

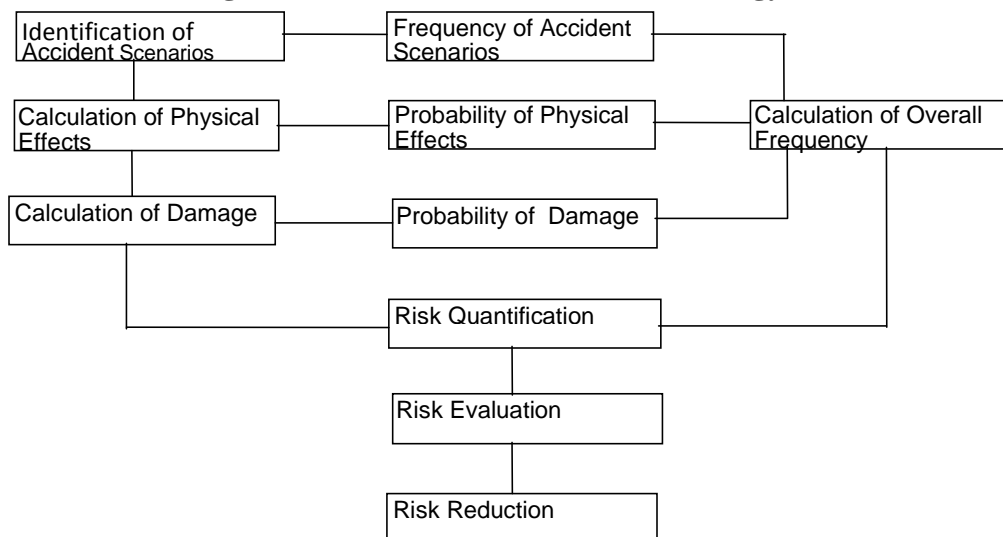


1.0 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

1.1 Preamble

The main objective of The Quantitative Risk Analysis (QRA) study is to identify the potential hazards, assess the effect/consequence of all probable accidental releases and risk mitigating measures to reduce hazards of the proposed facilities. The Quantitative Risk Analysis (QRA) study scheme is shown in **Figure - 1.1**.

Figure - 1.1: Risk Assessment Methodology



Detailed scope of work for QRA study is given below:

- Identification of Hazards and Selection of Failure Scenarios
- Effects & Consequence Estimation
- Frequency and Risk Analysis
- Risk Mitigation Measures

The criterion of acceptance of risk is As Low As Reasonably Practicable (the ALARP principle).

1.2 Hazard Identification and Selection of Failure Scenarios

Hazard is defined as a chemical or physical condition having the potential for causing damage to life, property or the environment. Hazards associated at the ferro alloy plant have

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been identified using HAZAN techniques. For each selected release source, several scenarios may be possible depending upon the failure mode causing loss of containment.

The hazard identification includes a selection of scenarios ranging from the more likely high probability-low consequence event to the low probability-higher consequence event. The criteria used for selection of scenarios for the consequences analysis is the Maximum Credible Accidental (MAC) scenarios. Detailed Hazard and Operability study has been carried out by National Safety Council.

☐ **Identification of Hazardous Process/Area**

Broadly, there will be mainly three major types of hazards during operation of expanded plant as described below:

- Fire in flammable materials;
- Explosion in flammable and explosive materials; and
- Toxic Release of hazardous gases.

Apart from these, there will also other hazardous conditions during lifting hot metal handling by cranes and hoists, handling of industrial gases throughout the plant.

1.3 RISK ANALYSIS

Risk is defined as the unwanted consequence of a particular activity in relation to the likelihood that this may occur. Risk thus comprises of two variables: magnitude of consequences & the probability of occurrence. It thus finds application as a decision making tool in situations where judgment has to be made about the tolerability of the risk posed by an existing/proposed activity. The normal approach adopted is to relate the risk measures obtained to risk acceptance criteria. The risk criteria simply attempt to establish whether Risk is “tolerable”. Below is a list of words generally in use in risk analysis.

1. **ACCEPTABLE RISKS:** No risk should be called “acceptable”. It might be better to say that the activity may be acceptable generally, but the risks can only ever be tolerable;



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2. **TOLERABLE RISKS:** are the risks which are expected to bear without undue concern ;
and

3. **NEGLIGIBLE RISKS:** are risks so small that there is no cause for concern.

Risk criteria, if they are to be workable, recognize the following:

- ❑ Level of risk that is so high that it is considered unacceptable or intolerable regardless of the benefits derived from an activity;
- ❑ Level of risk that is low enough as to be considered negligible; and
- ❑ Level of risk in between the two as mentioned above is to be considered tolerable subject to being reduced to a level i.e. “As Low As is Reasonably Practicable (ALARP)”.

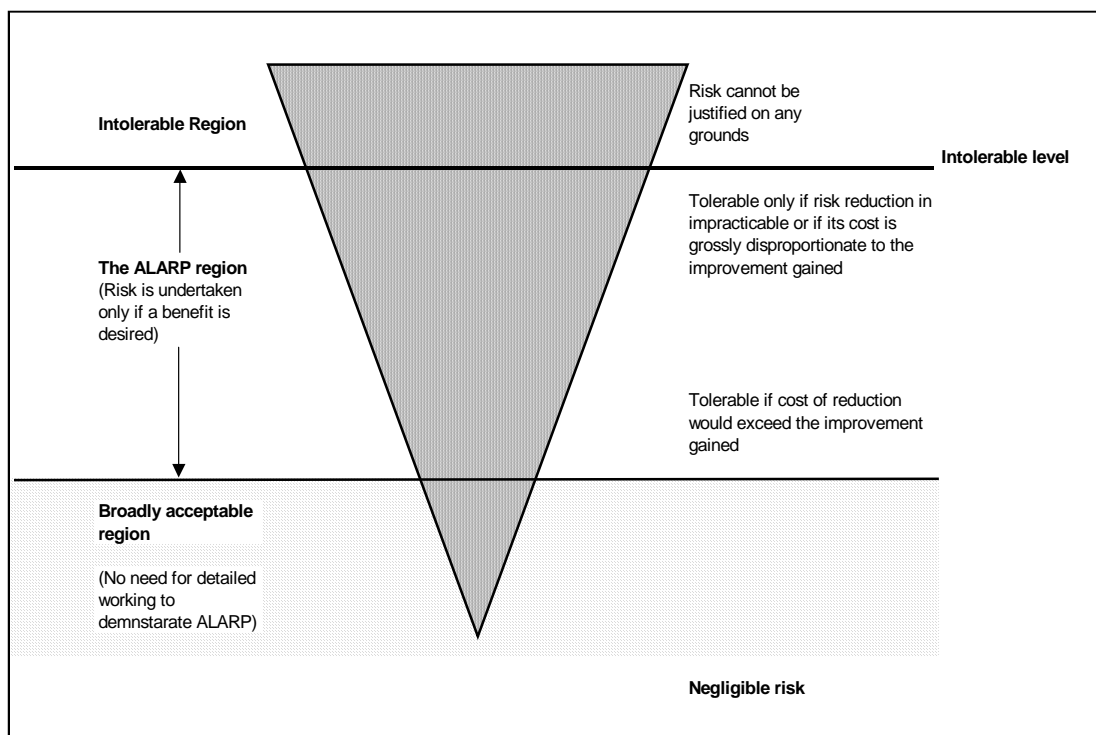
The ALARP (As Low As is Reasonably Practicable) principle seeks to answer the question “What is an acceptable risk?” The definition may be found in the basis for judgment used in British law that one should be as safe as is reasonably practicable. Reasonably practicable is defined as implying “that a computation must be made in which the quantum of risk is placed on scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time, or trouble) is placed on the other, and that, if it be shown that there is a gross disproportion between them – risk being insignificant in relation to the sacrifice – the defendants discharge the onus upon them”.



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The effects-consequence and frequency analyses for the selected releases have been summarized in previous sections. In this section results of Risk summation are presented as following:

Individual Risk is the probability of death occurring as a result of accidents at a installation or a transport route expressed as a function of the distance from such activity. Such a risk actually exists only when a person is present at that spot. The unit of Individual Risk is fatality likelihood of an individual per year. Individual risk for a single accident scenario is calculated as:

$$\text{Individual Risk} = \text{Accident frequency} \times \text{Response fraction} \times \text{Weather class probability} \times \text{Wind direction probability}$$



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Response fraction is the percentage of the exposed population who would be lethally injured when exposed to the calculated thermal radiations over the exposure duration. In case of a vapour cloud explosion, other probabilities such as ignition probability, probability of flash fire versus explosion also are taken into account.

The calculation of individual risk at a geographical location near a site assumes that the contributions of all incident outcome cases are to be added. Thus, the total individual risk at each point is equal to the sum of the individual risks resulting from all incident outcome cases associated with the plant.

