# CHAPTER 1

## INTRODUCTION

### 1.1 GENERAL

India is one of the most disaster prone countries in the world. Its location and geographical features render it vulnerable to a number of natural hazards including cyclone, drought, floods, earthquake, fire, Landslide, avalanches and industrial accidents. A disaster is an event that causes the sudden disruption to the normal life of a society and causes damage to property and lives, to such an extent that normal social and economic mechanisms available to the society are inadequate to restore normalcy.

A number of special programs are in operation for mitigating the impact of natural disasters and local communities have developed their own indigenous coping mechanisms. In the event of an emergency, the mobilization of community action adds strength to the national disaster management capacity.

$$\textbf{Disaster} = \frac{\text{Hazard} + \text{Risk} \times \text{Vulnerability}}{\text{Capacity}}$$

# TYPES OF DISASTER

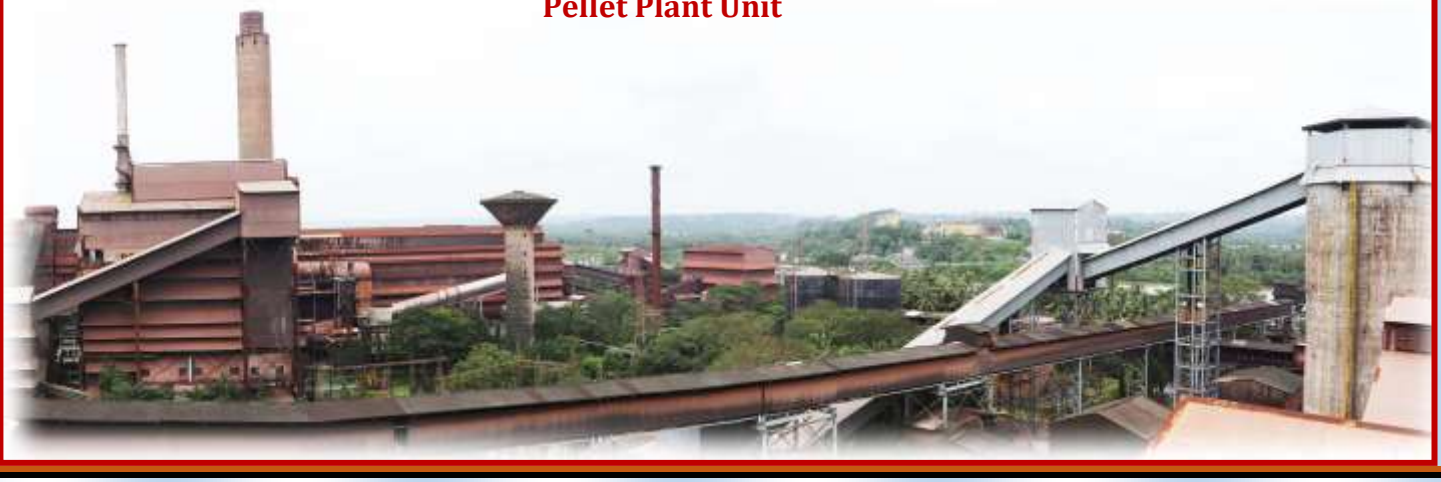
## NATURAL DISASTER

- EARTHQUAKE
- CYCLONE
- FLOOD
- AVALANCHE
- HEATWAVE/COLDWAVE
- DROUGHT
- TSUNAMI
- HURRICANE
- LANDSLIDE
- HAILSTORM
- FAMINE
- FOREST FIRE

## MANMADE DISASTER

- ACCIDENTS
- INDUSTRIAL DISASTER
- RIOTS
- HIJACKING
- BIOLOGICAL WARFARE
- DAM BURSTS
- TERRORISM
- CHEMICAL WARFARE
- NUCLEAR WARFARE
- EPIDEMICS
- FIRE

**Pellet Plant Unit**



## The Natural and Human induced Hazards may be classified as follows

| | | |
|---|---|---|
| Meteorological Hazards ( climate and weather related) | : | Cyclones, floods, Tropical storms, Drought, climate change |
| Hydrological Hazards | : | Floods, cloud bursts, Rapid glacier advance |
| Geological Hazards | : | Earthquakes, Volcano, landslides, Mudflow, Tsunami |
| Human Induced Hazards | : | Terrorism, industrial and Chemical accidents, Gas leakages |
| Atmospheric Hazards | : | Excess rainfall Freezing rain (glaze Hail<br>Heavy snowfalls<br>High wind speeds<br>Extreme temperatures |
| Biological Hazards | : | Epidemic in humans<br>Epidemic in plants, Pest Attack<br>Epidemic in animals<br>Locusts |

**Blast Furnace Unit**

# Managing Disaster:

| Disaster Management | | | |
|---|---|---|---|
| **MITIGATION** ⇩ | | | **RESPONSE** ⇩ |
| **Assessment Of Risk** ⇩ | **Prevention** ⇩ | **Early Warning** ⇩ | **Rescue** |
| Hazard Mapping | Structural | Evacuation | **Relief** |
| Vulnerability | Measures | | |
| Assessment of Habitat Elements | Non-Structural | | **Sheltering** |
| Risk Mapping | Measures | | |
| | Retrofitting | | **Rehabilitation of Habitat** |
| | | | **Economic rehabilitation** |

Furnace Oil Storage Tanks

## 1.2 THE LOCATION

Mangalore city in Dakshina Kannada District is located in the southern Indian State of Karnataka along the western coast of the peninsular India. The district is situated between Arabian Sea on one side and the Western Ghats on the other. The following surround the district:

- North - Udupi district
- East - Chikmagalur and Hassan districts
- South - Kodagu and Kasargod (Kerala) district
- West - Arabian Sea


The national highway NH 66 (Kanyakumari – Mumbai) as well as the Konkan Railways passes through the length of the district from south to north along the coast. The NH 75 from Mangalore to Bangalore passes through breadth of the district from west to east.

Recently, one of the state highways has been upgraded to National Highway No. 169, which extends from Mangalore to Solapur. This passes between Mangalore and Moodbidri in the district. Apart from Konkan railways, there are two major rail lines namely Mangalore – Bangalore (presently under gauge conversion) and Mangalore – Calicut.

The Mangalore airport is located at Bajpe about 17km from the city. There are proposals to upgrade this into an international airport Mangalore has a modern all weather port 10 km. north of the town at Panambur, which is gateway to the state of Karnataka.

Considering the ideal location of the district and presence of good infrastructure facilities like port, industrialization has crept in and many major industries. This phenomenal growth of the district has brought with it the possibility of a disaster affecting large area if not controlled immediately.

## METEOROLOGICAL / CLIMATOLOGICAL DATA

Meteorological factors, which govern the dispersion of leaked hazardous chemicals are temperature, humidity, rainfall, wind speed and wind direction. Since these factors fluctuate largely with time, it becomes essential to obtain long term data while depicting the overall meteorological pattern. Climatological data for Dakshina Kannada is included in this document.

All these meteorological factors are elaborated in the following sub-sections :

### 1. Temperature

Mangalore for the period of 1951-80. maximum temperature ranges from 28.5 to 32.5oC and minimum varies from 21.7 to 24.5oC. Extreme highest temperature observed in different months varies from 31.7oC in September to 37.8oC in February while the monthly extreme lowest varies from 16.7oC in December, January and February to 20.6oC in July and August.

### 2. Humidity

Annual mean of relative humidity is 80% in the morning and 74% in the evening. Monthly mean humidity varies from 69% in December to 91% in July and August both in the morning whereas in the evening it ranges from 61% in January to 88% in July.

### 3. Rainfall

Monthly rainfall data over 10 years (1986 to 1995) for the Panambur station shows that the average annual rainfall was 3774 mm over 10 years period. The maximum rainfall was observed in the month of July followed by June and August. 78% of the total annual rainfall occur in the months of June to August, 16% in September to November and remaining 6% in the months of December to May. Maximum annual rainfall of 4820 mm was observed in 1992 while a minimum of 2419 mm in 1987.

**4. Wind Velocity**

The wind speed ranges from 0 to 19 kmph. However, wind speed from 20 to 61 kmph is also reported in the months of March, April, June and July for a few days.

The various hazards that are possible in Mangalore have been broadly categorised as follows and the mitigative measures for each of these have been discussed

| NATURAL DISASTERS | INDUSTRIAL DISASTERS | TRANSPORTATION DISASTERS | MISCELLANEOUS DISASTERS |
|---|---|---|---|
| Cyclones / storm | Toxic Release | Road Tanker Accident | Building collapse |
| Flood | Fire / Explosion | Rail Accident | Stampede |
| Earthquake | Oil Spill | Air craft crash | Boat capsize |
| Forest Fire | Loading/ Unloading | Pipeline failure | Epidemic |
| Land Slide | Material Slide | | Cattle disease |
| Tsunami | | | Food Poisoning |
| | | | Bomb Threat |

## 1.3 NATURAL DISASTERS

Mangalore is located on the western coast of Karnataka and two major rivers pass through the district namely Netravathi and Gurpur. The district falls just outside the earthquake fault line along the Sahyadri ranges in neighbouring state of Maharashtra. Historically the district has been fortunate and has not encountered any major earthquake disaster so far. However, a natural disaster striking the district can not be totally ruled out.

**Categorization of Risk**

Zone 1: Less Risk
Zone 2: Moderate Risk
Zone 3: High Risk
Zone 4: Severe Risk

Following are the possible natural disasters in Dakshina Kannada.

**1. Cyclone**

Cyclone is a vast violent whirl or vortex in the atmosphere following formation of an intense low-pressure area.

The district falls within the cyclone area of storms originating in the Arabian Sea and those that enter across the Indian Peninsula from the Bay of Bengal. However, historically it is seen that cyclones are not as severe as and as frequent as in the Bay of Bengal along the eastern coast of India. Historically, the worst cyclone to hit the district was during the year 1979. No major damage was reported during that period.

Mangalore is in Zone 1 which is safe zone Tropical storm and Tsunami risk. Cyclones do not directly hit Mangalore Port or Dakshina Kannada District but pass over the Arabian Sea and move towards Gujarat. (Severe activity can be seen in the Bay of Bengal which is a high risk cyclone zone). The passing of the cyclone towards Gujarat could cause strong winds to hit Dakshina Kannada.

**2. Floods**

There are two major rivers flowing in the district namely Netravathi and Gurpur Rivers. Netravathi river flows through Belthangady, Puttur and Bantwal talukas before joining the Arabian Sea at Ullal in Mangalore Taluka. Similarly the Gurpur River flows through Belthangady and Bantwal talukas before joining the Arabian Sea at Thannirbhavi in Mangalore Taluka. In addition to these, there are other smaller rivers like Mulki River, Pavanje River etc flowing through the district.

Historically there have been incidences of floods in the low-lying areas along the major rivers especially Netravathi and Gurpur.

**3. Earthquake**

Earthquakes are result of tectonic displacement of plates. The entire district of Dakshina Kannada falls under the Zone I of the earthquake classification as per Indian Standards, which is relatively safe. Historically there has been no incident of earthquake during last one hundred years. However, there are moves to upgraded the region to Zone II in view of changing geological patterns, as the possibility of an earthquake in the district can not be totally ruled out.

Mangalore and Dakshina Kannada District lies in Zone III (IS code) which is a moderate earthquake risk zone.

### 4. Forest Fire

Dakshina Kannada has dense forests along its eastern border in Belthangady and Sullia Talukas. Historically there has been no incidence of forest fires in the district. However, chances of a forest fire or a bush fire in the district can not be totally ruled out. These types of fire have a devastating effect not only on the environment but also on the people living in and around the affected area

### 5. Landslide

Landslide is a natural disaster whose effects are mostly localised. Landslides are likely especially in the ghat section beyond Shiradi in Belthangady taluka along the NH 48. This can be attributed to de-forestation in the region. There could be blockage of traffic and / or a few causalities during any landslide in the district.

## 1.4 INDUSTRIAL DISASTERS

Dakshina Kannada is one of the highly industrialized districts of Karnataka with 12 MAH (Major Accident Hazard) units and 6 Hazardous Industrial units. Most of these units are concentrated around the New Mangalore Port area at Panambur in the Mangalore Taluka. These units import, store, handle and export various hazardous chemicals, both flammable and toxic. Any major accident within the premises of these units may result in a disaster having off-site implications. The industries fall under the purview of Inspectorate of Factories and Boilers. The industries have their own On-site Emergency Plans to meet any disasters, which are confined to their premises. The industries have been considered as representative failure cases involving these hazardous chemicals with off-site implications have been considered to know the maximum impact distances under worst weather conditions. This would ensure proper planning for mitigating any disaster arising from these industrial units having off site implication

### Toxic Release

Ammonia and Chlorine are the major toxic chemicals handled in the district. Ammonia is handled in large quantities in the Port and MCF in Panambur area. MCF has ammonia storage tanks within their premises as well as in Imported Ammonia Terminal beside NMPT. There is a 1.2 km long pipeline connecting the two storages, which crosses the NH 17 over a pipe rack. Ammonia is also transported to Goa by road tankers.

Chlorine is handled in various major industries in small quantities for water treatment. The chlorine is handled only in tonners, which are transported by truck from Uttara Kannada district where there is a manufacturing facility for chlorine.

Any release of these chemicals could result in toxic effect on general public over a large area. Fire / Explosion.

LPG and various POL products are handled in large quantities through out the district, and their storages are mostly concentrated in and around Panambur area. LPG is imported at NMPT as well as manufactured by MRPL. The transportation from the port to various storage tanks at Bala is done through pipelines. From there LPG is mostly transported to various parts of the state by road tankers. There are chances of Fire / Explosion involving these hazardous chemicals whose effects would be localised or widespread depending on various factors as discussed later in the report.

**Oil Spill**

Large quantities of petroleum products are handled mostly in the NMPT where there are chances of oil spill on sea in the region. The port is equipped to handle any oil spill in their jurisdiction. The chances of oil spill on land or other water bodies is remote and even if there is one, the effects would be mostly localized. The oil spill could also take place on high seas affecting the district along the coastline during which the district administration may take help of Coast Guard to take corrective steps.

In addition to the list of industries mentioned above, the New Mangalore Port handles various hazardous chemicals like LPG, ammonia etc. There are few tank farm terminals within the port premises which import and store substantial quantities of hazardous chemicals. Following is the list of various terminals and chemicals normally stored. NMPT has prepared a detailed DMP after carrying out Risk Analysis Study for controlling any disaster within the port. The IAT (Imported Ammonia Terminal) of MCF and the IOCL Terminals which are just adjacent to NMPT have been considered separately and not along with the port.

Besides this, coastal terminals of HPCL and MRPL, which have LPG/POL pipeline manifolds and monitoring stations, are located within the port.

**Loading/ unloading**

Workplace vehicle hazards may occur during:
- pedestrian movement at workplaces and coming into contact with mobile equipment
- vehicles or plant reversing and manoeuvring
- arrivals and departures
- loading and unloading
- hitching and unhitching trailers
- mounting or dismounting from vehicles
- securing loads, and
- maintenance work.

Most at risk from vehicles at workplaces are people who work with, or interface with vehicles and mobile plant, such as:
- cars

- vans
- forklifts
- trucks
- semi trailers and trailers
- tractors
- loaders
- buses, and
- utilities.

## 1.5 TRANSPORT DISASTERS

In Mangalore, two modes of transport are employed for transfer of hazardous chemicals in and out of the district. They are by road tankers and through cross country pipelines which originate mostly from New Mangalore Port area.

### 1. Road Tanker Accident

Mangalore is located at the strategic location along the western coast. The location of the New Mangalore Port at Panambur in the district along with concentration of MAH units around it and passing of three national highways namely, NH 17, NH 13 and NH 48 through length and breadth of the district has made it the hub of movement of various hazardous chemicals. Apart from these national highways, there are other State highways and district roads where there are tanker movements but to lesser extent as compared to national highways

Various POL products that are produced at Mangalore Refineries and Petrochemicals Ltd. are transported to other parts of Karnataka as well as to neighboring states by road tankers. Similarly various other hazardous chemicals imported at NMPT are also transported by road tankers. These tankers mostly ply on the national highways NH 17, NH 13 and NH 48. As MRPL is not located on the national highway, the tankers take other district roads to approach the national highway. Similarly, the tankers may take detour from the national highway to other roads to reach their final destination in far-flung areas in the district.

### 2. Pipeline Failure

With advent of industrialization of Mangalore, various cross- country pipelines have been laid, most of them link to New Mangalore Port. These pipelines mainly handle LPG and other petroleum products including crude oil. More recently, a new pipeline has been laid from Mangalore to Bangalore for transportation of POL product, which is being commissioned (refer Fig 2.3). There would be drastic drop in the movement of road tankers along this route once the pipeline becomes functional.

As the pipelines pass through public domain, any major accident involving a pipeline would call for activation of the Disaster Management Plan. However majority of the pipelines are laid below the ground level and suitably protected against all possible damages. All the underground pipelines have been provided with cathodic Protection system as protection against corrosion.

The 3.5 km long naphtha and FO pipelines of MCF from NMPT to MCF premises is laid above ground except at the highway crossing where it is laid underground. Similarly the 1.6 km long Ammonia pipeline from IAT which is adjacent to NMPT to MCF is also laid above ground and the line at highway crossing is also laid over a pipe rack. This pipe rack is properly guarded against possible vehicle impact. Patrolling of these pipelines is done on a continuous basis whenever there is transfer operation.

Mangalore is fairly peaceful and no terrorist activity is reported in the region so far. Hence, the probability of failure of a cross-country pipeline due to terrorist activity is remote.

In case of a leak from the pipeline, the control system may not be sophisticated enough to detect the same. Hence the leak has to be notified by the eyewitness to the owner who would immediately shut down the pumping operation. This may not necessarily result in declaration of the disaster. In absence of an eyewitness, the leak may go undetected in the incipient stages and may result in a major disaster requiring activation of District Disaster Management Plan. (In case of Mangalore - Bangalore POL pipeline cathodic protection and SCADA system for communication and leak detection has been provided).

## 1.6 MISCELLANEOUS DISASTERS

Emergencies involving building collapse, stampede, food poisoning, epidemic, Bomb threat etc. are categorized as Miscellaneous Disasters.

