open flame. Ground all transfer equipment properly to prevent electrostatic discharge.

Conditions for safe storage, including any incompatibilities

Further information on storage conditions: Hygroscopic, No metal containers, Keep container tightly closed in a cool, well-ventilated place.

Specific end use(s)

For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

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8. Exposure Controls/Personal Protection

Control parameters

Components with occupational exposure limits

Exposure controls

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact Material:
Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Body protection:

Acid-resistant protective clothing

Respiratory protection

Recommended Filter type: Filter type P1

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures have to be properly documented.

Control of environmental exposure

Do not let product enter drains

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9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical form:	Powder / Crystals
Color:	White
Odor:	Odorless
Odor threshold:	Not determined
pH value:	6.5-9.0 at 100g/L in R O water
Hardness (Ca/Mg):	300 PPM Max
Boiling point:	No data available
Flash point:	Not applicable
Iron Contents (PPM):	Less than 5 PPM
Auto Ignition:	>400^{0}C
Vapor pressure:	No data available
Density@ 20C:	2.70-2.75 g/cm^3 Min.
Solubility in water:	Soluble
Full Solubility:	Fully soluble in hot water
Self-Ignition:	Product is not classified as self- igniting.
Thermal decomposition:	No decomposition if stored and handled as prescribed in TDS.
Explosion hazard:	May explode when react with water and strong alkali compound
Fire promoting properties:	No data available

10. Stability and Reactivity

Reactivity
No data available.
Corrosion to metals: Corrosive effect on metal.

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
No data available.

Conditions to avoid
Avoid exposure to moisture.

Incompatible materials
Substances to avoid:
No data available.

Hazardous decomposition products
Hazardous decomposition products:
In case of fire, see section 5.

11. Toxicological Information

Information on toxicological effects
Acute toxicity
LD50 Oral - Rat - male and female - 2.0 mg/kg
Remarks: (ECHA)
Inhalation: No data available
Dermal: Burns human / animal skin
Irritation
Assessment on Rabit Skin:
Not irritating to the skin 4h.
Remarks: (IUCLID)
Serious Eye Damage / Eye Irritation
Remarks: Causes eye irritation.
Germ cell mutagenicity

Test system: Salmonella typhimurium
Result: negative
Remarks: (ECHA)
Carcinogenicity
Assessment of carcinogenicity:
No data available
Reproductive toxicity
No data available
Developmental toxicity
No data available
Experiences in humans
The substance and its mixtures does not contain components considered to have endocrine disrupting properties.

12. Ecological Information

Toxicity

Assessment of aquatic toxicity:

Toxicity to Fish: semi-static test LC50 - Pimephales promelas (fathead minnow) - 7.960 mg/l-96 h
Toxicity to Daphnia and other aquatic invertebrates:
Static test EC50 Daphnia Magna (Water flea) - > 1.766 mg/l (48h) (US-EPA)
Toxicity to Aquatic plants:

static test EC50 - Nitzschia sp. - 1.900 mg/l - 120 h Remarks: (ECHA)

Persistence and degradability

Methods of determining biological degradability are not applicable to inorganic substances.

Bioaccumulative potential

No data available.

Mobility in soil

No data available.

Results of PBT and vPvB assessment

According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH): The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative).

Other adverse effects

No data available.
Discharge into the environment must be avoided.

13. Disposal Considerations

13.1 Waste treatment methods

Must be disposed off in accordance with local regulations.

