Report of Functional Area Expert

For

"Risk Assessment & Hazard Management" (RH)

Occupational Health & Safety

Prepared and submitted by –

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- **Study Period**: (Oct-Dec 2016)

1.0 INTRODUCTION

1.1 Project Proponent: M/s. Aloke Steel Industries Pvt Ltd

1.2 Name of the Project: Capacity expansion of Sponge Iron Plant of M/s Aloke steel Industries Pvt Ltd at Village Budhakhap, P.O-Karma, Dist Ramgarh, Jharkhand

1.3 Location: **Village Budhakhap**

P.O Karma, District-Ramgarh

Jharkhand

2.0 SCOPE OF WORK AS PER TERMS OF REFERENCE (ToR) LETTER

***T.o.R Point (3 ix)*:**

1. Hazard identification and details of proposed safety systems

***T.o.R Point (7 xiii)*:**

1. Onsite and Offsite Disaster (natural and Man-made) Preparedness and
2. Emergency Management Plan including Risk Assessment and damage control.
3. Disaster management plan should be linked with District Disaster Management Plan.

***T.o.R Point (8i-iv)*:**

i. Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved,

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometrv. Vision testing (Far & Near vision. color vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.

iii. Annual report of heath status of workers with special reference to Occupational Health and Safety.

iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

3.0 REPORT REFERENCE

1) http://jamshedpur.nic.in/default.htm

2) http://ramgarh.nic.in/disaster.htm

3)http://environmentclearance.nic.in/writereaddata/Form-1A/HomeLinks/ommodel3.html

4)https://en.wikipedia.org/wiki/Main_Page

5) http://asc-india.org/seismi/seis-jharkhand.htm

4.0 Project Proposal

At present, Aloke Steel Industries Pvt. Ltd. (ASIPL) is operating an Integrated Steel Plant with Sponge Iron Plant having Four (4) Nos. Coal Based Rotary Kilns each of 100 TPD capacity. The present production capacity of the plant is 120000 TPA. Now , ASIPL In order to improve the viability of the plant by cost reduction and producing value added saleable product, it is now planned to undertake an expansion project to install following additional facilities as an expansion programme to make it a mini Integrated Steel Plant.

The capacity of proposed project activity has been tabulated below **Table 1.1**:

Table 1.1
Proposed Project Activity

PRODUCTION FACILITY	PLANT SIZE	PRODUCTION (TPD)	PRODUCTION (TPA)
EXISTING			
Sponge Iron Plant	4x 100 T/day of DRI	400 TPD	120000TPA
PROPOSED			
Steel Making Shop, Induction Furnaces and Billet Caster	3 x 12 T	360 T	108,000 T
Rolling Mill – TMT Rebar Mill	15 Stand Mill with Direct Hot Charging	300 T	90000 T
Power Plant **Waste Heat Boilers** **AFBC Boiler**	Total 18 MW 4 x 2 MW 1 x 10 MW	18 MW	18 MW (Captive use)
Iron Ore Crushing & Beneficiation Plant	80 – 100 TPH single stream	920 T	276000 T
Slag Crushing Plant for SMS Slag	Single stream 8 TPH	55 T	16200 T

Table 1.2
Process flow description

Section	Technology	Process flow
Sponge Iron plant	Coal Based Rotary Kiln Process	Feeding of RM to the Rotary Kiln through feed tube → Cooling in the rotary cooler → Screening → magnetic separation of the product → sponge iron Other outputs - Char
SMS Unit	Induction Furnace (IF)	Feeding of RM → Melting in IF (adding alloys as per requirement) → Metal in Liquid form → casting & cooling → dispatch. Other outputs : Slag from IF
Rolling Mill	Direct Rolling of hot billets	Feeding of hot billets → roughing strands → rolling → cutting & bundle → dispatch
Power	Based on WHRB & AFBC	Steam from WHRB+AFBC (char used along with coal as fuel) → TG set → Power generation Other outputs : Ash from AFBC
Iron ore crushing & Beneficiation	Sizing of ore and washing Recovery of fines by hydro cyclone and thickener	Crushing & sizing using screens → washing in wet screens → to DRI Slurry to hydro-cyclone → dewatering → under flow fines for sale Overflow slurry → Thickener → Tailing dam
Slag crusher	Jaw & Cone crusher with magnetic separator	Slag → jaw crusherr → screen → magnetic separator → cone crusher → screen → magnetic separator → recovered metallic part

Table 1.3

Raw Material requirement

S. No.	Item	Per MT of Product	Requirement MT per day	Requirement MT per year	Source
Sponge Iron Plant (400 TPD – 120000 TPA)					
1	Iron Ore	1.9	760	228,000	In House
2	Coal	1.6	640	192,000	Jharkhand
3	Dolomite	0.025	10	3000	Local Market
	TOTAL	**3.525**	**1410**	**423,000**	
Iron Ore Beneficiation Plant (920 TPD – 276,000 TPA)					
1	Iron Ore	0.978	900	270000	Local Market
	TOTAL	**0.978**	**900**	**270000**	
SMS (360 TPD – 108,000 TPA)					
1	Sponge Iron	0.627	448	120,000	In House
2	Purchased scrap/pig iron	0.160	57.66	17,300	In House
3	Revert Scrap	0.039	14.33	4,300	In House
	TOTAL	**0.826**	**519.99**	**141600**	
Rolling Mill Plant (300 TPD – 90,000 TPA)					
1	Steel Billets	1.2	360	108,000	In House
	TOTAL	**1.2**	**360**	**108,000**	
CPP (18 MW)					
1	Coal	9.25 t/MW	166.66	50000	Jharkhand
2	Char	5.55 t/MW	100	30000	In House
		14.80t/MW	**266.66**	**80000**	