KIOCL Berth Area

# CHAPTER 2

## THE COMPANY

KIOCL Limited (Formerly Kudremukh Iron Ore Company Limited), a flagship Company under the Ministry of Steel, Government of India, with Mini Rathna Status, formed on 2nd April 1976 for mining and beneficiation of low grade Iron ore from Kudremukh Mines located in the state of Karnataka. Engaged in the business of manufacture and export of high quality Iron Oxide pellets and supply of Pig Iron Complex located at Mangalore, coastal city of Karnataka .An ISO-9001:2008,ISO-14001:2004 and OSHAS-18001:2007. Certified and having an excellent track record of making consistent profits.

The annual capacity of the pellet plant and Blast furnace unit is to produce about 3.5 million tons of pellets and 2.16 lakhs tones of Pig Iron required by the Steel Industry worldwide and for the domestic market. KIOCL pellets have excellent chemical, Physical and reduction properties and are ideal feed for Blast furnace and direct reduction plants. The palletisation plant is situated in the port area of New Mangalore Port Trust, Mangalore Panambur situated to the left of NH-17.It is about 10KM s away from Mangalore city in Dakshina Kannada District It has latitude of 12.9 deg. N and Longitude of 74.78 Deg.E. Major Industries located around the site are Indian Oil Corporation Ltd (IOC), New Mangalore Port Trust (NMPT), and Mangalore Chemicals and Fertilizers Limited (MCF)

## 2.1 DISASTER MANAGEMENT PLAN FOR KIOCL Limited

The Disaster Management Plan for KIOCL Limited has been prepared for implementation by the Departments who would be involved in execution of the Plan during any disaster in the Company. The plan indicates emergency action plans, roles and responsibilities of key personnel and suggests mitigation measures during any natural or manmade disaster, taking into consideration the available resources with various agencies involved. The plan evolves systems to make the plan an effective response mechanism. In short, the plan brings under one roof, various departments to control any type of disaster.

No plan is complete without practicing it. Therefore periodic mock drills for the Disaster Management Plan should be conducted at least twice in a year involving various department mentioned in the plan. The desktop exercise for the plan may be carried out more frequently say once in a year to check the flow of information. The Disaster Management Plan needs to be updated every year based on experience of mock drills as well as to make changes in view of any change in hazardous potential like commissioning of a new plant, hazardous machinery in the Company. Regular updating of Disaster Management Plan also ensures correct contact details of key persons due to change in

organization structure of the Company, transfer of officials and change in telephone numbers etc.

The Disaster Management Plan for KIOCL Limited has basically three main elements:

**1. Hazard Analysis**

The Hazard Analysis comprises of:

- Study and identification of various possible hazards in the Company.
- Identification of possible failure scenarios having public implications.
- Consequence Analysis of the failure scenarios using computer models

**2. Emergency Response Planning**

The preparation of the Response Plan involves the following:

- Development of Emergency Organisation Structure.
- Fixing the duties and responsibilities of all-key personnel to face any disaster with the available means.

**3 Suggestions of Mitigative Measures**

This involves suggestion of various mitigative measures in the aftermath of a disaster to keep the impact minimal and to normalize the condition in shortest possible time. This also involves suggestion of various recommendations, to improve the preparedness of the district to meet any major disaster.

## 2.2 THE MANUFACTURING PROCESS

### 2.2.1 PELLET PLANT UNIT

| | | |
|---|---|---|
| ADDRESS | : | M/S.KIOCL Limited, Panambur, Mangalore -575010 |
| NAME AND RESIDENTIAL ADDRESS OF THE OCCUPIER OF FACTORY | : | SHRI. N VIDYANANDA, DIRECTOR (P&P), NO. 4/197-10, KANMANI, MARKADA, KUNJATHBAIL,MANGALORE - 575 015 |
| NAME AND RESIDENTIAL ADDRESS OF THE MANAGER OF FACTORY | : | SHRI. BOBARAJ V.JEYAHARAN, QTR.NO. KIOCL TOWNSHIP, KAVOOR, MANGALORE - 575 015 |
| MAXIMUM NO. OF WORKERS | : | 557 |

## PORT FACILITIES

Iron ore fines received from external suppliers is subjected to grinding in Ball mills (3 nos.). The ground slurry is stored in two nos. of agitator tanks and then sent for filtration in 18 nos. of val disc filters and 3 nos of Horizontal Pressure Filters. The filtered iron ore concentrate with around 10% moisture is stored in Shed I through Conveyors CB # 71 to 75 and CB 81, the tripper conveyor.

The filtrate coming out of filter having 1% iron ore solids is pumped through 4 nos. of vertical slurry pumps of 400 M3/hr capacity each to Thickener 36M in dia, thickened to 65% iron ore solids and pumped back to slurry tanks. The water overflow from thickener is collected back to cooling pond 45,000 M3 via dump pond.

Filter plant process is supported by 18 nos. vacuum pumps with a vacuum of 26" mercury, 4 nos. of snap blow compressors capacity 3200 cfm; 6 nos. Instrument Compressors 1390 M3, process water pumps-4 nos, 3 SPW pumps capacity 500 M3/hr each, 4 gland water pumps capacity 350 M3/hr each. In addition 3 Nos. of Horizontal Pressure Filters of 180 TPH capacity are also used for filtering Iron ore slurry.

Water collected in dump pond is utilized as process water for Pellet Plant, Port Facilities, Captive Power Plant and Blast Furnace Unit.

The concentrate stacked in storage Shed I and IOF in Shed II is reclaimed by Two Bridge type Reclaimer 3500 TPH and conveyed to Pellet Plant and Ball Mills respectively.

Loading of Pellets is being done by PF from Pellet stock yard 2.5 lakhs capacity by Pellet Reclaimer capacity 6000 TPH through conveyor Silo, Apron feeder and ship loader. The whole operation of PF is controlled from Central Control Room with process PC supported by PLIS.

## PELLET PLANT

The plant produces iron oxide pellets and has the latest equipment including automation. The process of iron oxide pellets making with furnace oil as thermal source involves proportional mixing of iron ore concentrate and additives, ball forming in pelletizing disks, drying, preheating, firing and cooling of pellets in furnace, size classification and recycling in various stages and stacking. The entire operation of the plant is controlled from central control room with the help of Tata Honey well distributed control system.

The iron ore concentrate filtrate with 9.5% moisture is fed to the Pellet Plant from Port Facilities through concentrate conveyor and passed to roller press to increase the Blaine number and fed to mixers after adding additives and binders in the day bin building. The mixed material is taken to balling building for ball formation in six palletizing discs and primary screens. The oversize and undersize material is recycled and fed to discs with

fresh material. The correct size green ball with required drop number and green crushing strength is fed to indurating machine through oscillatory conveyor and double deck roller screen. The undersize is separated in Double Decker Roller Screen and recycled before feeding green ball to indurating machine. A bed height of 100mm hearth layer pellets is fed to the pellet car. Total bed height of 500mm is maintained in the pellet car before feeding to indurating machine. In indurating machine the process involves drying, preheating, firing and cooling. The finished product which comes out of the indurating machine will be carried to the stockyard through production conveyor.

The sequence of the plant and machinery used during the production of pellets are as under :-

1. 30 Tonnes/hr capacity additive grinding plant having Bradley pulveriser mill, fans of various sizes, burner to provide heat input, dedusting system to control the dust generated, transportation conveyors both belt type and pneumatic.
2. 12 Tonnes per hr capacity bentonite grinding plant heaving swedala pulveriser mill, fans of various sizes, burner to provide heat input, dedusting system to control the dust generated, transportation conveyors both belt type and pneumatic.
3. Roll press to increase the Blaine no. of the concentrate(raw materials) to improve the green ball properties which in turn results in enhanced quality pellets production.
4. Mixers to mix the iron ore concentrate with the additives prepared in the additive grinding plant.
5. Pelletising disks to prepare green balls.
6. Indurating Machine to fire the green balls to a temp. of about 1320 deg C to impart required physical and chemical properties of the finished product.
7. Process fans to provide required air flow for combustion and heat recovery.
8. Screen for screening the final product and stacker for stacking the same in the storage yard.
9. Material handling conveyors for transportation of the product/ raw material in various stages.
10. Process pumps to provide necessary plant water requirements and furnace oil requirement.
11. Compressors to supply instrument air and other plant air requirement.
12. Wet scrubber to catch the fugitive dust at various transfer points.
13. Various electrical installation decontrols to cater the needs of the plant.

## CAPTIVE POWER PLANT

The Captive power plant is Diesel Generator (DG) set based plant. We have 3 DG sets of 9.36 MW capacity each. Furnace oil (HFO grade MV2) is used as fuel for the engine (prime mover) which directly drives the generator (alternator) which generates Electrical power. Salient features of the engine and the alternator are tabulated below :-

| **Features** | **Engine** | **Alternator** |
|---|---|---|
| **Make** | Wartsila, Finland | ABB, Sweden |
| **Model** | 12V46 | |
| **Type** | 4 Stoke, Inter cooled, turbocharged | Synchronous, Air cooled, IP23 |
| **Speed in RPM** | 500 | 500 |
| **Rating** | 9.65MW | 11750 KVA,6.6KV, 1028 Amps 0.8 pf |
| **No. of Cylinder** | 12 | |
| **Direction** | Clock wise | Clock wise |

These engines are dual fuel type and are designed to run on diesel (HSD) and furnace oil (HFO), cold start, after a prolonged shutdown is generally with diesel and normal running is with Furnace oil. Furnace oil is drawn from storage tank and heated and transported to Captive Power Plant through insulated pipeline and then passes through centrifugal separators for purification/separation.

Fuel Boosters, then boost the fuel pressure and control the viscosity and temperature. This fuel enters the engine for internal combustion and produces mechanical power is generated. Power is generated at 6.6kv at the alternator terminals and is fed to two High voltage buses in the switchgear room. Power is evacuated through 6.6KV, SF6 breakers feeding the downstream load centers like Pellet Plant and the Port facilities. Entire Power plant operation is digital control system/programmable logic controller controlled. All plant safety /protection parameters are hooked up to control system and the man-machine interface is done at the Central Control room.

Approved brands of lubricating oil of viscosity grade 40 are used as lube oil in the system. The post combustion exhaust gas, after the turbocharger and the silencer, passes through the flue gas desulphurization(FGD) unit where the undesired Sox and Nox are removed by scrubbing with Sodium Hydroxide solution. Then, clean gas with steam is let to the atmosphere at a height of 45 mtrs through the chimney. The important raw

materials/inputs used in CPP are furnace oil, lube oil, lube oil, caustic soda and cooling water/water and the product is electrical power.

## 2.2.2 BLAST FURNACE UNIT

| | | |
|---|---|---|
| ADDRESS | : | M/S.KIOCL Limited(BLAST FURNACE UNIT), Panambur, Mangalore -575010 |
| NAME AND RESIDENTIAL ADDRESS OF THE OCCUPIER OF FACTORY | : | SHRI. N VIDYANANDA, DIRECTOR (P&P), NO. 4/197-10, KANMANI, MARKADA, KUNJATHBAIL,MANGALORE - 575 015 |
| NAME AND RESIDENTIAL ADDRESS OF THE MANAGER OF FACTORY | : | SHRI. ROQUE D'SOUZA GENERAL MANAGER (BFU), |
| MAXIMUM NO. OF WORKERS | : | 54 |

The Blast furnace unit is having a blast furnace of 350 cum capacity capable of producing 240000 MT of Hot Metal per annum. The end product of the blast furnace complex is foundry grade Pig Iron that finds its major use in machine parts casting.

The principle involved in Blast Furnace iron making is the thermo-chemical reduction of iron oxide ore by Coke into liquid iron at around 1500$^{o}$C. The unwanted materials are removed in the form of liquid slag by addition of suitable fluxes. Raw materials are charged from blast furnace top and hot air is sent up from bottom resulting in the above thermo-chemical reactions. The wastes generated in the process are flue gases and slag. This flue gas contains about 24-25 percent of CO gas, which is poisonous, combustible and explosive in nature. The Hot slag which is very hot and corrosive in nature can cause Burn injuries.

The major raw materials used in Blast Furnace operation are Iron Ore, Coke, Manganese Ore, Lime Stone, Quartzite and Dolomite, the last three being the fluxes. The raw materials are received and stacked material wise in the stockyard. The materials required for the days usage are then transferred into day bunkers by use of a conveyor system. The materials from day bunkers are screened and weighed to the required size and quantity in batches. The undersize materials in the screening process are transferred into

fines bunkers for storage. The weighed batches are discharged into a conveyor in a pre-determined sequence and are transported to the blast furnace top for charging.

Blast furnace top charging system is equipped with a double bell system to maintain the blast furnace top pressure. The raw materials are evenly distributed by using a rotary chute. The charging is carried out in batches as per the pre-determined sequence. The stock level indicator measure the level of raw materials inside the furnace and gives the feed back for charging. The entire charging system from screening to charging is fully automated.

The hot air required for the chemical reactions are blown into the furnace at an average rate of 43000$Nm^3$/hr by 2 HT motor driven blowers. The air before entering into the blast furnace is heated up to 1100$^oC$ using 3 nos. of Stoves. The stove refractory checkers, which store heat, are heated by combustion of air and blast furnace gas inside stoves at optimum proportions. Blast furnace gas is a by-product the furnace and carries around 20% CO which makes it a cheap and efficient fuel. The heat thus stored is passed onto the cold air blown by the blowers raising its temperature to 1100$^oC$ making it suitable for use in blast furnace.

The counter current movement of blast air and raw materials facilitates the reduction reaction of iron ore. The liquid iron (Hot metal) produced collects at the bottom of the furnace above which liquid slag, which is lighter, is collected. Both slag and hot metal are drained out through a tap hole at regular intervals in Cast House. The hot metal is collected in 35T capacity ladles where as the slag is granulated into powder form in a Slag Granulation Plant.

The blast furnace gas generated inside the furnace is cleaned of dust at Dust catcher and Gas Cleaning Plant (GCP). Gas is washed off dust in GCP by water spray and the cleaned gas is used by stoves and captive power plant as a cheap source of fuel. Any excess gas is bled off to atmosphere after flaring.

A dedicated water pumping arrangements provides cooling water for the different cooling members inside the furnace. Cooling is essential in view of the refractory and shell life of the furnace. Another pumping system caters to the water requirements of GCP.

The ladles carrying hot metal is transferred to the Pig Casting Machine (PCM) using a high capacity EOT crane. In PCM the hot metal is cast into 'Pig Iron' of max 8Kg weight. The arrangement for this includes a double strand casting chain carrying 298 moulds in one strand. The strands are driven by an electric drive. The ladle is tilted using the EOT crane and the hot metal is directed into the moulds by a runner system. Air-cooling and water-cooling is provided for the casting chain.

The pig Iron generated by the PCM is transported to the pig yard and stacked grade wise for dispatch to customers. Pig Iron is segregated into different grades based on the chemical composition.

The Captive Power Plant (CPP) with two nos. each of 3.5 MW Steam Turbine Generators caters to the power requirement of the Blast Furnace complex. CPP uses blast furnace gas as the major fuel making it highly cost effective.

## Product Specifications

1. Pig Iron

| Sl. No. | Grade | Specifications (% ofSi) |
|---|---|---|
| 1 | Basic | <1.24 |
| 2 | GP2 | 1.25 to 1.74 |
| 3 | GP3 | 1.75 to 1.99 |
| 4 | KFG | 2.0 to 2.24 |
| 5 | GP4 | 2.25 to 2.74 |
| 6 | GP5 | 2.75-3.24 |
| 7 | GP6 | >3.25 |
| 8 | SG Grade | Mn <0.3%, S<0.025%, P<0.05%, Si-15 to2 % |
| 9 | OFFGrade | Sl. No. 1 to 8 with SulphurAbove 0.08% |

2. By Products
   a. Slag : Fused undesirable gangue materials in the raw materials

      Chemical composition: Cao-30 to 33%,Mgo-8 to 10%, $SiO_2$ 30 to 33%, $Al_2O_3$ 18 to 21%

      Available in granulated and un granulated form
   b. Auxiliary Materials : Pig Iron scrap of shape and size different from that of Pig Iron. Available in the form of Chips, Biscuits, Goli and Lumps.

# CHAPTER 3

## HAZARD ASSESSMENT

One of the aspects of hazard assessment is the estimation of injury to people and damage to property from the physical phenomenon of fire, explosion, and toxic release. Disasters at Bhopal, Flixborough involving toxic and flammable materials respectively, are evidence of this phenomenon thereby proving the complex nature of technologies, scale of processes and services involving hazardous materials.

The likelihood of such occurrences can be reduced by process design and reliability engineering, which meets or exceeds, established codes of practice. These codes include well designed pressure relief and blow down systems, adequate maintenance and inspection programs, management of human factors in system design and perhaps most important, a full understanding and support by responsible risk managers. Mitigating measures may include reduction of storage capacity; reduction of vessel volumes; modification of plant siting and layout, including location of control rooms.

A comprehensive assessment of the hazards associated with our manufacturing activities reveals the following information:

The objective is:

a. To avoid/minimise any loss or damage to lives and property.

b. To eliminate panic and build up confidence.

c. To be prepared for proper handling of any critical situation

## 3.1 ON-SITE EMERGENCIES (YELLOW ALERT):

Emergency occurrences within the plant premises and which do not spread beyond and affect population outside the factory limits are termed On site Emergencies and it could be controlled by timely and immediate preventive measures. When On site emergencies occur **YELLOW LEVEL ALERT** can be called for.

## 3.1.1 PELLET PLANT UNIT

1. **Fire due to electrical short circuit un the plant**

Area wise:

- Filter Plant
- Pellet Plant
- Captive Power Plant
- Central Stores
-

2. **Fire due to furnace oil, Gas cutting and hot pellets :**

Area wise:

- Pellet Plant
- Captive Power Plant

**Detection :**

- Company employee or any personnel on site
- When fire appears to be escalating unabated and tends to spread to adjacent equipments , then Incident Controller declares it to be emergency.

3. **Breaching of Furnace oil from storage tanks :-**

The radius that can be affected by a harmful release is normally limited by selection of storage tanks and it can reduce a major environmental accident. All these furnace oil tanks are best separated from the main plant and provided secondary containment bunding/dyking to reduce the probability of containment failure. Secondary containment pits include binding, interception pits and retention basins for contaminated fire water.