There is no specified risk acceptance criterion in India for Individual Risk levels. A review of risk acceptance criteria in use in other countries indicates the following:

For industrial plants, Individual Risk Criteria have been developed by various countries and the review indicates that Individual Risk of fatality to the members of the public outside the installation boundaries may be adopted between 10⁻⁵ per year (in populated areas) for intolerable risk and lower than 10⁻⁶ per year for negligible risk. The region in between is the so-called ALARP region where risk is acceptable subjected to its being As Low As Reasonably Practicable (the ALARP principle).

❑ Findings of Risk Summation

The individual risk (10⁻⁵ /yr) for gas release is within ALARP region and tolerable. The activities at ferro alloy plant also lies in ALARP region and tolerable.

Risk Reduction Measures

Risk Assessment study provides a quantitative technique for assessing the significance of the impact of any facility on its external environment, a means for highlighting key areas for greater attention and a tool for comparing alternative options. Though, it cannot substitute for close attention to the fundamentals of safety throughout the design process or for design reviews.



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For risk reduction, attempts should be made to either reduce inventories that could get released in the event of loss of containment or failure likelihood's or both as feasible. Risk Assessment identifies the dominant risk contributors, which enables prioritisation of plants/section that deserve special attention in terms of inspection and maintenance in particular and over all safety management as a whole.

- Gas holders should be provided to maintain a positive line pressure in gas network;
- The gas line pressure should be maintained by a floating piston;
- The level of holder should be monitored and recorded on hourly basis in the logbook;
- Fresh oil should be added to make up the losses due to contamination of oil;
- The seals of the gasholder (sealing oil level) should be checked on alternate day to ensure safety and recorded in the logbook;
- The safety device, such as limit switches, shut off bell along with other mechanical and electrical system should be inspected on weekly basis jointly with gas safety and electrical and recorded.
- The fire service facilities will be equipped with:
 - Smoke and fire detection alarm system.
 - Water supply
 - Fire hydrant and nozzle installation
 - Foam system
 - Water for sprinkler system
 - Mobile fire fighting equipment
 - First aid appliances
- Smoke and fire detection, fire hydrant & nozzle installation etc. and shall be included as part of all major units at the proposed project.
- Periodic maintenance of all protective and safety equipment
- Periodical training/ awareness will be given to work force at the project as refresh courses to handle any emergency situation.
- Periodic mock drills will be conducted so as to check the alertness and efficiency of the DMP and corresponding records shall be maintained.

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- Signboards including emergency phone numbers and no smoking signs should be installed at all appropriate locations.
- Plant shall have adequate communication system.
- All major units / equipment will be provided with smoke / fire detection and alarm system.
- ‘No smoking zone’ shall be declared at all fire prone areas.
- Fuel oil storage location will be selected at an isolated place with proper fencing and guarding.
- Dyke will be provided for Fuel oil storage tanks.
- Wind socks will be installed to check the wind direction at the time of accident and accordingly persons may be diverted towards opposite direction of wind.
- Naked flame, welding etc. will not be permitted in fuel oil storage area.
- To prevent the hazard of static electricity and recirculation, lines to the storage tanks will be discharged below the liquid level.

1.4 Disaster Management Plan

Preamble

The purpose of this Disaster Management Plan (DMP) is to detail organizational responsibilities, actions, reporting requirement and support resources available to ensure effective and timely management of emergencies at or affecting any of operation of proposed expansion. This will be achieved by;

- Describing procedures to deal with emergencies affecting personnel, equipment, third party contractors, local community and environment;
- Defining the role and responsibility of Incident Response Group (IRG) and others at plant;
- Describing the external resources available to the IRG for use in an emergency and how these resources will be coordinated; and
- This plan should recognize that:

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1. Incident Controller will be authorized to initially control and contain any and all emergency situations;
2. Site Controller will be authorized to co-ordinate strategic response to all emergencies associated to the operation;
3. EHS management Review Committee will be authorized to co-ordinate the overall strategic response to any emergency at plant;
4. It should be clubbed with DMP of existing operation; and

It should be in compliance with legal requirement as described below:

The provisions of the Hazardous Chemicals Rules, Section 41 B(4) of the Factories Act, 1948 (as amended) requires that every occupier is to draw up an on-site emergency plan with detailed disaster control measures and to educate the workers employed. The obligation of an occupier of hazardous chemicals installation to prepare an emergency plan is also stipulated in Rule 13 of the 'Manufacture, Storage and Import of Hazardous Chemicals Rule's, 2000 and amended.

Under the 'Manufacture, Storage and Import of Hazardous Chemicals Rules' preparation of 'Off-site Emergency Plan' is covered in Rule No.14. The duty of preparing and keeping up to date the 'Off-site Emergency Plan' as per this rule is placed on the District Emergency Authority. Also, occupiers are charged with the responsibility of providing the above authority with such information, relating to the industrial activity under their control, as they may require for preparing the off-site emergency plan.

Following are the main objectives of the DMP to:

- Define and assess emergencies, including hazards and risk;
- Control and contain incidents;
- Safeguard employees and people in the vicinity;
- Minimize damage to property and/ or the environment;



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- Minimization of risk and impact of event accident;
- Preparation of action plan to handle disasters and to contain damage;
- Inform employees, general public and the authority about the hazards/ risk assessed, the role to be played by them in the event of an emergency and to provide safeguards;
- Be ready for 'mutual aid' if need arises to help neighboring unit;
- Inform authorities and mutual aid centers to come for help;
- Effective rescue and treatment of casualties;
- Effective rehabilitation of the affected people and prevention of damage to the property;
- Identify and listing of any fatality;
- Inform and help kith and kin;
- Secure the safe rehabilitation of affected areas and to restore normalcy;
- Provide authoritative information to media; etc

The results of the QRA study are made direct use in preparation of DMP.

□ Definitions

Definitions relevant to the emergency planning/ disaster management installation are given below.

- **Incident:** Incident may be defined as an emergency situation associated with any critical deviation in the process control or otherwise that may lead to a major accident/ potential emergency and disaster.
- **Accident:** An accident may be defined as “*an undesirable and unplanned event with or without major damage consequence of life and/ or property*”.
- **Major Accident:** It is a sudden, unexpected, unplanned event resulting from uncontrolled developments during an industrial activity, which causes or has the potential





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to cause, death or hospitalization of a number of people, damage to environment, evacuation of local population or any combination of the above effects.

- **Emergency:** This can be defined as any situation, which presents a threat to the safety of people or/ and property. It may require outside help as well.
- **Major Emergency:** Major emergency occurring at a work is one that may affect several departments within and/ or may cause serious injuries, loss of life, extensive damage to property or serious disruption outside the works. It will require the use of outside resources to be handled effectively.
- **Disaster:** Disaster is a sudden calamitous event, resulting in great damage, loss or destruction.
- **Hazards:** Hazard may be defined as “*the potential of an accident*”. Hazard exists in man and the system of materials and machines.
- **Risk:** Risk may be defined as the combination of consequence and probability or likelihood of an accident being caused in a given man-material-machine system.
- **On-Site Emergency plan:** Deals with measures to prevent and control emergencies within the factory and not affecting outside public or environment.
- **Off-Site Emergency plan:** Deals with measures to prevent and control emergencies affecting public and the environment outside the premises.

Classification of Emergencies

Emergencies can be categorized into the following three (3) broad levels on the basis of seriousness and response requirement:

- a. **Level-I :** this is an emergency or an incident which
 - i. can be effectively and safely managed and contained within the site, location or installation by the available resources; and
 - ii. has no impact outside the site, location or installation;
- b. **Level-II:** This is an emergency or an incident which





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- iii. cannot be effectively and safely managed or contained at the location or installation by the available resources and additional support is alerted or required ;
- iv. is having or has the potential to have an effect beyond the site, location or installation and where external support of mutual aid partner may be involved; and
- v. is likely to be of danger to life, the environment or to industrial assets or reputation.

c. **Level-III:** This is an emergency or an incident with off-site impact which could be catastrophic and is likely to affect the population, property and environment inside and outside the installation; and management and control is done by the District Administration. Although Level-III emergency falls under the purview of the District Authority but until the Authority steps in, it should be the responsibility of the concerned unit to manage the emergency.

Based on the QRA study, chances of Level-III emergency occurring are negligible.

Pre-Emergency Planning

Hazard Identification and Consequences

Table 1.1 The common causes for emergency/ disaster situation

Man Made	Natural Calamities	Extraneous
<ul style="list-style-type: none"> • Leakage • Fire and explosion • Failure of critical control system • Design deficiency • Unsafe acts • Inadequate maintenance 	<ul style="list-style-type: none"> • Earthquake • Excessive rainfall 	<ul style="list-style-type: none"> • Riots/civil disorder/mob attack • Terrorism • Sabotage • Bomb threat • War/ hit/ missiles

Hazard identification and consequences analysis for Maximum Credible Accidents (MCA) scenarios have been carried out as per details given in chapter-7. It is evident that societal risk lies well below the ALARP region and is therefore considered as negligible.

