Considering the generic structure of the EIA/EMP report prescribed in EIA Notification dated 14.09.2006, this chapter is to comprise of public consultation, disaster management, social impact assessment and R&R Action plan. This chapter deals with identification of hazards and disaster and preventive measures for disaster. The expansion of existing Plant may face certain types of hazards which can disrupt normal activities abruptly and lead to disaster like fires, inundation, failure of machinery, hot metal spill, electrocution to name a few. Disaster management plan is formulated with an aim of taking precautionary step to control the hazard propagation and avert disaster and also to take such action after the disaster which limits the damage to the minimum.

Industrial activities, which produce, treat, store and handle hazardous substances, have a high hazard potential to safety of man and environment at work place and outside. Recognizing the need to control and minimize the risks posed by such activities, the Ministry of Environment & Forests have notified the "Manufacture Storage & Import of Hazardous Chemicals Rules" in the year 2008 (In supersession of the Hazardous Wastes (Management and Handling Rules, 1989) and subsequently modified, inserted and added different clauses in the said rule to make it more stringent. For effective implementation of the rule, Ministry of Environment & Forests has provided a set of guidelines. The guidelines, in addition to other aspects, set out the duties required to be performed by the occupier along with the procedure. The rule also lists out the industrial activities and chemicals, which are required to be considered as hazardous.

During the process of manufacture and other associated materials hazardous wastes are generated which are stored and used within the plant process. The major chemicals handled / stored by the plant includes HSD, LDO etc. In view of this, proposed activities are being scrutinized in line of the above referred "manufacture, storage and import of hazardous chemicals rules" and observations / findings are presented in this chapter.

1.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Hazard is a source or situation that has the potential for harm in terms of human injury, ill health, damage to property or the environment, or a combination of these factors. It has got a short or a long term effect on the work environment with considerable human and economic costs. A hazard can have a potential to create an emergency like situation at the work place. Hazard is a potential cause to generate a disaster.

Hazards exist in every workplace in different forms and required to be identified, assessed and controlled regarding the work processes, plant or substances. They arise from (i) workplace environment, (ii) use of plant and equipment (iii) use of substances and materials, (iv) poor work and/or plant design, (v) inappropriate management systems and work procedures, and (vi) human behaviour.

Steel plant has many hazardous processes and operations which can cause considerable environmental, health and safety risk to the workforce. All the hazards cause potential risk to the work environment which include work force and work place and hence need proper assessment.

M/s Ma Amba Sponge Iron Ltd. has planned to install 1x350 TPD Sponge Iron Plant, (3x20 T) Induction Furnaces, 120000 TPA Capacity Rolling Mill along with 27 MW Capacity Captive Power Plant at village: Jemua, P.O. Mejia, District: Bankura in West Bengal. The Plant has lower risk potential than those industries dealing with toxic and flammable chemicals. Off-site people are not exposed to any dangers, hence the societal risk is insignificant.

For hazard identification, maximum credible accident (MCA) scenarios have been assessed. The maximum credible accident has been characterized as an accident with a maximum damage potential and the occurrence of which is most probable. Based on MCA scenario, the following hazards were identified for this project.

(a) <u>Splashing of molten metal and solid waste</u> : Sudden breaks out of molten metal and slag have been known to take place during furnace operation. The break out may take place from weak portions of hearth. The spillage of hot metal or slag can cause severe burn injuries and fires. Explosions may also occur due to hot metal or slag falling in a pool of water resulting in injuries and fire due to flying hot splinters and splashing of hot metal or slag. The spillage of hot metal can also be due to hearth breakage, mould breakage and during transportation. The accidents can occur due to failure of water-cooled panels, puncture in water-cooled lances, leakage of water from the walls of mould. Through regular checks and proper upkeep of furnace refractory and cooling panels, such incidents can be avoided.

The consequences will result in death (extreme case), severe burn and mechanical injury and will be limited to working personnel near the site of incident.

(b) Dust and fumes: Dust and fumes are generated at many points in the existing steel plant. Dust and fumes are found in the preparation processes, especially sintering, in front of the blast furnace, induction furnaces etc.

