

RISK ASSESSMENT

1.1 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

The primary requirement for making disaster management plan is the reliable and up to date information about topography and socio- economic and climatic conditions of this region which is describe in previous chapter. This will help in identifying the areas vulnerable to environmental and manmade hazards. This chapter deals with the information on geographical aspects of Unnao- U.P., its area, population distribution, climatic condition, physiographic divisions as well as geology of the district. History of problem prone an activity in Unnao- U.P. has also been mentioned to depict the picture, as to how, the district is prone to different kinds of hazards like earthquakes, draught, industrial disasters, fire etc.

For the last two decades, it has been on the faster pace of the development, and emerged as the industrial and financial hub of Uttar Pradesh. Hazard Risk in Unnao- U.P. are further compounded by increasing vulnerabilities related to the high population growth, rapid-urbanization, increasing Industrialization, rapid development within high risk seismic zone (Zone IV), environmental degradation, climate change etc.

The threat (Risk) and possible impact (Vulnerability) which can be actualized from these hazards ranges from minor impacts affecting one village to events impacting larger than the state alone.

During last one decade, Unnao- U.P. has undergone major changes and has now developed into Modern Township. Over the years, Disasters have caused threat to life and property and have adversely impacted economic development. The entire region of Unnao- U.P. falls in high risk seismic zone IV and corresponds to MSK intensity VIII making it highly vulnerable to Earthquakes.

Although no major earthquake have occurred in Unnao- U.P. in recent year, yet tremors have been felt whenever there is an earthquake in the Himalayan foothills. The Unnao- U.P. has fairly high seismicity with general occurrence of earthquakes of 5-6 magnitude, a few of magnitude 6-7 and occasional incident of 7.5-8.0 magnitude shocks.

For above mentioned point, Proposed Project development project falls in Unnao- U.P. district and required risk assessment and disaster management plan are the following:

<u>TYPE OF HAZARDS</u>	<u>LOCATION IN PLANT</u>	<u>PREVENTIVE MEASURES</u>
• Chemical Hazard	• Chemical Storage Area	• Isolated Storage • Prevention of any spark In the area • Water Sprinkling arrangement • Dry Chemical Fire Extinguisher • Fire Safety measures as per NBC 2005
• Fire Hazard	• Diesel Storage area	• Fire Retardant electrical fittings • Fire extinguisher at every 50ft • Regular fire drills • Availability of MSDS at specific locations • Emergency Planning & Training for all type of Hazards
• Earth Quake	• Building Structure	• Compliance of all fire norms • Earthquake resistant structures • Spill Control Measures • Proper Ventilation
• Flood	• Plant area	• Manual Emergency Alarms • Standby Emergency power system • Storage in Leak Proof MS Tanks • Temperature & pressure alarm at storage tanks • Storm water Drain all around the complex

1.2 EMERGENCY PREPAREDNESS PLAN

A state of “Emergency” is defined as any event that disrupts normal operations or poses a serious threat to persons or property, requires a quick or immediate response and may require support beyond the abilities of the company. Generally good design, regular inspection and preventive maintenance of the equipment(s) reduce the probability of occurrence of emergencies. However, as it is not possible to totally eliminate such eventualities and random failures of equipment or human errors, omissions and unsafe acts, it is important to have an Emergency Response Plan (ERP), which focuses on mitigating the effects of such an Emergency and restoration of normalcy at the earliest. The overall objective of an ERP is to make use of the combined resources on-site and outside services to achieve the following:

- To localize the emergency and, if possible, eliminate it;
- To minimize the effects of the accident on the people and property on-site;
- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Evacuate people to safe areas/assembly points;
- Informing and collaborating with statutory authorities to tackle the emergency;
- Initially contain and ultimately bring the incident under control;
- Preserve relevant records and equipment for subsequent enquiry into the cause and circumstances of the emergency; and
- Investigating and taking steps to prevent reoccurrence.

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The ERP can identify only some possible events that could occur during an emergency and the ERP therefore designates areas of authority and responsibility and defines the framework within which emergency decisions will be made. The ERP defines the levels of emergencies and focuses on the most serious of incidents. The ERP has to be related to the identification of sources from which hazards can arise and the maximum credible loss scenario that can take place in the concerned area. The ERP takes into account the maximum credible loss scenario - actions that can successfully mitigate the effects of losses/emergency need to be well planned so that they would require less effort and resources to control and terminate emergencies, should the same occur.

