CHAPTER 7
ADDITIONAL STUDIES

7.1 INTRODUCTION

M/s. Maharashtra Enviro Power Limited formerly known as Vidharbha Enviro Protection Ltd. (VEPL), handles various types of wastes like Liquid waste, Aqueous waste, Semisolid Organic waste, Solid Waste etc.

MEPL, having an integrated facility would minimize the risk involved in waste transportation and waste movement and monitoring of such facilities would be better and feasible. Any waste, by virtue of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances. Thus, the main focus of this project would be to identify the environmental impacts due to the activities carried out at TSDF.

7.1.1 Objectives of Risk Assessment

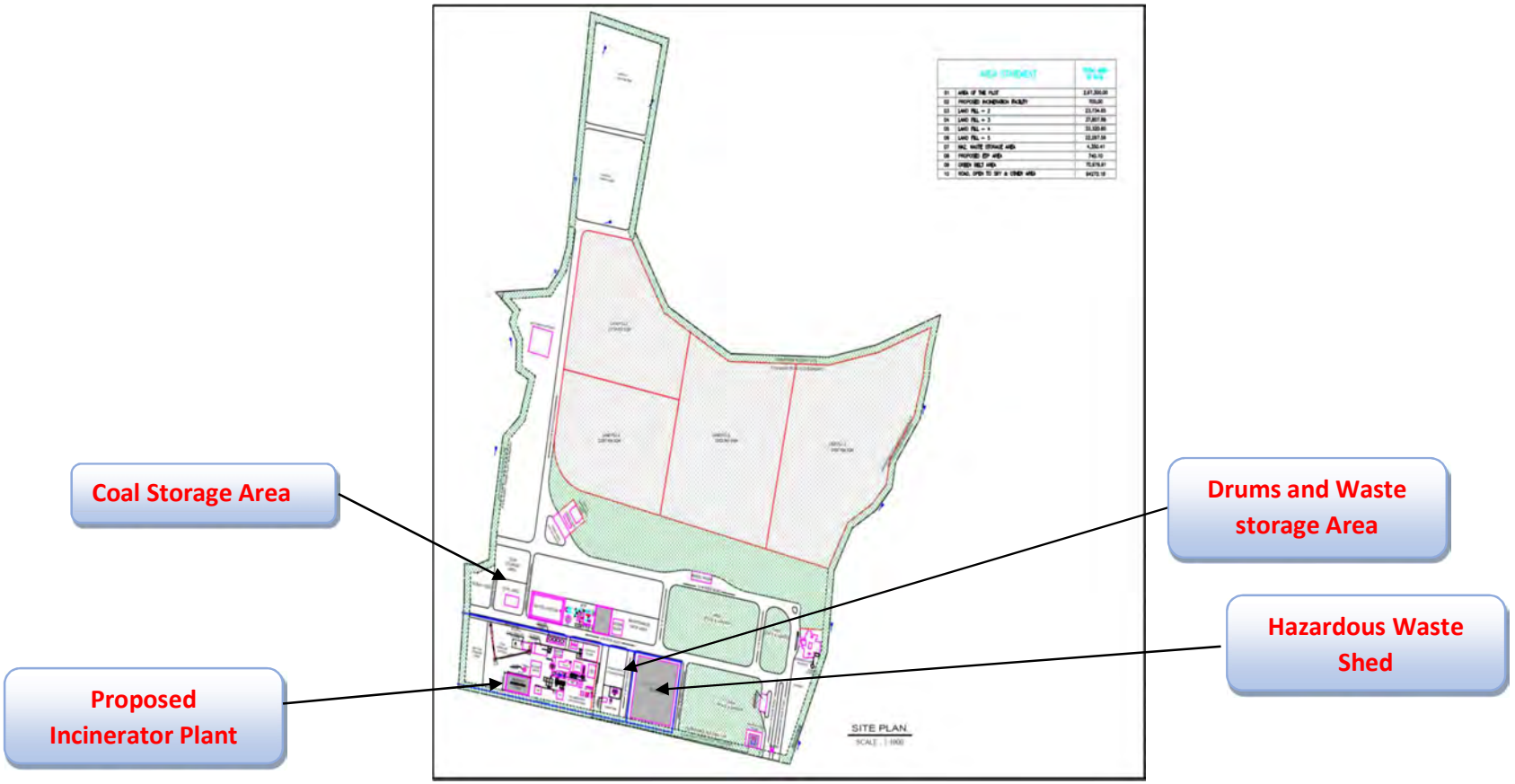
Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighbouring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc. Much of this information is difficult to get or generate. Consequently, the risk analysis is often confined to maximum credible accident studies.

Risk assessment is carried out for the following objectives:

1. To identify hazard and risk resulting from the hazards
2. To study and foresee the effects of such risks on the workers, public, property and environment and to find out necessary control measures to prevent or minimize risk.
3. To comply the legal requirement by various safety and environment laws of the country like…
    - The Factories Act, 1948
    - The Environment Protection Act and Rules, 1986
    - Hazardous waste (Management & Handling) Rules, 1989
    - Public Liability Insurance Act & Rules,1991
    - Chemical Accident, (Emergency, planning, preparedness and response) Rules,1996
4. To get the necessary information for Emergency planning and evacuation.

7.1.2 Plant Layout

FIGURE 7.1 - LAYOUT PLAN OF TSDF, SHOWING DETAILS OF LANDFILL AREA, INCINERATOR AREA, WASTE STORAGE AREA, ETC.



7.2 HAZARDOUS IDENTIFICATION & RISK ASSESSMENT

7.2.1 Hazardous Identification

Identification of hazards at the existing TSDF indicates the characteristics of hazardous wastes that create potential for an emergency situation. All the components of existing TSDF has been thoroughly examined to assess their potential for initiating or propagating an unplanned event/sequence of events, which can be termed as an accident or emergency.

At the TSDF site, following types of hazards may persist in the coming wastes (solid, semi-solid, liquid) from different industries, which can create potential emergency situation in the event of spillage and accidental release of hazardous waste from the site.

Unit has chemical storage area for Raw materials like (Caustic lye, Hydrated lime, Activated carbon and other chemicals), thus looking to the nature, type & properties of the chemicals, these chemicals cannot be modelled and hence we have analysed the risk associated with them Qualitatively. Quantitative risk assessment is not relevant for these chemicals.

7.2.2 Quality Risk Assessment

Many times Risk involved in various processes / process equipments cannot be addressed completely by Consequence Analysis. As a conservative approach, these risks have been considered separately under this topic. The approach is to identify hazards associated in operation of equipments as well as in processes, assessing its impacts, ranking the risk posed by it and finally to propose remedial actions/mitigation measures such that the risk is minimized to tolerable level.