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Following emergency preparedness measures shall be implemented:

Internal Safety Audits

Internal safety audits will be conducted by a team specially formed for identification of various hazards during operation of proposed expansion and will check the following:

- Workability of personnel protective equipments;
- Workability of various safety facilities available;
- Workability of fire fighting facilities available;
- Workability of work permit system;
- Workability of maintenance system; etc

Suggestions and schemes will be made for modification or for additional requirement, so as to make the existing system more reliable and upgrade it based on latest advanced techniques or equipments available.

Third Party Survey/ Audit/ Study

The third party (i.e. external expert/ consultants) safety audit and study will be carried out, as and when required, to fulfill statutory obligations and also for the following:

- To study and re-identify various hazards associated with the premises;
- To check in-built safety systems for their adequacy;
- To suggest modifications/ additions in the system, if required; etc

Safety/ Relief Valve Testing

- List of safety/ relief valves will be prepared and be readily available for reference;
- Periodical schedule for testing will be prepared & followed and records will be maintained; and
- Action plans will be made and implemented for repair and replacement of faulty or damaged materials.

Fire System Testing

- To prepare list of fire extinguishers and maintain record of the same;





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- To prepare list of fire hydrants, fire system applications, fire pumps, water monitors, automatic fire alarms, smoke detectors and other available appliances and maintain a record of these;
- To draw testing schedules and record the findings;
- To replace/ modify defective equipment/ accessories;
- To periodically check fire pump capacities, delivery, pressure and auto–start/ stop systems; and
- To draw a schedule for testing the workability/ operability of the stand-by equipments, etc. used for firefighting services.

Mutual Aid Scheme

Mutual aid scheme will be available for:

- Fire fighting with fire brigade, industries and other facilities located in the surrounding area;
- Medical help with Government and private hospitals/ nursing homes; and
- External technical support for dealing with the emergency in case it is prolonged.

Mock Drills

Minor mock drills will be conducted for training personnel internally. Major mock drills will be conducted after informing the State Authority, Press/ Media and Police for handling the situation effectively. The objective of the mock drill is:

- To conduct periodic drills so as to check the performance of workforce and equipments.
- To identify the drawbacks in the system in order to implement appropriate corrective action.
- Mock fire response drill should be conducted inside the plant once in six (6) months to ensure awareness about “FIRE MISHAP” among employees.

Training

Security staff will be trained on fire fighting which includes fire fighting refresher course, fire demonstration and drills.



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Some of the employees and the security staff will be trained in first aid via an in-house First Aid Training Programme. Selective employees will be given intensive training on first aid by a reputed organization and these employees will act as first aid team in case of an emergency situation.

Protective Equipment

Personal protective equipments such as helmets, asbestos apron, leather apron, asbestos suit, asbestos gloves, leather gloves, asbestos shoes, safety shoes, gum boots, safety belts, safety goggles, ear muff, respirator etc. will be made available to workers as per the requirements. PPE will be made mandatory for all staff and visitors inside the premises and employees will be trained to use PPEs.

First aid kit with medicine, resuscitator, self breathing apparatus and torch light will be provided at different locations as per the requirements.

Communication

The following will be undertaken:

- Internal/ external communication system will be maintained in good working order;
- Telephone system between fire station and off-site will be maintained in working conditions
- Siren sound will be modified for emergency; and
- Wind cocks/ wind recorders will be installed within the premises of SMIORE to ascertain the wind direction and velocity.

Emergency Lights

The following will be undertaken:

- Emergency lights in control rooms and selected areas in the hazardous areas such as oil storage/Blast Furnace/Coke oven will be checked and maintained;
- Sufficient number of torches/ batteries will be made available in control rooms; and
- Mobile diesel operated power generating set will be kept as standby, in case of failure of normal power supply during emergency and solar lighting will be installed to avoid no-power blackouts.



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Emergency Control Room for emergency will be earmarked/ identified outside the identified hazardous area. In order to coordinate the emergency procedure during emergency, ECC will be equipped with the following:

- Layout plan of plant and surrounding area;
- At least two (2) telephone lines - one will be for receiving calls and second will be for making calls in case of an emergency;
- PPEs, masks, etc;
- Telephone numbers of administrative authorities, fire brigade, District medical officer, Factory Inspectorate, local police station and local private hospitals;
- Telephone numbers of all employees and mutual aid partners;
- Telephone directory of the city;

Assembly Points and Evacuation Route

- Two assembly points will be identified;
- Evacuation route will be marked on ground with fluorescents paint;
- Separate phones will be provided at each Assembly Point for better coordination; and
- Duties of the Assembly Point in-charge will be defined and displayed at all the Assembly Points.

Liaison with State Authorities

Liaison with Civil Authorities, Local Hospitals, Police, Fire Brigade, Collector and Factories Directorate will be maintained and will be informed of any new development, etc by personnel of SMIORE.

State authorities will be called to witness the mock drills conducted at SMIORE.

Emergency Organization and Roles & Responsibilities**Emergency Organization**

The purpose of this DMP is to detail organizational structure and responsibilities, actions, reporting requirements and available support resources to ensure effective and timely





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management of emergencies, without affecting any operation within the premises of plant.

This will be achieved by:

- Defining the role and responsibilities of Incident Response Team and others at the plant site; and
- Describing the external resources available and off-site emergency plan.

The actions necessary in an emergency depend upon the circumstances. It is imperative that required actions should be initiated and directed by a nominated team having specified responsibilities. This avoids confusions arising out of a panic situation. The details of the proposed IR team are provided below.

□ Chief Incident Controller

Chief Incident Controller (CIC) shall have overall responsibility to protect personnel, site facilities and the public before, during and after an emergency or disaster. CIC shall be present at the main emergency control centre for counseling and overall guidance. The responsibilities of the Chief Incident Controller shall include the following:

- Preparation, review and up-gradation of DMP;
- Assessment of situation and declaration of emergency;
- Mobilization of main Coordinators and key personnel;
- Activation of Emergency Control Center;
- Taking decision on seeking assistance from mutual aid members and external agencies like police, fire brigade, hospitals, etc;
- Continuous review of the situation and decision on appropriate response strategy;
- Taking stock of casualties and ensuring timely medical attention;
- Ensuring correct accounting and positioning of personnel after the emergency;
- Ordering evacuation of personnel as and when necessary; and
- Taking decision in consultation with District Authorities when an off-site emergency is to be declared.

Site Incident Controller (SIC)



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Site Incident Controller (SIC) as identified by the Chief Incident Controller will report directly to the CIC. A SIC should be nominated by management for each shift in a day (24 hours). Responsibilities of the SIC shall include the following:

- SIC shall maintain a workable emergency control plan, establish emergency control centers, organize and equip the organization with DMP and train the personnel;
- SIC shall be capable of making quick decisions and taking full charge;
- SIC shall communicate to the emergency control center, where it can coordinate activities among group;
- SIC shall be responsible for ensuring that appropriate local and national Government authorities are notified, preparation of media statements, obtaining approval from CIC and releasing such statements once approval is received;
- SIC shall also ensure that the response to the incidents or the emergencies, as the case may be, is in line with in-house procedures and coordinate business continuity or recovery plan for the incident. The SIC must ensure that next of kin are notified in a timely manner;
- SIC shall also coordinate if any specialist support is required for the abovementioned purpose; and
- SIC shall decide on seeking assistance on mutual aid members and external agencies, like, police, fire brigade, hospitals, etc.

Administration and Communication Coordinator

The responsibilities of the administration coordinator shall include the following:

- To coordinate with mutual aid members and other external agencies;
- To direct external agencies to respective coordinators at desired locations;
- To activate the medical centre and render first aid to the injured. Arrange ambulance and coordinate with hospitals for prompt medical attention to casualties;
- To ensure head counts at assembly points;
- To arrange procurement of spares for firefighting and additional medicines medication;



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- To mobilize transport to various teams for facilitating the response measures;
- To monitor entry and exit of personnel in and out of the premises;
- To ensure only authorized personnel enter in the premises;
- To regulate the flow of traffic in and out of the premises and control the mob outside, if any, with the assistance of the police;
- To provide administrative and logistic assistance to various teams; and
- To arrange evacuation as directed by CIC, in coordination with civil authorities like police, *panchayat*/ municipal authorities, etc.

Fire Safety Coordinator and Fire Team

Responsibilities of the fire safety coordinator shall include the following:

- To activate emergency sirens as per the practices codes;
- To take charge of all fire fighting and rescue operations and safety matters;
- To ensure key personnel are called in and to release firefighting operations crew as per emergency procedures;
- To assess functioning of his team and communicate with the CIC or administrative controller for any replenishment or replacement of manpower or firefighting equipment;
- Direct the fire brigade personnel and mutual aid members to their desired roles and proper positioning of manpower and equipments;
- To decide the requirement of mutual aid and instruct fire station, who in turn will contact mutual aid members;
- To coordinate with outside fire brigade for proper coordination of firefighting operations;
- To ensure that casualties are promptly sent to first aid centre/ hospital;
- To arrange requirement of additional firefighting resources including help from mutual aid partners;



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- Continually liaise with SIC and/ or CIC and implement the emergency combat strategies as communicated by them; and
- Ensure adequate hydrant pressure in the mains and monitor water level in reservoir.