Main hazards identified for **Project** include:

- Fire hazard;
- Earthquake;
- LPG/Natural Gas leakage;
- Chemical hazards
- Thermal Hazards

A detailed ERP for the above mentioned emergencies will be prepared for the Project. All employees, guests, and visitors shall be made aware of the ERP through regular training/awareness programmes, signages, etc. The ERP related to hazards pertaining to fire, earthquake and LPG/Natural Gas leakage is briefly described in the following section.

1.2.1 FIRE HAZARD

7.3.1.1 Fire Protection System

The fire protection system for the proposed Project is to be designed as per the provisions of National Building Code - 2005 and the directions of local fire service authority.

7.3.1.2 Preventive Measures to prevent outbreak of fire and its spreads

The following provisions will be made available which is expected to provide a reasonable degree of protection from fire hazards and at the same time satisfy the local fire authority, if any:

- i) Wet risers with hose reels.
- ii) Chemicals, oil tanks, packaged materials shall be kept in separate rooms.
- iii) Ventilation must be sufficient to cope with the maximum expected vapor levels in building.
- iv) Small spills should be remediated with sand, earth, or other non-combustible absorbent material, and the area then flushed with water. Larger spills should be diluted with water and diked for later disposal
- v) Hydrants should be strategically placed with adequate hoses
- vi) Dry chemical extinguishers should be accessible for small fires.
- vii) Manual call alarm system.

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- viii) Automatic fire detection & alarm system.
- ix) Public Address and Communication System.
- x) Defining safe means of escape for all person in the event of a fire
- xi) Good Housekeeping & Maintenance and training of staff.

7.3.1.3 Static Storage of Water for Fire Fighting Purposes

A static water storage tank is proposed in the underground reservoir including for firefighting purpose.

7.3.1.4 Fire Pumping System

Fire pumps are provided in the pump room in the underground reservoir so that always flooded suction is available for the pumps. The pumps are designed to cater for the flow and pressure requirement at any point of the fire fighting system. The system will comprise of following pumps:

- Electric Fire Hydrant pump
- Electric Jockey Pump
- Diesel Standby pump

7.3.1.5 Portable Fire Extinguishers

ISI marked portable fire extinguishers (hand-held and wheeled types) of specified type and capacities shall be provided at strategic locations.

7.3.1.6 Response in Case of Fire

- Required response in the event of a fire should be described in signs/labels displayed in the relevant areas of the Proposed Project.
- On sighting a fire, it should be immediately informed to the concern person or authority at the site giving the details about the exact location and the type of fire.
- Intimate the Emergency Response Team for fire.
- If the fire is small, get engaged in extinguishing the fire using the nearest fire extinguisher
- The response team should immediately move to the point of fire and take all necessary steps to stop the fire. If the fire is not controllable and spreads, then the manager in charge should inform the district authorities and call for external help.
- The Emergency Response Team should immediately inform the nearest Hospital, Fire Station and Police. If required, a Fire Tender should be summoned.
- The Emergency Response Team shall provide immediate relief to the injured people at the scene of incident. Any injured persons should be evacuated on priority to the dispensary or one of the nearest hospitals based on their condition.

7.3.1.7 Instructions for Staff

- Get out of the building as quickly and as safely as possible.
- Close all the processes at the unit.
- Stay away from the boiler.
- When evacuating, stay low to the ground.
- If possible, cover mouth with a cloth to avoid inhaling smoke and gases.
- Close doors in each room (after escaping) to delay the spread of the fire.
- Be patient, do not panic or push.