The Risk Matrix presented below should be referred in evaluating this assessment.
In Qualitative Risk Assessment, risk has been analyzed using methodology called HIRA-Hazards Identification & Risk Assessment. In HIRA, major manual activities carried out by plant personnel as well as contract labours have been considered.
Qualitative Risk Assessment has been carried out for the following areas:

- Caustic Lye Handling
- Coal Handling
- Working at DG Set Area
- Working at Boiler Area
- Waste Receipt Activities
- Transportation From Generation Plants To TSDF Site
- Hazardous waste Handling
- Storage and Handling of Drums/ Barrels

TABLE 7.1 – RISK MATRIX FOR QUALITATIVE ASSESSMENT

LIKEHOOD/ PROBABILITY		SEVERITY				
		Catastrophic (Death /System Loss)	Major/ Critical (Serious injury /illness)	Moderate (Less Serious Injury/ illness)	Minor/ Marginal (Minor Injury/ illness)	Insignificant /Negligible (No injury /illness)
		5	**4**	**3**	**2**	**1**
Almost Certain	**5**	**H**	**H**	**H**	**M**	**M**
Likely	**4**	**H**	**H**	**M**	**M**	**L**
Possible	**3**	**H**	**M**	**M**	**M**	**L**
Unlikely	**2**	**M**	**M**	**M**	**L**	**L**
Impossible	**1**	**M**	**M**	**L**	**L**	**L**

Risk Range	Risk Acceptability Criteria	Remarks
H	Unacceptable/ High	Management's Decision/Action Plan Required. Potential off-site Impact.
M	Medium	Generally Minor Impact. Acceptable with Management's Review. Specific monitoring or SOP to be followed.
L	Low	Acceptable without Review. Manage through Routine Procedure.

7.2.2.1 Storage and Handling of Caustic Lye

[√] Risks and Recommendations:

SR.	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	Caustic lye handling /Loading & Unloading	• Exposure due to leakage from joints, corroded lines failure etc.	• Skin burn. • Eye irritation and respiratory disorder.	2	3	**M**	• Dyke is made available. • Caustic lye is stored in well ventilated area. • Eye wash station is made available nearby. • Maintenance is carried out as per schedule. • PPEs are used.	2	2	**L**	1. Proper trainings to be provided to the operators/workers. 2. SOPs to be prepared and followed the same. 3. Corroded lines to be painted/ replaced.
2.	Working in Storage Area	• Exposure due to spillage	• Severe irritation to eyes, skin etc.	2	3	**M**	• Neutralization media is kept available. • PPEs like face mask, gloves etc. are worn	2	2	**L**	

			• Internal body burns.				by concerned person. • Eye wash station is made available nearby.				
3.	Tank overflow	• Chemical Exposure	• Eyes and Skin irritation.	2	3	**M**	• Level indicator is made available and same is checked for proper operation.	2	2	**L**	4. Working of level gauge to be checked.

7.2.2.2 Storage and Handling of Coal

[√] Risks and Recommendations:

SR.	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	Unloading of Coal from Truck.	• Exposure to Coal dust.	• Ingestion & Inhalation of dust powder.	3	3	**M**	• Dust suppression system is available. • De dusting is quite adequate and effective.	2	3	**M**	5. Effective Housekeeping (removal of accumulated dust on structures, cable trays, beneath the conveyor belts, etc.) to be ensured.
2.	Storage & handling of coal.	• Exposure to Coal dust. • Fire	• Ingestion & Inhalation of dust powder.	3	3	**M**	• PPEs are use. • Fire Extinguisher is available in storage area.	2	3	**M**	
3	Coal charging to Boiler	• Fire	• Burn Injury	2	3	**M**	• Mobile & Portable hand appliances like fire extinguishers	1	2	**L**	

							and fire buckets are available in plant.				

7.2.2.3 Working at D.G. Set

[√] Risks and Recommendations:

SR.	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	Working near DG room.	• Apparently High noise.	• Noise induced hearing impairment or, • Hearing loss	4	4	**H**	• PPE's like ear plugs, ear muffs etc., are used. • Acoustic enclosures are provided for DG room. • Generator is used in open air, away from work area, where high noise does not disturb the other facilities.	2	3	**M**	6. Only Trained Personnel to be allowed to work in this area. 7. Audiometry test & other relevant tests to be carried out for the personnel In-charge of this area.
2.	Maintenance work (Electrical)	• Electrocution	• Death, • Burns, serious injury	4	4	**H**	• No cables are unplugged while	2	3	**M**	8. Work permit procedure to be

							unit is under operation. • Shut down is taken before carrying out any maintenance work. • Flameproof fittings are used. • Access to unit is restricted to authorized persons only. • Strict Vigilance is carried out during the work.				given due importance. 9. Hot Work & Electrical work Permit to be followed before carrying out electrical work. 10. Standard Operating Procedure to be prepared & followed.
3	Maintenance work (Mechanical work like cleaning, Repairing Greasing, etc)	• Slips, Trips and Falls while carrying out mechanical work. • Rotating parts.	• Severe body injury.	4	3	**M**	• Access to maintenance parts is made after performing complete safe checks only. • PPEs are used & Operators are wearing suitable safety footwear at all times. • Proper guards are provided to rotating parts.	1	2	**L**	

4.	In Bio fuel Storage - Leakage, spillage of Hot Oil / Hot Fumes/Diesel.	• Spillage, • Leakage, • Fire.	• Risk of severe bodily injury, • Possible fatal, • Building/equipment damage.	4	4	**H**	• Spillage is cleaned with the help of suitable adsorbent & spill containment kit shall be made available. • Fuel is stored in sealed containers, away from source of ignition and from generator also. • Storage area & related accessories are inspected on regular basis for leakage/spillage/ damage conditions, if any. • Firefighting facilities as mentioned under the below sections shall be available all the times. • Only qualified and highly trained personnel are allowed to work in this area.	2	3	**M**	11. Fire Fighting facilities to be inspected on regular basis. 12. Leakage & spillage sources shall be identified & will be rectified immediately. 13. Storage are shall be labeled as "NO Smoking Area", Dangerous ZONE", Restricted Area", etc. 14. Sources of ignition, combustibles, shall not be allowed inside the TSDF site.

		• Hot Parts of Generator. • Inhalation of exhaust fumes.	• Severe burns, • Injury, asphyxiation,	3	3	**M**	• Proper insulation are provided to hot parts. • Exhaust is pointed away from public places. • PPEs like Heat – resistant clothing, face mask, goggles, gloves, etc. shall be used.	2	2	**L**	15. Online leak/smoke/fire detectors shall be provided, wherever required.
		• Dermatitis from diesel and lube oil.	•	3	3	**M**	• PPE's like safety shoes, helmets, face mask, hand gloves, ear plugs, etc. are used. • Spillages are treated/ absorbed with suitable adsorbent immediately.	2	2	**L**	

7.2.2.4 Working at Boiler Area

[√] Risks and Recommendations

SR.	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	High pressure in Boiler, Leakage, spillage, maintenance work etc.	• Fire, • Explosion	• Risk of severe bodily injury • Possible fatal • Building/equipment damage	5	3	**H**	• Level & pressure measuring instruments are provided. • Safety valve is provided. • Boiler Fuel shall be stored in an isolated safe location, away from source of ignition. • Spillage is cleaned with the help of suitable adsorbent & spill containment kit is made available.	2	2	**L**	16. Only Trained Personnel to be allowed to work in this area. 17. Working of Instruments & safety interlocks to be inspected regularly. 18. Safety interlocks with automatic alarm and indicators will be provided.