Note: Fire Chief shall wear identification jacket at the site of disaster so that he is clearly distinguishable among the firefighting personnel and is visible from a distance.

Security Coordinator

The security coordinator will report to the Chief/ Site Incident Controller and shall be responsible for security of the installation during any incident or emergency situation and implement the following actions:

- Obtain an approved list from the security department or reception for ensuring that personnel on the list are escorted to the reception by security staff;
- Maintain security office in the event of an office evacuation;
- Provide office security and assist authorities in the event of civil unrest or when required organize additional security at the emergency scene;
- Obtain initial briefing from Chief/ Site Incident Controller and providing security information and status reports to the SIC during emergency;
- Assuming responsibility for any task delegated by the CIC; and
- Assess the emergency, identify security specific problems and recommended solutions to the CIC.

Support and Auxiliary Services for Major Installation

The following additional coordinators will be nominated and delegated specific responsibilities falling under the basic functions of SIC and/ or CIC:

a) Human Resources and Welfare Service Coordinator

He shall perform the following duties:

- Liaise with CIC/ SIC for incident briefing and likely requirements;
- Liaise with nearby community for incident briefing and likely requirements;
- Prepare an initial community impact assessment report with nearby community and forward the same to the CIC;





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- Consider attending/ sending community support representatives to meet the relevant community leader/ groups;
- Initiate local media monitoring as appropriate;
- Consult with other affected parties, contractors, etc in the development of media plan;
- Identify and make key ministerial/ public servants/ regulatory bodies contacts and maintain liaison as appropriate;
- Consider need for relief/ replacement of personnel in-charge;
- Set-up relative response dedicated contact phone number(s);
- Prepare personal details for patient hospital admission;
- Establish any details of incident which may involve notification to civic or social welfare organizations and determine what contacts have already been made; and
- Determine likely catering/ accommodation requirements for respondents and initiate ongoing supply.

b) Transport and Logistic Services Coordinator

Transport and Logistic Services Coordinator shall perform the following duties:

- Arrange transport facilities for the incident site;
- Mobilize all available vehicles to the incident site for emergency use;
- Arrange vehicles from other sources, if required; and
- Liaise with the CIC/ SIC for evacuation of personnel and transportation of victims

c) Communication Coordinator

Communication Coordinator shall perform the following duties:

- Ensure all available communication links remain functional;
- Quickly establish communication links between the incident site and the Emergency Central Control Room;
- Ensure that previously agreed inventory of various types of communication equipment is maintained in working condition and records are kept; and





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- Maintain voice record of significant communications with time received/ passed from the Emergency Central Control Room.

d) Media and Public Relations Coordinator

CIC will designate one (1) specific individual as the Media Officer and his duties shall include the following:

- Only the designated Media Officer will speak to the media personnel. The Media officer should ensure orderly and accurate dissemination of information; and
- CIC should understand the need to relay up-to-date “status reports” to the Media Officer on a regular basis.

e) Operation and Technical Coordinator

He shall perform the following duties:

- Liaise with CIC/ SIC for incident briefing and likely requirements;
- Assume responsibility for providing technical advice on response strategies and technical assessment of incident, source engineering drawings, plans, etc as required; and
- Ensure that the company and/ or contact personnel are available to CIC/ SIC to provide technical advice on all aspects of response operations.

Emergency Communication System

There should be an effective system to communicate emergency:

- within the plant premises i.e. to the workers including key personnel and essential workers on duty and inside during normal working hours;
- to the key personnel and essential workers not on duty and outside during normal working hours;
- to the outside emergency services and to the Government authorities; and
- to the neighboring firms and the general public in the vicinity.

Each and every section of plant will be connected by internal telephones. External phone at office and residence and mobile phones will also be available with key personnel and top executives of the plant. Walkie-Talkie sets and Public Address (PA) System network will also be available.





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Raising Alarm

Any person noticing an emergency should be able to raise or cause to be raised the first Floor Level Emergency Alarm (FLEA). All employees must be trained to operate such emergency alarms. Siren is provided to indicate an emergency. The siren differs from regular sirens in use with hauling arrangement and is audible throughout the plant.

In case of emergency, Siren type alarm system as provided is to be operated for one (1) minute continuously for three (3) times within a period of 5 to 10 minutes. The type of siren to be sounded for Major and Minor emergencies are given below. This will make all the personnel who are present in the plant become aware about the occurrence.

Emergency Siren code should be as follows:

- (a) Emergency Level I: a wailing siren for two (2) minutes;
- (b) Emergency Level II and III: Same type of siren as in the case of Level I, but the same will be sounded for three (3) times after an interval of one minute (i.e. wailing siren for 2 min + gap for 1 min + wailing siren for 2 min + gap for 1 min + wailing siren for 2 min). Total duration of the disaster siren shall be eight (8) minutes;
- (c) All CLEAR: Straight run siren for two (2) minutes; and
- (d) TEST: Straight run siren for two (2) minutes at a frequency of at least once a week.
- (e) Public Address System should be provided with message.

Telephone Message

After hearing the emergency alarm and emergency declaration or even if receiving the emergency message on the phone first, the security in-charge at the plant main gate (or Information Officer) plays an important role. The security in-charge (at the plant main gate) should be precise, sharp, attentive and quick in receiving and noting the message and then for immediate subsequent action of further communication in consultation with the



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Information Officer. A form to record emergency telephone calls will be made available with the security in-charge (at the plant main gate) or the person available in the Emergency Control Centre, who will record such calls during emergency.

Communication to the Outside Emergency Services and Authorities

Once the declaration is made, it is essential that the outside emergency services, if they have not already been called in, be informed in the shortest possible time. The emergency must be immediately communicated to the Government Authorities such as local Factory Inspectorate, Collectorate, Police and District Emergency Authorities. The statutory information to the abovementioned authorities must be supplied beforehand so that the off-site emergency control (contingent) plan may be implemented, if needed. Under the statutory provisions, information is required to be provided to the following:

- Workers;
- General public and neighboring firms;
- District Emergency Authority;
- Factory Inspectorate; and
- Odisha Pollution Control Board.

Declaring Level of Emergency

The declaration of major emergency puts all personnel/ agencies into action and the ongoing operations may be disturbed which may be very costly at times or the consequences may be serious, therefore such declaration should not be decided on whims or immature judgment or without proper thought. Given the scale of activity, which will be activated after the declaration of the major emergency, it is advisable to restrict the authority for declaration. However, it is not necessary to limit this authority to the Chief Incident Controller or his appointed deputy.

It may be advisable therefore, to divert the authority to declare a major emergency in a number of nominated people. They should be selected on the basis of their knowledge and



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experience. Nominated person/ persons will advise the Chief Incident Controller or the Site Controller to declare the emergency.

Joint decision to declare a major emergency may be taken but it should be as early as possible and without wasting time.

When an emergency situation arises, it will most probably be first noticed by the operator/ technician working in the concerned area. He should immediately get in touch with the Shift In-charge of the concerned area. The Shift In-charge should assess the situation and apprise the CIC/SIC accordingly.

CIC will rush to the ECC room and assess the situation or will get complete information (by phone if possible) through the SIC. The Site Controller will then assess the nature of emergency as either "Major" or "Minor".

Emergency Shutdown Procedure

If necessary, full or partial shutdown of the plant should be followed under the judgment of the Chief Incident Controller or the Site controller. On hearing the emergency siren/ message over phone, the following procedure will be followed to shutdown the plant:

- The operation/ maintenance department will stop incoming vehicles and move away the tankers, if any;
- The operation/ maintenance department will declare the quantity of the oil stored, gas stored etc;
- Head (operations) will stop all the production/ maintenance activity, if necessary; and
- The individuals designated for the emergency preparedness will carry out the work as assigned to them per the checklist.

Roll Call

The employees attending duty will be known through punch cards and the records (on daily basis) of others (contractors and others) will be available at the security gate. At the time of



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emergency, attendance will be verified with the people assembled in the safe assembly and emergency assembly point.

Contractors should maintain a similar list of personnel on-site. Record of the arrival and departure of visitors should also be maintained, together with the names of those they have called to see which will prove useful in establishing their whereabouts during an emergency. Visitors should wherever practicable, be accompanied on-site by a responsible member of the work staff.

In the immediately affected area, the Site Incident Controller should arrange for a search to be made by the fire brigade for any casualty. Nominated work personnel should record the names and other details of the casualties taken to the respective reception areas and the location, e.g. hospital.

At ECC, a nominated person should be posted to collate the lists and check these against the nominal role of those believed to be missing. Where missing people could be at the affected area, the Incident Controller should be informed immediately and arrangement shall be made for further search.