4. **Breaching of Slurry storage tanks :**

5. **Gallery Collapse**

**Prevention**

- Regular inspection and maintenance of fuel oil tanks are done by stores Department
- Corrosion protection is done every three years
- Protection against external impact and energetic events such as fire or explosion is done by isolating the area.
- Protection against natural events such as earthquake, tornadoes, floods in the design and construction standards.

## 3.1.2 BLAST FURNACE UNIT: IDENTIFICATION OF HAZARDOUS AREA

| | | | |
|---|---|---|---|
| 1. | Coke Storage | 16. | Central Laboratory |
| 2. | Iron Ore Storage (Emergency) | 17. | Fuel Oil Storage |
| 3. | Pallet Storage | 18. | Oxygen Storage |
| 4. | Flux / Manganese Ore Storage | 19. | Electrical Sub-Station |
| 5. | Screen House | 20. | Compressed Air Station |
| 6. | Blast Furnace | 21. | Works Office |
| 7. | Ductile Iron Spun Pipe Shop | 22. | Central Store |
| 8. | Gas Cleaning Plant | 23. | Road Weigh Bridge |
| 9. | Pig Casting Machine | 24. | Effluent Treatment Plant |
| 10. | Slag Granulation Plant | 25. | Mechanical Repair Shop |
| 11. | Stock House | 26. | Blower House |
| 12. | Power & Blowing Station | 27. | De-dusting Plant |
| 13. | Main Sub-Station | 28. | Combustion Air Fans |
| 14. | Pig Iron Storage | 29. | Water Reservoir |
| 15. | Flare Stack | 30. | Canteen |

**CO GAS EFFECT ON HUMAN BEING**

| | |
|---|---|
| 50 PPM | 8 HOURS |
| 400 PPM | 15 MINUITS |
| 4OO PPM AND ABOVE | WEAR GAS MASK |

| CODE NO. | HAZARD | LOCATION | CAUSE |
|---|---|---|---|
| 1. | FIRE | Coke Storage<br>Office area<br>Central Laboratory<br>Fuel Oil Storage<br>Generator Room<br>Control Panel Room<br>Mechanical Repair Shop<br>Central Stores | Coke<br>Paper, Files etc.<br>Chemical / Electric cable<br>Furnace oil<br>High speed diesel<br>Electricity<br>Oil, Cotton waste etc. |
| 2. | FIRE / EXPLOSION | Blast Furnace / Gas line / Transformer yard/<br>Power/Blower station Laboratory.<br>Main Sub station<br>Canteen<br>Iron ore Storage / Pellet<br>Flux / Manganese Ore<br>Storage / Screen House / Stock House /<br>Flare Stack / Gas Cleaning Plant /<br>De-dusting Plant /<br>Electrical sub-station | Flue Gas oil /<br>High voltage combustible gas chemicals.<br>Transformer<br>leakage of LPG<br>Dust Explosion<br><br>Transformer Oil /<br>High voltage |
| 3. | EXPLOSION | Compressed Air Stn.<br>Gas pipe line<br>Gas cylinders | Hydro Carbon deposit<br>Flue Gas leakage<br>Gas leakage |
| 5. | TOXIC RELEASE, CHEMICAL BURNS | B.F.CO Gas line, CPP<br>ETP Acid storage<br>Laboratory, Entrance &<br>Exit of factory | Valve Failure, Gas line puncture.<br>Chemical acid spillage |

## 3.2 SAFE OPERATIONS AND CONTROL SYSTEMS:

-The process control system designed for iron ore slurry filtration, pillarization, shipping, captive power plant operations incorporates in-built safety guard against abnormal conditions.

-The system enables control personnel to resort to manual and automatic control modes as necessary automatic shutdown systems would take care of excessive deviations from normal parameters and lead to safe stoppage of the plants.

-Safety interlock trip systems and emergency shutdown systems ensure the operating safety and afford protection to the operating equipment and personnel from hazardous fire prone situations.

-As a fire prevention system, cooling water sprinkler arrangements are provided at hot pellet discharging point to conveyor belt.

-Furnace oil storage tanks are provided with dike walls to constrain oil spillages.

-Directory of all officers with address and phone nos is available at security office, fire station and control rooms, this is kept updated by Administrative Departments.

## Fire and Safety Equipment

Each type of emergency requires different types of fire extinguishers depending on the type of fire.
But fire and safety equipment available at site can reduce the impact of catastrophic situations considerably

The list of such equipments and their locations are clearly marked and displayed at all prominent locations. All technical staff / fire fighting CISF staff are informed of such locations, proper use of such equipments etc.

1. Smothering agents : Sand, DCP
2. Cooling agents : Water
3. Chemical Extinguishers : CO2 Extinguisher
4. Fire Hydrants:
   -Are located at all strategic locations at the periphery of each plant
   -The fire water network header pressure is maintained at 7 kg/cm2
   -The detailed lists of fire extinguishers deployment at various locations in the total plant area are displayed in their respective control rooms like Filter Plant, Pellet Plant and Captive Power Plant.

5. Breathing Apparatus:
   -Two sets of breathing apparatus are available to help in evacuation of

Gas/smoke victims and for isolation of gas/ smoke leaks.

6.Fire suits :

Fire fighting crews are provided with fire suits (2 nos.)

7.Fire trucks:

-Two fire trucks are readily available on 24 hrs call

-It is sufficiently stocked with foam, water and accessories like fire hoses, foam branches, pick axes, foam drums, tanks, ropes, ladders, BA sets, gum boots and fire extinguishers etc.,

## PREVENTION

1. Regular inspection and maintenance of fuel tanks are done by Stores Department.
2. Corrosion protection is done in every three years.
3. Protection against external impact and energetic events such as fire or explosion is done by isolating the area
4. Protection against natural events such as earthquake, tornadoes, floods in the design standard
5. Security against unauthorized interference such a Arson or sabotage

**Both units -Vehicle Disaster**

Risks must be controlled as follows:

** Eliminating vehicle or pedestrian movement where possible, or removing the need for reversing.*
** Substituting unsafe vehicles, loading facilities, road signage or road surfaces with safer ones.*
** Isolating vehicles from pedestrians or vice versa.*
** Minimizing by engineering controls (e.g. pedestrian barriers, handrails, separate access doors for pedestrians and vehicles, speed limiting vehicles).*
** Applying administrative controls, such as:*
*providing education, training, supervision and safe work procedures on vehicle movement at workplace, ensuring a robust documented induction process takes place within the workplace before workers commence work*
**restricting pedestrian access in certain areas, or at certain times*
** enforcing appropriate site speed limits*
** preventing reversing in certain areas, or at certain times*
** providing designated parking for work and private vehicles*
** monitoring risks to ensure they remain as low as possible.*
** Using personal protective equipment (PPE), such as safety boots, helmets and reflective high-visibility garments. PPE is the lowest level of control.*
**Monitoring the effectiveness of safety changes and safe work procedures through regular inspections, checks and record keeping.*

## Traffic Routes

All traffic routes, maneuvering areas and yards should be:

*• safe for both vehicles and pedestrians at the workplace*
*• wide enough for the largest vehicle using them*
*• one-way if possible, with adequate passing space around stationary vehicles*
*• clearly signposted to indicate restricted parking, headroom, speed limits, vehicle movement and other route hazards*
*• surfaced with bitumen, concrete or other suitable material, and well drained*
*• free from steep gradients as far as possible (gradients that cannot be avoided should be clearly signposted, and plant should only operate on gradients if specifically designed to do so - use manufacturer's instructions as a guide)*
*• designed and controlled to ensure safe vehicle movement*
*• well maintained*
*• free from obstructions, grease or slippery substances*
*• free from damage to surfaces*
*• immediately cleaned or cleared following substance spills or falls from vehicles*
*• adequately lit, particularly junctions, buildings, plant, walkways and vehicles routes, and*
*• designed to avoid extreme light variation (e.g. drivers moving from bright sunlight into dull light or vice versa).*

## Pedestrian and mobile plant interaction

*The safest way to protect pedestrians is to:*
*• eliminate the requirement for people and plant to operate at the same level (e.g. design the hazard out by building raised loading docks in new facilities)*
*• provide separate footpaths or walkways and eliminate pedestrian traffic where vehicles and mobile plant operate*
*• install pedestrian barriers (e.g. inward opening gates) at building entrances and exits to prevent pedestrians walking in front of vehicles*
*• make traffic routes wide enough for safety where separating pedestrians and mobile plant is not possible*
*• mark traffic routes (e.g. paint directional lines on the floor or ground)*
*• provide separate access ways for vehicles and pedestrians into buildings or enclosures, and*
*• provide vision panels in pedestrian doors entering vehicle areas.*

**Workplaces where pedestrians have to cross vehicle routes should have**:

*• clearly visible ground markings and signs*
*• clear pedestrian and vehicle visibility*
*• adequate lighting, and*
*• established and communicated right-of-way rules.*

## Parking

Onsite parking, if provided, should enable separation between work and private vehicles.

Private vehicles should be parked away from busy work areas where possible.
Walkways leading to and from parking areas should be:
• *safely surfaced*
• *clearly marked*
• *adequately lit*
• *unobstructed*
• *sign posted, and*
• *separated from vehicle routes.*

Workers and customers, who bring private vehicles to workplaces, should be provided with, and comply with:

• *specified safe routes*
• *clear safety signs at parking areas*
• *clear speed limit signs, and*
• *information and instruction on safe driving on workplace routes*

**Loading bays and platforms**

Loading bays should be situated in safe and suitable locations where vehicles can be maneuvered easily, and near tarping areas.

Where practicable, they should be protected from adverse weather conditions, and should be subject to a risk assessment and safe work procedures. Raised loading platforms should be:
• *provided with safe access, egress and safe bays for people working at ground level*
• *clearly marked along the edges*
• *fitted with rails on the non-loading side, to reduce the risk of someone falling off the edge, and*
• *fitted with raised wheel-stop edges to prevent vehicles, such as forklifts and trolleys, rolling over the edge.*

**Reversing :** Reversing accidents are a major cause of workplace injury and damage to vehicles, equipment and premises. Most reversing accidents can be avoided by:

• removing the need for reversing (e.g. with drive-through loading and unloading systems)
• minimizing the need for reversing (e.g. by re-organizing loading and unloading procedures)
• providing clearly marked reversing areas visible to drivers and pedestrians
• excluding non-essential personnel from the area
• ensuring signalers wear high-visibility clothing and their signals can be clearly seen
• using radios and other communication systems
• ensuring drivers have another person to direct them if they cannot see clearly behind before reversing
• ensuring visiting drivers are familiar with workplace routes and reversing areas
• providing larger reversing areas
• placing fixed mirrors at blind corners
• fitting refractive lenses on rear windows to help drivers see 'blind spots'
• fitting reversing alarms to plant, and

• using flashing reversing lights on vehicles, especially if workplace noise is too loud for reversing alarms to be heard.

To reduce risks when reversing, keep rear vision mirrors, fixed safety mirrors and wind screens clean and in good repair, and reversing alarms in working order, loud enough to be heard above other work noises.

Injuries can occur when people at ground level assist in hitching trailers or trailed implements to semi trailer cabs, tractors and other prime movers. Safe procedures should ensure there is a clear form of communication between the operator and the hitcher. To prevent parked prime movers and trailers rolling, they should be parked:

• *on level ground, preferably in a designated parking area*
• *with brake firmly applied and in gear, and*
• *with wheels chocked.*

**Developing a traffic management plan**

Devise a plan to separate pedestrians and forklifts/ Trucks/ Tippers. Vehicle movements, braking distance, stability, environment, height of load and the type of load being handled must be considered when introducing pedestrian and truck exclusion zones.

The optimum is to eliminate forklifts/ Trucks or substitute them with more pedestrian-friendly load shifting equipment. Workplaces should also be designed to eliminate, or at least minimize, pedestrian access to areas where forklifts / Trucks operate. This can be done by:

• *studying the frequency of forklift / Truck and pedestrian interaction and identifying areas where they come into conflict*
• *clearly marking 'No Go' exclusion zones for pedestrians and forklifts / Truck*
• *erecting barriers to protect marked pedestrian walkways and designated forklift/ Truck operating areas*
• *providing designated pedestrian crossings, such as boom gates and overhead walkways*
• *implementing and enforcing procedures, such as clearly indicating when pedestrians and Forklifts/ Truck must give way to each other*
• *displaying clear warning and traffic management signs*
• *using proximity devices to trigger signals, boom gates, warning signs and other 'smart' technologies*
• *ensuring forklift / Truck warning devices and flashing lights are functioning at all times*
• *ensuring pedestrians wear high-visibility clothing (e.g. reflective vests), and*
• *ensuring all forklifts/ Truck have high-visibility markings and that the workplace is well lit*

## 3.3 OFF-SITE EMERGENCIES (RED ALERT):

Emergency uncontrollable and which spread beyond the Factory premises and likely to affect neighboring population and areas are Off Site Emergencies. When Off site emergencies occur **RED LEVEL ALERT** can be called for.

**DETECTION:**

1. Members of Public anyone such as member of the public can inform to KIOCL, Corporate Communication Department

## 3.4 MISCELLANEOUS DISASTERS (BLUE ALERT)

Emergencies involving building collapse, stampede, food poisoning, epidemic, Bomb threat etc. are categorized as Miscellaneous Disasters.

**Building Collapse**

Rescue guidelines for building collapse are as under:

- Immediately after a collapse, the debris of the building is very unstable and prone to additional movement. Rescuers must assess the nature of the scene and the pattern of the collapse before entering onto a pile of rubble to ensure their own safety and that of those potentially buried in it. Shoring may be necessary to prevent movement, before attempting rescues.

- Concentrate preliminary efforts on areas where people were last seen or known to be. It is suggested that a "Command" person be designated to interview those that may have escaped the collapse, were eyewitnesses, or were in the building and rescued early in the effort. Obtain a list of the people normally in the building, if one is available.

-After ensuring rescuer safety and minimal movement of the debris, send small organised teams to the top of the pile and systematically search the surface in specific grids. Use barricade tape and markers to visually demonstrate the areas that have been searched and those that could potentially contain victims. Concentrate efforts on those areas that are believed to be the last known locations of people, when the collapse occurred.

-Activate District Disaster Management Plan to have full-fledged rescue operation. This type of rescue is very manpower intensive and may require large numbers of extrication and medical personnel. The rescue operation may call for specialised equipment like cranes / earth moving equipment and gas cutting and concrete cutting equipment. The Rescue

Vehicle available at Pandeshwar Fire Station in Mangalore comprises of some of these critical equipment.

-During rescue operations, sound detection devices can be used to "listen" for movement or sounds deep within the debris. Call for "Search Dogs" and handlers from nearest available source.

-Once it is confirmed there is nobody trapped below is alive, continue to remove debris carefully and vertically, searching each "void" or entrance to a "void" as it becomes available to the rescuer. People have continually and historically been found alive many hours and days into the rescue. Have command, media relations, and logistics officers plan for a multiple day operation when people are still suspected of being missing and their bodies have not been recovered.

- Help from external agencies like Army or other professional bodies should be mobilised at shortest possible notice to ensure saving of human life.

-Great care must be taken when a person is located, either dead or alive, to ensure that additional collapse doesn't occur in the area of their entrapment. Rescuers should use their hands and small tools to remove the remaining debris surrounding a person. The victims condition may dictate the speed with which rescue efforts progress. Consideration should be given to early application of Military Anti-Shock Trousers for viable persons that have "crushing" injuries.

- Be prepared for the emotional and psychological implications of the incident. Prepare early for Critical Incident Stress debriefing sessions for rescuers, victims and families. It is strongly suggested that mental health professionals and crisis intervention be made available to the families of those believed trapped, at the earliest opportunity. The stress of protracted digging, discovery of disfigured remains, odd smells and sights can affect even the most hardened of rescue professionals. Supervisory personnel may want to set aside a special place for families and psychological care near to, but, off of the rescue site. To do otherwise will invite charges of insensitively, and probably prompt the families to attempt to enter or stay in the rescue area.

-Relief for both supervisory and field rescue personnel must be forthcoming. Even though most rescuers will insist in continuing their efforts for many hours, they lose a large part of their effectiveness after 18-24 hours or less. Ensure that all rescuers eat and rest at frequent intervals, as circumstances permit. Prepare to (and do) call in off-duty or mutual aid personnel as they are needed. Stage all extraneous units in a planned way and avoid having more personnel on-site than can effectively work at one time.

-Anticipate the need for additional resources that you haven't thought of prior to this event. Be prepared to obtain architectural drawings of the building(s) affected. How about gas lines, water pipes, or electrical services that are disrupted? You may want an aerial perspective of the scene...do you know where and how to get overhead photos of the collapse?

## Stampede

In occasion where there will be large congregation of people during functions, there could be a large gathering. There are chances of stampede during this period due to failure of crowd control measures leading to loss of human life

Like in any emergency planning, the affected persons should be given immediate medical attention. Various precautionary measures should be taken to prevent any stampede wherever there is assembly of large crowd. Following are various such measures for consideration

- Survey the gathering site for confinement I.e. inside factory, auditorium, building, structure etc.

- Study the layout and identify stampede prone pockets i.e. staircases, entry / exit point, narrow lobby etc.

-Estimate size of population going to gather. If the site area is not adequate to control an expected number of people, do not allow them to gather at first place. This can be achieved by informing people well in advance, staggering the visitors by issuing passes / identity cards.

-Study the layout and maintain adequate space between two clusters of people.

-Build temporary watchtowers for monitoring.

-Ascertain adequate ventilation in the area.

-Ascertain uninterrupted power supply in the area. Make arrangement for stand by power supply. As far as possible allow event to be conducted in day time.

- Post adequate staff to control mob.

-Segregation of male and female / children in the mob.

- Adequate arrangement for drinking water, food etc. As far as possible provide such facilities on mobile van, trolley instead of fixed counter/ stall.

**Food Poisoning**

Food poisoning is a probable phenomenon in the canteen where there is mass feeding of employees / workers.

On receipt of the information of the food poisoning in the district, the HOD (HR &A) should take following actions to instil confidence in the people

- collect food sample and seal the kitchen.