							• Leakage & spillage sources are identified & are rectified immediately. • Boiler area & related accessories is inspected on regular basis for leakage/spillage/ damage conditions, if any. • Storage area is labeled as "NO Smoking Area", Dangerous ZONE", Restricted Area", etc. • Sources of ignition, combustibles, is not allowed inside the TSDF site. • Fire fighting facilities as mentioned under the section no.: 7.5 is available all the times.				

							• Proper Housekeeping is maintained. • Only qualified and highly trained personnel are allowed to work in this area.				
2.	Working near Boiler & rotary equipment	• High noise • Rotating parts.	• Noise induced hearing loss	4	4	**H**	• PPE's like ear plugs, ear muffs etc., are used. • Boiler area is isolated form the working facilities. • Proper guards are provided to rotating parts.	2	3	**M**	19. Audiometry test & other relevant testings to be carried out for the personnel In-charge of this area.
3.	Boiler feed pump Suction Strainer cleaning.	• Water spillage • Pressurized water	• Personnel injury	4	3	**M**	• Proper Isolation is ensured before draining is carried out.	2	2	**L**	20. Standard Operating Procedure to be prepared & followed.
4.	Boiler Maintenance (like cleaning, Repairing Greasing, etc)	• Slips, Trips and Falls while carrying out mechanical work.	• Severe body injury.	4	3	**M**	• Access to maintenance parts is made after performing complete safe checks only. • PPEs are used at all times.	1	2	**L**	21. Work permit procedure to be given due importance.

							• Only trained personnel are allowed to work in this area.				
5.	Working in Boiler Area OR during Maintenance	• Hot surfaces /Substances	• Severe body injury. • Burns	3	2	**M**	• Proper insulation is provided to hot parts. • Maintenance is carried out under strict vigilance.	2	2	**L**	22. Heat – resistant clothing shall be used.
6.	Incomplete Combustion	• Asphyxiation from carbon monoxide	• Possibly fatal	5	3	**H**	• Flue gases are checked / tested for the presence of carbon monoxide periodically. • Care is taken to avoid incomplete combustion & formation of CO. • Measures are adopted to reduce the formation of CO. • Portable CO meter is used. • Proper ventilation is provided.	2	2	**L**	
7.	Electrical maintenance work	• Electricity	• Possible fatality due	5	3	**H**	• No cables are unplugged while	1	2	**L**	23. Hot Work & Electrical work Permit to be taken &

			to Electric shock, • Electric shock				unit is under operation. • Shut down is taken before carrying out any maintenance work. • Unit is tested on regular basis for smooth functioning of electrical system. • Access to unit is restricted to authorized persons only. • Strict Vigilance is carried out during the work.				followed before carrying out electrical work.

7.2.2.5 Waste Receipt Activities

[√] Risks and Recommendations

SR	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	Pre Shipment Waste Analysis	• Shipments of wrong waste • Waste profile might be differ	No impact on health.	1	2	L	• Representative sample of waste is carried out. • Bar code system is available for each type of waste. • Waste profile is recorded and documented.	1	1	L	
2.	Packaging and labelling of container	• Spillage	• Skin /Eye irritation	2	3	M	• Material of packing containers are able to withstand normal handling. • Containers are closed in manner.	2	2	L	

7.2.2.6 Transportation from Generation Plants to TSDF Site

[√] Risks and Recommendations

SR	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	Hazardous Solid Waste transportation from generation site to TSDF site	• Wastes Spillage, • Leakage from Damage Container. • Fire	• Exposure to Toxic, irritant, fumes. • Health problem. • Chronic & acute illness. • Burn or may be fatal.	4	3	**M**	• Vehicle used for carrying waste are maintained properly, such that no leakage can happen on the way. • Vehicle is checked & inspected frequently, for its smooth functioning. • Waste is covered properly so as to avoid its contact with ignition source. • Care is taken that the heat	2	2	**L**	24. Hazard Identification symbol/information and emergency telephone number to be displayed as per HAZCHEM CODE on the vehicle. 25. Before starting the vehicle from generation site, client shall educate the driver about the nature of waste & its preventive measures. 26. Drivers to be instructed to carry

							generation from the vehicle should not become the source of ignition. • Drivers are trained for the consequences of hazardous wastes, its preventive & mitigative measures. • Training is given on safe driving, hazards of chemicals, handling of SCBA sets. • Drivers are trained for not to travel & not to stop the vehicle in populated areas, only designated & isolated routes are preferred for the same. • Unloading activity is carried out in well ventilated area				necessary license, TREM cards, etc. 27. Prior to taking up effective treatment, it is necessary to ensure proper & safe collection, segregation and storage of adequate quantity of waste in most scientific manner through safe transportation system and storage facility.

							under proper supervision. • Required safety measures like necessary first aid, fire extinguishers, PPEs, etc. are kept available within the Vehicle. • Once it is received at TSDF, sampling is done to identify the severity of waste. • The truck is weighed, sample is collected for testing & verification of parameters. Then after verification, the truck is directed to an unloading area. • Dust collectors is in line with unloading hoppers. • All the trucks being used for transportation of raw material and				

							final product are checked for "Pollution under Control" certificate prior to their entry to the plant premises. • Material handling in the plant is done in closed conveyors. • All trucks are transported after covering from the top. • Raw material unloading is done by mechanized truck unloading system.				

7.2.2.7 Hazardous Waste Management System

[√] Risks and Recommendations

SR	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	Weighing and Sampling of Waste	• Hazardous properties of wastes	• Direct exposure to wastes, • Toxication, • Irritation.	3	3	**M**	• Appropriate PPEs like full body suit, face mask, gloves, helmet, shoes, etc. are used. • It is performed under continuous vigilance.	2	2	**L**	28. Standard operating procedure to be prepared & followed strictly.
2.	Operation of TSDF disposal area & Leachate Management	• Hazardous properties of wastes	• Direct exposure to wastes, • Toxication, • Irritation • Fire	4	3	**M**	• Activity is carried out in isolated area away from residential area. • Appropriate PPEs like full body suit, face mask, gloves, helmet, shoes, etc. are used.	2	2	**L**	29. Eye wash station & Safety Shower to be installed in near vicinity.

							• It is performed under strict vigilance. • Sources of ignition is not allowed inside the site. • Care is taken that Leachate shall not enter into sewers or any water bodies. • Leachate is directed to the further treatment process. • Area is marked as "NO Smoking Area", Dangerous ZONE", Restricted Area", etc. • Lightening Arrestor is installed covering the whole facility. • Only qualified and highly trained personnel are allowed to work in this area. • Landfill site is covered with the				

							temporary liner system from top and side before the onset of the monsoon season so that surface runoff does not come in direct contact with the landfill waste.				
3.	Slop Failure of landfill	• Fall of waste	• Sudden direct exposure to hazardous waste, • Deaths, • Health Effects	4	4	**H**	• Safe slope gradient of landfill is made. • Waste Compaction is maintained such that the waste shear strength is not lost & shall not result in failure of landfill. • Care is taken that excessive pore water pressure is not reached. • Safe place for containing the fall of landfill is kept around the landfill site. • The area is inspected on regular basis.	2	2	**L**	30. The site to be assessed particularly in terms of adequacy & strength of protective structures & possibilities of natural calamities.