Evacuation Procedure

Not required personnel will usually be evacuated from the incident site and also from adjacent areas. Evacuation should be to predetermined assembly points in a safe part of the plant. Assembly points need to be clearly marked. The plan should designate someone to record all personnel arriving at the assembly point so that the information can be passed to the ECC.

On hearing the emergency siren/ alarm, the employees of the concerned area and in other areas should stop their work and rush to the safe assembly point.

Control of Emergency

The control of emergency mainly involves combating the fire/ explosion/toxic release due to release of oil and gas, by using the various resources available for risk control and adopting the following procedures:

Release of Gas



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• **Primary Controller (First Noticing Person)**

Immediately after noticing the incident, the Primary Controller should:

- Identify himself and the location of the incident;
- Wear gas mask immediately;
- Inform shift-in charge about the nature of the incident;
- Inform the security & time office about the location and nature of the incident;
- Hold on until the message is repeated to ensure proper communication;
- Stop If the location of leakage is known, shut relevant manual valves only if it is safe to do so;
- Avoid creating any source of ignition;
- Keep unnecessary people away, isolate hazard area and deny entry; and
- Ventilate closed spaces before entering.

• **Shift- In charge/ Operator**

On receipt of the message from Primary Controller, the Shift In-Charge/ Operator should:

- Switch on the emergency siren for a few minutes (if not already switched on by the primary controller);
 - Telephonically inform Incident Controller/Security In-charge and Central Control Room (CCR);
 - Provide the location and brief description of leakage;
 - Close down all lines of gas supply;
 - Keep watch over the leakage; and
 - Do not allow unauthorized personnel on scene.
- **Chief Incident Controller**
- Obtain full incident briefing and likely requirements from shift in-charge and maintain liaison;
 - Instruct CCR to shut all gas supply, if required;





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- Ensure that all personnel are accounted for and consider need to evacuate non-essential personal near the incident site. Evacuate all personnel, if gas concentration reaches danger level i.e. above LFL (Low Flammable Limit) and LD50 or IDLH; and
- Notify Site Incident Controller and provide full incident briefing and likely requirements.
- **Site Incident Controller**
 - Obtain full incident briefing and likely requirements from Incident Controller and maintain liaison; and
 - Coordinate support activities as required.
- **Security Personnel**
 - Note down the location/ details of the incident;
 - Inform Senior Personnel Officer/ Security Officer;
 - Stop visitors/ contractors/ customers to enter inside the plant;
 - Be at the telephone for receiving any message; and
 - Organize the workers to assemble at the safe assembly point.
- **Security Officer**

On hearing the emergency siren/ alarm or on receiving the message over phone, the Security Officer will:

- Proceed to the emergency assembly point along with sufficient security personnel;
- Act as per the instruction of CIC/ SIC;
- Cordon off the area;
- Not allow any unauthorized person within the premises;
- Prevent crowding of people around the scene of incident;
- Inform:
 - Security In-charge;
 - Transport In-charge;
 - Head (Security)/ a security personnel placed at the plant main gate;





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- Head (Electrical);
- Head (HR); etc
- Keep ambulance ready; and
- Inform nearby fire service as per instruction of Incident/Site Controller.
- **Head (Security)**

On hearing the emergency siren/ alarm/ message over phone, the Head (Security)/ a security personnel placed at the plant main gate should rush to the emergency assembly point, report to the CIC and also:

- Ensure availability of gas masks with oxygen cylinders and fire extinguishers and continuous water supply for firefighting in anticipation of a fire;
- Depute responsible person for maintaining gas mask and continuous water flow for firefighting in case of a fire ; and
- Rush to the ECC for further activities if any, as per the instruction of the Incident/ Site Controller.
- **Transport In-charge**

On hearing the emergency siren/ alarm or on receipt of the message, the Transport In-charge should:

- Contact the Emergency Control Center (ECC);
- Depute a representative to ECC; and
- Plan for deployment of vehicles whenever/ wherever necessary as per the instruction of SIC/ CIC.
- **Head (Electrical)**

On hearing the emergency siren/ alarm/ message over phone, the Head (Electrical) will rush to the emergency assembly point and report to the CIC. The Head (Electrical) will be responsible to:

- Check the electrical connections in the affected area;





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- Ensure availability of electrical supply if the main line is to be switched off; and
- Arrange for alternate supply.
- **Head (HR)**

Role of Head (HR) will be to:

- Be in touch with SIC/CIC for any assistance;
- To arrange refreshment for all, if emergency is prolonged;
- To provide welfare function and ensure that casualties receive adequate attention;
- To inform kith & kin of employees as per instruction of SIC/ CIC; and
- To arrange additional help (compensation, etc.), if required and inform the relatives.

In Case of Fire/ Explosion

- **Primary Controller (First Noticing Person)**

Immediately after noticing the fire, the Primary Controller should:

- Identify himself and the location of the fire;
- Inform shift in-charge about the nature of the fire;
- Inform the security & time office about the location and nature of the fire;
- Hold on until the message is repeated to ensure proper communication;
- Switch off the electrical main in the nearby area;
- Wear gas mask immediately in case of fire due to leakage of gas;
- Inject fire extinguisher to extinguish the fire, if possible;
- Be on or near the incident site till the fire service personnel arrive to guide; and
- In case of fire in electrical equipment or installations, inform electrical shift in-charge about the nature and place of the fire.
- **Shift- In charge/ Operator**
- Switch on the emergency siren for a few minutes (if not already switched on by the primary controller);
- Telephonically inform Fire /Security In-charge and Central Control Room (CCR);
- Provide the location and brief description of the fire;





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- Close down all lines of oil/gas;
 - Keep watch over the fire;
 - Try to extinguish or prevent the fire from further spreading with available resources; and
 - Do not allow unauthorized personnel on scene.
 - **Chief Incident Controller**
 - Obtain full incident briefing and likely requirements from shift in-charge and maintain liaison;
 - Instruct CCR to shut all gas/oil processing activities, if required;
 - Ensure that all personnel are accounted for and consider need to evacuate non-essential personnel from the incident site or near it. Evacuate all personnel, if gas/oil vapour concentration reaches danger level; and
 - Notify Site Controller and provide full incident briefing and likely requirement.
 - **Site Incident Controller**
 - Obtain full incident briefing and likely requirements from Incident Controller and maintain liaison; and
 - Coordinate support activities as required.
 - **Security Personnel**
 - Note down the location/ details of the incident;
 - Inform Senior Personnel Officer/ Security Officer;
 - Stop the visitors/ contractors/ customers to enter inside the plant;
 - Be at the telephone for receiving any message; and
 - Organize the workers to assemble at the safe assembly point.
 - **Security Officer**
- On hearing the emergency siren/ alarm or on receiving the message over phone, he will:
- Proceed to the emergency assembly point along with sufficient security personnel;
 - Act as per the instruction of CIC/ SIC;
 - Cordon off the area;



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- Not allow unauthorized personnel within the premises;
- Prevent crowding of people around the scene of incident;
- Inform:
 - Security In-charge;
 - Head (Security)/ a security personnel placed at the plant main gate;
 - Transport In-charge;
 - Head (Electrical);
 - Head (HR); etc
- Keep ambulance ready; and
- Inform nearby fire service as per instruction of Incident/ Site Controller.
- **Head (Security)**

On hearing the emergency siren/ alarm/ message over the phone, the Head (Security)/ a security personnel placed at the plant main gate should rush to the emergency assembly point, report to the CIC and also:

- Ensure availability of gas masks with oxygen cylinders and fire extinguishers and continuous water supply for firefighting;
- Depute responsible person for maintaining continuous water flow for firefighting; and
- Rush to the ECC for further activities, if any, as per the instruction of the CIC/ SIC.

- **Transport In-Charge**

On hearing the emergency siren/ alarm or on receipt of the phone message, the Transport In-charge should:

- Contact the ECC;
- Depute a representative to ECC;
- Plan for deployment of vehicles whenever/ wherever necessary as per the instruction of the Site/ Incident Controller;
- Move away the tankers, if any;
- Stop the incoming vehicles; and





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- Give the quantity of the oil stored and gas stored etc.

- **Head (Electrical)**

On hearing the emergency siren/ alarm/ message over phone, the Head (Electrical) will rush to the emergency assembly point, report to the Incident Controller and will be responsible to:

- Check the electrical connections in the affected area;
- Ensure the availability of electrical supply if the lines are affected; and
- Arrange for alternate supply.

- **Head (HR)**

- To be in touch with Site/ Incident controller for any assistance;
- To arrange refreshment for all, if emergency is prolonged;
- To provide welfare function and ensure that casualties receive adequate attention;
- To inform kith & kin of employees as per instruction of SIC/ CIC; and
- To arrange additional help (compensation, etc.), if required and inform the relatives.