- Identify the source of food poisoning and destroy the remaining stock of the contaminated food.

- Rush the affected persons to nearest hospitals for first aid / medical treatment.

- Take preventive measures to avoid re-occurrence of such food poisoning in future.

**Bomb threats**

- Bomb threats may be received in writing or may be received on phone.

-Keep the caller on the line as long as possible. Request him to repeat the message, listen carefully as every word spoken by the person has to be recorded mentally or penned down.

-If the caller does not indicate the location of the bomb or the time of possible detonation, it is advisable to try to ask him for this information.

- Inform the caller that the building is occupied and the detonation of a bomb would result in death or serious injury to many innocent persons.

- Pay particular attention to peculiar background noises such as motors running, background music, traffic, aircraft, voices and any other noise which may give a clue as to from where the call is being made.

- Listen closely to the voice (male, female), voice quality (calm, excited), accents and speech impediments. Immediately after the caller hangs up report should be made to the immediate senior manager or security officer on duty, nearest police station.

To-day industrial installations, sensitive sites, public gatherings are becoming targets of the terrorist groups. Therefore the possibility of receiving bomb threats cannot be ruled out. The golden rule is consider all bomb threats as genuine and act accordingly keeping in mind the safety of the people and the property.

### 3.5 NATURAL DISASTERS (ORANGE ALERT)

Earthquake, Floods, Cyclone / Tsunami

### 3.6 NEIGHBOURING UNITS DISASTERS (PURPLE ALERT)

Pipeline Leakage, Tanker explosion

## 3.7 FORMAT FOR EMERGENCY REPORT

The On- site and off site emergency alerts should be concise and to the point, but it should also contain relevant details of the disaster situation and affected regions. The following form is to be used when recording various disasters:

- EMERGENCY / DISASTER REPORT
- BOMB THREAT REPORT

### 3.7.1 EMERGENCY / DISASTER REPORT (Other Than Bomb Threat)

**1.Hazard:**
Hazard Type (Natural/ Manmade) (ON-Site/ Off-Site):
Use published information and verifies it during discussion

**a.Location**
Name of the place:

**b.Characterization of hazard**
ı Natural ı technological ı human ı secondary ı complex

**c.Probability of occurrence**
ı Calculable ı hypothesized ı unknown ı independent of past events ı dependent of past events

**d.Frequency of hazard**
ı Regular (e.g. seasonal) ı some regularity ı random

**e.Pattern of impact**
ı Sudden catastrophe ı rapid build-up (<24h) ı slow on set

**f.Duration (how long the event may continue)**
ı Seconds ı minutes ı hours ı days ı weeks ı months ı years

**g.Area of Impact**
ı widespread ı local ısite specific

**2.Short-term predictability (forecast capability)**

**a.Location**
ı predictable ı variable but generally known ı unpredictable

**b.Timing**
ı highly predictable ı very predictable ı somewhat predictable ı highly unpredictable

**c.Warning capability**
1 very high 1 high 1 moderate 1 low 1 very low
Controllability (can physical process be stopped?)
1 definitely 1 probably 1 possibly 1 no

**3.General assessments**
Vulnerability
1 very high 1 high 1 moderate 1 low 1 very low
Risk levels
1 very high 1 high 1 moderate 1 low 1 very low

**4.Preparedness levels**
1 very effective 1 effective 1 unknown 1 ineffective 1 lacking
Structural and semi-structural preparedness
1 very effective 1 effective 1 unknown 1 ineffective 1 lacking

**5.Infrastructure preparedness**
1 very effective 1 effective 1 unknown 1 ineffective 1 lacking

**6.Probable future impact levels**
1 very effective 1 effective 1 unknown 1 ineffective 1 lacking

**7.Staff / community awareness of hazard**
1 very effective 1 effective 1 unknown 1 ineffective 1 lacking

**8.Support for mitigation and preparedness measures**
1 very effective 1 effective 1 unknown 1 ineffective 1 lacking

**9.General assessment of mitigation situation for this hazard**
1 very effective 1 effective 1 unknown 1 ineffective 1 lacking

### 3.7.2 BOMB THREAT REPORT

**ACTIONS ON RECEIVING BOMB THREAT CALL**
1. Do not put down receiver or cut off caller.

2. Put on tape-recorder, if available.

3. Alert nearest colleague.

4. Keep Form and pen ready to fill.

5. Note time and duration correctly.

6. Obtain as much information as possible.

7. Keep caller engaged in conversation as long as possible
(Apologise for bad line, ask him to speak up etc.)
Time of call..... Date..... Exact words of caller.....
Was any one called for by name or designation ( )Yes ( )No. If so, who?

**QUESTIONS TO ASK CALLER**

*1. Who is calling, from where?*

*2. When is it set to go off?*

*3. Where is the bomb placed?*

*4. What kind of bomb is it?*

*5. How does it look like?*

*6. Why are you doing this?*

*7. Whom do you represent?*

*8. How do you know so much about the bomb?*

*9. How can we get rid of the bomb?*

*10. Do you know that the bomb will kill innocent people?*

**DETAILS OF CALLER**

* Sex: ( ) Male ( ) Female Approximate age: .....years.
* Origin of call: ( ) inside plant, ( ) outside local, ( ) outside long distance.
* Voice characteristic: ( ) fast, ( ) slow, ( ) stutter, ( ) distinct, ( ) disguised, ( ) educated, ( ) uneducated, ( ) loud, ( ) soft.
* Language used ....., accent ....., manner: ( ) calm, ( ) angry, ( ) emotional, ( ) laughing, ( ) deliberate, ( ) normal, ( ) abnormal, ( ) other
* Is voice familiar? () yes, () no.
* Background sound: ( ) street, ( ) telephone booth, ( ) airport, ( ) railway stn, ( ) residence, ( ) cannot identify, ( ) others

Security Manager / Police station informed at :.....Name of the person receiving call .....

Signature.....

# CHAPTER 4

## EMERGENCY PREPARATION

### 4.1 TRAINING

Training plays an important part in containing any kind of emergency. All essential personnel during emergency are trained properly in fire fighting, first aid etc. A separate cell of fire fighting wing of CISF Wing is deployed for 24 hrs service in the plant. Fire and safety personnel are trained in all aspects of fire fighting and fire alarm glass locations, plant overall layouts, roads and how to approach during emergencies. Training is followed by continuing series of exercise to ensure well tuned emergency response capability.

Extensive planning will be effective only if people are properly trained in all aspects of the plan, the role in its implementation, and how the tasks are to be co-ordinated. The development and conduct of a training program for the emergency organisation is vital to emergency preparedness Emergency response teams, and medical personnel must all be trained. Classroom type lectures, demonstrations, and participation in exercises that test the adequacy of the plan are essential to maintenance of a well-prepared team of emergency response personnel. To minimise the extent of the training needed, the emergency organisation position has been developed so as to keep the emergency duties parallel to the individual's day-to-day responsibilities wherever possible.

The goals of any training program are to ensure that participants obtain a thorough understanding of their plans and procedures, and develop the leadership and communication skills necessary for confident decision making during stressful situations.

A good training program provides initial training for all tasks, it should provide periodic refresher training for those who have been given the initial training, and also should provide for the training of new personnel who may be inducted from time to time.

## 4.2 MOCK DRILLS

By far the best training is received from participation in the enactment of mock accident scenarios during drills and exercises. These serve as positive training experiences and are also advantageous to public relations, once the appropriate level of training and readiness is achieved. Their purpose is to give people confidence that the contingency plan works, and to identify those areas of improvement that, once corrected, will ensure that properly implemented plans and procedures can adequately protect public health and safety.

There are two major considerations in the preparation and implementation of a successful drill to test the ability of all personnel and resources to respond to an emergency:

1) The formation of a competent, knowledgeable, and highly motivated planning and co-ordination exercise committee, and

2) The development of a scenario that induces drill participants - the "players" - to fully demonstrate their knowledge and capabilities, and that demonstrates the readiness level of emergency response facilities and equipment.

It is advisable to test small parts of the contingency plan frequently, through table top exercises and mini drills, in such important areas as notification and communication.

Full-scale field exercises once in two years involving various departments and local responders are recommended. Whether the exercise is a limited or full-scale test of the contingency plan, the development process is essentially the same, though the planning for (and expense of) a full field exercise is considerably greater. In particular, as a part of this process, one should

**- Define the goals and objectives:**

- The general objectives (overall, applicable to all).
- The specific objectives - for each participating function/ group/ organisation.

**-Identify the participants:**

- The players - key and alternate(s) for each function
- The moderators/controllers to keep the scenario going
- Evaluators

**- Develop the scenario:**

- Prepare a draft scenario abstract for comment/approval
- Draft a full scenario, with specific activities to test objectives
- Obtain required comments/ approval of the draft scenario
- Finalise the scenario

**-Develop supporting materials:**

(Note: the following apply to a tabletop exercise; the list would necessarily be expanded for a full field exercise)

## Initial conditions

| Maps of | Data tables | Emergency organisation charts | Messages or questions to guide responses | Notification message forms |
|---|---|---|---|---|
| Affected areas | Meteorological | | | |
| Evacuation routes | Release/activity levels | | | |
| Vulnerable zones | Doses (if appropriate) | | | |

**Exercise description:**

| | |
|---|---|
| Purpose | |
| Agenda | Methodology |
| Scope | Player "ground rules" |

**-Make logistic arrangements:**

- Establish date, time, duration (include time for the critique session).
- Arrange for the use of location facility (ies) and/or room(s) at a selected time.
- Invite participants
- Establish a readily observable identification scheme (arm bands, caps, jerseys, signs) for players, controllers, evaluators, and observers

Prepare scenario packages and handouts

-Conduct the exercise and critique session

-Prepare a written critique –
ensure that the identified improvement action items are entered into a tracking system.

The post-exercise critique session is ideally held immediately following the drill or exercise involving all participants. It provides feedback to those involved, while events and their response actions are fresh in their minds. A follow-up written evaluation, summarising the carefully considered comments of the participants, is also important, since an exercise of the plan uncovers it deficiencies. These may be found, for example, in equipment (most important being the communications equipment), operating procedures, protocol, or interagency relationships. Often, they signify training program improvement

areas. To correct the deficiencies, it is important to establish an Action Item Tracking System, wherein identified problem areas are defined, responsibility for and expected date of completion designated, and accomplishment noted. This is all a part of plan maintenance.

As emphasised earlier, an emergency preparedness program must be dynamic, with the contingency plan maintained as a living document. This means continual updating and revision.

**Updating**

Keeping a plan up-to-date is normally neglected, or at least is often assigned a low priority. One organisation should be responsible for the co-ordination of this task and overall stewardship of the plan.
Some of the important aspects are :

-regular review period

-record of amendments and changes

-"where to report changes" notice

- current distribution list of plan holders

The plan should contain easily replaceable sections accompanied by clear directions for insertion into the plan and an acknowledgement form to be returned. The use of electronic word processing and computer-developed tables and figures is also recommended and has been provided with the plan. Information given in the softcopy of the report / action.

The Disaster Management Plan updation should be done at least annually, and whenever applicable conditions change. This means reviewing the hazards analysis process to see whether additions or deletions are appropriate, and changing the contingency plan when they are, the incorporation of resolved action items, and revisions to training programs, where needs are identified.

Some data in the plan must be updated more often than annually. Telephone numbers, for example, should be checked at least quarterly. When new equipment is acquired or old equipment retired, these resource listings must be changed. All changes must be distributed to holders and potential users of the plan.

# CHAPTER 5

## EMERGENCY MANAGEMENT PROCEDURE

It is necessary to understand what exactly is to be done when an emergency arises. Emergency may be in any of the form as assessed in the previous chapter on hazard assessment. The flow of communication and the other important aspect of the emergency plan is to specify the roll of individual members and teams.

Since the overlapping/mixing of rolls leads to confusion and delay in handling of emergency which in turn increase the loss of life and extent of damage. Every one knowing their roles the emergency management can be done smoothly and faster which in turn helps the emergency management teams to save more lives and reduce the extent of damage as well. The rolls of individuals and teams are as explained below.

### 5.1 PELLET PLANT

**1. The Site main controller: Jt.GM I/c (P)**

After receiving the emergency call, he promptly proceed to the incident spot and assess the emergency situation based on hazard assessment guidelines and declare emergency. On declaring an emergency he precedes to main Emergency control center i.e. GM (Office).

**The Site main Controller's role is to:**

- Take control of overall emergency situation.
- Ensure that the key persons are available.
- Communicate and guide the Incident Controller-1 and Emergency service coordinator in handling the emergency.
- Advice people, who are handling emergency to preserve material evidence for any further investigation purpose.
- He is the final authority on all matters of Emergency management system. (Eg: Information to Statutory bodies, Police, PCB, Corporate office, press, Public and mutual aid from neighbouring Industries etc.
- Overall responsibility for directing operation from the main Emergency control centre i.e. GM(Office)
- Continually review course of incidents to determine best communication.

## 2. Incident Controller-I (IC-I) HOD'S (PP, PF, CPP &STORES)

Incident Controller-1 is the person who heads the emergency operation teams during emergency. In his absence, the Shift in Charge (Incident controller-II) will play this role till his arrival.

Initially he assist the Site main controller to assess the emergency situation based on the Hazard assessment guidelines discussions with the shift in-charge & other management personnel available or over telephone activate the relevant action plan. Since this action plan may require shutting down of plant, diverting flows, transferring inventories etc. He must have a thorough knowledge of the overall situation in the factory.

**The role of Incident controller (I) is to,**

1. Help the Site main controller (CC) in assessing the severity of Incident for declaring the emergency.
2. Directing for safe shut down of plant and evacuates unauthorized persons from effected area, to enable rescue operation. He take the assistance of Assistant commandant-CISF
3. Mobilize fire fighting facilities
4. Arrange the rescue/evacuation, Fire/security and engineering teams for emergency operations.
5. Summon First aid centre to be ready to treat patients.
6. Ensure all jobs such as isolate, divert the process from other areas, arrange for removal of combustible substances from the scene of emergency, Transfer of inventories etc.
7. Preserve material evidence for investigation purpose.
8. Arrange and keep ready necessary rescue, Fire fighting First Aid appliances to fight the emergency.
9. Arrange for evacuation of employees to the predetermined place.
10. Direct the Rescue/evacuation team and fire/security team for emergency operation.
11. Ensure that only authorized people are available in the emergency spot.
12. Establish danger zone and barricade emergency area through Fire/Combat team.
13. Render technical guidance and logistics to Fire personnel.
14. Advise to wear/Donning of Suitable PPE by the rescue and Fire team members
15. Arrange for treatment in the first aid centre and in company recognized hospitals.
16. Arrange ambulance for transporting casualties.
17. Plan and organize the deferent teams and train its members.
18. Arrange cranes, lifting tackles, trucks, welding and gas cutting accessories, tools and materials that may be needed during emergency operation.
19. Arrange and keep medical supplies such as antidotes and related drugs

## 3. Incident Controller-II Shift-In-Charges (PP, PF, STORES & CPP)

On witnessing / being informed of the incident/Emergency, promptly confirms the information and reports to the Site main controller, Incident- controller-I and Emergency Service Coordinator and assumes the role of the above said three emergency team members till their arrival.

**The role of Incident Controller is to:**

Take Safe shutdown of plant with the help of Maintenance Staff available at site.

- Direct the rescue/evacuation and Fire team members available in his shift for rescuing the victims and fighting the fire.
- Ensure wearing of Suitable PPE by the Rescue/Evacuation and Fire team member
- Provide the correct information to the Site main controller, Incident controller-I and Emergency Service Co-ordinator so that they can communicate with the concerned agencies like factory inspectorate, police and press to avoid spreading of rumours.
- Preserve material evidence for the further investigation.
- Ensure only authorized people are available at the emergency spot and unauthorized people are made evacuated with the help of fire crew.
- Arrange for shifting of casualties to the first aid centre
- Arrange vehicles to shift the casualties to the recognized hospitals
- Inform in advance to the recognized hospitals so that they are ready to receive and treat the patients - Use First aid trainees and hospital staff available in his shift, for this purpose
- Handover the charge to Incident controller(IC-I) on his arrival and assist him

## 4. Emergency Service Coordinator HOD (I&C)

On receiving the information about incident, the Emergency Service Co- ordinator rushes to the incident spot, ascertains the correct position, reports to the Site main controller and establish contact with Incident controller (IC-I).

**The role of Emergency Service Coordinator is to:**

1. Arrange immediate medical treatment to all the injured with the help of the Medical officer.
2. Arrange for Safe transfer of injured persons to the outside Hospitals and medical aid from outside agency with the help of medical officer and HOD(HR&A) department.
3. Get the mutual aid from neighbouring industries such as fire brigade, ambulance and medical aid and procure these facilities if required on hire/rent basis through HOD (HR&A).
4. Resource transportation facility to ensure availability of adequate transport vehicles through HOD (HR&A).

5. Make available extra security for maintaining law and order near incident spot and main gate.
6. Ensure the welfare of injured (providing food and drinks) through HOD (HR&A)
7. Ensure smooth operation of Emergency control and treatment to the injured people.
8. Arrange for head count at assembly point by security people.
9. Arrange for walkie- Talkie set and distribute to all Incident controllers through communication controller.
10. Arrange one telephone mechanic and electrician to assist the emergency team for communication through communication controller.

## 5. Welfare and Transport controller HOD (HR&A)/Dy.MANAGER(HR&A)

On, receiving information of the incident. The HOD (HR&A) rushes to the spot and reports to Emergency Service coordinator.

**The Role of the HOD (HR&A) )/Dy.MANAGER(HR&A) is to:**

1. Resource Suitable transport facility for shifting of casualties (Ambulance, Cars, Jeeps Fire tenders etc.)
2. Resource food and drinking (water, coffee and tea etc..)
3. Take press people and government agencies to the nearest safe place in consultation with the Safety department and CISF.
4. Give the information of the incident to the District commissioner, police, public, press and statutory agencies to avoid spreading of unwanted rumours.
5. Communicate with the family members of injured persons.

## 6. Medical Officer – HOD (HEALTH CENTRE) :

On being informed of the incident, the Medical Officer rush to the incident spot and reports to the Emergency Service co-ordinator and acts his- role.