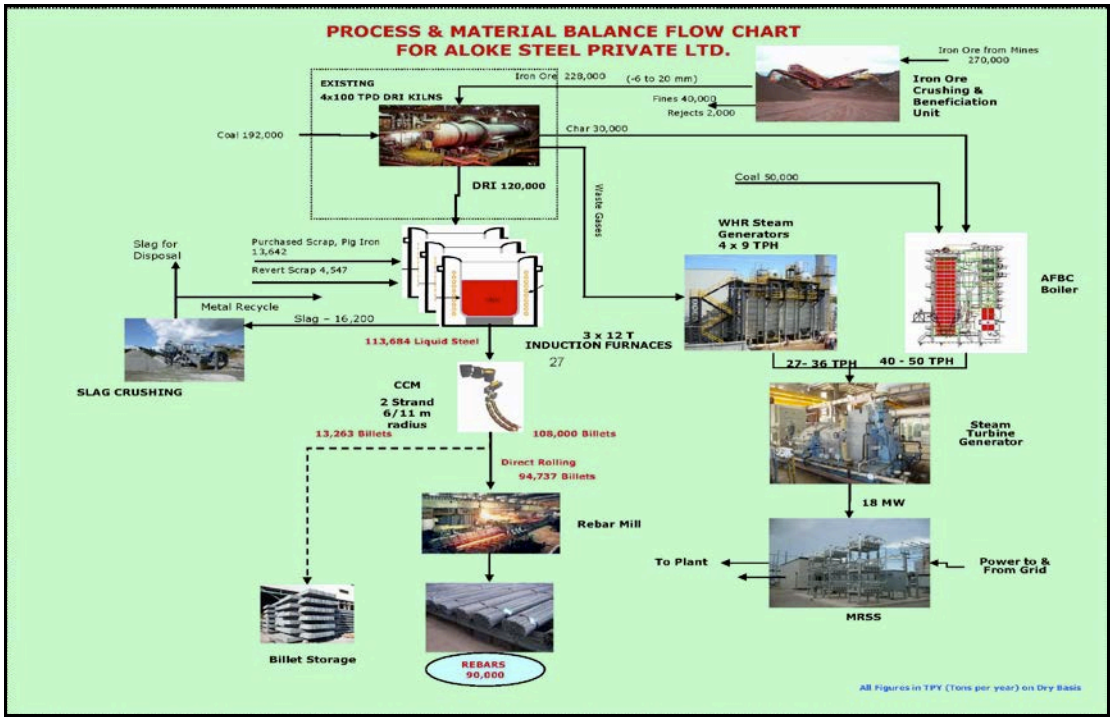

Fig 1.1 : Schematic diagram of proposed Integrated Steel plant

5.0 Risk Assessment

5.1 Risk Assessment & Damage Control

Risk assessment is the determination of quantitative and qualitative value of risk related to a concrete situation and a recognized threat. Activities requiring assessment of risk due to occurrence of most probable instances of hazard and accident are both onsite and off-site.

5.2 Maximum Credible Accident Analysis (MCA)

Increasing fatal accidents that have occurred during transportation, Handling, operation, Process have to be taken into consideration and, therefore have prompted the Ministry of Environment and Forests & Climate Change (MoEF&CC), Government of India, to make Risk Assessment a mandatory requirement for all Industry sector.

MCA stands for Maximum Credible Accident or in other words, an accident with maximum damage distance, which is believed to be probable. MCA analysis does not include quantification of the probability of occurrence of an accident. In practice the selection of accident scenarios for MCA analysis is carried out on the basis of engineering judgment and expertise in the field of risk analysis especially in accident analysis.

5.2.1 Methodology of MCA Analysis

The MCA analysis involves ordering and ranking of various sections in terms of potential vulnerability. The data requirements for MCA analysis are:

- ✓ Operating manual
- ✓ Flow diagram and P&Id diagrams
- ✓ Detailed design parameters
- ✓ Physical and chemical properties of all the chemicals
- ✓ Detailed plant layout
- ✓ Detailed area layout
- ✓ Past accident data

5.2.2 Following steps are involved in the MCA analysis:

- ✓ Identification of potential hazardous sections and representative failure cases
- ✓ Visualization of release scenarios considering type and the quantity of the hazardous material
- ✓ Damage distance computations for the released cases at different wind velocities and atmospheric stability classes for heat radiations and pressure waves

6.0 Hazard Identification & Risk Assessment (HAZID-HIRA)

The steel manufacturing industry is labor intensive and uses large scale and potentially hazardous manufacturing processes. The industry experiences accident rates that are high compared with some other manufacturing industries. Some examples of such hazards likely to

occur in proposed *Sponge Iron Plant, Induction Furnace, Continous casting machine, Billet Caster , Mini Blast furnace, Rolling Mill, CPP at M/s Aloke steel Industries Pvt Ltd are given below.*

These mainly impact on those working within the industry, although health hazards can also impact on local communities.

- ✓ Fire
- ✓ Explosion
- ✓ Physical Hazards due conveyor system, material handling
- ✓ Fugitive Dust of Raw Material Handling at charging bay, storage yard, Crusher, DRI Kiln, billet crushers
- ✓ Occupational health issue of Fly Ash, Slag crushing, dolomite exposure
- ✓ Collapse of Structures/Fall of Material, stacking failure
- ✓ Loading/ Unloading /Packaging Operations failures
- ✓ Cleaning operation failures/ Cyclone Jamming
- ✓ Electrocution/ Electrical Hazards
- ✓ Accidental Spillage of hot molten metal & Diesel fuel

6.1 Identification of source of Ignition at M/s. Aloke Steel Industries Pvt Ltd

- ✓ Creation of hotspots during operation or maintenance of Process equipments
- ✓ Self ignition of hot material
- ✓ The electrical Discharge(thunderbolt, electrostatic charges, short circuits), Static charge

6.2 Identification of sources of Fire & Explosion at M/s. Aloke Steel Industries Pvt Ltd

- ✓ Oil and Lubricant Room (spillage)
- ✓ Fine Coal Hoppers
- ✓ Coal Storage area
- ✓ Electrical Substations (Short circuit)
- ✓ AFBC Boilers
- ✓ Induction Furnace

6.3 Thermal radiation

Table 1.4 Enlists damage consequences due to different Heat Loads are given below:

Table 1.4
List of Damages Envisaged at Various Heat Loads

Sr. No.	Heat loads (kW/m^2)	Type of Damage Intensity	
		Damage to Equipment	Damage to People

1	37.5	Damage to process equipment	100% lethality in 1 min. 1% lethality in 10 sec
2	25.0	Minimum energy required to ignite wood	50% Lethality in 1 min. Significant injury in 10 sec
3	19.0	Maximum thermal radiation intensity allowed on thermally unprotected equipment	--
4	12.5	Minimum energy required to melt plastic tubing	1% lethality in 1 min
5	4.0	--	First degree burns, causes pain for exposure longer than 10 sec
6	1.6	--	Causes no discomfort on long exposures
Source*: World Bank (1988). Technical Report No. 55: Techniques for Assessing Industrial Hazards. , Washington, D.C: The World Bank.*			

6.4 Physical Hazards onsite

- ✓ Dust Exposure at coal crushing area
- ✓ Dust Exposure of Fly Ash, Bottom Ash
- ✓ Dust Exposure of Dolomite, Slag (SMS)
- ✓ Accident due to Conveyor system, Material handling
- ✓ Slip/Trip/ Fall due to improper stacking of material

6.5 Loading/Unloading operation/ Storage

- ✓ Approach of heavy good vehicles for unloading material
- ✓ Work inside hopper/Silo for unblocking of mouth
- ✓ Excessive Dust during Loading/unloading operation
- ✓ Airborne dust
- ✓ Conveyor moving parts
- ✓ Cleaning of overflows
- ✓ Unauthorized passages ,travelling over transportation system
- ✓ Motor overloading
- ✓ Unclean platforms causing staggering and falls

6.6 Silo cleaning operation

- ✓ Work in confined spaces
- ✓ Falling of material
- ✓ Falling of personal from working platform
- ✓ Exposure to dust
- ✓ Use of lifting equipments

- ✓ Use of hand held work equipment during cleaning

6.7 Steel Melting Shop

The main hazards arise out of the use of hot metal and oxygen at the spillage of hot metal cause serious burn injuries and fires. Severe explosions are also caused due to hot metal falling over a pool of water, resulting in injuries to persons, fire and damage to equipment due to flying of hot splinters & splashing of liquid metal/slag.

Sudden break out of molten metal result in heavy explosions, due to their coming in contact with water, thereby causing serious burn injuries to persons and damage to equipment.

6.8 Electrical Hazard due to Dust

Electrical equipment such as motors, circuit breakers, transformers, and switchgear can produce sparks and ignite dust clouds and hybrid dust/air mixtures in the vicinity. Reference is taken from *CCPS Guidelines for safe handling of Bulk solids*.