In Case of Accident

During the time of any accident or emergency condition, the Primary Controller will have to inform the Shift In-Charge immediately which will be followed by:

- Shift In-Charge will inform to responsible Department Head, Time Office and Security Personnel;
- According to the seriousness of the accident, the Department Head will arrange duty doctors, ambulance and inform the personnel department;
- Department head will also report to Incident Controller and Site Controller about the incident and actions taken/required;
- The department head will immediately report to spot and collect the cause of accident;
- The department head will make a final report;
- The cause of accident will be analyzed and rehabilitation measure will be implemented; and



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- The workmen will be advised to do the work with more safety measures.

All Clear Signal

As soon as the emergency situation has been brought under control, it is necessary to bring it to the notice of all concerned. This will be done by a coded siren. The coded siren for this would be a continuous siren for five (5) minutes. This would indicate that the emergency situation has been brought under control.

Post Emergency Activities

Post emergency activities comprise of steps taken after the emergency is over so as to establish the reasons for the causation of the emergency and preventive measures. The steps involved are:

- Collection of records;
- Conducting inquiry and concluding preventive measures;
- Making insurance claims;
- Preparation of inquiry reports with recommendations;
- Rehabilitate the affected people within the plant and outside the plant, if any; and
- To restart the plant.

Off-Site Emergency Plan

The Risk Assessment (RA) study has concluded that the off-site risk is in the negligible range. Toxic material generally will may have an off-site;

Legal Authority

Under the Environment (Protection) Act, 1986 the 'Manufacture, Storage and Import of Hazardous Chemicals Rules' were promulgated in November, 1989 & amended in 2000 and 'Rules on Emergency Planning, Preparedness and Response for Chemical Accidents' in 1996.





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Under the 'Manufacture, Storage and Import of Hazardous Chemicals Rules' preparation of 'Off-site Emergency Plan' is covered in Rule No.14. The duty of preparing and keeping up to date the 'Off-site Emergency Plan' as per this rule is placed on the District Emergency Authority (DEA). Also, occupiers are charged with the responsibility of providing the information, relating to the industrial activity under their control, as DEA may require for preparing the off-site emergency plan.

In addition to information provided in the relevant sections on actions to be taken by plant personnel and exposed public during any situation, the District Authority (i.e. District Collector, Factory Inspector, etc) in conjunction with SMIORE, nearby industries under mutual aid scheme and relevant emergency services should have an off-site emergency plan considering the following:

- Incidents at the site including fires and/ or explosions and toxic release that would likely cause concern among the local population. It would be necessary to advise people to stay away from the area, reassure them that they are in no danger and follow relevant actions as suggested in the DMP;
- In addition to SMIORE personnel, the following "local" external agencies may be involved in the formulation of procedures for off-site incidents and may also be involved in response to any incident;
 - Police at District Headquarter;
 - Traffic Police at District Headquarter;
 - Fire services District Headquarter;
 - Fire services available with nearby industries;
 - Civil Authority at District Headquarter;
 - Factory Inspector;
 - Odisha Pollution Control Board;
 - Electricity Authority at District Headquarter; etc
- Develop a continuous liaison system with the abovementioned agencies for better coordination to deal with any emergency;



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- The following aspects should be addressed in any detailed response to an off-site incident:
 - *Organization:* includes details of command structure, coordination arrangement, implementation procedures, emergency control centers;
 - *Communication:* includes identification of personnel involved, lists of telephone numbers, etc.
 - *Availability of Specialist Emergency Equipment:* includes details of heavy lifting gear bulldozers, specialized firefighting equipments available in the vicinity and status of availability;
 - *Availability of Specialist Technical Knowledge:* includes details of organization or individuals whom it may be necessary to call e.g. for specialized chemical knowledge, impact knowledge etc;
 - *Mutual Aid Scheme:* includes details of contacts and available facilities;
 - *Meteorological Information Sources:* includes arrangements for obtaining details of weather conditions prevailing and weather forecast on regular basis;
 - *Humanitarian Arrangements:* includes details of provisions for transport, evacuation routes and centers, food, treatment of injured, etc;
 - *Public Information:* includes arrangements for dealing with the media, informing relatives of employees and local population;
 - *Incident Assessment:* includes arrangements for collecting information on incident causes and reviewing the efficiency and effectiveness of all aspects of the emergency plan;
 - Efficient off-site incident planning also involves interaction on a regular basis among various organizations. To ensure that every procedure put in place will run efficiently and effectively, exercise (mock drills) involving all the relevant organizations will be carried out. These will be monitored and assessed with procedures updated to reflect knowledge gained; and
 - Contact details of relevant external organizations and individuals.

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The On-site and Off-site plans are dovetailed so that the emergency services are summoned at the appropriate time and are provided with accurate information and a correct assessment of the situation. The responsibility for this is with the CIC.

CIC will provide a copy of On-Site and Off-Site Emergency Plan to the District Authorities, the Factories Inspectorate and the Emergency Services, so that on the basis of information provided in the plan, such authorities can make their emergency preparedness plan to formulate and execute the District/ Area Off- Site Emergency Plan.

Role of External Agencies

It is expected that the following roles shall be performed by various external agencies during off site emergency:

❑ Fire Brigade

- a) Rush fire tenders to the incident site with all necessary firefighting equipments;
- b) Dispersal of vapors by water spray away from the inhabited area in case of leakage;
- c) Extinguish the fire, in case of fire;
- d) Allow the fire to burn under controlled conditions if isolation is not possible;
- e) Save human lives and salvage material from incident;
- f) Assist fire department of plant to handle the emergency;
- g) Liaise with fire brigade in the adjoining town for additional help, if necessary;
- h) Arrange water through municipal water tankers or any other source; etc

❑ Police

- a) Stop traffic from both ends of the road and divert the traffic;
- b) Warn the people living in the adjacent area to stop all smoking, evacuate to safer places, if necessary;
- c) Contact district police headquarters for further assistance, if required;
- d) Evacuate personnel from the area, if required;
- e) Extend help in removal of injured personnel to the nearest first aid center/ hospital,



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contacting highway patrol, completing legal formalities in case of any casualty; etc

❑ District Administration

- a) To keep a watch on the overall situation;
- b) Rush ambulance to the incident site if casualties are reported;
- c) Direct cranes or any other such equipment to carry out rescue operations;
- d) Issue warning messages to people through public address system, if any evacuation is required;
- e) Arrange emergency vehicles for evacuation;
- f) Give direction to hospitals having burn injuries ward for readiness to receive patients in case of incident involving fire;
- g) Provide basic amenities, e.g. water, electricity, food and shelter to the affected people as required; etc

❑ Medical Department

- Will provide first aid and treatment;
- Will arrange ambulance for removal of victims/ casualties;
- Will set up temporary medical camp and import first-aid to casualties;
- Will arrange for casualties to be sent to Government/ private hospitals; and
- Will secure assistance of medical and paramedical personnel from nearby hospitals/ institutions.

Security Threat Plan and Action Plan to Meet the Eventualities

On identification of doubtful packet/ bags/ others, following emergency action shall be taken in case of bomb threat:

- (a) Area should be cordoned off immediately;
- (b) On receipt of first hand report, CIC should contact District Authorities and Police immediately;
- (c) Persons inside the installation should be evacuated as soon as possible;
- (d) All the vehicles on the installation premises should be evacuated to safer places; and



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(e) All piping valves should be closed and all operations at **SMIORE** should be stopped.

Pre-Incident Information

Provision of providing incident/ awareness details to the public should also be a part of the responsibility of "Government Authorities" and not of SMIORE alone. Recommended information to be provided to the public are as follows (it is recognized that some of the information given below may not be divulged due to security reasons):

- Name of the site manager and address;
- Details of the person responsible for providing information;
- Common name(s) of all hazardous substance and indication of their characteristics;
- An assurance that SMIORE will be taking all reasonably practicable steps to minimize the risk of a major accident (the level of risk has been estimated through RA which shows acceptable off-site risks);
- Details of emergency warning system and the actions to be taken on receipt of warning;
- An assurance that SMIORE will make appropriate arrangements to deal with any foreseeable incidents;
- Reference to off-site emergency planning and advice to the public to cooperate with emergency services;
- Details of where and from whom further information may be obtained;
- Details of any emergency response exercise to be carried out; and
- The above information can be circulated via posters, talks, leaflets, etc which should be in the local language. Leaflets containing do's and don'ts may also be circulated in the vicinity. Any printed information to be provided to the local community should be in the local language.

Actions Recommended for the Public

SMIORE's personnel, in liaison with the emergency services, will provide relevant information to the public during any incident via the use of loud hailers, etc. As a



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precautionary measure, the actions to be taken by the general public in the event of a major accident are as follows:

- Move away from the site to safer areas and follow any instruction from SMIORE personnel;
- Take appropriate shelter and close doors, windows, curtains and blinds, if available;
- Do not smoke or light matches, until given the all clear;
- Put out fires, until given the all clear;
- Follow the instructions of SMIORE 's emergency services;
- Listen public announcement carefully;
- Do not contact the emergency services unless you are alone unaided/ injured or are in need of urgent assistance; and
- Remain indoors until you are told that it is safe to go outside. If evacuation is necessary, you will be notified by SMIORE 's emergency services;
- It is SMIORE 's responsibility, in liaison with relevant local authorities, to update the local community at appropriate intervals.

