7.2 Risk Assessment, Occupational Health & Disaster Management plan:

Although Beneficiation plant & Slurry Pipeline System will not cause any disastrous emergencies, control measures due to accidental discharge, spillages of slurry during transportation, storage and manufacturing process needs to be assessed. The company has established a system for preventive maintenance to minimize emergency events. A team headed by Safety Officer is responsible for the above. He reports to Plant Head. Emergency events that can arise as listed below

i. Failure of dust collection device like, Bag house etc.
ii. Accidental spillage of Iron or dust containing Iron.
iii. Failure of the dust extraction network.

Company observes the following for assessment of emergency events:

i. A formal and written emergency plan related to health risks is in place.
ii. The team has been well acquainted with the major potential Hazard sources and locations.
iii. Visual inspection of the pollution control systems on a daily basis is carried out.
iv. The emergency plan clearly defines persons responsible in case of an incidental failure.
v. There is an annual engineering check of the equipments.
vi. A record of the maintenance activities are kept for review.

vii. The senior member of the team inspects the operation. Any anomaly found is directly reported to Plant Head and a record is maintained in this regard.

7.3 Training to Employees:
All employees are educated to take precautions and use all protective measures to control dust in working environment. They are well informed of the consequences of ignoring the precautions. Personal protective equipments as per BIS code of practices IS; 12078: 19817 are provided to the employees. Pictorial warning signs and precautionary notices as per BIS code of practices IS; 12078: 19817 (Part-I); 1987 (reaffirmed 1997) are displayed. All work places where accident may cause a hazard are clearly indicated as a “hazard area”, with well displayed signboard along with effects on health. The employees are educated about the safety features through written literature, pictorial signature and color coded signs.

Record of education & training activities are maintained. All employees are provided information booklet in Hindi & English language, on the risk related to project activities and recommendations to protect themselves from undue exposures.

7.4 **Occupational Health:**

The occupational health surveillance program is implemented to address pre employment & periodic health examination. Every employee prior to his appointment undergoes the pre employment medical examination arranged by the project proponent and issued an Appointment letter only on getting fitness certificate issued by competent authority. Scheme for health surveillance include periodical examination of workers. Occupational health surveillance is carried out by occupational, physical or chest physician, trained in occupational medicine. All the above are provided by the company free of cost.

The medical records are maintained & stored for a period of 15 years, following the termination of employment or for 40 years after first day of employment, whichever is later. All employees are provided with medical book.
The occupational health surveillance program addresses mainly the following aspects:

i. Pre employment medical examination

ii. Periodic medical examination

iii. Medical examination on cessation of employment

iv. Maintenance of Medical records & health education

Periodical medical examination (PME) is carried out as per DGMS guidelines at Occupational Health Centre (OHS), NMDC –Apollo Central Hospital, Bacheli for all employees once in 5 years. For above 45 years of age employees medical examination is done once in 3 years. Pre-retirement medical examination is also carried out for the employees.

NMDC is in the process of getting Integrated Management System covering Quality, Environment & Occupational Health for its existing projects at Bacheli. This certification will extend to the proposed Beneficiation plant also.

7.5 Workplace Monitoring:

Following general guidelines (as per BIS; 11451: 2006 code of practice for preparing Workplace Monitoring Schedule) are followed:

i. Once in a month, where dust concentration is likely to exceed prescribed exposure limit.

ii. Once in three months where dust concentration is likely to be between exposure limit and action level.

iii. Once in every 6 to 12 months where dust concentration is below action & once in every 12 months at all work spots where there are exposures irrespective of dust concentrations.
7.5.1 Environmental Laboratory:

NMDC has a well established NABL certified Chemical Laboratory. In house monitoring for ambient air quality, work zone monitoring for total dust content, stack monitoring, noise monitoring are being done regularly to assess the pollutant concentrations. Most of the instruments required for environmental monitoring are available. Outsourcing is also done for certain environmental parameters through MoEF approved labs.

7.6 Disaster Management Plan:

An important element of mitigation is emergency planning, i.e. recognizing that accidents are possible, assessing the consequences of such accidents and deciding on emergency procedures, both onsite and offsite, that would need to be implemented in the event of an emergency.

Emergency/ disaster planning is just one aspect of safety and cannot be considered in isolation. M/s NMDC Limited. fully endorse this view and hence a Disaster Management Plan is prepared to ensure that the necessary standards, appropriate to the safety legislation, are in place.

The important elements of disaster planning are broadly classified as follows.

- Identification of various scenarios
- Advance planning to overcome the problem
- Actions in case of disaster phase, which includes warning, evacuation of personnel, rescue relief operations to people affected in mishaps & containment of a disaster.

7.7 Objectives of the Plan:

The overall objectives of the emergency plan are:

a) To localise the emergency and, if possible eliminate it and
b) To minimize the effects of accident on people and property

7.8 Identification and assessment of hazards:

The equipment are designed and selected with utmost care to ensure the minimization of Hazards. Care will be taken in the following areas namely:

a) Material storage and distribution

b) Dispatch of finished product

7.8.1 Hazardous areas in the plant:

Any failure of storage tanks and pipelines could be a source of hazard in the immediate surroundings.

7.8.2 Likely fire hazards:

The operation involving handling and use of flammable materials, which are prone to fire risk and hence their installation areas need special attention not only in design erection but also during operation/maintenance to ensure fire safety.