**The role of Medical officer is to:**

1. Offer assistance and treatment during emergency.
2. Assist ESC to shift the injured persons to the hospital.
3. Maintain close contact with hospitals for medical facility and ambulance service.
4. Maintain close contact with the Emergency control center for any medical information.

## 7. Security Team – Leader-Assistant commandant- CISF

- On getting the emergency call the Assistant commandant along with his team rush to the incident spot and report to the Emergency service co-ordinator.

**The role of security team is to:**

- Report to the site of accident immediately.
- Check and allow emergency vehicles to enter the plant.

- To depute people for fire fighting as needed by Incident controller-1.
- To regulate traffic inside plant premises.
- To evacuate non- essential personnel from the incident site.
- Control and disperse crowd from incident spot. Except for the plant employees, fire fighting and security personnel and incident controllers all other people should be sent out from the site.
- To provide fire protection coverage when emergency shutdown is being done. Cover with foam blanket in fire vulnerable areas as required.

## 8. Communication controller –HOD (I&C)

- On hearing emergency siren the communication controller rush to the incident spot and report to Emergency Service Co-ordinator.

**The role of Communication controller is to:**

- Arrange radios from plant and distribute to the emergency team leaders.
- One telephone mechanic and electrician to assist the communication controller.
- Communicate with the other controllers and convey instructions/messages of site main controllers.

## 9. Safety Controller- HOD/Manager (T&S) department:

On receiving the message from Emergency control centre. The HOD (T&S) along with Manager (T&S) rush to the spot.

**The role of HOD T&S/Manager (T&S) is to:**

- Immediately stop all Hot permit works
- All Safety appliances such as Hand gloves dust respirators, ear plugs, ear muff etc to be arranged for supplying to the emergency team members.
- In addition to the above co-ordinate with concerned departments to conduct periodical mock drills in all departments.
- Regular first aid trainings to be arranged so that sufficient First aider's are available in all shifts.

## 10. Rescue evacuation /fire combat team: leader: Fire officer

The team leader reports to Incident Controller-I(IC-I) and directly fights the emergency.

**The team is responsible for:**

1. Wearing all suitable safety appliances before attempting search and rescue operations.
2. Helping the security team to cordon off the area.
3. Carrying out rescue and search operations of persons trapped in the incident spot and escorting them to the predetermined assembly point through safe exits.
4. Assisting the hospital crew for shifting the casualties to the first aid center.

5. Making the head count of rescue/evacuation and fire combat teams involved in the rescue and fire fighting operation at the incident spot.

## 11. Engineering team: leader: SM (PF)SM(PP)SM(CPP) & MGR(Stores)

On obtaining the information from Emergency Control Center, the Team leader along with his team rush to the spot and report to the Engineering team

**The Role of Engineering team is to:**

1. Take instruction from the Incident Controller 1
2. Ensure Safety of the remaining part of the plant
3. Implement plant shutdown in consultation with IC-1
4. Undertake any repair work on an emergency basis
5. Arrange to carry out civil work in the course of emergency operation.
6. Arrange to supply fire water under maximum pressure for fighting emergency
7. Miscellaneous duties regarding mechanical /electrical electronic assistance

**12. Security team: (leader: Assistant commandant)**

The Team Leader reports to the Emergency Service Coordinator

**The team is responsible for:**

1. Ensuring that the main gates are closed and movements are restricted immediately on hearing the siren. (The mutual aid from neighbouring industries and other agencies (Such as Fire tender, Ambulance and Police) to be permitted inside the plant and directed to the incident spot, Other officers from the State government or local authorities should be directed to the Emergency Control centre.
2. Arranging to provide security coverage at the main gate and at the site of emergency.
3. Cordoning off the emergency area and preventing unauthorized movement into the same.
4. Fire Fighting
5. Clearing a path for the rescue team for search and evacuate operations
6. Head count at assembly point.

**13. Emergency control centre**

The three control rooms are designated as emergency control centers

a). Filter plant control room.
b). Pellet plant control room.
c). Captive power plant control room.

The Administrative building shall serves as main emergency control room. Proper communication facilities are provided. All other important emergency personnel outside

agencies can be contacted by the Incident controllers who shall operate from here. The centre is equipped to receive and transmit information's and directions from and to the emergency team members, other areas of work as well as to the outside.

This is a common centre of the unit and is permanently installed. The staff can be asked to assemble at the identified safe place in case of emergency and the activities are performed from emergency control centre (ECC). The control centre is located outside the reasonable area of hazard and is suitably fortified and easily accessible.

The ECC will be equipped with emergency power, means of communication to the plant area and outside the complex with civil authorities. The control room will have the following information / provisions.

- Communication facilities like telephone etc.,
- Overall layout of the installation
- Technical documentation like P&I diagrams, process data and equipment data.
- Maps marked with escape routes.
- Evacuation plans in case of total evacuation of the complex and surroundings.
- Information about important plant functionaries, district authorities and Emergency services to be contacted along with contact nos. (Regarding the fire fighting and medical services)
- Personal protective equipment
- Medical first aid facilities to handle two or three people at a time

**14. Fire/emergency siren**

For fire emergency call, wailing alarm will be sounded for two minutes. For all clear, continuous siren would be sounded for one minute.

**15. Evacuation of personnel/ assembly points**

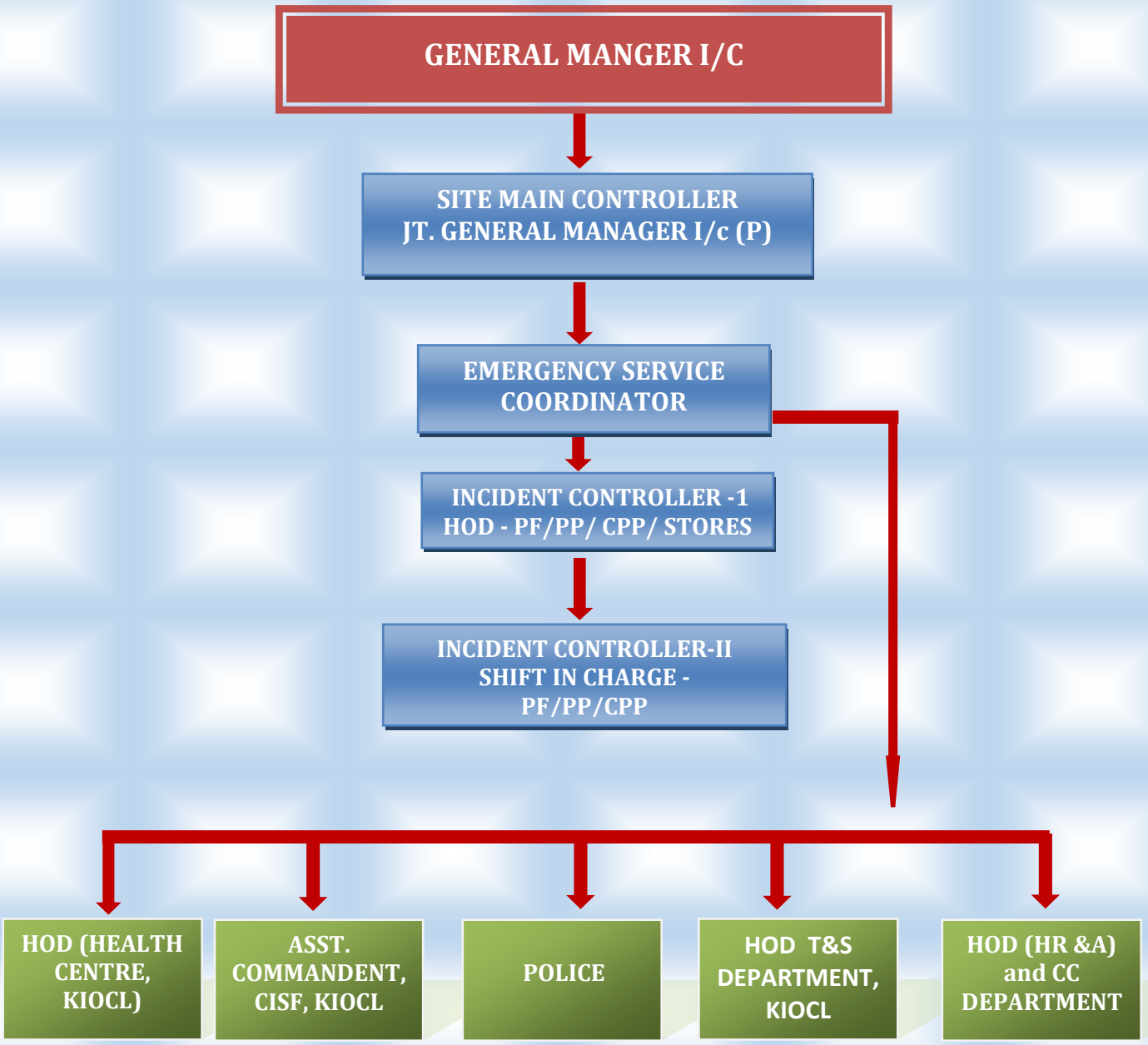
The following assembly points have been identified for the people to assemble in emergencies which are as follows:

1. In Pellet Plant (Feed End) :'O' Meter Level PP Office In Pellet Plant (Discharge End) : 'O' Meter Level Project Office
2. Port Facilities : PF Repair Shop
3. Captive Power Plant : 'O' Meter level entrance point

**16. Evacuation of personnel/ assembly points**

There will be 350 people working at any time in the factory. Attendance is maintained for all workers, which will be available at the office. A register for visitors will also be maintained since they are also accounted during emergency.

# ON SITE EMERGENCY ORGANIZATION CHART OF PELLET PLANT UNIT



## 5.2 BLAST FURNACE UNIT

### 1. THE CHIEF CONTROLLER (CC)- I/c -BFU

On being notified about an emergency, promptly proceeds to the incident spot and decides whether an emergency is to be declared or not, depending upon the gravity thereof. On declaring an emergency he proceeds to Emergency control center (ECC).

The Chief Controller's role is to:

1. Take control of overall emergency situation.
2. Ensure that the key persons are available.
3. Communicate and guide the Incident Controller-1 and Emergency service coordinator in handling the emergency.
4. Advice the people-handling emergency to Preserve material evidence for any further investigation purpose.
5. He is the final authority on all matters of Emergency management system. (Eg: Information to Statutory bodies, Police, PCB, Corporate office, press, Public and mutual aid from neighbouring Industries etc. through P&A Dept.)

### 2. INCIDENT CONTROLLER-I (IC-I) – HOD'S (MM / OPER /I&C/ ELEC/ STORES)

Immediately after receiving the emergency call from the Shift-In-Charge, rushes to the site of emergency and reports to the Chief controller and establishes contact with Emergency service co-ordinator.

The incident controller's (I) role is to,

1. Help the Chief controller (CC) in assessing the severity of Incident for declaring the emergency.
2. Direct in safe shut down of operation in consultation with Chief controller and evacuate unauthorized persons from effected area to enable rescue operation. He takes the assistance of Assistant commandant-CISF
3. Call the rescue/evacuation, Fire/security and engineering teams to rush to the spot.
4. Inform First aid center to be ready to treat patients in case if required.
5. Ensure all jobs to Isolate, divert the process from other areas, arrange for removal of combustible substances from the seen of emergency, Transfer of inventories etc. Through Shift In-Charges of Operation and maintenance departments and engineering team.
6. Preserve material evidence for investigation purpose.
7. Arrange and keep ready necessary rescue, Fire fighting First Aid appliances to fight the emergency with the help of Emergency Service Coordinator.
8. Arrange for evacuation of employees to the predetermined place.
9. Direct the Rescue/evacuation team and fire/security team for emergency operation.
10. Ensure that only authorized people are available in the emergency spot.
11. Establish danger zone and barricade emergency area through Fire/Combat team.
12. Render technical guidance and logistics to Fire personnel.
13. Advise to wear/Donning of Suitable PPE by the rescue and Fire team members
14. Arrange for treatment at the hospital in the vicinity through Emergency Service Coordinator ESC.
15. Arrange ambulance for transporting casualties with the help of ESC.
16. Plan and organize the deferent teams and train its members through ESC.

17. Arrange cranes, lifting tackles, trucks, welding and gas cutting accessories, tools and materials that may be needed during emergency operation. He uses the service of Shift In charges of Operation and Maintenance and engineering team.
18. Arrange and keep medical supplies such as antidotes and related drugs and equipments in coordination with (ESC).

### 3. INCIDENT CONTROLLER-II (Shift-In-Charge- OPER/ MM/ I&C/ ELEC/ STORES)

On witnessing / being informed of an incident/Emergency, promptly confirms the information and reports to the Chief Controller (CC), Incident Controller-I(IC-I) and Emergency Service Coordinator (ESC) and assumes the role of both CC and IC-I till their arrival. He declares the emergency after assessing the situation and carries out the duties / role of the CC and IC-1 till their arrival.

The Incident Controller's (II) Role is to:

1. Take Safe shutdown with the help of Maintenance Staff available at site.
2. Direct the rescue/evacuation and Fire team members available at site in his shift for rescuing the victims and fighting the emergency.
3. Ensure wearing of Suitable PPE by the Rescue/Evacuation and Fire team members.
4. Provide the correct information to the CC,IC-I and ESC to make them convenient to Inform to the concerned agencies like factory inspectorate, police and press to avoid spreading of rumours.
5. Preserve material evidence for the further investigation.
6. Ensure only authorized people are available at the emergency spot and unauthorized people are made evacuated with the help of fire crew.
7. Arrange for shifting of casualties to the first aid centre and to the nearby hospital.
8. Arrange vehicles to shift the casualties to the nearby hospital
9. Inform in advance to the nearby hospitals so that they are ready to receive and treat the patients - Use First aid trainees and hospital staff available in his shift, for this purpose.
10. Handover the charge to Incident controller(IC-I) on his arrival and assist him

### 4. EMERGENCY SERVICE COORDINATOR (ESC)- HOD (I&C)

On being informed of the incident, the Emergency Service Co-coordinator rushes to the incident spot, ascertains the correct position and reports to the chief controller (CC) and establish contact with Incident controller (IC-I). Emergency Service Coordinator's role is to:

1. Arrange immediate medical treatment to all the injured with the help of the Medical officer.
2. Arrange for Safe transfer of injured persons to the outside Hospitals and medical aid from outside agency with the help of medical officer and P&A department.
3. Get the mutual aid from neighbouring industries such as fire brigade, ambulance and medical aid if necessary in consultation with Chief Controller (CC) and Incident Controller-I. (IC-I) and with the help of HR &A department and Medical officer.
4. Ensure availability of transport vehicles with the help of P&A department.
5. Make available extra security for maintaining law and order near incident spot and main gate.
6. Ensure the welfare of injured (providing food and drinks) with the help of P&A department and welfare team.

7. Ensure smooth operation of Emergency control and treatment to the injured people.
8. Arrange for head count at assembly point by security people.
9. Arrange for Walkie Talkie set and distribute to all Incident controllers.
10. Arrange one telephone mechanic and electrician to assist the emergency team for communication.

**5. WELFARE AND TRANSPORT CONTROLLER - HOD (HR&A )**

On being informed of the incident, The HOD (HR&A Department) rushes to the spot and reports to Emergency Service coordinator.

The Role of the HOD (HR&A Department) is to :

1. Arrange for Suitable transport facility for shifting of casualties (Ambulance, Cars, Fire tenders etc.)
2. Arrange food and drinking water, coffee and tea etc..
3. Take press people and government agencies to the nearest safe place in consultation with the Safety department and CISF.
4. Give the information of the incident to the District commissioner, police, public, press and statutory agencies to avoid spreading of unwanted rumours.
5. Communicate with the family members of injured.

**6. SAFETY CONTROLLER -HOD (SAFETY) DEPARTMENT**

On being informed of the incident, The HOD (Safety department) rushes to the spot and reports to Emergency Service coordinator.

The Role of the HOD (Safety department) is to:

1. Stop any hot permit going on in the area.
2. Monitor the area for any gas leakage
3. Assist the ESC in selecting suitable safety appliances to the teams involved in the Emergency operation.
4. Coordinate with all departments in conducting the Mock drills regularly.

**6. SECURITY TEAM- ASSISTANT COMMANDANT, CISF, KIOCL (PP)**:

On being informed of the incident, The Assistant Commandant (CISF, KIOCL (PP) rushes to the spot and reports to the Chief controller (CC), and coordinates with the Incident controller (IC-I) and Emergency Service coordinator (ESC).

The Role of the Assistant Commandant (CISF) and with the help of Fire and Security team he:

1. Regulate the movement in Main gate and allow vehicles needed inside with personnel needed.
2. Depute Fire fighting people as required by the IC-I and ESC
3. Regulates traffic inside plant premises.
4. Evacuates unauthorized people from the incident site.
5. Ensure proper direction to the Mutual aid such as Fire tender, Ambulance and Police to the Incident spot.
6. Ensure the direction to government agencies, Press.
7. Provide with fire coverage with foam blanket in fire vulnerable areas.

## 8. MEDICAL OFFICER- Dy. CMO / Med Suptd.:

On being informed of the incident, The Medical Officer rushes to the Medical Centre and reports to the Chief controller and continue to work in coordination with Emergency Service Coordinator (ESC) and Incident Controller-1.

The Medical officer's role is to:

1. Offer assistance and treatment during emergency.
2. Seek help from Emergency service coordinator to shift the injured to the hospital.
3. Maintain close contact with hospitals for medical facility and ambulance service.
4. Maintain close contact with the Emergency control Centre for any medical information.

## 8. WELFARE TEAM LEADER- HOD (HR &A)/ DY. Manager (HR &A): -

The team leader reports to Medical officer and the emergency service coordinator (ESC).

The team is responsible for:

1. Providing first aid and canteen facilities such as tea and snacks to the injured as and when required.
2. Accompanying the injured to the Medical Center.
3. Assisting the Medical Center staff in giving First aid treatment to the injured employees and if necessary stay back in the Medical Center till the emergency is over.
4. Informing surrounding hospitals in advance to stand by for emergency treatment
5. Arranging for Hospital Admission / Treatment as per the advise of the ESC and Medical officer.
6. Maintaining a list of all personnel treated at the site, Medical Center and the Hospital.