List of Details to be notified:

List of telephone numbers of outside agencies as listed below should be readily available:

- District Collector;
- Police;
- Fire Brigade;
- Ambulance;
- Hospital;
- Factory Inspectorate;
- Regional and Head office, Odisha Pollution Control Board; etc



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1.5 OCCUPATIONAL HEALTH AND SAFETY

Source of Occupational Health Hazards are:

Fire Hazards

The fire prone area in the plant premises are furnace Oil & Diesel storage room, Laboratory. In the above sites fire extinguishers are provided which are always inspected to be ready-use Condition and training of fire fighting is providing to employees at site periodically. In case of emergency, trained fire fighting team is also there.

Heat Radiations

Workers are strictly undergo safety equipments while expose to work along with furnace areas.

They usually wear helmets, FR aprons, Leather hand gloves, goggles and safety shoes at workplace. At the time of lancing and casting of hot metal worker expose to heat wear full body FR apron and stay behind body protection guard made by steel. Nos. of man cooler, eye and body washer provided for them. In summer re hydration oral liquid provided all workers to avoid if any heat stroke.

Air Pollution

The major air pollution areas are identified as sales yard, MRP area, loading & unloading of materials area.

SMIORE basically concern about the air pollution as well as dust. So regularly water sprinklers are used in the roads, waste areas, sales yard etc to decreases the amount of dust. Dry fog system is adopted at raw material feeding area and permanent water sprinkling method adopted to reduce fugitive dust emission which can cause dust borne disease by respiration and skin contact of human body.

Noise Level

The noise prone areas are observed as sales yard, MRP area, production area.

The employees were engaged at noise prone area on shift basis and duty area also changed Frequently to avoid more exposure to noise.





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Discussions & Recommendations For Prevention Of Hazardous Effects

Before joining at SMIORE, all the new employees are strictly undergo a initial medical examination (PME) .

A periodical health check up provision also there which is usually to be conduct by the company once in a year including various tests such as test of Eye vision, respiratory system, cardiovascular System, nervous system, Skin Condition etc.

Regular occupational health awareness camp occurs in the company Premises.

Following measure have been taken up by company towards occupational health safety viz.

- Pre-medical examination of all new joinee as per statutory provision.
- Regular Health Check-up of all employees.
- Providing Hygienic canteen and drinking water for all employees.
- Provision of medical treatment for employees.
- Emergency Occupational Health Facility: A well and good dispensary running there with one doctor (medicine Specialist) with one staff nurse, one attendance & four pharmacists. The dispensary is well maintained and well equipped.
- Undertaking adequate Safety Measures: SMIORE is implementing the following safety measures to reduce the health risk of workers in the Company Premises.

Communicate the risks to the workers and steps for prevention and control through audiovisual presentation, pamphlets, posters etc.

Educating worker, or person about any hazard in the work and training is being given to that worker for handling, storage, use, disposal and transport of any equipment, substances, tools, materials etc.

Taking every precaution reasonable in the circumstances for the protection of a worker.

A Safety Committee is constituted for emergency purposes headed by the factory manager.

The cost of tests and treatment of occupational illness is being borne by the company and the medical allowance has been given for the non-occupational illness as per the pay structure and norms of compensation set by labour department.



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A corpus fund for compensation in case of injury or loss of life is being maintained separately.

The health check up records is being maintained for 5 years for reference purpose and further necessary.

Adopted proven safe technology and strive at all times for up-gradation of safety and health standards,

Continuously monitor and improve working conditions to prevent ill health & injury.

Formulate safe operating procedures (SOP) and standard maintenance procedure (SMP) for different processes to provide and sustain a healthy working environment.

Comply with all the prevailing statutory rules and regulations in force in respect with safety and health of workers,

Develop among persons under the control of the organization an awareness of occupational health & safety responsibility and adherence to safe work practices.



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Pre-Employment/Periodical Health Check-Up Format

Form No - 31 A
HEALTH RECORD
(Pre-employment / Periodical)
[Prescribed under Rule-62 - I]

1.	Name of the factory	:
2.	Name of the Employee	:
3.	Employee Distinguishing Number	:
4.	Age of the Employee	:
	Identification Mark	:
	Nature of Job	:
5.	Date of Employment	:
6.	Length of service in years	:
7.	General Survey	:
	Health :- Good / fair / Poor	
	Height :- cms	
	Weight :- Kg	
8.	Blood Group	:
9.	Eye Vision	:
	Normal / Abnormal	
	Use of Glass :- Yes / No	
10.	Hearing : Normal / Abnormal	
11.	Respiratory system and chest Measurement	
	Inspiration	
	Expiration	
	Respiration rate / min	
	Remarks, if any	
12.	Cardiovascular system	
	Pulse rate	
	BP	
	Heart Sound	
	Remarks, if any	



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13. Abdomen Tenderness : Yes / No
14. Nervous System
- History of Fits : Yes / No
- Epilepsy : Yes / No
- Remarks on Mental health :
15. Locomotor System : Normal / Abnormal
16. Skin Condition : Normal / Abnormal
- : Remarks on any skin Disease Noticed :
17. Hemias : Present / Absent
18. Hydrocele : Present / absent
19. Present Complain ,if any :
20. Summary of Findings :
- Heart disesse
- Hypertension
- Diabetes
- T. B
- Epilepsy
- Poisoning
- Others
- Occupational disease,if any
21. Recommendation,if any
for any further investigation :

Signature of the Employee

Signature of the Medical officer





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Result of Periodical Health Check-up

SMJORE Arogya Community Health Centre
Kudligi Road, behind Forest Office, Sandur
Bellary Dist. - 583 119, Phone No. 08395-260304
Email : arogyahospital@sandurgroup.com

5/6/14

Sl. No. 39

Company Name: SHPPL

Name: S. Heghya Naik	Department: Jr. Tapper
Age: 42 Sex: Male	Employment No.: 997935
Address:	In Emergency Contact:
In Emergency Contact:	

Personal History

Identification Marks: 1 BLACK MOLE OVER THE ABDOMEN

2

Blood Group: O+ve Diet:

H/o any Allergy:

	Smoking	Alcohol	Tobacco Chewing	Snuff
Quantity/day				
Duration				
Type				

Presenting Complaints	
Past History	for regular medical
Family History	clear up
Obstetric / Menstrual History	

General Physical Examination

Height: 162 cms	Weight: 55 kgs	
Blood Pressure: 80/60 mm of Hg	Pulse Rate: 88 / min	Respiratory Rate: / min
Chest Measurement	Inspiration: 41 cms	Expiration: 88 cms

Vision Acuity

Eye	Distant Vision	Near Vision	Colour Vision	Corrections
Right	6/6		normal	no glasses
Left	6/6		normal	





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2

Systemic Examination

ENT	} NAD
a) Right Ear (hearing)	
b) Left Ear (hearing)	
c) Any abnormality	
Oral Hygiene	
Respiratory System	
Cardiovascular System	
Abdomen	
Central Nervous System	
Locomotor System	
Skin	
Any other abnormality	

Investigations

Chest X-Ray PA view	} WNC Reports enclosed
Spirometry	
Audiogram	
ECG	
Blood Investigations	
a) Blood Grouping & Rh type	
b) CBC	
c) FBS & PPBS	
d) Lipid Profile	
e) Renal Profile	
f) HBS Ag & IDV	
Urine routine examination	

Dietary Advice :

Remarks : NIL



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SMIORE's AROGYA COMMUNITY HEALTH CENTRE
Kudligi Road, Sandur-583119, Ph:08395-260304
LABORATORY TEST REPORT