The fire hazards may occur in the following units:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Type</th>
<th>Quantity</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HSD for 2 DG sets of 1000 KVA</td>
<td>500 liters/day</td>
<td>No storage, NMDC own diesel pumps at Bacheli</td>
</tr>
<tr>
<td>2</td>
<td>Oil for 2 DG sets of 1000 KVA</td>
<td>5 liters/day</td>
<td>Drum for 30 days</td>
</tr>
</tbody>
</table>

7.8.3 On-site emergency planning:

The on-site emergency plan would be related to the final assessment and it is the responsibility of the Works Management to formulate it. The plan must therefore, be specific to the site.
The plan sets out the way in which designated people at the site of the incident can initiate supplementary action either inside, or outside the works, at an appropriate time. An essential element of the plant is the provision to make safe the affected unit, for example by shutting it down. The plan also contains the full sequence of key personnel to be called in from other sections or from off site.

7.8.4 Appointment of personnel and delegation of duties:

Effective emergency plan requires that, in an event of an accident, nominated individuals are given specific responsibilities, often separate from their day-to-day activities. The two principal people are the site incident controller and the site main controller.

The site incident controller takes control of handling the incident. He will often be the person in charge of the plant at the time of the incident and should provide 24-hour cover where shift operation applies. The site incident controller will have to take decisions involving neighbouring area, perhaps to be involved in an escalating emergency, if it is not shut down.

Apart from the two site controllers, other works personnel have key roles to play in the implementation of the emergency plan. These include senior management of plants not directly involved in the emergency, first aiders, atmospheric monitoring staff, casualty reception staff and public relations staff to keep liaison with the District Authorities and Media. Every individual needs to be aware of the emergency pre-planning and the precise nature of their roles.
7.8.5 Emergency Control Center:

The emergency control center is the place from where the operations to handle the emergency is directed and coordinated. It is manned by the site main controller, key personnel and the senior officers of the fire and police services.

The center is equipped to receive and transmit information and directions from and to the incident controller and other areas of the works, as well as outside.

Emergency control center therefore should contain the following:

a) An adequate number of external telephones;

b) An adequate number of internal telephones;

c) A work plan of the works, to show:
   i) Areas where HSD & other inflammable materials are kept.
   ii) Sources of safety equipment;
   iii) The fire-fighting system and additional sources of water;
   iv) Entrances & Roadways, including latest information on road network;
   v) Assembly points,
   vi) The location of the works in relation to the surrounding community.
   vii) Lorry parking,
   viii) Roll of employee,
   ix) A list of key personnel, with addresses, telephone/mobile numbers, etc.

7.8.6 Action on site:

The primary purpose of the on-site emergency plan is to control and contain the incident so as to prevent it from spreading to nearby area. It is not possible to cover every eventuality in the plan and the successful handling of
the emergency will depend on appropriate action and decisions taken on the spot. Other important aspects considered include the following:

a) Evacuation of non essential personnel
b) Accounting for personnel affected
c) Access to recording personnel for sending the information to the friends and relatives.
d) Public relations
e) Rehabilitation of the affected persons

7.9 Post disaster analysis and evaluation:

When the emergency is over, the team will carry out a detailed analysis of the causes of the accident, evaluate the influence of various factors and minimize them for future. At the same time the adequacy of the Disaster Preparedness Plan is also evaluated and shortcomings are ratified for subsequent improvement of the plan.

7.10 Emergency services:

The provision of following emergency services has been made available in the existing plant

a) Fire protection system
b) Medical facilities
c) Rescue facilities
d) Plant safety arrangements
e) Emergency action within 15 minutes of occurrence.

7.11 Off-site emergency plan:

7.11.1 Introduction:
The off-site emergency plan is an integral part of any major hazard control system. It is based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan. The roles of the various parties that may be involved in the implementation of an off-site plan are described in this section. The responsibility for the off-site plan is likely to rest either with the works management or with the local authority.

Some of the aspects included in off-site emergency plan are as follows:

7.11.2 Organization:
Details of command structure, warning system, implementation procedures, emergency control centers, Names and appointments of incident controller, site main controller, their deputies and other key personnel.

7.11.3 Communications:
Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

7.11.4 Special emergency equipment:
Details of availability and location of heavy lifting gear, bulldozers, specified fire-fighting equipment, fireboats.

7.11.5 Voluntary Organizations:
Details of Organizations, telephone numbers, resources, etc.
7.11.6 Meteorological information:

Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts.

7.11.7 Humanitarian arrangements:

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

7.11.8 Public information:

Arrangements for (a) dealing with the media-press office, (b) informing relatives, etc.

7.12 Assessment:

Arrangements for (a) collecting information on the causes of the emergency (b) reviewing the efficiency and effectiveness of all aspects of the emergency plan.

7.13 Role of the emergency co-coordinating officer:

The various emergency services are coordinated by an emergency coordinating officer (ECO). The ECO liaise closely with the site main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control passes to a senior authority/ administrator.
7.13.1 Role of major hazard works management:

The role of works management in off-site emergency planning is to establish liaison with those preparing the plans and to provide information appropriate to such plans.

Information is provided by works management to all the outside organizations, which involve in handling the emergency off-site and which are familiarized with the technical aspects of the works activities, e.g. emergency services, medical departments etc.

7.13.2 Role of the Fire Extinction authorities:

The control of fire is normally the responsibility of the senior fire brigade officer, on arrival at the site. The senior fire brigade officer also has a similar responsibility for other events, such as explosions and toxic releases. Fire authorities get familiarized with the location on site of all stores of flammable materials, water and foam supply points and fire-fighting equipments.

7.13.3 Role of the health authorities:

Health authorities, including doctors, surgeons, hospitals, ambulances and so on, have a vital part to play, following a major accident and they form an integral part of any emergency plan.

For major fires, injuries will be the result of the effects of thermal radiation to a varying degree and the knowledge and experience to handle this in all, available nearby hospitals is essential.

7.13.4 Role of the Government safety authority:

The factory inspectors can visit/check the off-site plan and the arrangements made for handling emergencies of all types including major emergencies. The advice of Factory inspectors is incorporated from time to time.