## 9. RESCUE/EVACUATION TEAM: FIRE OFFICER CISF

The team leader reports to Incident Controller-I(IC-I) and directly fights the emergency.

The team is responsible for:

1. Wearing all suitable safety appliances before attempting search and rescue operations.
2. Helping the security team to cordon off the area.
1. Carrying out search and evacuate operations of persons trapped in the incident spot and escorting them to the predetermined assembly point through safe exits.
2. Assisting the Fire team for shifting the casualties to the first aid center.
3. Ensuring the head count of rescue/evacuation and fire teams involved in the rescue and fire fighting operation at the incident spot.

## XII. ENGINEERING TEAM LEADER: MANAGER (MM)/ MANAGER (O)

On obtaining the information from Emergency Control Center, the Team leader along with his team rush to the spot and report to the Incident Controller-1.The roll of the team is to:

1. Take instruction from the Incident Controller 1
2. Ensure Safety of the remaining part of the plant
3. Implement plant shutdown in consultation with IC-1
4. Undertake any repair work on an emergency basis
5. Arrange to carry out civil work in the course of emergency operation.
6. Arrange to supply fire water under maximum pressure for fighting emergency
7. Miscellaneous duties regarding mechanical /electrical electronic assistance

## XII: SECURITY/FIRE TEAM: (LEADER: FIRE OFFICER CISF)

The Team Leader reports to the Incident Controller-I and Emergency Service Coordinator

The team is responsible for:

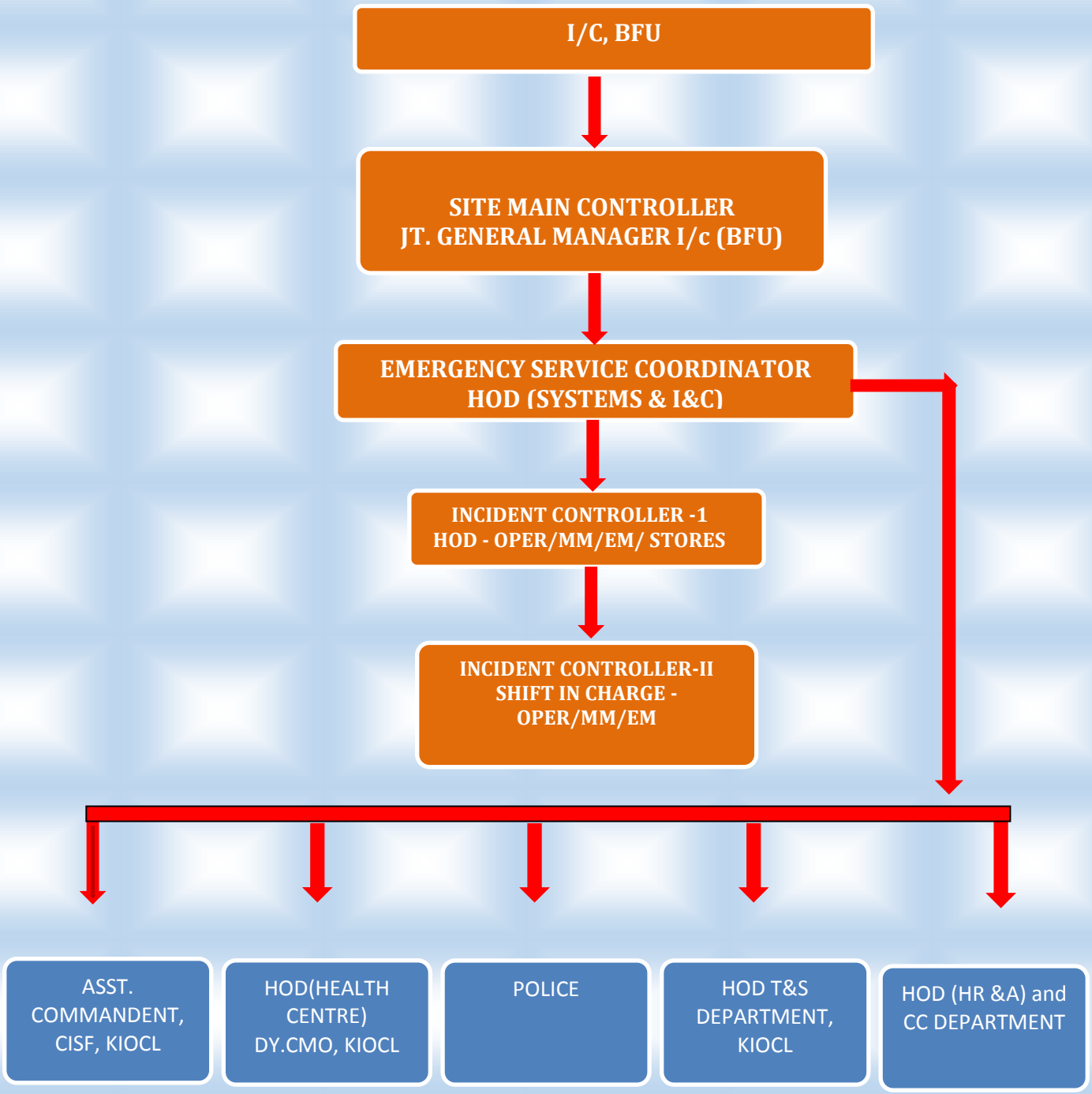
1. Ensuring that the main gates are closed and movements are restricted immediately on hearing the siren. (The mutual aid from neighbouring industries and other agencies (Such as Fire tender, Ambulance and Police) to be permitted inside the plant and directed to the incident spot, Other officers from the State government or local authorities should be directed to the Emergency Control Centre.
2. Arranging to provide security coverage at the main gate and the site of emergency.
3. Cordoning off the emergency area and preventing unauthorized movement into the same.
4. Fire Fighting
5. Clearing a path for the rescue team for search and evacuate operations

## CONTROL ROOM

The Role of the Control Room Operator is to

1. Assist the Chief Controller and act as per his advise to
    a. Call the local fire brigade or police
    b. Inform the neighbouring Communities, industries, Hospitals and local authorities and seek their assistance.
3. Keep the telephone board free for urgent communication.

## ON SITE EMERGENCY ORGANIZATION CHART BLAST FURNACE UNIT



## 5.3 RESPONSIBLE PERSONNEL DURING EMERGENCY

### PELLET PLANT UNIT

FOR ALL ALERTS: YELLOW/ RED / BLUE / ORANGE /PURPLE

| | | |
|---|---|---|
| 1 | Site main controller | Jt.GM I/c (P) |
| 2 | Incident Controller-I | HOD'S (PP, PF, CPP &STORES) |
| 3 | Incident Controller-II | Shift-In-Charges (PP, PF, STORES & CPP) |
| 4 | Emergency Service Coordinator | HOD (I&C ) |
| 5 | Welfare and Transport controller | HOD (HR&A)/Dy.MANAGER(HR&A) |
| 6 | Medical Officer | HOD (HEALTH CENTRE) |
| 7 | Security Team | Assistant commandant- CISF |
| 8 | Communication controller | DGM (I&C/ Systems) |
| 9 | Safety Controller | HOD/Manager (T&S) |
| 10 | Rescue evacuation /fire combat team | FIRE OFFICER |
| 11 | Engineering team | SM(PF)SM(PP)SM(CPP) & MGR(Stores) |

**EMERGENCY CONTROL CENTRE:**

JT. GM I/c - PPU Office
Filter plant control room
Pellet plant control room.
Captive power plant control room.

### BLAST FURNACE UNIT:

FOR ALL ALERTS: YELLOW/ RED / BLUE / ORANGE /PURPLE

| | | |
|---|---|---|
| 1 | The chief controller (cc) | I/c -BFU |
| 2 | Incident controller-i | HOD'S (MM / OPER /I&C/ ELEC/ STORES) |
| 3 | Incident controller-ii | Shift-In-Charge- OPER/ MM/ I&C/ ELEC/ STORES) |
| 4 | Emergency service coordinator | HOD (I&C ) |
| 5 | Welfare and transport controller | HOD (HR&A DEPARTMENT) |
| 6 | Safety controller | HOD (SAFETY) |
| 7 | Security team- | ASSISTANT COMMANDANT ,CISF, |
| 8 | Medical officer | HOD (HEALTH CENTRE) |
| 9 | Welfare team leader | HOD (HR &A)/ DY. Manager (HR &A) |
| 10 | Rescue/evacuation team | FIRE OFFICER CISF |
| 11 | Engineering team leader | MANAGER (MM)/ MANAGER (O) |
| 12 | Security/fire team | FIRE OFFICER CISF |

**EMERGENCY CONTROL CENTRE:**

I/c - BFU Office
Blast Furnace Control room

## 5.4 EMERGENCY RESPONSE CHECK LIST

### MINOR SPILL

*In the event of a minor spill the person who discovers the spill will immediately notify the immediate supervisor who in turn will initiate the following:*

- Inform Incident Controller-1
- Evacuate immediate area
- Verify identity of spilled material
- Remove source of ignition if flammable
- Determine proper handling precautions
- Use appropriate personal protective and emergency equipment
- Contain spill
- Neutralize if corrosive
- Pump / absorb spilled area
- Transfer to recovery container
- Decontaminate spill area
- Label recovery container
- Contact safety department / safety officer regarding drum storage and disposal
- Restock emergency supplies
- Assess incident and revise emergency plan accordingly

### MAJOR SPILL

*After being notified a major spill, the Incident Controller-1 with the assistance of the emergency response team should implement the following activities:*

- Notify employees (Public address system or alarm)
- Evacuate the hazardous area.
- Obtain emergency medical assistance if required.
- Summon On-Site Emergency assistance.
- Verify identity and estimated quantity of spilled material.
- Determine proper handling precautions.
- Obtain and use Personal protective and emergency equipment.
- Notify Off-site emergency responders as appropriate.
- Remove surrounding incomplete materials and sources of ignition.
- Contain Spill.
- Determine quantity of materials spilled.
- Notify appropriate agencies.
- Neutralize spilled material if corrosive.
- Pump or absorb spilled material
- Transfer to recovery container and label.

- Decontaminate spill area.
- Contact Safety Department / Safety Officer regarding storage and disposal of materials.
- Restock Emergency supplies.
- Follow up with appropriate notifications.
- Assess incident and revise emergency plan accordingly.

**MINOR FIRES**

*The department supervisors will implement the following actions in case of minor Fires:*

- Remove people who are not actively involved in fighting the fire from the area.
- Identify the material involved in the fire and handling precautions.
- Use required protecting clothing and equipment.
- Remove all Flammable materials from the immediate area (if appropriate)
- Fight the Fire with Emergency equipment (includes fire blankets or hand held Fire Extinguishers)
- Clean up the area.
- Place debris in containers as appropriate.
- Properly label, store and dispose of containers.
- Report incident to appropriate authorities.
- Review Cause – Initiate Preventive Measures

**MAJOR FIRES**

*The Incident Controller-1, with the assistance of the Emergency Team will implement the following actions in the case of major Fire.*

- Evacuate the affected area.
- Shut down all feed lines, including power and HVAC.
- Determine if anyone is injured (contact medical personnel if required).
- Summon off-site help if required (Fire Brigade team).
- Coordinate with Fire Brigade team.
- Use proper protective equipment.
- Identify ignitable substances and substances that could result in heat-induced explosion and remove from the area.
- Initiate Fire Fighting activities (Note: While early containment of fires can significantly reduce the severity of the final outcome, fire fighting should not be performed at the risk of injury.
- Provide containment (eg. Diking, blocking off of sewers and storm drains).
- Signal the end of the emergency.
- Thoroughly clean up the affected area.
- Put fire debris in appropriate containers.
- Label, store and properly dispose of containers.
- Notify all appropriate agencies and file written reports as required.

- Review the cause of the Fire and implement future preventive measures.

**DISCIPLINE**

*Utmost care shall be followed in handling the emergency. The guidelines of DO'S AND DONT'S are listed below*

**Do's**

1. Give attention to all Instructions.
2. Report your leader and carry out your assignment
3. Conduct the visitors/contract labors outside the emergency zone to designated location.
4. Only qualified first aiders shall render first aid wherever possible and wait for the Doctor.

**Don'ts**

1. Do not panic
2. Do not communicate with any external agencies unless instructed by the Chief controller/Incident
Controller/Emergency service coordinator.
3. Do not spread unauthorized or exaggerated information to others
4. Do not approach the emergency site as a spectator.
5. Do not unnecessarily use the communication aid like telephone/public address system
6. Do not disturb the team leaders assigned with specific work for handling emergency.

# CHAPTER-6

## INFORMATION

Directory of all officers with their addresses and phone numbers is always made available at the security office, fire stations control rooms and HR and Administration Department. The addresses of all employees and workers are available with the HR Department. In case of emergency the relatives of the affected employees will be informed

### 6.1 FIRST AID FACILITIES AND TIE UP WITH OTHER HOSPITALS

Company has set up an Occupational Health cum First aid centre in the Plant premises wherein necessary treatment is extended to people in need. All necessary equipments as required are available here. In addition to the above there are First Aiders in all Departments. List of such first aiders has been displayed in all Departments. A list of all such facilities provided at different locations in the factory along with no. of trained first aiders available at each location is provided.

The following Hospitals at Mangalore are available for treatment of employees:-

| SL.NO | NAME OF HOSPITAL | PHONE |
|---|---|---|
| | | |
| 1 | DISTRICT HEALTH & F.W. OFFICER | 9449843080, 2423168, 2423632 |
| 2 | FR.MULLERS CHARITABLE HOSPITAL, KANKANADY | 2436301 |
| 3 | KMC, JYOTHI CIRCLE | 2444590 |
| 4 | KMC, ATTAVAR | 2445858 |
| 5. | A.J. INSTITUTE & RESARCH CENTRE | 2225533 |
| 6. | PRIMARY HEALTH CENTRE, KULOOR | |
| 7. | HEALTH CENTRE, KAVOOR | 2481889 |
| 8. | NMPT HOSPITAL, PANAMBUR | 2407448 |
| 9. | GOVERNMENT AMBULANCE | 101/ 108 |

### 6.2 NEIGHBOURING UNITS:

| SL.NO | NAME OF FIRE DEPARTMENT | PHONE |
|---|---|---|
| 1 | KIOCL/CISF FIRE WING | 2403337 / 2403237 |
| 2 | GOVERNMENT FIRE | 102 |
| 3 | NMPT | 2407488 |
| 4 | MCF | 2220647 |
| 5 | MRPL | 2270279 |

## 6.3 CONTACT NUMBERS OF IMPORTANT PERSONNEL OF PELLET PLANT UNIT

| Name<br><br>S/Sri | Designation | EPABX<br><br>No.(O)<br>(2403*) | EPABX<br><br>No.(R )<br>(2403*) | TEL.NO.<br>(Office) | TEL. NO.<br>(Resi.) | MOBILE NO. |
|---|---|---|---|---|---|---|
| N. Vidyananda | D(P&P) | 220 | --- | 2407916 | 2481361 | 9448383984 |
| V.Bobraj Jeyaharan | GM | 393 | | 2408124 | | 9449824118 |
| VJ Shastri | PS to D (P&P) | 290 | -- | 2408124 | -- | 9449861664 |
| S. Govindraj Bhat | Jt.GM I/c (P) | 270 | 112 | 2403270 | 2403112 | 9448383160 |
| B.R.Alva | Jt.GM (PF) | 303 | 113 | 2403308 | | 9449871533 |
| A. Devananda Pai | Jt.GM (PP) | 390 | -- | 2407302 | -- | 9448383162 |
| T. Gajanana Pai | Jt.GM (P & PC) | 292 | -- | 2407304 | -- | 9448454184 |
| K.H. Naik | Jt.GM (Ele.) | 372 | -- | 2403372 | -- | 9449861673 |
| AVS Bhat | Jt.GM (CPP) | 305 | --- | 2408820 | --- | 9448383067 |
| UC Arun Bhat | DGM(I&C) | 370 | -- | 2403370 | -- | 9449858620 |
| Shankar Karnam | Asst. GM (HR & A) | 225 | -- | 2407919 | -- | 9449861682 |
| Sri Ramachandra Bhat | Asst. GM (Sys) | 270 | -- | 2403208 | | 9449269073 |
| BV Prakash | Asst. GM (PT)/PC | 285 | 116 | 2403285 | 2403116 | 9448454145 |
| Dasappa Shetty | Asst.GM.(Comm.) | 240 | | 2407661 | 2491173 | 9448457876 |
| Raviraja | Asst. GM.(Stores) | 264/291 | | 2407361 | -- | 9449861676 |
| Dr.Manjunath M.N. | Med. Suptd. | 181 | 117 | 2481889 | 2484488 | 9448000236 |
| Malavika G. | Asst. GM (F&A) | 212 | -- | 2407636 | 2482425 | --- |
| K. Vadiraja Rao | Asst. GM (C & PC), | 311 | -- | 2403311 | -- | 9449871535 |
| Puttaraju H.S. | Mgr.(Vig) | 223 | 133 | 2403223 | 2485007 | --- |
| Shivaraju | Mgr.T &S | 366/353 | 154 | 2403366 | 2403154 | 9449858623 |
| K.S.Dayanidhi | Sr.Mgr(MM), L&E | 190 | -- | 2403109 | -- | 9448622626 |
| S. Murgesh | DM (HR &Adm.), | 227 | -- | 2403227 | -- | 9449871540 |
| B S Shetty | JO/Admn. | 202 | -- | 2407616 | -- | 9448383158 |
| AC, CISF | CISF | 250/252 | 169 | 2403250 | 2403169 | 9449861668 |
| Fire Officer | CISF | 337/237 | 179 | 2403237 | -- | 9449861662 |
| CISF Main Gate | MAIN GATE | 395/245 | -- | 2403395 | -- | --- |
| PP Control Room | Pellet Plant | 334/224 | -- | 2403344 | 2403244 | 2407915 |
| PF Control Room | Port Facilities | 200/300 | -- | 2403200 | 2403300 | 2407918 |
| CPP Control Room | Captive Power plant | 236/246 | -- | 2403236 | 2403246 | --- |
| BFU Control Room | Blast Furnace Unit | 500 | -- | 2403500 | -- | --- |