4.	Water accumulation at landfill (due to heavy rain)	• Land slide (due to water pressure on landfill waste & making it porous & weak to withstand the water accumulation) • Leachate generation	• Sudden direct exposure to hazardous waste, • Deaths, • Health Effects • Exposure to leachate, • Toxication	4	4	**H**	• Care is taken to avoid water accumulation at landfill site. • Proper Safer route is designated for the movement of water resulting due to heavy rain fall. • Only trained personnel are allowed to work.	2	2	**L**	31. Frequent checks to be carried out to ensure whether waste management concepts are in place, e.g. waste reduction. 32. Evaluation to be done whether and how storm water events would enhance transport of pollutants to the water bodies.
5.	Management for gaseous emission	• Toxic Gases	• Inhalation, • Toxication, • Irritation.	3	2	**M**	• Sampling & Testing is done for the emitted gases. • Flare system is installed. • Gases are purified before emitting to atmosphere. • Chimney is made tall so as to emit the gases at a greater height. • Gas generation is avoided or reduced by avoiding disposal of	1	2	**L**	

							biodegradable / organic waste into landfill. However, gaseous emission is anticipated which is managed by (a) controlled passive venting or (b) control collection and treatment /reuse.				
6.	Incineration activity (As existing facility is not in working mode, measures are provided for proposed modification)	• Toxic pollutants like Ash, • Emissions of heavy metals, dioxins, etc.	• Exposure to Toxic fumes & pollutants, • Health Effects, • Inhalation	3	2	**M**	• Sampling & Testing shall be done for the emitted gases. • Gases/Ash or other pollutants shall be treated before disposing off. • Flare system shall be installed. • Existing chimney is made tall so as to emit the gases at a greater height. • PPEs shall be used at all the time • Only trained & qualified personnel shall be carried out this activity.	1	2	**L**	33. Periodic Inspection of flanges/ferrule joints & other related accessories shall be carried out.

							• Personnel vigilance is carried out on regular basis. • Efforts shall be made to produce/recover as much energy as possible from wastes.				
		• Exposure to Hot surfaces (while working)	• Burns • Severe Injury.	3	2	**M**	• Proper insulation will be provided to hot parts. • Heat – resistant clothing shall be used. • Maintenance shall be carried out under strict vigilance. • Necessary work (Hot Work, etc.) permits shall be followed, whenever required.	2	2	**L**	
7.	Managing Surface Water Drainage System	• Toxic Pollutants	• Toxication, • Inhalation & skin effects	3	2	**M**	• Waste surface water is directed safely to the necessary treatment processes.	2	2	**L**	34. Procedure to be prepared for handling & treating the surface water & followed.

							• A surface runoff management system comprises of channels, ditches, culverts and basin is made. • PPEs are used.				

7.2.2.8 Storage & Handling of Drums/Barrels

[√] Risks and Recommendations

SR	PROCESS OR ACTIVITY	ASSOCIATED HAZARDS	HEALTH & SAFETY IMPACT (RISK)	INITIAL RISK			EXISTING MEASURES	RESIDUAL RISK			ADDITIONAL RECOMMENDATIONS
				SEVERITY	LIKELIHOOD	RISK		SEVERITY	LIKELIHOOD	RISK	
1.	Unloading of chemical drums from truck.	• Drum rupture • Fall of drums	• Toxic Vapour inhalation etc. • Fire	3	3	**M**	• Loading & Unloading activity is carried out in well-ventilated area. • Pellets are used for handling of drums. • Trained workers • PPEs	1	2	**L**	

2.	Handling of Drums (during storage and usage)	• Exposure to fumes due to leakage in drums. • Spillage of chemicals.	• Skin/Eye irritation. • Toxic Vapour inhalation etc.	2	3	**M**	• Storage and handling of drums is carried out in well-ventilated area. • PPEs are used.	2	2	**L**	35. Allied facilities to be inspected on periodic basis. 36. Neutralization media is made available in areas where acids are stored/handled/used.
3.	Unloading/ Emptying of chemical from drums	• Exposure to chemical fumes.	• Severe irritation to eyes, skin. • Body burns.	3	3	**M**	• Storage area is well ventilated. • Neutralization is done immediately with soda ash/lime or spill is absorbed in sand or by suitable adsorbent. • PPEs like face mask, gloves etc. are worn by concerned person.	1	3	**L**	
4.	Transfer of chemicals from drums to plant/reactor	• Exposure to chemical fumes.	• Skin/Eye irritation.	3	3	**M**	• PPEs like face mask	1	3	**L**	
5.	Cleaning of empty drums	• Exposure to chemical fumes.	• Toxic Vapor inhalation etc.	2	3	**M**	• PPEs like face mask	1	3	**L**	

7.3 OTHER SAFETY PRECAUTIONS/RECOMMENDATION

Following Safety Precautions are followed /practiced during Storage, transportation, unloading and handling of Waste and the same shall be updated to cover the expansion facilities, in order to ensure health & safety of woprkers involved in handling hazardous chemicals and avoid the human health impacts.

1. Transportation of Trucks of hazardous Waste

Sr.	ACTIVITY	SAFETY PRECAUTIONS
1	Transportation of road truck.	• Training is given to driver and cleaner regarding the safe driving, hazards of chemicals, emergency handling. • TREM card is kept with TL. • Instructions are given not to stop road tanker/truck in populated area. • Hazard Identification symbol and emergency telephone number are displayed as per HAZCHEM CODE. • Appropriate PPEs are kept with TL. • Source of leakage are checked. • Combustibles (wood, paper, oil, etc.) are kept away from spilled material.
2	Unloading of Waste from tanker/truck.	• Priority is given to Tanker/truck to immediately enter the storage premises at site and shall not be kept waiting near the gate or the main road. • Security person checks License, TREM CARD, Fire extinguisher condition; required PPEs as per SOP laid down. **Following precautions are taken during unloading:** • Wheel stopper is provided to TL at unloading platform. • Static Earthing is provided to road tanker. • All TL valves are closed in TL. • Only day time unloading is permitted.

2. Storage Area (Storage Shed)

- Flammable, ignitable, reactive and non-compatible wastes are stored separately and never stored in the same storage shed.
- Storage area have different sheds for storing different kinds of incinerable hazardous wastes and sheds are provided with suitable openings.
- Storage area are designed to withstand the load of waste stocked and any damage from the hazardous waste spillage.
- Installation of a storage area with proper top covering and impervious flooring is done to avoid soil contamination due to leach ate infiltration and during rainy season.
- Hazardous waste storage area is provided with the flameproof electrical fittings and it is strictly adhered to.
- Automatic smoke, heat detection system is provided in the sheds.