13.2 Contaminated packaging:

Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

14. Transport Information

Land transport ADR

UN number or ID number:	Nil
UN proper shipping name:	Not Dangerous
Transport hazard class(es):	-
Packing group:	-
Environmental hazards:	no

RID

UN number or ID number:	Nil
UN proper shipping name:	Not Dangerous

Packing group:	-
Environmental hazards:	no
Special precautions for user:	None known

Inland waterway transport **ADN**

UN number or ID number:	Nil
UN proper shipping name:	Not dangerous
Transport hazard class(es):	-
Packing group:	-
Environmental hazards:	no
Special precautions for user:	None known

Sea transport

IMDG

UN number or ID number:	Nil
UN proper shipping name:	Not Dangerous
Transport hazard class(es):	-
Packing group:	-
Environmental hazards:	no Marine pollutant: NO
Special precautions for user:	-

Air transport

IATA/ICAO

UN number or ID number:	Nil
UN proper shipping name:	Not Dangerous
Transport hazard class(es):	-
Packing group:	-
Environmental hazards:	No Mark needed as dangerous for the environment
Special precautions for user:	Not known

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

16. Other Information

Full text of classifications, hazard symbols and hazard statements, if mentioned in section 2 or 3:

Not a hazardous substance.

CAS No 7757-82-6

ANNEXURE XI

WASTEWATER DISCHARGE APPROVAL

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

Soneri Bank

CHEQUE NO CA 78009243

A COMPLEX-III KHI. BRANCH 0222
D FLOOR, PLOT NO: MISC-2, BAHRIA CO

DATE 19042025

Executive Engineer Lahore,
Drainage Division Lahore.

S Twenty four thousand five hundred

OR BEARER

PKR 24,500/-

nly —

SONE0022220011423524
Account No.

IL STARCHEM INDUSTRIES PVT LTD

Tafail Starchem Industries (Pvt) Ltd.

Signature

'8009243"085122":00000200114235 24"000"

Real chq
on 29/4/2

Sub D
Issue D
Canal Ban
LA

ANNEXURE XII

COMPANY REGISTRATION CERTIFICATE

SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN

Company Registration Office

CERTIFICATE OF INCORPORATION

[Under section 16 of the Companies Act, 2017 (XIX of 2017)]

Corporate Unique Identification No. 0231805

I hereby certify that **TUFAIL STARCHEM INDUSTRIES (PRIVATE) LIMITED** is this day incorporated under the Companies Act, 2017 (XIX of 2017) and that the company is **limited by shares.**

Given at **Karachi** this **Eighth** day of **June,** Two **Thousand** and **Twenty Three**

Faiza Rasheed
Deputy Registrar

https://eservices.secp.gov.pk/eServices/ControllerServlet?request_id=VERIFY_ONLINE_INCORP_CERT&id=0231805

Disclaimer: This certificate of incorporation is not a permission to accept deposits from the general public by offering fake jobs/investment packages and return thereon, indulge in leasing/ financing of vehicles and household products etc., MLM, Pyramid and Ponzi Schemes, Lottery Business, trading in forex and virtual currencies or any other unlawful business activities.

ANNEXURE XIII

GOOGLE EARTH MAP

Tufail Starchem Industries (Pvt) Ltd

Location Map

ANNEXURE XIV

AUTHORITY LETTER IN FAVOR OF PROPONENT

TUFAIL STARCHEM INDUSTRIES (PVT) LTD

Tufail starchem

Date : May 12, 2025

AUTHORITY LETTER

I, Pervez Tanveer Tufail, Chief Executive Officer (CEO) M/S Tufail Starchem Industries (Pvt) Ltd hereby authorize **Mr. Muhammad Munir Arshad** S/O Abdul Hameed Arshad bearing CNIC No 35201-1340436-7who is working as G.M. Technical and Commercial at the company to act as proponent on behalf of M/S Tufail Starchem Industries (Pvt) Ltd and to deal with all the matters related to the filing of petition/representation in any court of law / government authorities regarding EPA department.

Best regards.

Tufail Starchem Industries (Pvt) Ltd.

Chief Executive Officer (CEO)

Tufail Starchem Industries (Pvt) Ltd

A part of the Tufail Multichem Group

Head Office
3rd B, 4th Floor, Dolmen Executive Tower,
Sea View Road, Clifton, Karachi, Pakistan.
+92 213 5360083-86
www.tufailmultichem.co

Lahore Office
1st Floor, Awami Complex Usman
Block New Garden Town,
Lahore, Pakistan.
+92 42 35832341, +92 42 35864963, +92 42 35835547