## 6.4 CONTACT NUMBERS OF IMPORTANT PERSONNEL OF BLAST FURNACE UNIT

| SL NO | NAME | DESIGNATION | EPABX No.(O) (2403*) | TEL.NO (Office) | TEL. NO. (Resi.) | MOBILE NO. |
|---|---|---|---|---|---|---|
| 1 | ROQUE D' SOUZA | GM (BFU,NMDC-O&M) | 409 | 2403409 | 2409673 | 9449858612 |
| 2 | SRINIVASAN K. | AGM(OPN) | 448 | 2403448 | --- | 9449871536 |
| 3 | SATHEESH KUMAR R. | AGM(ELE) | 427 | 2403427 | --- | 9449871544 |
| 4 | K.R.RAMAMOHAN | AGM(MM) | 411 | 2403411 | --- | 9449242726 |
| 5 | BASAPPA.S. KASANGERI | SRMGR(STORES) | 445 | 2403445 | 2403156 | 9449871530 |
| 6 | RAMANATH SHANBHAG | SR'MGR(SYS) | 436 | 2403436 | --- | 9449871539 |
| 7 | G.V.S.K MANIKYAL RAO | SRMGR(BO&M) | 461 | 2403461 | --- | 9342054422 |
| 8 | JAGDEESH K.N. | MGR(MM) | 501 | 2403501 | --- | 9449368375 |
| 9 | LINGAIAH U.S | MGR (I&C) | 410 | 2403410 | --- | 9448549138 |
| 10 | BFU Control Room | Blast Furnace Unit | 500 | -- | 2403500 | -- |

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## 6.5 GOVERNMENT AGENCIES

In case of emergency the following Government authorities are to be contacted:

| SL.NO | OFFICE | CONTACT NO |
|---|---|---|
| 1 | DEPUTY COMMISSIONER,MANGALORE | O- 2420519 |
| | | R-2440394 |
| 2 | 1.SUPERINTENDENT OF POLICE, MANGALORE | 2426426 |
| | 2. DEPUTY SUPERINTENDENT OF POLICE, PANAMBUR | 2407736 |
| | 3.POLICE STATION, PANAMBUR | 2407314 |
| | 4.SPECIAL BRANCH | 2443216 |
| 3 | DIRECTORATE OF FACTORIES AND BOILERS, MANGALORE | 2459214 |
| | | Fax-2451716 |
| 4 | DISTRICT FIRE OFFICER, MANGALORE | 2423333 |
| 5 | ENVIRONMENT OFFICER,MANGALORE | 2408239 |
| 6 | DY.CHIEF CONTROLLER OF EXPLOSIVES, MANGALORE | 2441588 |

| SL.NO | Police Station In Mangalore | |
|---|---|---|
| 1 | Mangalore - 574199 | 2220536 |
| 2 | Kadri, Mangalore - 575003 | 2220521 |
| 3 | Kaikamba, Mangalore - 574151 | 2220535 |
| 4 | Mulky, Mangalore - 574154 | 2290533 |
| 5 | Panambur, Mangalore - 575010 | 2220530 |
| 6 | Kavoor, Mangalore - 575015 | 2220531 |
| 7 | Surathkal, Mangalore - 575014 | 2220540 |
| 8 | Kotekar, Mangalore - 575022 | 2564155 |
| 9 | Bunder, Mangalore - 575001 | 2220518 |
| 10 | Bunder, Mangalore - 575001 | 2220516 |
| 11 | **The Superintendent of Police** | |
| 12 | Dakshina Kannada District, Mangalore H O, Mangalore - 575001 | 2220503 |
| | | |

## DEPLOYMENT OF FIRE EXTINGUISHERS IN AND OUT SIDE PLANT AREA (KIOCL MANGALORE)

| SL NO | LOCATION | CO2 FIRE EXTINGUISHERS | | | | | | DCP FIRE EXTINGUISHER | | | | DCP CEASE FIRE EXTINGUISHER | | | | WATER CO2 | MECHANICAL FOAM | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 KG | 2 KG | 4.5 KG | 6.8 KG | 9 KG | 22.5 KG | 2 KG | 5 KG | 10 KG | 9KG | 500 GMS | 1 KG | 2 KG | 5 KG | 9LTR. | 9LTR | |
| 1 | Ship loading area | | 1 | 5 | | | | | 3 | | | | | | 1 | | 1 | 11 |
| 2 | Admin.Building | | 1 | 3 | 4 | | | | 1 | | | | 3 | 1 | | 8 | | 21 |
| 3 | Central store area | 2 | | 2 | 10 | | | 1 | 9 | | | | | | | 3 | | 27 |
| 4 | P.F.Workshop area | | | | 3 | | | | 5 | | | | | | | 2 | | 10 |
| 5 | Electrical- | | | | 2 | | | | 2 | | | | | | | | | 4 |
| 6 | canteen | | | | 2 | | | | 2 | | | | | | | | 1 | 5 |
| 7 | Filter plant | | 1 | 8 | 7 | 2 | | | 8 | | | | | | 1 | | 1 | 28 |
| 8 | P.F.Pump house area | | | 3 | 3 | | | | 3 | | | | | | | | | 9 |
| 9 | MSDS area | | | 3 | 3 | 3 | | | 1 | | | | | | | | | 10 |
| 10 | old HFO tank area | | | | | | | | 2 | | | | | | | | 1 | 7 |
| 11 | 14.2 MCC (Motor Control- | | | 2 | 3 | | | | 2 | | | | | | | | | 7 |
| 12 | First Aid centre(plant) | | 1 | | | | | | | | | | | | | | | 1 |
| 13 | Weigh Bridge | | | | | | | | 2 | | | | | | | | | 2 |
| 14 | Out side battery limit | | | | 11 | | | | 1 | | | | | | | | | 1 |
| 15 | Pellet Plant area | | 1 | 26 | | 8 | | | 53 | | | | | | 26 | 2 | 5 | 132 |
| 16 | C.P.P.Area | 1 | | | | 42 | 2 | 7 | 4 | 20 | | | | 2 | | 2 | 8 | 88 |
| 17 | 71 MCC | | | 2 | 2 | 4 | | | 3 | | | | | | | | | 11 |
| 18 | Reclaimer1&2 | | | 3 | | | | | 4 | | | | | | | | | 7 |
| 19 | 14.1 MCC | | | 2 | 3 | 5 | | | 2 | | | | | | | | | 12 |
| 20 | New HFC Tank area | | | | | | | | 5 | | | | | | | | | 5 |
| 21 | Project Office area | 1 | 1 | | 1 | | | | 6 | | | | | | 1 | 5 | | 15 |
| 22 | Fire stationand stores | 36 | 32 | 16 | 15 | 9 | | 3 | 40 | 2 | | 5 | 17 | 17 | 18 | 19 | 25 | 254 |
| 23 | Foam tender | | | 3 | 2 | 1 | | | 1 | | | | | | 6 | 1 | | 14 |
| 24 | Ball mill area | | | | | | | | 2 | | | | | | | | 2 | 4 |
| 25 | Old Boiler house. | | | | | 3 | | | 4 | | | | | | 3 | | | 10 |
| | TOTAL | 38 | 36 | 68 | 54 | 81 | 2 | 10 | 147 | 22 | | 5 | 20 | 20 | 55 | 29 | 43 | 630 |

## SAFEFTY AND FIRE FIGHTING FACILITIES :

| DETAILS OF PERSONAL PROTECTION EQUIPMENTS | | | |
|---|---|---|---|
| **SL NO** | **MATERIAL DESCRIPTION** | **SL NO** | **MATERIAL DESCRIPTION** |
| **1** | **HELMETS** | **9** | **SAFETY SHOES** |
| | HDP YELLOW/WHITE | | ANKLE SHOES |
| | HELMET WITH FACE SHIELD | | ANKLE SHOES- 5" |
| | HDPE HELMET W/ ARCLIC EYESHED | | ANKLE SHOES -6" |
| 2 | **SAFETY GOOGLES** | | ANKLE SHOES -7" |
| | SAFETY GOGGLE SPECTACLE TYPE | | ANKLE SHOES -8" |
| | ARC WELDING GOGGLES | | ANKLE SHOES -9" |
| | GOGGLES GRIDING | | ANKLE SHOES- 10" |
| | GAS WELDING GOGGLE -6ADIN | | GUM BOOT -5" |
| | SAFETY GOGGLES PANORAMA TYPE(CHEMICAL) | | GUM BOOT -6" |
| **3** | **EAR PROTCTIVE EQUIPMENTS** | | GUM BOOT -7" |
| | EAR MUFFS* | | GUM BOOT -8" |
| | ANTI NOISE EAR PLUG* | | GUM BOOT -9" |
| **4** | **DUST RESPIRATORS** | | GUM BOOT -10" |
| | DISPOSABLE BREA THING MASK | | LEATHER SHOES -5" |
| | DUST REPIRATOR THEOW AWAY TYPE*V-410SL | | LEATHER SHOES -6" |
| **6** | **APRONS** | | LEATHER SHOES -7" |
| | LEATHER APRONS | | LEATHER SHOES -8" |
| | PVC RUBBER APRONE FOR ACID AND ALKALI HANDLING | | LEATHER SHOES -9" |
| | ASBESTOS APRON | | LEATHER SHOES -10" |
| **7** | **HAND GLOVES** | **10** | **HEIGHT SAFETY PPE** |
| | LEATHER HANDGLOVES | | SAFETY BELTS AS PER IS CODE |
| | ASBESTOS HAND GLOVES 350MM* | | LIFE LINE |
| | PALM LEATH CANVAS GLOVES 300MM | | ROOF LADDER |
| | BANYAN TYPE HND GLOVES * | | LADDERS |
| | CANVAS GLOVES - PALM LEATHER * | | A-TYPE LADDERS |
| | CANVAS HANDGLOVES 350MM* | | |
| | HAND GLOVES -RBR ACID /ALKALI PF | | |
| | HAND GLOVES SHOCK PROOF RUBBER | | |
| | RUBBER HAND GLOVRE BIS4770-1968 | | |
| | GLOVES SURGICAL HAND SIZE-8" | | |
| **8** | **RAIN SUITS** | | |
| | DUFFLE JACKET -MEDIUM | | |
| | DUFFLE JACKET -LARGE | | |
| | DUFFLE JACKET -EX LARGE | | |
| | DUFFLE JACKET -SUPER LARGE | | |

# FIRST AID BOXES INSPECTION REPORT : DECEMBER-2013

| DETAILS | FIRST AID BOX | LIST OF MATERIALS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COTTON 1/2 ROLL | BANDAGE 4" 10 NO.S | ADHESIVE PLASTER (1 SPOOL) | DETTOL 300 ML | ANTISEPTIC CREAM (1) | EYE/EAR DROPS(1) | TAB CROCIN 10 NO's | SCISSOR 4" I N0. | STERILE DRESSING 2" & 4" | TRIANGULAR BANDAGE 2 NO's | SPLINTS 12"-15" LONG | SCRIBBLING PAD 1 NO. | XYLOCAINE 5% OINTMENT | Silverx Ointment | FIRST AIDERS AVAILABLE |
| COM | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Tel Exg. | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PERS/ CANTEEN | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| STORES | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PF(O) | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PF(M) | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PF(E) | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PF(I&C) | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PP(O) | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PP(M) | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PPE | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PP I&C | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PC | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| PROJ-OFFI( | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| CPP GENEI | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| CPP CCR | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| T&S | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |

YES- AVAILABLE X-NOT AVAILABLE EX Expired

# CHAPTER 7

## KIOCL KAVOOR TOWNSHIP

The KIOCL Township located at Airport-Kavoor-Mangaluru road. at Kavoor, beside the KIOCL Township is the KHB Colony and opposite to the Township is the MESCOM Sub-station. The Township covers an area of 27.57 acres with 490 residential buildings with 457 dwellings for family and 33 dwellings for bachelors. Apart from the residential dwellings, the township houses a Health Centre, a community hall, a Guest house, shopping area, play ground, Children's park and CISF barrack. At any point of time around 1500 persons reside in the township premises.

The disasters mentioned in Chapter 1 are applicable at the Township.

### 7.1 DISASTER PREPAREDNESS

#### 7.1.1 IDENTIFY HOME HAZARDS

- Repair defective electrical wiring and leaky gas connections
- Repair cracks in ceilings and foundations
- Store weed killers, pesticides and flammable products away from heat sources
- Place oily polishing rags or waste in covered metal cans
- Dispose toxic substances as per instructions
- Clean and repair chimneys, flue pipes, vent connectors and gas vents
- Cut big trees which are uprooted or which are near the verge of falling
- Report electrical hangings in Township area
- Place large, heavy objects on lower shelves
- Secure water heater by strapping to wall studs.

#### 7.1.2 PREPARE AN ESCAPE PLAN

In a fire or other emergency, plan for evacuations from the buildings should be so made that evacuations shall be made fast.

#### 7.1.3 PREPARE THE DEPENDENTS

If a local disaster strikes, there may not be much time to act. Not only the employees but the dependents also need to made known of the emergency plan. The plan needs to displayed at the Community Notice Board so that all the residents are aware of it and can act fast in case of emergency.

### 7.2 DISASTER ALERT

The Hazard Assessment features, Emergency Preparation, Duties of Responsible persons is same as per Chapter 3, 4 and 5 respectively and as it is a residential area, we have to point out the On-Site Emergencies **YELLOW ALERT** should be looked into.

### 7.2.1 ON-SITE EMERGENCIES YELLOW ALERT

1. **Fire due to electrical short circuit in the KIOCL Township at Kavoor.**

Area wise:

- Individual house/a Block
- Electrical control room
- KOICL Guest House
- CISF Barrack

2. **Fire due to LPG Gas Cylinder burst.**

Area wise:

- Individual house
- KOICL Guest House
- CISF Barrack

**Detection**

- Resident or any personnel on site

-When fire appears to be escalating unabated and tends to spread to adjacent building , then Incident Controller declares it to be emergency.

### 7.2.2 OTHER ALERTS

The **RED ALERT** i.e. Off-Site Emergencies, **BLUE ALERT** i.e Miscellaneous Disasters, **ORANGE ALERT** i.e Natural Disasters, Neighboring Unit disaster i.e. **PURPLE ALERT** will be applicable as per Chapter 3.

### 7.3 DUTIES OF EMERGENCY TEAM

The Officials responsible for coordinating with the District Authorities during the disasters are as furnished. Other important Phone numbers same as in Chapter 6

**EMERGENCY CONTROL CENTRE: CISF BARRACK**

**RESPONSIBLE PERSONS**

| | | |
|---|---|---|
| 1 | Site main controller | Jt.GM I/c (P) |
| 2 | Incident Controller-I | Land & Estate in-charge |
| 3 | Incident Controller-II | HOD (L&E) |
| 4 | Emergency Service Coordinator | HOD (I&C ) |
| 5 | Welfare and Transport controller | HOD (HR&A)/Dy.MANAGER(HR&A) |
| 6 | Medical Officer | HOD (Health Centre) |
| 7 | Security Team | Assistant commandant- CISF |
| 8 | Communication controller | HOD(I&C) |
| 9 | Safety Controller | HOD (T&S) |
| 10 | Rescue evacuation /fire combat team | FIRE OFFICER |
| 11 | Engineering team | HOD(Projects ), HOD(Civil) |

# CHAPTER 8

## KUDREMUKH

Kudremukh, is located at Aroli, Gangamula Range In Western Ghat in Chikmagalur District, with a Latitude : 13°.10 ' To 13°17' Deg Longitude : 75°10' To 75° 18' Deg and Altitude : 800 To 1281 Mt. with a temperature (Deg) Max :39.5 Min: 4.5 and Rain Fall (Mm) Max:10182 Min :4323.

The disasters mentioned in Chapter 1 are applicable at Kudremukh. As the mines are closed and only 10 % of our employees are placed at the area and also half of the dependents of the employees are residing in the Township the measures will be taken as per the District Commissioners Orders. The Hazard Assessment features, Emergency Preparation, Duties of Responsible persons is same as per Chapter 3, 4 and 5 respectively and as the plant is closed and dismantled, only **BLUE ALERT** i.e Miscellaneous Disasters, and **ORANGE ALERT** i.e Natural Disasters will be applicable at Kudremukh office premises. The Officials responsible for co-ordinating with the District Authorities during the disasters are as furnished.

**EMERGENCY CONTROL CENTRE: GM I/C KUDREMUKH OFFICE**

### RESPONSIBLE PERSONS

| | | |
|---|---|---|
| 1 | The chief controller (cc) | GM I/c Kudremukh |
| 2 | Incident controller-i | HOD'S (MM / OPER /I&C/ ELEC/ STORES) |
| 3 | Incident controller-ii | Shift-In-Charge- OPER/ MM/ I&C/ ELEC/ STORES) |
| 4 | Emergency service coordinator | HOD (I&C) |
| 5 | Welfare and transport controller | HOD (HR&A) |
| 6 | Safety controller | HOD (SAFETY) |
| 7 | Security team- | HOD (HR&A) |
| 8 | Medical officer | HOD(Health Centre) |
| 9 | Welfare team leader | HOD (HR &A) |
| 10 | Rescue/evacuation team | HOD (HR &A) |
| 11 | Engineering team leader | Shift-In-Charge- OPER/ MM/ I&C/ ELEC/ STORES) |
| 12 | Security/fire team | HOD (HR &A) |

**A View Of Kudremukh**

## 8 LAKYA DAM

Lakya Dam at Kudremukh was constructed for Pollution control measures to store tailings during mining operation and water requirement for Plant operation. The Dam was constructed in two stages. 1st stage was completed in 1979 with spillway level at 850.0 M. Later dam was raised to 890 M with Tunnel spillway at 885 M. But the present operational level is with Morning Glory spillway at 875 M.