- ✓ Ingress of dust into enclosures with subsequent ignition causes smoldering or burning (fires)
- ✓ Dust that enters an enclosure will settle out as layers on internal surfaces and become heated
- ✓ Electrically conductive dusts causes short-circuiting when deposited on exposed electrical components and circuits
- ✓ Abrasive and/or corrosive dusts damages components of electrical equipment
- ✓ Electric shock

6.9 Captive Power plant (CPP Unit) expansion

- ✓ Steam Handling and Pressure drop(Steam Explosion)
- ✓ Fly Ash handling
- ✓ Exposure to High temperatures
- ✓ Physical Hazards
- ✓ Blast overpressure
- ✓ Design failure
- ✓ Failure of Safety Relief devices
- ✓ Id fan/PA fan/SA fan failure
- ✓ Circulation line failure
- ✓ Turbine system failure
- ✓ Furnace bed maintenance for AFBC Boiler
- ✓ Dosing System Failure(HP and LP)

- ✓ Failure of fuel firing system / Burner Management system(BMS)
- ✓ RCC chimney blockage
- ✓ Temperature drop and failure of Air cooled condenser, Low pressure(LP) and High Pressure(HP) heater and Drain cooler
- ✓ Failure of re-circular system
- ✓ Pump failure(Boiler feed, HSD unloading, Transfer)

6.10 Waste Heat Recovery Boiler (WHRB Unit)

- ✓ Blast Over pressure
- ✓ Steam Pressure drop
- ✓ Leak , Catastrophic rupture in steam lines
- ✓ Temperature drop in Boiler, Pre heater
- ✓ Process failure, Explosion due to Blast overpressure

6.11 Natural and Manmade Calamities which can lead to Emergency

Earthquake

The Ramgarh District area falls under the seismic zone-II, which is the Low risk quake upto magnitude 4.1 and may trigger into a technological disaster, includes collapse of old structures, buildings leading to fire and explosion. Earthquake cannot usually be forecasted and therefore precautions immediately prior to such event are not usually possible. Emergency recovery plan has been considered by the emergency management team as per the situation and site conditions as follows in **Table No 1.5**

Table No 1.5

Step	Activity	Action By
Preparedness	• Constitute Emergency Response Team • Identify ECC, if the identified ones are damaged • Control centers to be equipped with ❖ Alarming ❖ Communication facilities ❖ Emergency vehicles/ equipment ❖ List of emergency contacts & suppliers ❖ Medical facilities	Plant Key Person
Action during effective period	• Do not panic. Raise alarm • Avoid standing near to windows, external walls • Stand near the columns or duck under sturdy furniture. • Assemble at emergency assembly	Individual(s)

	point as there may be aftershocks	
Action after effective Period (Establish Emergency Control Center. Site Main Controller to direct all activities)	• Assess situation and initiate shut down of plants (if required) • Initiate search & rescue (if required) • Evacuation of people. • Recovery/ Rehabilation Work • Medical care for the injured. • Supply of food and drinking water. • Temporary shelters like tents, metal sheds etc. • Repairing lines of communication and information. • Restoring transport routes • Take head count • Activate emergency plan as situation demands • Assess damage	Main Controller, Incident Controller, Site Incident Controller, , Coordinators – Fire & Security, Safety, Material and Medical

Storm

The contingency actions during storm shall be based on the weather forecasts obtained from meteorological stations and the local meteorological department. Some of the important actions to be carried out are as follows:

Prior to Storm

- ✓ Communication with the local meteorological department.
- ✓ Maintain distances from storm in order to execute preparatory actions in a shorter time.
- ✓ Considering the consequences about the emergency might have on operations and personnel.
- ✓ Review all operations carefully to ensure that systems in jeopardy are taken care of or shut down.
- ✓ Ensure the readiness of first aiders, emergency vehicles, medical centre, medicines etc.
- ✓ Metallic sheets, loose materials, empty drums and other light objects shall be properly secured.
- ✓ Flush the drainage systems.

During Storm

- ✓ Remain calm.
- ✓ Avoid going outdoors.
- ✓ Do not seal the office completely as the suction created by the difference in atmospheric pressure inside and outside can rip open a window or door by breaking window glass panes.

After the Storm

- ✓ Do not touch electric lines.
- ✓ Stay away from the disaster area.
- ✓ Take special precautions in driving vehicles since the under-pavement could cave in due to the weight of automobile.

Flood

Jharkhand faces major floods mainly due to Flash Floods.Appropiate measures will be taken as required to maintain the Plant safety. Flash flood has caused severe damages to houses, roads, bridges and culvert. As Damodar river is located 2km away from the plant site Flood control measures will be taken as required to maintain the Plant safety.

Air Raid

Air raid warning is obtained from the District Emergency Authority or Defence Authorities, during which total blackout of the entire complex should be considered. Some of the contingency actions to be considered during an air raid are as follows:

- ✓ The Aviation Lights installed on highest point inside the factory shall be switched off.
- ✓ All the lighting on the Streets shall be put off.
- ✓ All the plant lighting shall be put off.
- ✓ Brown curtains shall be provided for all windows inside the building.
- ✓ Other emergency actions shall be followed in addition as per the general procedure.

Food and Water Poisoning

Food and water poisoning to a no. of persons, due to canteen food or other means, is another scenario which can leads to major emergency. In this case Medical Officer would be informed immediately by the Main Controller at site and then to incident Controller(IC) and Site Controller (SC). In such situation doctors will act and if situation demands additional help such as ambulances, doctors and medicine would be arranged from nearby factories and hospitals.

7.0 Fire & Explosion Index

Fire and Explosion Index (FEI) is useful in identification of areas in which the potential risk reaches a certain level. It estimates the global risk associated with a process unit and classifies the units according to their general level of risk. FEI covers aspects related to the intrinsic hazard of materials, the quantities handled and operating conditions. This factor gives index value for the area which could be affected by an accident, the damage to property within the area and the working days lost due to accidents.

Fire and explosion index is then calculated as the product of Material Factor (MF) and Unit Hazard Factor. Degree of hazards based on F& EI given in the following **Tables 1.7** and **Table 1.8** respectively.

Table 1.6

Degree of Hazards Based on F& EI

FEI Range	Degree of Hazard
0 – 60	Light
61 – 96	Moderate
97 – 127	Intermediate
128 - 158	Heavy
159 and Above	Severe

Table 1.7

Calculated Degree of Hazards Based for M/s. Aloke Steel Industries Pvt Ltd

Sl No.	Unit	Parameter	Hazard F&EI Potential	Remarks
1.	Raw materials & Products	Iron ore	Light	Physical Hazard
		Coal	Moderate	Fire
		Fly Ash, Bottom Ash, Slag	Moderate	Dust & Toxic
		Other fluxing minerals	Light	Dust & Toxic
		Product steel	Light	Physical Hazard
2.	Iron making in Rotary kiln	Coal reduction fuel gas	Intermediate	Flammable and CO pollution
		Hot Metal	Intermediate	Personnel injury & fire
		Burning coal	Intermediate	Personnel injury & fire
3.	Rolling Mills	Hot metal	Intermediate	Fire
4.	Fuel gas Distribution	Fuel leaks	Intermediate	Fire and CO pollution
5.	Electric power supply	Short circuit	Intermediate	Fire
6.	Transformer	Electrical Fire	Light	Explosion & fire
7.	Steam turbine generator building	Explosion	Moderate	Fires in Lube oil system, Short circuit in control room/switch gear, cable galleries & oil drum storage
8.	Boilers	Heat recovery boilers	Moderate	Fire/steam explosion

9.	Coal Handling plant	Storage shed	Moderate	Fire or dust explosion
10.	Coal Storage	Storage shed	Moderate	Spontaneous Combustion
11.	Dolomite storage	Storage shed	Moderate	Toxic exposure

8.0 Mitigation Measures

Risk Mitigation measures for the proposed Expansion and new Installation activities require adoption of best safety practice at the respective construction zones as well as operational phase within the works boundary. In addition, the design and engineering of the proposed facilities will take into consideration of the proposed protection measures for air and water environmental as outlined in earlier Chapter.