If in a room with a closed door, please follow the instructions as mentioned below:

- If smoke is pouring in around the bottom of the door or if it feels hot, keep the door closed.
- Partially open a window to escape or for fresh air while awaiting rescue and stand near it.
- If there is no smoke at the bottom or top and the door is not hot, then open the door slowly.
- If there is too much smoke or fire in the hall, slam the door shut.
- Pack the space under the door with wet clothing or other material to keep the smoke out.
- Let someone know you are trapped. Call Security and stay on the line until he tells you to hang up. If there are no phones available, yell out the window (if you have one), kick on the door, do anything to make noise and draw attention to yourself. Hang a sheet, jacket or other article out of the window to signal your location.
- Stay low to the floor as the smoke will fill higher areas first.
- Do not attempt to jump from windows above the ground level as this can cause serious injury or death.
- If you are physically unable to evacuate, proceed to a safe place and inform Security of your location.
- You may assist a disabled but mobile individual in an evacuation. However, attempts to carry immobilized individuals are discouraged. Once the location of the disabled individual is received, trained and equipped emergency personnel will evacuate the individual depending upon the site of the fire and the potential hazard.
- All personnel should know where primary and alternate exits are located, and be familiar with the various evacuation routes available. Floor plans with escape routes, alternate escape routes, exit locations and designated assembly points shall be displayed.
- Stay out of the damaged building.
- Check that all wiring and utilities are safe.

1.3 EARTHQUAKE

1.3.1 Response Procedures for Staff

- **If indoors:** Take cover under a piece of heavy furniture or against an inside wall and hold on. Stay inside, the most dangerous thing to do during the shaking of an earthquake is to try to leave the building because objects can fall on you.
- **If outdoors:** Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops.

1.3.2 after Earthquake

- After the quake, be prepared for aftershocks.
- Although smaller than the main shock, aftershocks cause additional damage and may bring weakened structures down. Aftershocks can occur in the first hours, days, weeks, or even months after a quake.

1.3.3 Help injured or trapped persons

- Give first-aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.
- Stay out of damaged buildings.
- Use the telephone only for emergency calls.

1.3.4 Damage Control

- No attempts are to be made at damage control that involves any degree of risk to life and health of facilities personnel. The following actions can be undertaken by staff to reduce damage potential to the property:
- Shut off all process at the unit.
- Shut off water mains
- Disconnect mains power supply if the isolating devices for these utilities are outside the building

1.3.5 Damage Assessment/Reporting:

After the initial shock, evaluate the situation and if emergency help is necessary, call the emergency response team (ERT) at the designated emergency response number. Report any injuries or damage to facilities to ERT.

1.3.6 Response Procedure for Emergency Team

- Formulate an Emergency Response Team for earthquake response.
- Using the public address system, inform visitors and staff about the response procedures discussed above.
- Inform the necessary authorities for aid.
- Ensure that no staff are stuck beneath any debris, in case of a structural failure.
- Ensure that all staffs standing outside/near the buildings are taken to open areas.

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- Ensure that the first-aid, ambulance and fire tender vehicles are summoned, if necessary.
- Inform the nearby hospitals if there are any injuries.
- Check the utilities and storage tanks for any damage.

1.3.7 LPG/Natural Gas Leakage

- The affected area should be evacuated and cordoned off immediately.
- Intimate the Emergency Response Team about LPG/Natural Gas leakage.
- Shut down the main valves in the gas pipeline.
- Ensure that only concerned personnel are present in the affected area and all other staff are moved to the nearest assembly points.
- Rescue trapped personnel. Also, check if any personnel are unconscious in the area and immediately move them outside and provide first aid.
- Ambulance should be summoned to take injured personnel to the nearest hospital.
- Personnel in the nearby building shall be asked to close all doors and windows to prevent entry of the leaked gas.
- Source of leakage shall be traced and isolated from all other areas. If required, pedestal fans shall be used to bring down the gas concentration.

1.4 CHEMICAL ACCIDENTS

The hazardous chemicals involved in the Tannery are:

- **Sulphuric acid**- As per the MSDS sheets, the LD₅₀ value of Sulphuric acid is 2140 mg/ kg (oral- rat) & LC₅₀ value is 510 mg/ m³ (inhalation- rat). Strong inorganic acid mists containing sulphuric acid are carcinogenic. The permissible exposure limit of sulphuric acid is 1 mg/ m³.
- **Sodium sulphide**- As per the MSDS sheets, the LD₅₀ value is 246 mg/ kg (oral-rat). The LC₅₀ in guppy fish is found to be 15mg/l. This chemical is not identified as carcinogenic.
- **Basic chrome sulphate**- As per the MSDS sheets, the LD₅₀ value is 7.760 mg/ kg (oral-rat). This chemical is not identified as carcinogenic. The permissible exposure limit of this chemical is 0.5 mg/ m³.