- Adequate separation distance is maintained between each facility.
- "Fire break" of at least 04 meter between two blocks of stacked drums is provided in the storage shed. One block of drum does not exceed 300 MT of waste.
- Doors and approaches of the storage area is of suitable sizes for entry of fork lift and firefighting equipment;
- The exhaust of the vehicles used, for the purpose of handling, lifting and transportation within the facility such as forklifts or trucks is fitted with the approved type of spark arrester.
- In order to have appropriate measures to prevent percolation of spills, leaks etc. to the soil and ground water, the storage area is provided with concrete floor or steel sheet depending on the characteristics of waste handled and the floor is structurally sound and chemically compatible with wastes.
- Measures are taken to prevent entry of runoff into the storage area. The Storage area is designed in such a way that the floor level is at least 150 mm above the maximum flood level.
- The storage area floor is provided with secondary containment such as proper slopes as well as collection pit so as to collect wash water and the leakages/spills etc.
- All the storage yards are provided with proper peripheral drainage system connected with the sump so as to collect any accidental spills in roads or within the storage yards as well as accidental flow due to fire-fighting.
- Special care is taken for storing medical wastes. It is kept totally isolated from other wastes:
- All care is taken so that infectious material shall not leak and spread the infection.

Hazardous Waste Treatment and Disposal Facilities

- It is ensured that handling of all spillages is done properly by introducing spill control procedures for various hazardous and toxic materials. Spill control procedures are followed strictly.
- Vapour recovery systems is used to prevent the release of toxic organics into air.
- Monitoring data is analysed and reviewed at regular intervals and compared with the operating standards, so that necessary corrective actions can be taken, if any.
- Ground and surface Water use is monitored carefully.
- Practices such as process optimization, production scheduling, materials tracking and inventory control, special material handling and storage procedures, preventive maintenance programs, and waste stream segregation is adopted.
- The construction of landfill and development phase that requires proper planning and proper selection of the earthwork / lining material is followed.
- The containment system of landfill is proposed with double liner system with a view to avoid the leach ate infiltration into the ground.

Spillage/Leakage Control Measures

- The storage areas are inspected daily for detecting any signs of leaks or deterioration, if any. Leaking or deteriorated containers will be removed and ensured that the contents from it are transferred to a sound container.
- In case of spills/leaks, dry adsorbents/cotton is used for cleaning instead of water.
- Proper slope with collection pits is provided in the storage area so as to collect the spills/leakages.
- Storage areas is provided with adequate number of spill kits at suitable locations. The spill kits are provided with compatible sorbent material in adequate quantity.

3. Drainage/Collection and Its Management

- A leachate collection system is designed at the base of landfills.
- It is comprising of drainage layer i.e. layer of pebbles of greater permeability, leach ate collection piping attached with sump, and leach ate transfer pump.
- After collecting leachate it is transferred to onsite Effluent Treatment Section, which will provide the physico chemical treatment consisting of neutralization, precipitation and filtration of leachate. Here, acidity, suspended solids and heavy metal content of leach ate will be precipitated and removed from the waste water.

4. Closure and Post Closure Maintenance Plan

The closure & post closure maintenance plan is comprise of following components:

- Plan for vegetation stabilization of the final landfill covers and side slopes.
- Plan for management of surface water run off with an effective drainage system.
- Plan for periodical inspection and maintenance of landfill cover.
- Plan for post closure management of leach ate & post closure environmental monitoring.
- Super fund for any unforeseen event.

7.3.1 Fire Control Plan

M/s. Maharashtra Enviro power Limited (VEPL), has considered fire prevention measures at the project planning stage to avoid any outbreak of fire. But the chances of outbreak of fire cannot be totally ignored. Hence to tackle such a situation, company has developed a well-resourced and adequate number of fire Extinguishers. The same shall be updated to cover the expansion facilities also, if required.

Other Firefighting Measures to be updated for the new facilities shall be:

- Fire load calculation should be carried out and accordingly firefighting facilities comprising of main pump, stand by pump, jockey pump, diesel driven pump, Hydrant Network, Hose Box, Hose reels, Manual call points, fire alarms, fire buckets, etc. to be provided as per the TAC guidelines.
- Fire Extinguishers like DCP type, Water type, Foam trolley, CO_2 type, kept available in adequate nos. at various conspicuous locations.
- Working staff is trained to operate fire extinguishers.
- Factory Layout has a provision for separate entry and exit with adequate margin all around the periphery for unobstructed easy movement of the emergency vehicle / fire tenders without reversing back.
- DG set is available as a separate power backup for fire network, in case of emergency or power failure.
- Complete Addressable analogue fire detection system with heat and smoke detectors with necessary cabling, interface panels, controllers, sounders, manual call points, sirens, response indicators, and all necessary hardware and accessories are provided for conspicuous areas.

7.3.2 Safety Practices

DO'S & DON'TS

Management has listed some of the Do's & Don'ts activities to strengthen the SAFETY AT WORK, which are followed strictly:

Do's:

- Inspection of Storage Area, Earthing & Bonding system, all Fire Fighting Facilities /Check Alarms operations.
- Ensuring that operators/workers etc. follows the SOPs, Safety procedures & standards, work permit system, etc.
- Make sure existing fire extinguishers are fully charged and ready for action.
- Inspections of plant, storage area, machinery, tools, equipment, premises, work practices, processes, procedures to be carried out for the health and safety of plant, people and surrounding.
- Correct or report unsafe conditions.
- Use prescribed protective equipment; keep them in good working conditions.
- Smoking shall be prohibited in and around the storage areas.
- Good housekeeping shall be maintained around the premises.
- Signboards showing precautionary measures to be taken, in case of normal and emergency situations shall be displayed at appropriate locations.
- To the extent possible, manual operations within storage area shall be avoided. In case of manual operation, proper precautions shall be taken, particularly during loading / unloading of liquid hazardous wastes.
- The wastes containing volatile solvents or other low vapor pressure chemicals shall be adequately protected from direct exposure to sunlight and adequate ventilation shall be provided.
- Tanks for storage of liquids waste will be properly dyked and will be provided with adequate transfer systems.
- Storage sites will have adequate & prompt emergency response equipment systems for the hazardous waste stored on-site. This will include fire-fighting arrangement based on the risk assessment, spill management, evacuation and first aid. On-site and Offsite Emergency Plans shall be reviewed and updated, as per the requirement.
- Immediately on receipt of the hazardous waste, it shall be analyzed and depending upon its characteristics and storage & disposal shall be finalized.
- Mock drill for onsite emergency shall be conducted regularly and records will be maintained

Don'ts:

- Don't allow anyone who hasn't received specific safety and operational training to get indulge in any site activity.
- Don't perform your own maintenance.
- Don't compromise on Design and Engineering part.
- Don't perform any activity without proper permit.
- Don't allow spilled chemicals to drain to sewers/gutters etc.

Hazard Analysis and Safety Audit

During operation of TSDF, a preliminary hazard analysis has been conducted. Safety Audit is conducted internally by the operator every year & externally once in two years by a reputed expert agency. Conditions stipulated by SPCBs while granting authorization under Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules, 2008 to the TSDF operation is complied.