Coal Handling Plant

- ✓ Coal handling unit shall be minimum 500 meters away from the residential area, school/colleges, Historical Monuments, Religious Places, Ecological sensitive area as well as forests area. Also from Railway line, Express ways, National Highways, State ways and District Roads and from water bodies like River, Nala, Canal, Pond etc.
- ✓ Coal storage unit shall provide paved approach with adequate traffic carrying capacity.
- ✓ Compound wall with adequate height should be constructed around the coal storage area
- ✓ The unit should have adequate water supply through pipe/ surface water before selection of the site.
- ✓ Coal storage unit should ensure that stacking of coal in heaps does not get higher than the compound wall of premises of unit
- ✓ Adequate dust suppression measures should be provided to prevent fugitive emission and also risk of fire. Similar measures should be adopted for loading/unloading operations. Coal ash should be transported in tankers, which are covered and closed and there is no chance of spillage during transportation.
- ✓ Fire fighting measures should be provided to avoid any fire and ensure that there is no explosive or chemical reaction in storage yard.
- ✓ Coal unit should take measures to control the air pollution while loading/handling coal. Specific measures should be under-taken to avoid fugitive emission at the time of loading/unloading of coal by individual coal yard unit.

Induction Furnace

- ✓ Gas safety man would accompany the team and would test the atmosphere for the presence of CO, before starting the work. If CO, concentration is found exceeding the sage

limit, the job would be undertaken using necessary safety appliances viz., Oxygen Breathing Apparatus/Blower type Gas mask.

- ✓ Any gas cutting /welding job would be undertaken with the clearance from Gas safety man.

Control Rooms

- ✓ Control rooms shall be blast proof and shock proof
- ✓ The building shall be located upwind of the process storage and handling facilities. The building shall not be at a lower level than the tank farm.
- ✓ Adequate number of doors shall be provided in the control room for safe exit
- ✓ Smoke detectors system shall be provided for control rooms at suitable locations
- ✓ One hydrant (minimum) for every 45m per wall of the building shall be positioned all around the building

Gas Explosion, Prevention & Preventive Measure

The following actions would be taken to prevent any gas explosions in case of gas leakage.

- ✓ For works on gas lines/equipment, non-sparkling copper tools will used. If such tools are not available, grease coated steel tools would be used.
- ✓ Electrical drill & other electrical equipment will not be used as these can give rise to sparks.
- ✓ The gas line would be thoroughly purged with steam before undertaking the job on the same.
- ✓ Naked lights will not be used near any de-pressurized gas main or equipment unless the same has been thoroughly purged.
- ✓ In case of profuse leakage of gas, action would be taken for water sealing and isolating that portion.
- ✓ The approach road to the gas line complex would be kept free from any obstructions.
- ✓ If gas catches fire due to some leakage, it will be extinguished with plastic clay, steam or water.
- ✓ The portion of gas main affected would be cooled down with water. The valve will not be closed when fire is still there and the pressure in the main will be maintained at minimum 100mm (WC).
- ✓ Gas tapping points of flow or pressure measurement will be cleaned with wooden stick or grease coated wire.
- ✓ If lighting is necessary near gas line, portable spark, proof electrical lamps of low voltage or explosion proof torchlight will be used for enclosed areas.

Mitigation measure for Hot Metal spillage

Any accumulation of water will be prevented in such vulnerable areas.

- ✓ In case of minor leakages, the flow of molten metal will be controlled.
- ✓ If there is major breakout, the area would be cut off and cordoned.
- ✓ Vital connections e.g. water, gas, compressed air, oxygen etc., would be cut off or regulated as per requirement.

Electrical safety

- ✓ Adequately rated and quick response circuit breakers, aided by reliable and selective digital or microprocessor based electromagnetic protective relays would be incorporated in the electrical system design for the proposed activities.
- ✓ The metering and instruments would be of proper accuracy class and scale dimensions.

Fire Fighting Facilities

All the fire extinguisher system will be controlled by the Security Department. Safety department will consist of qualified safety manager, safety officer and supporting staff.

- ✓ Portable fire extinguishers
- ✓ Fire Hydrant system
- ✓ Sprinkler system employed near fire prone areas
- ✓ Fire Buckets

Table no 1.8

Details of Fire Fighting Facilities onsite

Sl No.	**Name of site**	**Type of Extinguisher**
1	Cable galleries	CO_2 & Foam type, Dry chemical powder
2	High voltage panel	CO_2 & Foam type, Dry chemical powder
3	Control rooms	CO_2 & Foam type, Dry chemical powder
4	MCC rooms	CO_2 & Foam type, Dry chemical powder
5	Pump Houses	CO_2 & Foam type, Dry chemical powder
6	Guest houses and offices	Dry chemical powder, foam type
7	Godowns	Foam type
8	Bunkers, Silo, enclosed dust collector	CO_2 type, N_2 type, automatic sprinkler, fixed spray nozzle(unless water reactive)

Personal Protective Equipment (PPE)

Personal Protective equipments kept onsite are made readily available to plant personnel. **Table1 .9** shows the lists of recommended Personal Protective equipments (PPE) onsite.

Table 1.9
Summary of Recommended Personal Protective Equipment According to Hazard

	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, molten metal, gases or vapors, light radiation	Safety glasses with side-shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power cords	Plastic helmets for top and side impact protection
Hearing protection	Noise	Hearing protectors (ear plugs or ear muffs)
Foot protection	Failing or rolling objects, points objects. Corrosive or hot liquids	Safety shoes and boots for protection against moving and failing objects, liquids and chemicals
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures	Gloves made of rubber or synthetic material (Neoprene), leather, steel, insulation materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors	➢ Facemasks with appropriate filters for dust removal and air purification (chemical, mists, vapors and gases). ➢ Single or multi-gas personal monitors, if available
	Oxygen deficiency	Portable or supplied air (fixed lines). Onsite rescue equipment
Body / leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Insulating clothing, body suits, aprons etc. of appropriate materials
Fly Ash	Fly ash handling and storage	➢ For handling, dust-proof goggles and rubber or PVC gloves. ➢ For large quantities or where heavy contamination is likely, wear: coveralls. ➢ For high dust levels, wear: a Full-face Class P3 (Particulate) or an Air-line respirator. ➢ For inhalation risk exists, wear: a Class P1 (Particulate) respirator.