1.4.1 Handling:

- Workers shall wash their hands thoroughly after handling.
- Chemicals shall be used only in a well-ventilated area.
- Workers shall use spark-proof tools and explosion proof equipment.
- Workers shall avoid contact of chemicals with eyes, skin, and clothing.
- Containers shall be kept tightly closed.
- Shall avoid contact with heat, sparks and flame.
- Shall not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
- Operator training as well as written operating instructions, safety rules and check lists shall be provided.

1.4.2 Storage:

- Chemicals shall be kept away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container.
- Shall be stored in a cool, dry, well-ventilated area away from incompatible substances.
- Storage & handling area shall be readily accessible with safety showers, fire extinguishers and other fire fighting equipment, water hydrants with spray nozzle and other emergency equipment such as chemical proof suits and respiratory apparatus.

1.4.3 Spills / Leaks

Spills will be absorbed with inert material (e.g. vermiculite, sand or earth), they will be placed in suitable container. All sources of ignition shall be removed and a spark-proof tool shall be used. Ventilation shall be provided and a vapor suppressing foam shall be used to reduce vapors.

1.4.4 Major accidental Release measures & measures for storage & handling

- The hazardous material shall be stored in a separate safety storage room, shall be kept away from sources of ignition.
- Proper ventilation should be maintained.
- In case of fire outbreak due to sodium sulphide, flooding quantities of water, foam or dry powder as extinguishing agents shall be used.
- Sulphuric acid is not flammable or combustible. However, fires may result from the heat generated by contact of concentrated sulphuric acid with combustible materials. In case of fire outbreak use dry chemical or carbon dioxide extinguishers or water spray to cool fire-exposed containers. Do not use water directly on acid as a violent reaction may occur resulting in spattering of the acid.
- Proper medical facility arrangement shall be provided in case of any accidental release.
- In case of leak or spill, ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Do not contact with acids. Do not handle with bare hands.

1.4.5 Collection, development and dissemination of information

- Material Safety DataSheet (MSDS) shall be provided.
- Prior to working with these chemicals, workers should be trained on its proper handling & storage.
- Label Hazard Warning on container.
- Label Precautions and First Aid.
- Emergency plan shall be prepared and mock drill of the on-site emergency should be conducted
- Inspection of the industrial activity shall be done at least once in year and annually status report on the compliance with the Rules shall be submitted.

1.5 THERMAL

Thermal hazards are objects or substances that transfer energy as heat.

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Tannery Unit can have following points of thermal hazard.

- Open flame
- Boiler
- Hot machines/ equipments

1.5.1 Preventive Measures

The thermal hazard can cause burn of skin; following preventive measures can be taken:

1. The open flame area like canteen shall be restricted.
2. Boiler section shall be properly insulated and safe distance & guard will be installed.
3. D.G set room; etc will have restricted entry.
4. Operators in the thermal hazard area shall be provided with protective gears like gloves, goggles etc.
5. For emergency first aid room will be maintained.

1.5.2 Instructions for staff

Even after all the preventive measures for any emergency, following infrastructure shall be provided:

1. There will be an Emergency Control Room.
2. Assembly area shall be demarked for Industry.
3. Communication system shall be installed which includes intercom and public address system.
4. Fire alarm shall be installed at vulnerable place.
5. The safe zones (at the time of emergency) shall be displayed at different locations.
6. First Aid facility shall be made available at Control room.

In case of emergency following action shall be taken:

1. The emergency shall be declared in case of following:
 - i) Fire alarm buzzing (Fire hazard)
 - ii) Vibration/Earthquake feeling (Earthquake)
 - iii) Water logging above 30 cm (Flood)
 - iv) Any unusual smell of gas or suffocating feeling (Chemical leakage)
 - v) Security alarm from main gate. (Security risk/Terrorism)
2. On declaration of emergency, communication shall be made to residents for any type of emergency
3. All the workers of the affected area shall be moved to safe zone
4. The control measures shall be done as per the emergency action plan for each type of hazard.
5. All the members of disaster management cell shall take charge of their respective duties.
6. Outside help like fire tender, police, ambulance etc. shall be called by site controller or Incident controller.