Display of Necessary Information at TSDF Site

Necessary information containing the following elements are displayed at the site.

- Waste type (Flammable, toxic, reactive, etc.)
- Approximately quantity of each type of wastes
- Generation location of waste

7.3.3 Measures of Fugitive Emission Control

- Regular monitoring of site area is conducted and records are maintained.
- Extractor Hood routed through emission control system is used to absorb toxic fumes from furnace & finally discarded to atmosphere after the treatment (dust collector from chimney, may be used).
- Mask made compulsory to be worn by concerned personnel, wherever required.
- Entire Operational Area is well ventilated. High Speed Industrial Fans are placed to continuously supply fresh air to operational people and drift fumes to open/safe area, wherever required.
- Safe Operating Procedures and EMERGENCY RESPONSE PROCEDURES are followed strictly.

7.4 DISASTER MANAGEMENT PLAN INCLUDING EMERGENCY EVACUATION DURING NATURAL AND MAN MADE DISASTER

M/s. Maharashtra Enviro Power Limited formerly known as Vidharbha Enviro Protection Ltd. (VEPL) has prepared the Disaster Management Plan which is linked with District Disaster Management Plan. The purpose of this plan is to provide M/s. Vidharbha Enviro Protection Ltd. (VEPL) with the means to effectively utilize all the resources at its disposal for the protection of life, environment and property.
The same DMP shall be updated after expansion to cover new plants or facilities, if required. The details of the same are discussed in the following sections.

The details of the same are discussed in the following sections.

7.4.1 Defining the Nature/Level of Emergency

THE LEVEL OF EMERGENCY CAN BE CLASSIFIED IN THREE CATEGORIES:

LEVEL - 1:

The leakage or emergency, which is confinable within the plant/area. It may be due to:
a) Small pipe/valve rupture or similar leakages that do not affect outside premises.
b) Release of toxic chemicals for short duration.
c) Small fire in the plant.
d) The incident at proposed TSDF is confined to a small area and does not pose an immediate threat to life or property. Spillage of liquid or solid hazardous wastes, small fire in flammable hazardous wastes, etc. can come under this category.

LEVEL - 2:

The emergency, which is confinable within the factory premises. It may arise due to -
a) Leakage of toxic chemicals for long duration.
b) Medium scale explosion confined to the factory premises.
c) Medium scale fire inside the factory premises.
d) The incident at proposed TSDF is confined to a small area and does not pose an immediate threat to life or property. Spillage of liquid or solid hazardous wastes, small fire in flammable hazardous wastes, etc. can come under this category.

LEVEL - 3:

The emergency, which is not confinable within the factory premises and general public in the vicinity are likely to be affected. It may arise due to -
a) Heavy / Profuse leakage of toxic / flammable gases for a long duration.
b) Explosion of high magnitude affecting the adjacent area.
c) Major fire inside the factory premises.
d) The incident at proposed TSDF is confined to a small area and does not pose an immediate threat to life or property. Spillage of liquid or solid hazardous wastes, small fire in flammable hazardous wastes, etc. can come under this category.

7.4.2 Objectives of Emergency Management System

The objectives of the emergency management system are summarized as under.

- To identify and assess types of emergencies due to different types of hazards.
- To work out plan with all provisions to handle emergencies and safeguard employees and people in the vicinity of the factory.
- To provide for emergency preparedness and the periodical rehearsal of the plan.
- To plan mode of proper communication and actions to be followed in the event of emergency.
- To keep all necessary information with respect to hazard/accident control and emergency contacts in one document for easy and speedy reference.
- To inform employees, general public and the authorities about the hazards/risk if any and the role to be played by them in the event of emergency.

- Minimization of the risks to lives and safety of proposed TSDF operators on-site and of the neighbouring community.
- To control and contain the accident.
- Containing and minimizing environmental damage, to surroundings, and to site property, and equipment, this could occur from emergency or accidental situations beyond the normal operations of the TSDF.
- To effect rescue and treatment of casualties.
- To inform and help relatives of casualties.
- To secure rehabilitation of affected area and restore normalcy.
- To provide information to media and government agencies.
- To preserve record, equipment etc. for investigating cause of emergency.
- To be ready for "mutual aid" if need arises to help neighbouring units.
- Maintaining effective trained personnel capable of performing the established emergency response procedures when it is required.

7.4.3 Structure of Emergency Management System

M/s. MEPL (formerly known as VEPL) has develop an Emergency Management Team. The management structure includes the following personnel's;

- Crises Coordinator
- Chief Emergency Coordinator (CEC)
- Site Incident Controller
- Fire and Safety Function Co-ordinator
- Media Function Co-ordinator
- Communication Function Co-ordinator
- Medical Function Co-ordinator

The other elements of Emergency Plan shall be:

- Assembly points
- Emergency control centre
- Fire control arrangements
- Medical arrangements
- Other arrangements

➢ **CRISES COORDINATOR**

The Head of TSDF will work as Crisis Coordinator:

- He will assess the situation and instructs the Chief Emergency Co-ordinator to sound the siren.
- This will inform the employee that an emergency situation has siren arisen and that the proposed TSDF should be shut down and evaluated.
- All the personnel/part of the proposed TSDF need to be evacuated and employees other than given responsibility assemble at the assembly points.
- He will approve release of information to press, TV and Government agencies as required.

➢ CHIEF EMERGENCY COORDINATOR (CEC)

The General Manager of TSDF will work as Chief Emergency co-ordinator.
He will report at the command post and will assume overall responsibility of the works and its personnel. His duties will be:

- To assess the magnitude of the situation and decide whether a major emergency exists or is likely to develop, requiring external assistance. To inform District Emergency Authority (DEA) (i.e. District Collector) in case on-site emergency escalates into off-site emergency.
- To contact Crisis Cell of the Ministry and inform about the incident, magnitude of disaster, combating operations and number of casualties, if any.
- To exercise direct operational control over areas in the proposed TSDF other than those affected.
- To assess the magnitude of the situation and decide if personnel need to be evacuated to identify safe places.
- To continuously review in consultation with the other coordinators.
- To liaise with senior officials of police, fire brigade and Factories Inspectorate and pass on information on possible effects to the surrounding areas outside the factory premises.
- To liaise with various coordinators to ensure casualties are receiving adequate attention and traffic movement within the proposed TSDF is well regulated.
- To arrange for a log of the emergency to be maintained in control room.
- To release authorized information to press through the media officer designated.
- To control rehabilitation of the affected persons and the affected areas after the emergency.
- To obtain assistance from Mutual Aid partners.

➢ SITE INCIDENT CONTROLLER

The In-charge of waste storage will work as Site Incident Controller.
He will take overall control of handling the emergency at the plant. His first task will be the isolation of the source of containment loss to the extent feasible. Simultaneously, in case of fire, he will organize appropriate fire response to get the situation under control and to prevent escalation.