***Occupational Health & Safety Onsite as per T.o.R Point (8i-iv)*:**

i. **Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved**,

Occupational Health Hazards at M/s. Aloke Steel Industries Pvt Ltd, Jharkhand

M/s. Aloke Steel Industries Pvt Ltd will adopt suitable measures for the proper occupational health safety of workers complying to OSHA standards. Permissible Exposure Level (PEL) of various Chemical Handled onsite are listed below in **Table No 1.10**

- Dust Exposure level of shop floor workers shall be appropriately monitored.
- Check of the effectiveness of preventive and control measures on regular basis.
- Adequate supplies of potable drinking water is to be provided .Water supplied to areas of Plant food preparation or for the purpose of personal hygiene (washing or bathing) are according to drinking water quality standards
- Where there is potential for exposure to harmful dusts by ingestion arrangements are to be made for clean eating areas, where workers are not exposed to the hazardous or noxious substances
- Periodic medical hearing checks are to be performed on workers exposed to high noise levels
- Provisions are to be made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees
- Contractors that have the technical capability to manage the occupational health and safety issues of their employees are to be hired, extending the application of the hazard management activities through formal procurement agreements
- Ambulances and First aid treatment facilities are made available for any emergency situation

Table 1.10
PEL level Summary as per OSHA

SL No.	Chemical Name	OSHA PEL	Cal/OSHA PEL	NIOSH REL	ACGIH
		Mg/m3	**8-hour TWA (ST) STEL (C) Ceiling Mg/m3**	**Up to 10-hour TWA (ST) STEL (C) Ceiling Mg/m3**	**TLV**
1.	Coal Dust			1	0.9 (resp.) bituminous or lignite; 0.4 (resp.)
2.	a) Respirable fraction less than 5% SiO2	2.4 Mg/m3	0.9(bituminous)		

	b) Respirable fraction greater than 5% SiO2	10/(%SiO2+2)	0.1(bituminous)		anthracite (coal dust to be monitored for crystalline silica
3.	Iron oxide	10 (fume)	5 fume)	5 (dust and fume)	5 mg/m3
6.	Gypsum				
	a. Total Dust	15 Mg/m3	10 Mg/m3	10 Mg/m3	
	b. Respirable dust fraction	10 Mg/m3	5 Mg/m3	5 Mg/m3	
8.	Alumina Dust				
	a. Total Dust		15 Mg/m3	10 Mg/m3	
	b. Respirable dust fraction		5 Mg/m3	5 Mg/m3	
9.	Silica Dust		50 microgram/m3		
10.	Fly Ash (calcium oxide, sillicates)				1 mg/m3 , natural as Wollastonite (IHL,no asbestos and <1% crystalline silica
11.	Carbon Monooxide	55 Mg/m3	25 ppm	35 ppm	25 ppm
	Reference- OSHA/PEL exposure limit Guide				

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometrv. Vision testing (Far & near vision. color vision and any other ocular defect) ECG, during pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.

Workers' health shall be evaluated by pre designed format, given below for chest x rays, Audiometry, Spirometrv, Vision testing (Far & Near vision. color vision and any other ocular defect) ECG, during pre placement and periodical examinations that will give the details of the same.

Spirometry Tests						
Year	***Total Manpower***	***FVC (litres)***	***FEV 1***	***FEV 1/ FVC %***	***PEFR***	***Conclusion***

Physical Examination Tests								
YEAR	***Total Manpower***	***Pulse***	***ECG***	***BP***	***Right Eye***	***Left Eye***	***Color Blindness***	***Squint***

Investigations Tests					
YEAR	*Total Manpower*	*Blood (CBC)*	*Blood Sugar (F& PP)*	*Lipid profile*	*URINE (R&M)*

Audiometry Tests					
YEAR	*Total Manpower*	*Audiometry done*	*Normal*	*Abnormal*	*Conclusion*

iii. Annual report of heath status of workers with special reference to Occupational Health and Safety.

Annual report of health will be reviewed for M/s. Aloke Steel Industries Pvt Ltd, manpower once the facility the proposed activity is operational as per above given formats.

iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

Necessary required budgetary allocation will be kept for to ensure safety of all Employees including contract & casual workers.

9.0 DISASTER MANAGEMENT PLAN

9.1 INTRODUCTION TO THE TERM "DISASTER"

The term "Disaster" refer to extensive damage of property and serious disruption both inside, outside the work system and its surrounding that can be natural or human interfered. Emergency may be caused by a number of different factors, e.g. plant failure it will normally manifest itself in three basic forms viz fire, explosion or toxic release and requires the assistance of emergency control services to handle mass devastation effectively.

9.2 NEED OF DISASTER MANAGEMENT

The aim of Disaster management plan is concerned with preventing accidents through following guidelines of good design practice, operation, maintenance and inspection, by which it is possible to reduce the risk of an accident. Since it is known to all it is not possible to eliminate entire risk since, absolute safety is not achievable.

After Assessing and quantifying the possible scenarios, consequence analysis approach to emergency preparedness and emergency planning delineates Disaster Management Plan for both on-site and off-site. These plans are needed to be implemented in the event of a disaster.

9.3 OBJECTIVE OF DISASTER MANAGEMENT PLAN

The objective of Disaster Management plan is to give a broad framed layout to tackle emergency situation that may lead to a hazardous situation. It defines detail organizational responsibilities, actions, reporting requirements, broad and specific key roles and responsibilities of personal with Organograms and organisation charts. The overall objectives of the emergency plan will be:

- ✓ Ensure safety of people, protect the environment
- ✓ To ensure localization of risk
- ✓ To minimize and reduce the effects of the accident on people and property.
- ✓ Immediate response to emergency scene with effective communication network and organized procedures
- ✓ To obtain and mitigate early warning of emergency conditions so as to prevent impact on personnel, assets and environment
- ✓ To prevent injuries by following proper onsite, offsite emergency plans that can protect personnel from the hazard

9.4 PHASES OF DISASTER

There are various phases of Disaster including pre and Post Management of Hazardous Event that may or has occurred.

Warning Phase

Emergencies /disasters are generally preceded by warnings during which preventive measures may be initiated. For example uncontrollable build-up of pressure in process equipment, weather forecast give warning about formation of vapour cloud, equipment failure etc.

Period of Impact Phase

This is the phase when emergency /disaster actually strike and preventive measures may hardly be taken. However, control measures to minimise the effects may be taken through a well-planned and ready-to-act disaster management plan already prepared by organization. The duration may be from seconds to days.

Rescue Phase

This is the phase when impact is almost over and efforts are concentrated on rescue and relief measures.

Relief Phase

In this phase, apart from organization and relief measures internally, depending on severity of the disaster, external help are also to be summoned to provide relief measures (like evacuations

to a safe place and providing medical help, food clothing etc.). This phase will continue till normalcy is restored.3

Rehabilitation Phase

This is the final and longest phase. During which measures required to put the situation back to normal as far as possible are taken. Checking the systems, estimating the damages, repair of equipments and putting them again into service are taken up. Help from revenue/insurance authorities need to be obtained to assess the damage, quantum of compensation to be paid etc.