Exposure to silica is a risk to workers engaged in lining, relining and repairing blast furnace and induction furnaces and vessels with refractory materials. Ladles are lined with fire-brick or bonded crushed silica and this lining requires frequent repair. The silica contained in refractory materials is partly in the form of silicates, which do not cause silicosis but rather pneumoconiosis. Workers are rarely exposed to heavy clouds of dust.

Alloy additions to furnaces making special steels sometimes bring potential exposure risks from chromium, manganese, lead and cadmium.

(c) Rolling Mill: Severe injuries may be sustained in hot rolling, if workers attempt to cross roller conveyors at unauthorized points. Looping and lashing may cause extensive injuries and burns, even severing of lower limbs. The use of large quantities of oils, rust inhibitors and so on, which are generally applied by spraying, is another hazard commonly encountered in rolling mills. Despite the protective measures taken to confine the sprayed products, they often collect on the floor and on communication ways, where they may cause slips and falls.

Even in automated works, accidents occur in conversion work while changing heavy rollers in the stands.

Tongs used to grip hot material may knock together; the square spanners used to move heavy rolled sections by hand may cause serious injuries to the head or upper torso by backlash. Many accidents may be caused by faulty lifting and handling and by defects in cranes and lifting tackle. Many accidents are caused through falls and stumbles or badly maintained floors, by badly stacked material, by protruding billet ends and cribbing rolls and so on.

In hot rolling, burns and eye injuries may be caused by flying mill scale; splash guards can effectively reduce the ejection of scale and hot water. Eye injuries may be caused by dust particles or by whipping of cable slings; eyes may also be affected by glare.

Considerable noise develops in the entire rolling zone from the gearbox of the rolls and straightening machines, from pressure water pumps, from shears and saws, from throwing finished products into a pit and from stopping movements of the material with metal plates.

Cleaning of the finished products with high-speed percussion tools may lead to arthritic changes of the elbows, shoulders, collarbone, distal ulna and radius joint, as well as lesions of the navicular and lunatum bone.

1.2 DISASTER MANAGEMENT PLAN

A disaster is an unforeseen combination of circumstances that causes serious body injuries loss of life or extensive damage to the plant facilities or total.

Anyone or more of the following uncontrollable factors may cause disaster:

1. Reduction or failure of cooling water
2. Failure of Power
3. Rupture or damage of the line, vessel or tank
4. Excessive leakage of inflammable or corrosive or toxic material
5. Cyclone
6. Earthquake
7. Fine or explosion
8. Sabotage
10. Riot
11. Air Raid

The Disaster Management Plan of the company is divided into two parts:

(i) Onsite Emergency Plan
In this plan, the company officers are given pre-designated responsibilities for dealing with the emergency.

(ii) Offsite Emergency Plan
In this, different Govt. agencies will be conformed about the emergency for necessary help from them.

1.3 ON-SITE EMERGENCY PLAN

A) The disaster control procedure lays down the efforts to be made to prevent fatal accidents, physical harm or injury to personnel and damage to equipment facilities materials. It requires coordinated efforts of all employees to control and eliminate a disastrous situation.

B) All efforts to control a disaster will be coordinated among the various co-ordinators and all actions, taken will be as directed by the chief co-ordinator. The co-ordinating members will be responsible to keep him posted on the development and course of action will be followed by them (refer **Annexure-I)**.

1.3.1 FACILITIES TO BE AVAILABLE WITH THE FACTORY

a) Fire Fighting Facility

The entire factory will be protected with fire extinguishing system from outside and inside the shop floor.

b) Material Handling

Heavy duty cranes including mobile cranes, fork lifts, trucks, trolleys will be used in the plant. The same could be used at time of emergency for handling the material.

c) Personnel Protective Equipments

Safety shoe, safety helmets, safety goggles, asbestos hand gloves, rubber hand gloves, acid proof aprons, earplugs, aprons, leg guards etc. will be made available in the Central store of the plant. At the time of emergency, the same can be made easily available by safety coordinator.

d) Medical Facility

The Plant will have the required emergency medical facilities and health check up for the workers will be done regularly by the visiting Doctors. In case of major accident, persons will be referred to nearest Hospital/Primary Health Centre.