On arrival at the site, he will assess the scale of emergency and judge if a major emergency exists or is likely to develop and will inform the control room accordingly asking for assistance and indicating the kind of support needed. His duties and responsibilities will include:

- To coordinate the activities of other key persons reporting at the incident site, under his overall command.
- To direct all operations within the affected areas giving due priorities for safety of personnel and to minimize damage to environment, proposed TSDF and property.
- To provide advice and information to Fire & Safety personnel and other fire services as and when they arrive.
- To ensure that all non-essential workers and staff within the affected area are evacuated to appropriate assembly points and those areas are searched for casualties.
- To organize rescue teams for any casualties and to send them to safe areas/medical centre for first aid and medical relief.
- To setup communication points and establish contact with control room.

- To seek additional support and resources as may be needed through the control room.
- To seek decision support from the control room for decisions such as activation of mutual aid plan etc.
- To preserve all evidence so as to facilitate any inquiry into the cause and circumstance.
- To arrange for a head count after the emergency is over with respect to the personnel on duty in the affected areas.

➢ FIRE AND SAFETY FUNCTION CO-ORDINATOR

The Manager-Fire & Safety along with firefighting team will work as fire and safety functionary. The main responsibilities of fire and safety functionary are:

- To immediately take charge of all firefighting operations upon sounding of the alarm.
- To instruct the telephone operator to immediately inform all essential personnel not residing within the audible range of the emergency siren.
- To guide firefighting crew and provide logistics support for effectively combating the fire.
- To barricade the area at appropriate locations in order to prevent the movement of vehicular traffic.
- To assist in rescue and first aid operations.
- To operate the Mutual Aid Scheme and call for additional external help in firefighting via the control room.
- To organize relieving groups for firefighting.
- To inform the Crises Controller and give "All Clear" signal when the fire emergency is over.

INDIVIDUAL ROLE OF EACH CATEGORY:

A. Role of Manager (Fire and Safety) / Shift In-Charge (Fire & Safety)

1. Site Incident Controller directs the fire fighting and Emergency operation. His duties include.
2. Keep the constant touch with the CEC / In charge - EHS.
3. Direct the crew members to the scene of emergency and arrange replenishment of Manpower / equipment / extinguishing media etc.

B. Role of EHS Representative

1. On being notified about the location of fire/ gas leakage, he immediately proceeds to the help.
2. Decides his line of action in consultation with Site Incident controller and takes appropriate measures to handle the emergency.
3. Assessing the severity of the incident, immediately report to emergency controller about the gravity of the situation.
4. He assess the extra requirement required if any, from the neighbouring industry.

C. Fire crew members

1. On hearing fire alarm, emergency siren they immediately reports to control room and proceed to the scene of emergency and work under the direction of SIC /CEC.

2. The personal availability at the scene of incident to be made optimize.

D. Emergency Squad Members

1. On hearing Emergency Siren, they immediately reports to site main controller, safety in charge or incident controller.
2. They shall combat the emergency situation as per the direction of site main controller, safety in charge or incident controller.
3. They helps for safe evacuation.

➢ **MEDIA FUNCTION (IF REQUIRED) CO-ORDINATOR**

The Human Resource Manager will work as Media Function. He will under the direction of the CEC, co- ordinate the following:

- To liaise with various media and release written statements to the press through prior concurrence of Crises Controller.
- To handle media interviews with various media. Make arrangements for televising the information about the incident, if public interest warrants.
- Inform State and Central Governments & statutory bodies of the nature and magnitude of the incident, the number of casualties, etc.
- To locate himself such that media personnel/third parties do not need to go past the proposed
- TSDF security gates and that adequate communication links exist.
- Media personnel often insist on visiting the incident scene.
- To escort media team(s) if the Crises Controller approves such visits.

➢ **COMMUNICATION FUNCTION CO-ORDINATOR**

The Manger - Laboratory will work as communication functionary. He should perform the following duties:

- To ensure all available communication links remain functional.
- To quickly establish communication links between incident site and the control room
- To ensure that previously agreed inventory of various types of communication equipment is maintained in working condition and frequent checks carried out and records maintained.
- To maintain voice record of significant communications with timings received/passed from the primary control room.

➢ **MEDICAL FUNCTION CO-ORDINATOR**

The Manger – Occupational Health will look after medical function. He will perform the following:

- To arrange for the First Aid team to treat the affected personnel.
- He will render necessary treatment, at Occupational Health Center.
- To liaise with the local medical authorities and hospitals, if the casualties are more and the situation demands treatment at more/other medical centers.
- To liaise with the transport coordinator for transporting the victims to various hospitals.

- He will arrange for Hospitalization and Treatment at outside hospitals, if required.
- He will mobilize in getting the services of External medical agencies, other Para –medical services etc. and transportation services etc.
- He will arrange for extra medical assistance/antidotes, from out, if required.
- He will arrange for first-aid trained volunteers for necessary help.
- He will liaise with the Government Health Authorities for treatment of the affected persons nearby.
- To arrange for ambulances.
- The Medical Coordinator should ensure the upkeep of agreed medical supplies, antidotes and equipment that should always be kept in stock for treating victims of burns.
- To liaise with the Media coordinator for release of news to the press.

➢ Transport Function Coordinator

- The Waste Transportation Manger will work as Transport Function. He shall perform the following duties:
- Arrange for transport of victims to hospital/dispensaries.
- Mobilize all available vehicles available at the proposed TSDF for emergency use, along-with the drivers.
- Arrange for the duty rotation of the drivers to meet with the emergency situation.
- To direct refueling of vehicles, if not topped up.
- To arrange for vehicles from other sources.
- To liaise with the CEC for evacuation of personnel and transportation of victims.

OTHER ELEMENTS OF DMP:

➢ ASSEMBLY POINT

In affected & vulnerable plants, all nonessential workers (who are not assigned any emergency duty) will be evacuated from the area & they shall report to specified Assembly Points. Assembly point is located at a safe place well away from area of risk and least affected by the down wind direction.

To ensure that workers do not have to approach the affected area to reach the Assembly Point, proper location and number is marked at Assembly Points. Each Assembly Point is manned by a nominated person to record the names and dept. At each Assembly Point, duties of Assembly Point In-charge is displayed in brief. Before reaching an Assembly Point or subsequently, if it is required to pass through an affected area or due to presence of toxic substances, suitable PPE's including respirators, helmet etc., will be issued & made available with workers.

➢ EMERGENCY CONTROL CENTER

The Emergency Control Centre is the place or room from where the operations to handle the emergency are directed and coordinated. A safe room is marked/ identified as the Emergency Control Room.

Telephone and other facilities required with necessary documents are displayed in ECC for ready reference. ECC has been operated by designated trained personnel. In case of Major Emergency, the Site Main Controller will operate from ECC.

The ECC centre is equipped with the following facilities.