9.5 KEY ELEMENTS

9.5.1 Basis of Plan

Hazard Identification necessitates preparation and planning the prevention and methods by which accidental failure can be tackled without much damage to life. HAZID-HIRA and consequence analysis combines and requires planning for the following:

- ✓ Hazards from spread of fire or release of flammable from storage and process units
- ✓ Hazards due to formation of pressure waves due to vapour cloud explosion of flammable gases

9.5.2 Emergency planning and Response procedure

The Emergency Response Plan is plan for dealing with emergencies are implemented immediately whenever there is a fire, explosion, or release of a hazardous substance that threatens human health or the environment. The emergency response plan is reviewed and immediately amended whenever:

- ✓ The plan fails in an emergency
- ✓ The list of emergency contacts change
- ✓ The list of emergency equipment changes
- ✓ The facility changes in its design, construction, operation, maintenance, or other circumstances in a way that increases the potential for fire, explosions, or release of a hazardous substance

Incident Response Plan

It is the Frame work of addressing the emergency situation arose due to failure scenario.

- ✓ Incident Response Plan(IRP) and Emergency Preparedness Plan
- ✓ Incident Response Team (IRT)
- ✓ Emergency Response Team (ERT)
- ✓ Crisis Management Team (CMT)

9.5.3 Onsite Disaster Management Plan

Disaster management plan are prepared with an aim of taking precautionary step to control the hazard propagation, avert disaster, take action after the disaster which limits the damage to the minimum and follow the on-site emergency planning.

9.6 Onsite Emergency Plans

The onsite emergency is an unpleasant situation that causes extensive damage to plant personnel and surrounding area and its environment due to in operation, maintenance, design and human error. Onsite plan will be applied in case of proposed expansion. Following point are taken into consideration:

- ✓ To identify, assess, foresee and work out various kinds of possible hazards, their places, potential and damaging capacity and area in case of above happenings.
- ✓ Review, revise, redesign, replace or reconstruct the process, plant, vessels and control measures if so assessed.
- ✓ Measures to protect persons and property of processing equipments in case of all kinds of accidents, emergencies and disasters
- ✓ To inform people and surroundings about emergency if it is likely to adversely affect them

9.6.1 Disaster control Management system at Aloke Steel Industries Pvt Ltd

Disaster Management group plays an important role in combating emergency in a systematic manner. Schematic representation Emergency Control Management system for M/s. Aloke Steel Industries Pvt Ltd is shown in **Fig.1.2**

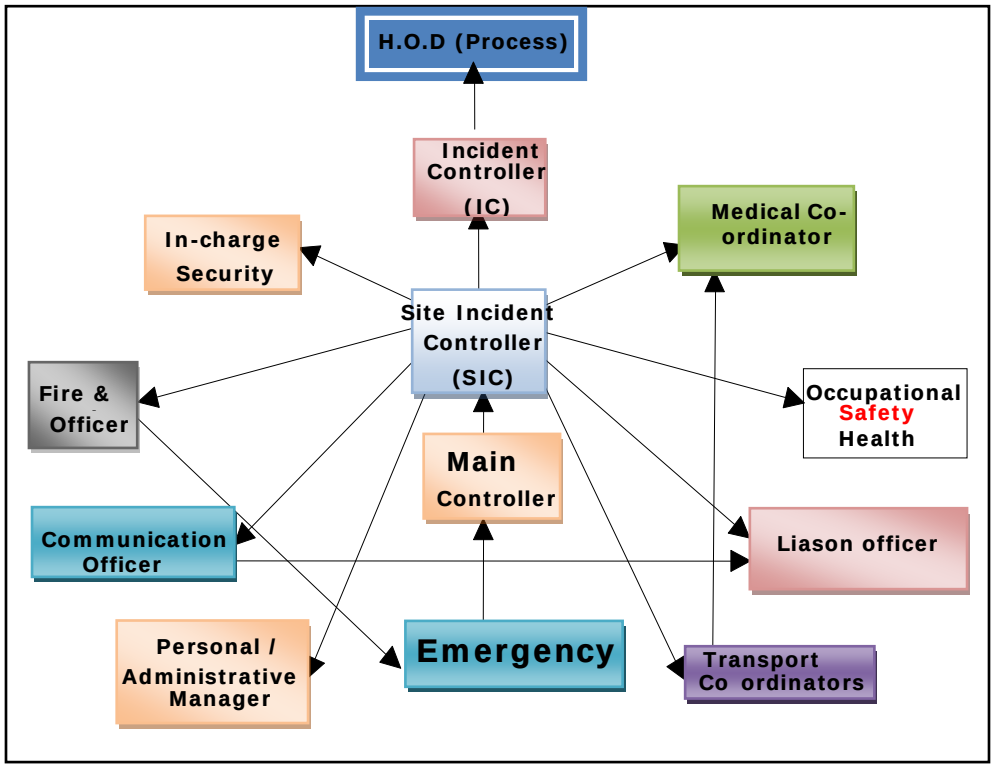

Fig.1.2: Onsite DMP - Disaster Control / Management System

9.6.2 Emergency Control Centre (ECC)

An Emergency Control Centre (ECC) is established from which emergency operations are directed and co-ordinated. Centre will be activated as soon as on-site emergency is declared. The ECC will consist of one room, located in an area that offers minimal risk being directly exposed to possible accidents. During an emergency, the Emergency Management Staff, including the main controller will gather in the ECC. Therefore, the ECC will be equipped with adequate communication systems in the form of telephones and other equipments to allow unhampered organization and other nearby facility personnel.

The ECC will provide shelter to its occupants against the most common accidents; in addition, the ECC's communication systems will be protected from possible shutdown. The ECC will have its own emergency lighting arrangement and electric communication systems operation. The ECC will always be ready for operation and provided with the equipment and supplies necessary during the emergency such as:

- ✓ Hazard identification chart, All Emergency response plans
- ✓ Population around factory
- ✓ Internal telephone connections and External telephone connections
- ✓ A list of key personnel, with addresses, telephone numbers, etc.
- ✓ Hotline connection to district collector, police control room, fire brigade, Hospital etc.
- ✓ Public address system (PAS)
- ✓ MSDS of all the materials used in Plant site
- ✓ List of dispensaries and registered medical practitioners around factory
- ✓ Area map of surrounding villages
- ✓ Note pads and ball pens to record message received and instructions
- ✓ The blown up copy of Layout plan showing areas where accident has Occurred
- ✓ Undated copies of the On-site Disaster Management Plan
- ✓ Emergency telephone numbers
- ✓ The names, phone number, and address of external agencies, response organizations and neighbouring facilities
- ✓ The adequate number of telephone
- ✓ Emergency lights
- ✓ List of fire extinguishers with their type no. and location, capacity, etc
- ✓ Personal protective equipment(PPE)

- ✓ Safety helmets
- ✓ Clock
- ✓ Material safety data sheets for chemicals handled at the facility
- ✓ Several maps of the facility including drainage system for surrounding area showing:
- ✓ Areas where hazardous materials are stored
- ✓ Plant layout
- ✓ Plot plans of storage tanks, routes of pipelines, all water permanent lines etc.
- ✓ The locations where personal protective equipment are stored
- ✓ The position of pumping stations and other water sources
- ✓ Roads and plant entrances
- ✓ Assembly areas
- ✓ Lay out of Hydrant lines

9.6.3 Roles and Responsibility

A team of following Essential persons shall be taking necessary action in case of emergency. The roles and responsibilities of these personnel are defined subsequently:

- Main Controller
- Site Incident Controller(SIC)
- Incident Controller (IC)
- Liaison Officer
- Communication Officer
- Observer
- Incharge (Security)
- Incharge (Medical)
- Shift Incharge (Security)

Main Controller

The Primary Controller is the employee who gives the first information about the incident/accident. He will be responsible for:

- ✓ To inform the Security office (Main Gate), & Engineers/Sr. Engineers / Shift In-Charges/HOD of Section of the aforesaid Department/Section from the nearest available telephone about the location and nature of incident.
- ✓ To assist rescue operation as well as clear obstruction, if any, in the same.
- ✓ To carry out all instructions from Incident Controller.