Name : <i>Mr Mangraya Nak</i>	Age: <i>42Y</i>	Sex <i>M/F</i>	Date : <i>5-5-14</i>
Ref By: <i>Hasan Dastagir</i>	Ref ID - <i>946</i>	<i>Emp-No-997935</i>	
Test	Observed Value	Normal Range/Unit	
HAEMATOLOGY:			
HAEMOGLOBIN	<i>15.4</i> grm/dl	12.0 to 16.0 gms/dl	
TOTAL COUNT	<i>6,400</i> cells/cumm	4000-11000 cells/cumm	
DC: NEUTROPHILS	<i>72</i> %	40-75, For 0-6yrs: 20-45%	
LYMPHOCYTES	<i>21</i> %	20-45, For 0-6yrs: 40-75%	
MONOCYTES	<i>05</i> %	2-10%	
EOSINOPHILS	<i>02</i> %	0-6%	
ESR	<i>10</i> mm/hr	0-15 mm/hr	
BLOOD GROUPING & RH FACTOR	<i>"O" +ve POSITIVE</i>		
BIOCHEMISTRY:			
FBS	<i>92</i> mg/dl	60-110mg/dl	
PPBS	<i>127</i> mg/dl	75-150mg/dl	
BLOOD UREA	<i>24</i> mg/dl	20-40 mg/dl	
SERUM CREATINE	<i>0.9</i> mg/dl	0.8-1.4 mg/dl	
CHOLESTEROL	<i>177</i> mg/dl	< 245mg/dl	
HDL CHOLESTEROL	<i>36</i> mg/dl	30-70mg/dl	
LDL CHOLESTEROL	<i>134</i> mg/dl	130-160mg/dl	
VLDL	<i>28</i> mg/dl	30-40mg/dl	
TRIGLYCERIDES	<i>129</i> mg/dl	40- 165 mg/dl	
CLINICAL PATHOLOGY:	ALB: <i>N/P</i>	FUS: <i>N/P</i>	PPUS: <i>N/P</i>
STOOL EXAMINATION	REDUCING SUBSTANCES :		MICRO : <i>2-3 pus cells</i>
OCCULT BLOOD :	MICROSCOPY:		<i>2-3 Epi cells</i>
SPUTUM FOR AFB	<i>Hiv:- Negative</i>		<i>are seen / n/p</i>
X-RAY	CHEST PA VIEW :		<i>Hb. Ag:- Negative</i>
<div> <div>LAB-TECHNICIAN</div> <div>X-RAY TECHNICIAN</div> <div>DOCTOR</div> </div>			

Opp. B.K.S. Hospital, Gandhi Nagar, BELLARY-583101. Ph-08392-255442, Mob-9442100001





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Eno! 999935

REPORT OF THE EXAMINING AUTHORITY
(to be filled in for every Medical Examination whether initial or periodical or re-examination or after cure / control of disability)

Annexure to Certificate No. SMPPL/39/2014 as a result of Medical Examination on 5/5/14 S. Meghya Lalik
Identification Marks S. Meghya Lalik
black mark one Left Thumb Impression of the candidate [Signature]

1. General Development : Good / Fair / Poor

2. Height 162 Cms.

3. Weight 85 Kgs.

4. Eyes :
(i) Visual acuity—Distant vision (with or without glasses)
Right Eye 6/6 Left Eye 6/6
(ii) Any organic disease of eyes * (iv) Colour blindness
(iii) Night blindness * (v) Squint
(to be tested in special cases)

5. Ears :
(i) Hearing Right ear Left ear
(ii) Any organic disease : —

6. Respiratory System :
Chest measurement—
(i) After full inspiration 91 cms.
(ii) After full expiration 88 cms.

7. Circulatory System :
Blood Pressure 100/60 mm Hg
Pulse 88/min

8. Abdomen :
i) Tenderness
ii) Liver
iii) Spleen
iv) Tumour

9. Nervous System :
i) History of fits or epilepsy
ii) Paralysis
iii) Mental health

10. Locomotor System :
11. Skin :
12. Hernia :
13. Hydrocele :
14. Any other abnormality :
15. Urine :
Reaction : Albumin : Sugar :

16. Skiagram of Chest :
17. Any other Chest test considered necessary by the examining authority
18. Any opinion of specialist considered necessary.

Place : [Signature]
Signature of the Examining Authority.

Left

[Stamp: SANDUR MANGANESE & IRON ORES LTD, BELLARY, KARNATAKA]





7.1 Rain Water Harvesting Plan

Rain water gets percolated through the soil, some amount gets evaporated and some amount gets mixed with river water and finally drains into ocean. Once the water gets mixed with ocean, the water becomes non potable and thereby resulting in loss of quite a huge amount of fresh water.

The rapid exploitation of ground water as well as surface water due to the industrial developmental projects, infrastructural development and increase in population resulted in acute scarcity of fresh water availability in many regions of India as well as States. Fresh water is necessary for the living being on this planet Earth. It has become necessary to conserve this valuable natural resource for sustainable development. Conservation of this valuable natural resource can be done by collecting this rain water scientifically and utilizing it either for drinking purpose, irrigation purpose or ground water recharging purpose. Scientifically and technically designed system, which helps us to collect and utilize the rain water effectively through various steps is collectively termed as ***Rain Water Harvesting System***.

Factors affecting rainwater harvesting potential is as follows:

- Rainfall
- Catchments area characteristics

Table 7.2 Runoff coefficients for various catchments surfaces

Type of Catchments	Coefficients
Roof Catchments	
• Tiles	0.8-0.9
• Corrugated metal sheets	0.7- 0.9
Ground surface coverings	
• Concrete	0.6-0.8
• Brick pavement	0.5- 0.6



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Untreated ground catchments	
• Soil on slopes less than 10 per cent	0.0 -0.3
• Rocky natural catchments	0.2 -0.5

Source: Pacey, Arnold and Cullis, Adrian 1989, Rainwater Harvesting: The collection of rainfall and runoff in rural areas, Intermediate Technology Publications, London.

Based on the above factors the water harvesting potential of a site could be estimated using the formula given below.

Water harvesting potential = Rainfall (mm) x Area of catchments x Runoff Coefficient

Suggested Methods for Rain Water Harvesting

• Roof-top catchment

The roof-top water collected can be made potable after suitable treatment. The excess water that flows can be stored in underground storage tanks. The water collected from this source is mostly used for storage purposes to be used later for dust suppression on roads, constructional activities, washing of dumpers, dozers, cranes, coal haulers, etc., fire-fighting, floor washing etc. Besides these activities, the water collected can be efficiently used for ground water recharging through various structures like percolation well, bore-well or open well method where water is diverted towards existing well or bore wells to recharge ground water.

• Open space and pavement

Since water collected from the above source will be unfit for consumption, it can be used for storage and later used for many purposes as discussed in the above case. But the water collected from pavements can be diverted through gutters to underground masonry tanks, reinforced cement concrete tanks, Ferro cement tanks, etc. for storage and to be used later.

Maintenance of Rainwater Harvesting Structures

The following maintenance guidelines should be considered in the operation of rainwater harvesting systems:

- A procedure for eliminating the "foul flush" after a long dry spell deserves particular attention. The first part of each rainfall should be diverted from the storage tank since this





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is most likely to contain undesirable materials which have accumulated on the roof and other surfaces between rainfalls. Generally, water captured during the first 10 minutes of rainfall during an event of average intensity is unfit for drinking purposes.

- The storage tank should be checked and cleaned periodically. All tanks need cleaning; their designs should allow for this. Cleaning procedures consist of thorough scrubbing of the inner walls and floors.
- Care should be taken to keep rainfall collection surfaces covered, to reduce the likelihood of frogs, lizards, mosquitoes, and other pests using the cistern as a breeding ground. Residents may prefer to take care to prevent such problems rather than have to take corrective actions, such as treating or removing water, at a later time.
- Chlorination of the cisterns or storage tanks is necessary if the water is to be used for drinking and domestic uses.
- Gutters and down pipes need to be periodically inspected and cleaned carefully. Periodic maintenance must also be carried out on any pumps used to lift water to selected areas in the house or building. More often than not, maintenance is done only when equipment breaks down.

As has been noted, in some cases the rainwater is treated with chlorine tablets. However, in most places it is used without treatment. In such cases, residents are advised to boil the water before drinking. Where cistern users do not treat their water, the quality of the water may be assured through the installation of commercially available in-line charcoal filters or other water treatment devices. Community catchments require additional protections, including:

1. Fencing of the paved catchment to prevent the entry of animals.
2. Cleaning the paved catchment of leaves and other vegetative matter.
3. Repairing large cracks in the paved catchment as a result of soil movement, earthquakes, or exposure to the elements.

	<p><i>M/s Sandur Manganese & Iron Ores Limited</i></p> <p><i>Final EIA/EMP on Proposed expansion of existing Ferro Alloys Plant to 1.0 MTPA integrated Steel Plant comprising of Sinter Plant, Mini Blast Furnace, Coke Oven Plant, Rebar Mill , Oxygen Plant & WHRB At Danapur, Danayakankere & Hanumanhalli Villages, Vyasankere, Hospet Taluk, Bellary District, Karnataka</i></p> <p><i>Risk Assessment & Disaster Management Plan</i></p>
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4. Maintaining water quality at a level where health risks are minimized. In many systems, this involves chlorination of the supplies at frequent intervals.

Rainwater harvesting methods are site specific and hence it is difficult to give a generalized cost. But first of all, the major components of a rainwater harvesting system - rain and catchment area - are available free of cost. A good proportion of the expenses would be for the pipe connections. By judiciously fixing up the slopes of roofs and location of rainwater outlets, this could be brought down considerably. However, the cost varies widely depending on the availability of existing structures like wells and tanks which can be modified and used for water harvesting.

Moreover, during the period of the project implementation, it is aimed to implement Rain water harvesting and groundwater recharge structures outside the plant premises in consultation with local Gram Panchayat and Village Heads to augment the ground water level.