1. Internal and external telephone including STD facility
2. Telephone directory/ Telephone nos. of mutual aid centres
3. Company layout showing all the locations
4. First Aid
5. Muster roll of Workers
6. Identity card register
7. Copy of ON SITE OFF SITE PLAN
8. Sand Buckets & Hydrant Network
9. Adequate numbers of PPE's

➢ Role of Security In-Charge (Security Officer)

- On hearing the emergency siren, he will find out the location of the incident (fire / gas leak / spill / explosion) and inform the location of the same to the key personnel coming to the plant.
- He will depute the security guards for managing gates and traffic control at the incident site & send remaining guards to the site of incident.
- He will prevent unauthorized entry in to the site
- He will render assistance as demanded by the safety in-charge.
- He will mobilize additional security force for help, if required.
- He will direct ambulance(s) and emergency vehicle(s) to the scene of incident.
- He will help evacuate persons within the scene of incident.
- As directed by the site main controller, he may be required to address the public of surrounding villages for warning / evacuation.

➢ Role of Mutual-Aid Members

- Company will have Mutual Aid with various factories from nearby.
- On receiving the call, they shall proceed immediately with fire squad & fire tenders.
- They will be guided to the place of the incident by the main gate security guard.
- The fire squad in-charge will report to the safety in-charge of the unit in which the incident has occurred.

➢ Other Arrangements

Other arrangements include external transport, heavy vehicles, lift/cranes, generator sets to supply emergency power, environment monitoring equipment, special instruments/equipments, rescue items etc. are made available (if required) from the nearby locations or Industries or local authorized bodies, when available resources do not meet the requirements.

❖ INITIAL NOTIFICATION OF RELEASES

In the event of emergency, alarm will be raised in control room. Otherwise, any person noticing a fire, explosion or the release of hazardous materials should shout "spillage" or "Fire" and. He will also inform the control room on the nearest telephone and the panel officer will inform SIC.

Please DO

- Immediately inform the control room.
- Act to control the incident as per the instructions.
- Reach the assembly point.

Please DO NOT

- Get panicky or spread rumors.
- Approach control room without work.
- Engage telephone or loud phone continuously.

Establishment and Staffing of Command Post

- Quickly establish a command post near the scene of incident. The minimum that is necessary is a continuously manned communication system close to the incident site.
- It is the responsibility of the response personnel at the Command Post to restrict the entry or movement of people into the Hazard zone. The first step of a response action must be restriction of access to the leakage site and other hazardous areas.
- Security and access control at Command Post and Primary Command Post need is provided.

Ensuring Health and Safety at Incident Scenes

The results of hazard analysis is used to identify the vulnerable zones. Based on incident-specific factors, the exact size and configuration of hazard control zones are determined. The Hazard Control Zones have been defined below.

The CEC will formulate safe operating procedures for a site safety and health program that addresses the following.

- The use of appropriate protective gear and equipment
- Utilizing the most experienced personnel for the most hazardous tasks.
- Positioning a backup team to assist or rescue personnel.
- Providing medical surveillance for personnel.
- Monitoring (visually and through communications contact) the welfare of personnel operating within the emergency zones.
- Ensuring that all personnel understand their assignments.
- Ensuring that responders do not ingest contaminants through eating, drinking, or inhaling.
- Replacing fatigued personnel with "fresh" personnel.
- Adjusting hazard control zones to reflect changing conditions.

❖ **STANDARD OPERATING PROCEDURE (SHALL BE FOLLWED DURING EMERGENCY)**

- As soon as emergency alarm is heard, all essential workers shall report to SIC or CEC.
- They shall carefully listen to the instructions given by SIC or CEC
- According to the type of emergency/accident, they shall get equipped with PPE/Firefighting equipment and devices.
- The runner among the workers shall inform CEC /SIC and key personnel if they are not at site.
- The messenger amongst the workers shall deliver messages to nearby units as per the instructions of CEC /SIC.
- The in-charge of medical arrangements shall prepare first-aid and other required facilities for the injured.
- The other essential workers shall try to control the emergency as per the instructions given to SIC.
- SIC would keep CEC informed about the status of control measures being taken at the site and ask for other requirements e.g. Mutual aid, equipment etc. if he find necessary.
- CEC would co-ordinate with outside agencies regarding control measures being taken, need for external help, evacuation, medical treatment etc.

7.4.4 Communication System

Communication System is a Crucial Factor while handling emergency. Company has quick & effective Communication System through which, any situation, which can lead to emergency, can be informed or known to…

I. All persons working inside the plant.
II. Key Personnel outside during normal working hours & during off-duty hours.
III. Outside emergency services, Statutory and Local Authorities and
IV. Neighbouring facilities and public leaving in vicinity.

Each and every section, Plant & Department of the Factory is connected by internal telephones with CEC, Supervisor or SIC's. External Phone at Office and Residence and Mobile is also available with Key Personnel and top executive of the factory. The Communication System shall begin with raising the alarm declaring the emergency, Telephone messages and Procedure to communicate the emergency to other persons & General Public.

➢ **Raising the Alarm**

As soon as incident takes place inside the factory and is noticed by someone, the first step shall be to raise the nearest manual emergency bell to alert the nearby people. Next, he/she shall informs the security persons to raise the emergency siren located at the factory gate. The security personnel sound the siren.

The alarm sound informs the SI.C and the CEC that an emergency has been created and emergency organization is to be activated. The SI.C. rushes to the site and shall takes charge of the scene.

➢ Declaring the Major Emergency

Major emergency is declared after sufficient and thorough check because the declaration of major emergency puts many agencies on action and it may disturb the running system, which may be Costly at, time or its Consequence may be Serious. Therefore, major emergency must not be decided on whims or immature judgment or without proper thought. Looking to all the above, we have nominated the persons (may be CEC) who can declare the emergency; we have selected them on the basis of their knowledge & experience. These persons are technically qualified and experienced. The decision about major emergency is taken as early as possible and without wasting time so that control action can be started immediately.

➢ Telephone Messages

A Telephone operator who is precise, sharp, attentive and quick in receiving and noting the message and subsequently effective in further Communication, has been appointed. A form to record emergency telephone calls is available with telephone operator or Person available in Emergency Control Centre, who records such calls during emergency. Telephonic messages are given out by the telephone operator to Site main Controller and key personnel as per the instructions of the Incident Controller. Telephonic messages are also given to authorities and external agencies to describe the type of emergency. All details of emergency are collected/ delivered according to this format, available with the telephone operator.

➢ COMMUNICATION OF EMERGENCY & STATUTORY INFORMATION COMMUNICATION OF EMERGENCY

Communication of Emergency:
An effective system to communicate emergency has been made to communicate about the emergency situation as mentioned below:

- Inside the factory i.e. workers including key personnel and essential workers, on duty & inside during normal working hours.
- To key personnel and essential workers not on duty and outside during normal working hours.
- To the outside emergency services and the Government authorities.
- To the neighbouring factory & the General Public in the vicinity.

STATUTORY INFORMATION:

a) Information to Workers

Set of Statutory information regarding types of hazards and their prevention and control as directed in the Factories Act is prepared by the unit. This information is printed in the local language and given in the form of booklet to all workers including contract workers.

b) To the outside emergency services and District Emergency Authority

Statutory information in the form of booklet is given to outside emergency services and authorities, if required.

c) To neighbouring firms, general public & Factory Inspectorate

Statutory information in the form of booklet is given to neighbouring units and the general public of the villages in the vicinity of the unit, if required.