Site Incident controller (SIC)

The Unit Head shall have overall responsibility for the factory and its personnel. In absence of Unit Head, Chairman OHS Committee shall assume the responsibility of Site Controller. His duties during emergency shall be:

- ✓ To assess the magnitude of the situation and decide if employees need to be evacuated from assembly points.
- ✓ To give necessary instructions to Liaison Officer, HOD(HR&A) regarding the help to be obtained from outside agencies like Fire Brigade, Police and Medical
- ✓ To advise Liaison Officer to pass on necessary information about the incident to News Media and ensure that the evidences are preserved for enquiry to be conducted by statutory authorities.

Incident Controller(IC)

The HOD of affected department shall have overall responsibility for controlling the incident and directing the personnel. Section In charge of the affected department shall assume the responsibility of Incident Controller(IC) in the absence of HOD of affected department. His duties during emergency shall be:

- ✓ To inform Communication Officer about the emergency, Control Center & Assembly point.
- ✓ To direct all operations` within the affected area with priorities for safety of personnel, to minimize damage to the Plant and environment and to minimize loss of material.
- ✓ To act as Site Controller till the later arrives.
- ✓ To advise and provide information to Fire Squad, Security Officer and Local Fire Services when they arrive.
- ✓ To ensure that all non-essential persons are sent to the assembly point.

Liaison Officer

HOD (HR&A) shall be the Liaison officer. He shall be responsible for: -

- ✓ To contact Fire Brigade, Police, and Medical facilities on intimation from Site Controller & arrange for the rescue operation.
- ✓ To ensure that the casualties receive attention.
- ✓ To inform relatives of the affected employee at the earliest.
- ✓ To arrange for additional transport if required.

- ✓ To arrange for relief of personnel & organize refreshment/catering facility, in case the duration of emergency is prolonged.
- ✓ To issue authorized statements to news media and ensure that evidence is preserved for enquiry to be conducted.

Incharge (Medical)

On receiving the information he will reach hospital immediately and take following actions :-

- ✓ He will keep necessary first aid medicines and artificial respiration equipment ready.
- ✓ Inform doctors at other places to be ready, for attending serious injury, burn cases and food poisoning

Observer

- ✓ During Mock Drill for Emergency Situations they shall be placed at different locations in plant to note down the movement and action taken by people and give feed back to the Site Controller.

Communication Officer

In-Charge (Safety) shall act as Communication officer. He shall work from Control Centre and maintain communication between relevant personnel. He shall be responsible for: -

- ✓ To apprise the site controller of the situation, based on the information received, suggest the evacuation of personnel from assembly points, if needed.
- ✓ To arrange for suitable persons to act as runners/messengers in case of failure of communication system.
- ✓ To carry out any other works as assigned by Site Controller/Incident Controller

Incharge - Security

- ✓ The Incharge (Security) shall guide the crew, according to the condition of emergency site, for the actions required to handle the emergency i.e. for fire fighting, removal of debris, arresting of dust, removal of oil soaked earth etc. He shall give instructions to Security Guards to cordon off areas as required by Incident Controller. He shall render all help to incident controller to handle the emergency and carry out the work as assigned to him.
- ✓ He shall be responsible for ensuring the discipline at control points and for preventing the entry of unauthorized persons inside the affected area as well as inside the factory during emergency.

Shift Incharge – Security

He shall be responsible for

- ✓ To arrange the necessary help as requested by Primary Controller.
- ✓ To inform Incharge (Security).
- ✓ To blow emergency siren, if instructed by the HOD (HR&A)/Incident Controller.
- ✓ To send Ambulance near accident area.
- ✓ To rush to the accident site with fire brigade along with available trained security persons.

9.6.7 Automatic Fire Detection System

Unattended vulnerable premises like electrical control rooms, cable tunnels, MCC, oil cellars, etc. will be provided with automatic fire detection and alarm systems.

9.6.8 Manual Call Point Systems

All major units and welfare/administrative building will be provide with manual call points for summoning the fire fighting crew from the fire station for necessary assistance.

9.6.9 Fire Station

The following equipment will be provided in the fire posts.

- ✓ Water tender
- ✓ Foam tender
- ✓ Portable pump
- ✓ Wireless set
- ✓ Hoses
- ✓ Hot line telephone

9.6.10 Alarm System

A hooter installed at the Security Office shall be blown alternately with high and low pitch for 2 minutes to indicate major emergency in the plant. In such case, all non-essential employees are expected to gather at assembly point i.e. Company's Main Gate/Time Office. Signal for the clearance of emergency shall be given by blowing the hooter continuously for one minute.

9.6.11 First Aid

- ✓ Fully equipped Hospital with Ambulance Van is available. Doctors and nurse are available round the clock to handle any emergency in the plant. The Ambulance shall be periodically checked through preventive maintenance programme .To ensure that the system is strictly followed, In-charge (Safety) shall cross check randomly once in a fortnight the preparedness of Ambulance as per the check list and counter sign
- ✓ The injured shall be shifted to nearby hospital, as per the opinion of the Medical Officer.

- ✓ A list of First Aid boxes is available in every department as mentioned in ECC
- ✓ Medical Officer shall ensure that refilling is done on monthly basis and he shall maintain a record of refilling.
- ✓ The names & contact numbers of trained First Aiders are provided the same is displayed at all the prominent locations in the premises.
- ✓ In case of Injury caused due to Hazardous Chemicals, Material Safety Data Sheet (MSDS) available with the user department / Hospital shall be referred.

9.6.12 Mock Drill

For reviewing and assessing the level of preparedness, In-charge (Safety) shall conduct Mock trials twice in a year (one in each half) simulating the covered emergencies and will maintain records of the trials. The team of Prime & Deputy Responsible persons will review the records and events of the emergency preparedness trials along with the observations taken by the observer and report shall be put forward to the Site Controller. Corrective and Preventive measures, if suggested/directed, will be initiated and relevant records of the same are maintained. Fire drills will be exercised once in every six months under the leadership of Incharge (Security). The records of Fire drill will be recorded & maintained.

The findings of the mock drills shall be used for improvements in preparedness and response. All team leaders shall be responsible for implementing the suggestions based on mock drill findings within reasonable time frame.

9.6.13 Training

On a yearly basis class room training for fire fighting and mitigating measures to be adopted to reduce environmental impact & OHS risks, will be imparted covering at least 20% employee by the In-charge (Safety) and In-charge (Security). The records of the same are maintained.