1.3.2 OBJECTIVES

The objective of the On-site Emergency Plan will be to make maximum use of both the internal as well as the external resources:

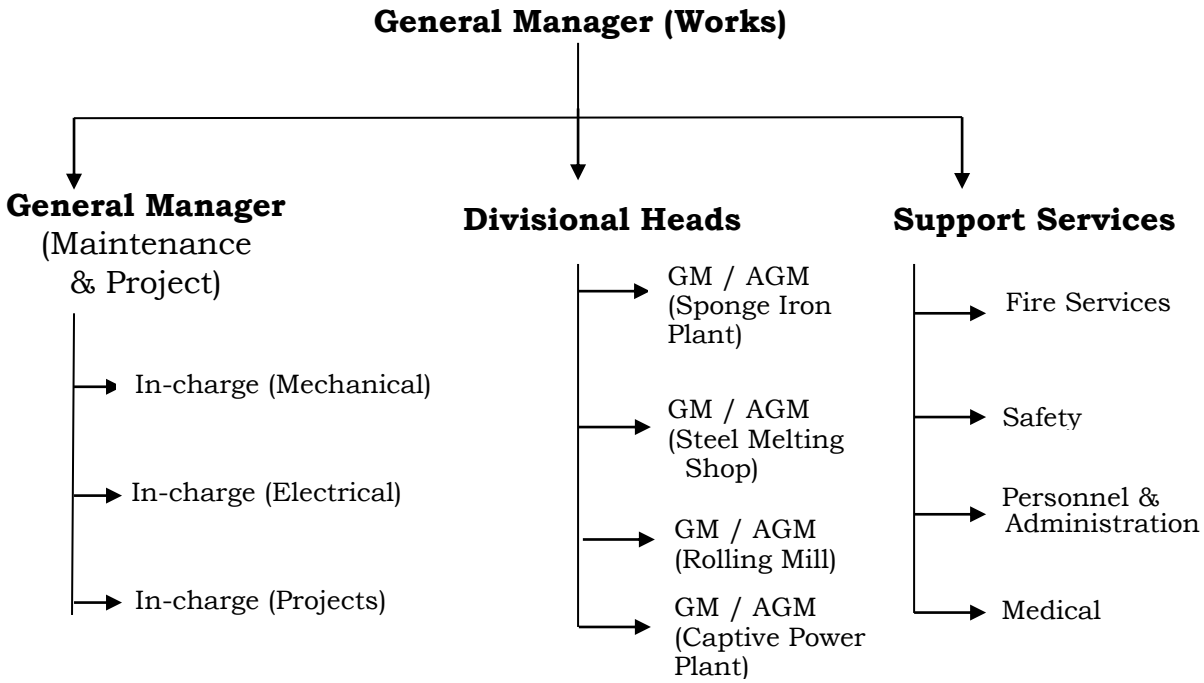
- For rescue and treatment of casualties and safeguard personnel in the premises.
- To minimize damage to property and environment.
- To initially contain and ultimately bring the incident under control.
- To ensure safe rehabilitation of affected areas.
- To provide authoritative information to the news media.
- To preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of emergency.

1.3.3 KEY PERSONNEL AND RESPONSIBILITIES

The actions necessary in an emergency will clearly depend upon the surrounding circumstances. Nevertheless, it is imperative that the required actions will be initiated and directed by nominated people, each having specified responsibilities as part of coordinated plan. Such nominated personnel will be known as Key Personnel.