The brief description of Lakya tailings dam along with its Salient Features are given below.

| | | | | | |
|---|---|---|---|---|---|
| 1. Length | : | 1048M | 5. Capacity | : | 245 Million $M^3$ |
| 2. Height | : | 108 M | 6. Total earthwork | : | 11 Million $M^3$ |
| 3.Catchment area | | 18.7 sq km | 7. Dam top level | : | 890 M |
| 4. Reservoir area | : | 6.05 sq km | 8.Full Reservoir level | : | Design:885M Present.: 875 M. |

9. Design consultants : M/s Central Water Commission, New Delhi

**TUNNEL SPILLWAY**

| | |
|---|---|
| Length of main tunnel | : 425 M |
| Length of inclined tunnel | : 31 M |
| Size of tunnel | : 4.00X 3.75 M |
| Design discharge | : 60 $M^3$/Sec |


A view of Lakya Dam at Kudremukh

## 8.1 DISASTER SITUATION IDENTIFICATION

Disaster situation in Lakya tailings dam and its downstream areas may arise due to following events;

- **Hydrologic:** Flooding occurs due to extreme storm, large releases, seepage, slumping, piping, embankment cracking, embankment deformation, embankment overtopping, movement of concrete section (sliding or over turning) settlement, failure of spillway gates or supporting structures, spillway & outlet works releases, equipment malfunction, etc.
- **Geologic:** These are related to landslides and/or earthquakes, impact of landslides / earthquake at dam which could lead to overtopping, embankment piping, embankment cracking, embankment deformation, liquefaction and movement of concrete section, etc.
- **All other events:** Arises when hazardous material spills / releases, equipment failures, security / criminal actions, fish / wildlife impacts, wildfires, structural fires, sabotage, war, etc.

## 8.2 DISASTER SITUATION EVALUATION

The emergency or disastrous situation in respect of each of the above possibilities should be identified, evaluated and classified as under;

**Extreme rainfall**

**Landslide into the reservoir**

**Earthquake –** The Lakya tailing dam is located in seismic zone II as per the seismic zoning map of India (IS:1893-2000). As such, no major damage is expected from earthquakes. However, earthquake events more than 5.5 on Richter scale in the vicinity can be taken as a potential phenomenon, which may cause disastrous situation.

**Structural damage to dam, spillways, etc.**

**Piping / Foundation failure**

**Sabotage**

## 8.3 PREVENTIVE & EMERGENCY ACTIONS

As the Lakya Tailing Dam comes under the Large Dam Category, all the routine inspection and reporting to State Level Dam Safety Committee in Karnataka is being done in line with **Dam Safety Bill -2010**. The Dam Safety Review Panel consisting of various

field experts constituted by Government of Karnataka inspects all the Large Dams in Karnataka once in 10 years and reports, the Health status of dam to The Chairman, Dam Safety Committee. Lakya Tailing Dam was inspected in 2010 and reported that Dam safety had increased due to deposition of tailing.

### 8.3.1 PREVENTIVE ACTIONS

Following preventive actions should be taken on regular basis.

#### 8.3.1.1 Dam Safety Inspections

Regular dam safety inspections by way of detailed systematic technical inspection and evaluation for hydraulic and hydrologic capabilities, structural stability and operational adequacy of the project, should be done to determine if the dam may constitute a danger to life & property. CWC Guidelines for Safety Inspection of Dams, June 1987 prescribe two stages of dam safety inspection;

**PHASE - I INSPECTION**

The Phase - I investigation will develop an assessment of the general condition with respect to safety of the project based upon available data and a visual inspection, determine any need for emergency measures and conclude, if additional studies, investigation and analyses are necessary and warranted. Based upon the findings, an evaluation will be made of the general condition of the dam, including, where possible, the assessment of hydraulic and hydrologic capabilities and the structural stability.

Various components of Phase - I inspections are detailed below;

- **Surveillance**

Surveillance or monitoring of health of the dam is the most important and effective preventive method if these procedures are followed:-

**Attendance:** The dam should be properly manned all the year round. There should be a full time dam operator and an alternate personnel, who will operate during his absence.

**Daily reports:** Daily reports about stage of the reservoir filling and condition and behavior of the dam must be submitted by the Engineer responsible.

- **Operation of spillway / reservoir**

Normally a reservoir operation schedule is laid to limit the flood stages in the river downstream and with maximum feasible utilization of the flood capacity of the river channel downstream of reservoirs, consistent with the safety of the dam. For this purpose, a schedule of opening and closing the gates to limit the reservoir levels to pre-set gauges is also laid down. In the instant case, there is no spillway gates to be operated, but it is essential to ensure that morning glory / tunnel spillway should be kept functional all the time, especially during monsoon season.

- **Visual Inspection**

Visual inspection to be made by an independent team of experts having specialization in hydropower, hydraulics, geology, concrete, gates, etc., at least twice in a year; one before and another after monsoon. Existing condition / behavior monitoring and recording instruments (strain gauges, stress gauges, piezometers, seepage / leakage flow meters etc.) should be made use of during the inspection.

Complete upstream water affected face (under drawn down conditions, if possible) for detecting any signs of physical defects, ageing factors, cracks, Alkali Aggregate Reaction (AAR), Alkali Silica Reaction (ASR), subsidence, seepage / leakage, presence of cavitations, erosion, etc. should be inspected. Downstream face should also be inspected similarly.

Visual inspection of civil and structural conditions (both internally and externally) of morning glory / tunnel spillway, etc., for detecting any apparent and incipient defects / damages should also be done. Standardised data book format, sample checklist and proforma for periodical inspection report", CWC Publication, October 1988 may be used to record the findings. Photographic records should also be maintained for future reference.

**PHASE - II INSPECTION :**

Phase - II inspection will be supplementary to Phase - I inspections and should be conducted when the findings of Phase - I inspections indicate the need for additional in depth studies, investigations or analyses. It should include all additional studies, investigations measurements, foundation exploration and testing, materials testing, hydraulic and hydrologic analysis, structural stability and operational adequacy.

**8.3.1.2 Access to the Site**

The road approach, 4.0 m wide and 1.0 km long metalled road connecting dam from the state highway 66 (Kottigehara - Padubidri) near Kudremukh to be maintained properly.

**8.3.1.3 Response during Periods of Power Failure:**

As there is constant power failure atleast 1 generator of 5 KVA capacity with sufficient stock of diesel to run for 3 nights should be kept in ready position at the dam site office.

**8.3.1.4 Response during Periods of Adverse Weather:**

Since the dam is well connected and the project colony infrastructure is quite adequate, adverse weather can be overcome to take necessary actions during the disaster.

**8.3.1.5 Alternative Systems of Communication:**

The Dam operator and supervisory officers should be well equipped with mobile phones in addition to the landline phone.

**8.3.1.6 Emergency Supplies and Resource**

Emergency supplies and resource should be kept handy which can help dam personnel and local officials manage emergency situations more safely and effectively. Any other people who may be needed (e.g., labourers, engineers), and how they are to be contacted?

Important Telephone Numbers should be kept handy. A Disaster Management Resource Database should be maintained and kept updated.

#### 8.3.1.7 Coordinating Information on Flows

Appropriate channels of communication should be established for getting regular information regarding weather / rainfall forecasts from local IMD/CWC offices and contact with local disaster management authorities for quick mobilization of resources.

### 8.3.2 EMERGENCY ACTIONS

Following potential problems, i.e., distress situations have been identified in respect of Lakya dam, for which emergency actions have been suggested, as given below.

#### 8.3.2.1 Overtopping By Flood Waters.

- Open outlet to maximum safe capacity.
- Place sand bags along the crest to increase freeboard and force more water through the spillway.
- Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other material over eroding areas.
- Divert flood water around the reservoir basin, if possible.
- Restrict Reservoir inflow, if possible.
- Create additional spillway capacity by making a controlled breach in a low embankment section or dike section where the foundation materials are erosion resistant.

#### 8.3.2.2 Loss Of Freeboard Or Cross Section Due To Storm Wave Erosion.

- Place additional rip rap or sand bags in damaged areas to prevent further erosion.
- Lower the water level to an elevation below the damaged area.
- Restore freeboard with sandbags or earth and rock fill.
- Continue close inspection of the damaged area until the storm is over.

#### 8.3.2.3 Slides On The Upstream Or Downstream Slope Of The Embankment.

- Lower the water level to an elevation If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required
- Restore freeboard with sandbags or earth and or filling in the top slide.
- Stabilize slides on the by weighing the toe area with additional soil, rock, or gravel

#### 8.3.2.4 Erosional Flows Through The Embankment, Foundation, Or Abutments.

- Plug the reservoir side of the flow with whatever material is available
- Lower water level until the flow decreases to a non-erosive velocity or until it stops.
- Place a protective sand and gravel filter over the exit area to hold materials in place.
- Continue lowering the water level until a safe elevation is reached.
- Continue operating at a reduced level until repairs can be made.

#### 8.3.2.5 Failure Of Appurtenant Structures Such As Morning Glory Spillways

- Implement temporary measures to protect the damaged structure, such as removing damaged / entangled components, strengthening by jacking, propping,

- Employ experienced professional divers, if necessary, to assess the problem and possibly implement repair.
- Make functional the tunnel spillway
- Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or controlled breach may be required.

#### 8.3.2.6 Mass Movement Dam On Its Foundation (Spreading Or Mass Sliding Failure)

- Immediately lower the water level until excessive movement stops.
- Continue lowering the water until a safe level is reached.
- Continue operation at a reduced level until repairs can be made.

#### 8.3.2.7 Excessive Seepage And High Level Saturation Of The Embankment

- Lower the water to a safe level.
- Continue frequent monitoring for signs of slides, cracking or concentrated seepage.
- Continue operation at a reduced level until repairs can be made.

#### 8.3.2.8 Back Cutting Threatening Reservoir Evacuation

- Reduce the flow over the dam by fully opening the main outlet.
- Provide temporary protection at the point of erosion by placing sandbags, rip rap materials, or plastic sheets weighted with sandbags.
- When inflow subsides, lower the water to safe level.
- Continue operating at a low water level in order to minimize spillway flow.

#### 8.3.2.9 Excessive Settlement Of The Embankment

- Lower the water level by releasing it through the outlet or by pumping, siphoning, or a controlled breach.
- If necessary, restore freeboard, preferably by placing sandbags.
- Lower water to a safe level
- Continue operating at a reduced level until repairs can be made.

#### 8.3.2.10 Loss Of Abutment Support

- Lower the water level by releasing it through tli outlet.
- Attempt to block water movement through the dam by placing plastic sheets on the upstream face.
- Lowering water to a safe level.

## 8.4 DISASTER SITUATION CLASSIFICATION

### 8.4.1 INTERNAL ALERT

*** BLUE LEVEL ALERT**

*** YELLOW LEVEL ALERT**

### 8.4.2 EXTERNAL ALERT

*** ORANGE LEVEL ALERT -**
*** RED LEVEL ALERT - Situation of inevitable catastrophe**

## 8.5 RESPONSE MECHANISM

| SI. No. | Alert Level | Official / Authority responsible | Response / Actions to be Action to be taken |
|---|---|---|---|
| 1 | BLUE | Dam Operation Office, AGM/Mgr (PCD) | 1. Measures to solve problem.<br>2. Give internal alert signal of blue level.<br>3. Inform to:<br>a. Dam Supervisor, GM (K)<br>b. Project Head. Director (P&P). |
| | | Dam Supervisory , GM I/c Kudremukh, | Get full report and satisfy himself regarding appropriateness of the measures being taken to solve the problem. |
| 2 | YELLOW | Dam Operation Office, AGM /Mgr (PCD) | 1. Measures to solve problem.<br>2. Give internal alert signal of blue level.<br>3.Inform to:<br>a. Dam Supervisor, GM (K)<br>b. Project Head. Director (P&P) |
| | | Dam Supervisory , GM I/c Kudremukh | 1.Get full report and satisfy himself regarding measures being taken to solve the problem.<br>2. Seek expert advice, if Considered necessary.<br>3. Inform civic administration / local disaster management authority for their preparedness. |

| Sl. No. | Alert Level | Official / Authority responsible | Response / Actions to be Action to be taken |
|---|---|---|---|
| 3 | ORANGE | Dam Operation Office, AGM/ Mgr (PCD) & GM I/c Kudremukh office | 1. Measure to solve problem.<br>2. Give external alert signal of orange level<br>3. Review preparedness as per para 2.5.<br>4. Inform to<br>(a) District Collector & S.P.<br>(b) State Flood Control Cell<br>Warning - Population downstream the dam to be ready for evacuation |
| | | Local Disaster Management Authority | 1. Review preparedness.<br>2.Inform all officers responsible for District Disaster Management for preparedness<br>3. Inform all residents of affected regions through their leaders / representatives / local radio / wireless etc. |
| 4 | RED | Dam Operation Office, AGM/Mgr (PCD), GM I/c Kudremukh Office | 1. Give external alert signal of red level.<br>2. Inform to:<br>(a) Local Disaster Management Authority<br>(b) State Flood Control Cell<br>Warning - Population downstream of the dam to evacuate quickly. |
| | | Local Disaster Management Authority | 1. Take actions as per para 2.5.<br>2. Get all officers responsible for District Disaster Management in action.<br>3. Inform all residents through their leaders / representatives / local radio / wireless etc.<br>4. Initiate search, rescue and relief operations |

## 8.6 IMPORTANT TELEPHONE NUMBERS

**KHALASA**

| NO. | DESIGNATION | OFF(08263) | Mobile/ Resi |
|---|---|---|---|
| 1 | Kudremukh Circle Police Station | 254399 | 08263-254299 |
| 2 | Kudremukh Police Station | 254169 | --- |
| 3 | Kalasa Police Station | 274877 | --- |
| 4 | Forest Office, Khalasa | 255998 | 9480807653 |

## COMPANY OFFICIALS KUDREMUKH

| NO. | NAME | DESIGNATION | OFF(08263) | MOBILE |
|---|---|---|---|---|
| 1 | Balakrishna H | G M I/c Kudremukh | 254172 | 9448383157 |
| 2 | Ravi Kiron N.K. | AGM(Stores) | 254102 | 9448454178 |
| 3 | Dr. Srinivasulu | Med.Supdt | --- | 9448555193 |
| 4 | ShivaShankar M | Sr.Manager(C&C, Shops) | --- | 9449023402 |
| 5 | Tharanatha Rai M | Sr.Manager(HR) | 254162 | 9448454113 |
| 6 | PrabhuSwamy | Mangaer(MM/PCD) | 254598 | 9448842798 |
| 7 | C.S.Urkade | Manager(O)/ M&S | --- | 9449758936 |
| 9 | KrishnaMurthy N | Manager(EM)/ D&M | --- | 9481226249 |
| 10 | Ravi Prakash KS | Manager(MM)/TA | --- | 9449950134 |
| 11 | MR SiddaGangaiah | Manager(C&C) | --- | 9449575781 |
| 12 | HD Mohan Kumar | Dy.Manager(Vigilance) | 254148 | 9481019308 |
| 13 | Ravindra TS | Dy.Manager(L&E) | 254148 | 9481254104 |
| 17 | Anil Kumar BB | Dy.Manager(Admn) | 254148 | 9448454110 |
| 18 | Guest House | | 254114 | 9448274849 |

## COMPANY OFFICIALS MANGALORE

| NO. | NAME | DESIGNATION | OFF(0824) | MOBILE |
|---|---|---|---|---|
| 1 | K.Vadiraja Rao | AGM (C, PCD) | 2403311 | 9449208135 |
| 2 | Kariappa T.M. | Manager (C,PC) | 2403367 | 9449553823 |

## CHIKMAGALUR OFFICIALS

| NO. | DESIGNATION | OFF(08262) | Resi(08262) |
|---|---|---|---|
| 1 | Commissioner ( Town Municipality) | 232272 /234032 | 230623 |
| 2 | Deputy Commissioner | 230401 / 231222 | 230402 |
| 3 | Assistant Commissioner | 230527 | 231274 |
| 4 | Tahsildar | 231392 | 230915 |
| 5 | Superintendent of Police (SP) | 230403 | 230404 |
| 6 | Town Police Station | 235333 | --- |
| 7 | Rural Police Station | 234042 | --- |
| 8 | Electricity | 232403 | 232404 |
| 9 | Executive Engineer (KEB) | 232403 | 232405 |
| 10 | Ambulance / Hospital | 235213 / 231163 | --- |
| 11 | District Health & Family Welfare Officer | 220429 / 220329 | 230261 |
| 12 | District Social Welfare Officer | 235259 | 231358 |
| 13 | Divisional Forest Officer | 238806 / 238807 | 220139 |
| 14 | Geologist | 235259 | --- |
| 15 | Executive Engineer (P.W.D.) | 234028 | 230043 |
| 16 | Fire Station | 101/220199 | --- |

# CHAPTER 9

## ALL CLEAR SIGNAL

After controlling the emergency, all clear signal will be given by the Occupier/Manager for the employees to resume work by means of coded siren and in case of Township to the residents to move to their premises.

## 9.1 ANALYSIS OF EMERGENCY RESPONSE

Once the emergency is over and normalcy is restored, it is necessary to conduct a detailed analysis report of the accident, evaluate influence of various factors and proposed methodology to eliminate or minimize them in future.

Remedial measures should be suggested in the final report. The above report will be carried out by other department incident controller.

## 9.2 TRAINING

Training plays an important part in containing any kind of emergency. All essential personnel during emergency are trained properly in fire fighting, first aid etc. A separate cell of fire fighting wing of CISF Wing is deployed for 24 hrs service in the plant. Fire and safety personnel are trained in all aspects of fire fighting and fire alarm glass locations, plant overall layouts, roads and how to approach during emergencies. Training is followed by continuing series of exercise to ensure well tuned emergency response capability.

Extensive planning will be effective only if people are properly trained in all aspects of the plan, the role in its implementation, and how the tasks are to be co-ordinated. The development and conduct of a training program for the emergency organisation is vital to emergency preparedness Emergency response teams, and medical personnel must all be trained. Classroom type lectures, demonstrations, and participation in exercises that test the adequacy of the plan are essential to maintenance of a well-prepared team of emergency response personnel. To minimise the extent of the training needed, the emergency organisation position has been developed so as to keep the emergency duties parallel to the individual's day-to-day responsibilities wherever possible.

The goals of any training program are to ensure that participants obtain a thorough understanding of their plans and procedures, and develop the leadership and communication skills necessary for confident decision making during stressful situations.

A good training program provides initial training for all tasks, it should provide periodic refresher training for those who have been given the initial training, and also should provide for the training of new personnel who may be inducted from time to time.