9.6.14 Evacuation Plan

To establish method of systematic, safe and orderly evacuation of all the occupants in case of fire or any emergency, in the least possible time, to a safe assembly point through nearest safe means of escape. Additionally to use available fire appliances provided for controlling or extinguishing fire and safeguarding of human life.

- ✓ Facility staff will be notified of evacuation by one or more of the following method(s): Verbal, Intercom, Portable Radio, Alarm, Other
- ✓ Notification to emergency services to ECC
- ✓ Staff will follow predetermined evacuation routes and assemble at designated areas. Evacuation maps must be displayed throughout the facility.
- ✓ Individuals responsible for coordinating evacuations must confirm the process

9.7 Off-Site Emergency Planning

The off-site emergency plan is an integral part of any hazard control system. It is based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority. Schematic representation of various organisation involved during emergency is shown below in **Fig.1.3.**

Either way, the plan must identify an emergency coordinating officer who would take overall command of the off-site activities. Consideration of evacuation may include the following factors:

- ✓ In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation
- ✓ If fire is escalating very fast it is necessary to evacuate people nearby as soon as possible
- ✓ In acute emergency people are advised to stay indoors and shield themselves from the fire.

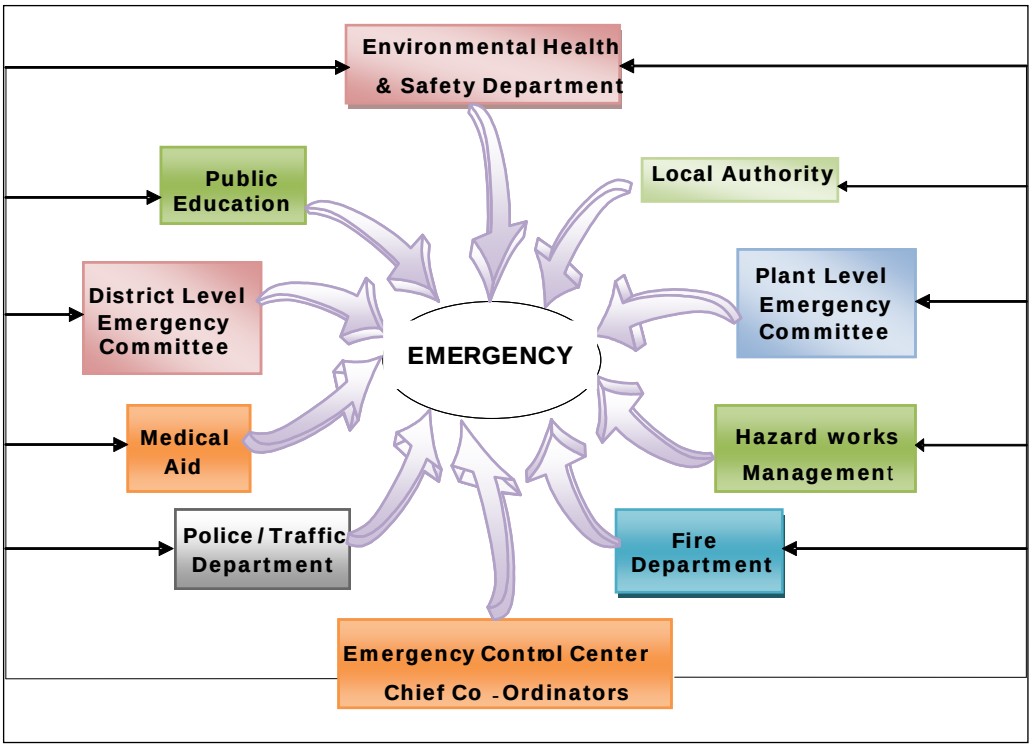

Fig. 1.3: Various Organizations Involved During Emergency

9.7.1 Organization

Organizational details of command structure, warning systems, implementation procedures, emergency control centres include name and appointments of incident controller, site main controller, their deputies and other key personnel involved during emergency.

9.7.2 Communications

Identification of personnel involved, communication centre, call signs, network, list of telephone numbers.

9.7.3 Special Emergency Equipment

Details of availability and location of heavy lifting gear, specified fire-fighting equipment, fireboats etc.

9.7.4 Voluntary Organizations

Details of Voluntary organizations, telephone numbers nearby of hospitals, Emergency helpline, resources etc are to be available with chief authorities.

9.7.5 Non-governmental Organizations (NGO)

NGO's could provide a valuable source of expertise and information to support emergency response efforts. Members of NGOs could assist response personnel by performing specified tasks, as planned during the emergency planning process.

- ✓ Evacuation of personnel from the affected area
- ✓ Arrangements at rallying posts and parking yards
- ✓ Rehabilitation of evacuated persons

9.7.6 Chemical information

Details of the hazardous substances (MSDS information) and a summary of the risks associated with them will be made available at respective site.

9.7.7 Meteorological information

There is to be arrangements for obtaining details of weather conditions prevailing at r before the time of accident and weather forecasts updates.

9.7.8 Humanitarian Arrangements

Transport, evacuation centres, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.

9.7.9 Public Information

- ✓ Dealing with the media-press office
- ✓ Informing relatives, etc.

9.7.10 Assessment

- ✓ Collecting information on the causes of the emergency
- ✓ Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

9.7.11 Role of local authority

Local Authorities like Panchayat, Sabha, Samity, municipalities can help in combating emergency situation after assessing the impact scenario in rescue phase.

9.7.12 Role of police

The police is to assist in controlling of the accident site, organizing evacuation and removing of any seriously injured people to hospitals.

- ✓ Co-ordination with the transport authorities, civil defence and home guards
- ✓ Co-ordination with army, navy, air force and state fire services
- ✓ Arrange for post mortem of dead bodies
- ✓ Establish communication centre with easy contact with ECC

9.7.13 Role of Fire Brigade

The fire brigade shall be organized to put out fires and provide assistance as required during emergency.

9.7.14 Media

- ✓ The media is to have ready and continuous access to designated officials with relevant information, as well as to other sources in order to provide essential and accurate information to public throughout the emergency and to avoid commotion and confusion
- ✓ Efforts are made to check the clarity and reliability of information as it becomes available, and before it is communicated to public
- ✓ Public health authorities are consulted when issuing statements to the media concerning health aspects of chemical accidents
- ✓ Members of the media are to facilitate response efforts by providing means for informing the public with credible information about accidents involving hazardous substances

9.7.15 Role of health care authorities

- ✓ Hospitals and doctors shall be ready to treat all type of injuries to causalities during emergency.
- ✓ Co-ordinate the activities of Primary Health Centres and Municipal Dispensaries to ensure required quantities of drugs and equipments
- ✓ Securing assistance of medical and paramedical personnel from nearby hospitals/institutions
- ✓ Temporary mortuary and identification of dead bodies

10.0 CONCLUSION

As discussed in above sections, adequate risk Control measures for process needs to be considered for to say that the proposed expansion New proposed Project Activity is not likely to

cause major significant risk to onsite, offsite & environment. Suitable Mitigation Measures will be taken by M/s. Aloke Industries Pvt Ltd, Dist-Ramgarh Jharkhand to ensure complete workplace safety. In the event of disaster onsite, offsite and all the emergency planning procedures will be followed so as to minimise the impact on working personnel, plant surrounding and environment.