1.3.4 ORGANIZATION

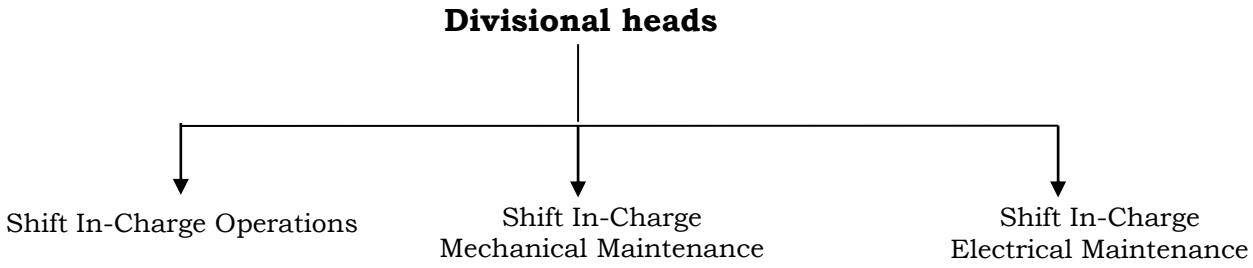
The Central Disaster Management Cell (DMC) will be set up under the direct charge of General Manager (Works). Organizational structure is as below:



General Manager (Works) will be empowered to declare emergency and he would be in charge of all operations in such situations. He will be supported by GM (Maintenance & Projects), Divisional Heads of respective all Plants, Security and Fire Fighting, Administration, Medical Officer, In-charge Safety and In-charge Environment in handling such a situation.

Disaster Control Cell will operate from the Administrative block during emergency.

There will be shop level Disaster management cell in each division. Divisional heads will be nominated as controllers for their respective divisions. They will support central team as required. Organizational structure is as below:



1.4 HAZARDOUS CHEMICALS & ASSOCIATED HAZARDS

The plant will have the storage facilities for the hazardous chemicals like Furnace oil, HSD etc., which may result in the fire or explosion hazard within the plant. The relevant details of the chemicals along with the range of the consequences are given in **Annexure-II**.

1.5 OFF SITE EMERGENCY PLAN

Type of emergency facilities/ actions required from outside bodies:

a) Fire fighting facilities required: Factory will have its own fire fighting facilities but during emergency, fire brigade may be called.

b) Police help required during emergency for evacuation of the people, traffic control security arrangements etc. shall be available.

c) Medical help required: seriously injured personnel may be referred to the Hospital/Primary Health Centre depending upon the gravity and type of injuries.

List of Key persons of Off- Site Emergency Plan has been given in **Annexure - III**.

1.6 EDUCATION OF PUBLIC

People living within the influence zone will be educated on the emergency in a suitable manner. This can be achieved only through the Local and District Authorities. However, necessary information can be extended to the Authorities.

ANNEXURE - I

List of Key persons of on Site Emergency Plan

Sl. No.	Emergency Co-ordinator
1	Executive Director
2	General Manager (Works)
3	General Manager (Maintenance & Projects)
4	General Manager/ Asstt. General Manager (Sponge Iron Plant)
5	General Manager/ Asstt. General Manager (Steel Melting Shop)
6	General Manager/ Asstt. General Manager (Rolling Mill)
7	General Manager/ Asstt. General Manager (Captive Power Plant)

ANNEXURE–II

CHEMICAL DATA SHEET

The factory will have only fire hazardous chemicals as shown below:

Fire Hazardous Chemicals	Handling	Storage Facility	Nature of Hazardous
LSHS/Furnace Oil	Pumping system provided	In the tank	Fire hazard
HSD	Storage Tanks	Drums/Tank segregated	Fire hazard

Likely occurrence of major accidents from:

a) Storage – Likely occurrence of major accidents could only be a fire and explosion.

b) Process – From Processes also likely occurrence of major accident could be fire. Since processes does not involve any toxic chemicals and hence no chance of leakage of toxic gases.

c) Leakage / Splashing of liquid metal.

Physical range of consequences propagating:

a) From storage – Entire process plant

b) From process – Localize to affected area

ANNEXURE - III

List of Key persons of Off Site Emergency Plan

1.	Collector of District
2.	Asst. Director I & II
3.	Fire Office
4.	Controller of Explosive
5.	District Informatics Officer
6.	Superintendent of Police
7.	District Health Officer
8.	Assistant Labour Commissioner
9.	SDO