1.0 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

Risk assessment has been carried out and based on the same disaster management plan has been prepared which is as follows:

During the operation of a proposed uranium recovery plant, following risks have been identified.

1. Surface Fire (Electrical and Oil)
2. Exposure to Siliceous and low level radioactive dust
3. Spillage of chemicals and product
4. Spillage of radioactive slurries
5. Associated radiological hazards due to external exposure, inhalation, ingestion
6. Accident at the time of transport

1.1 Surface Fire (Electrical and Oil)

Spillage of waste oil and fuel oil may resultant fire. Regular maintenance of all the electrical fitting and wiring will be carried out to prevent outbreak of fire. Sufficient nos. of portable fire extinguishers will be provided at strategic locations near the fuel store, oil storage area, fuel-filling area and DG sets to take care of any eventuality. In case of any electrical fire, the personnel on duty shall shut down the equipment and inform the shift-in-charge. Personnel trained in dealing with electrical fires will be summoned. The fire area will be cordoned off till the fire is fully extinguished and remain so until all wreckage and debris is cleared away. After necessary repairs the power will be restored. The clearance for restoration of power shall be given only by the shift-in-charge. As soon as any fire is reported, the shift-in-charge shall assume the function of disaster controller. In case of serious fire and depending on the gravity of the situation, the Plant Manager may be summoned to assume charge. Meanwhile the hospital will be informed to standby to handle casualties.

1.2. Exposure to Siliceous and low level radioactive dust

There will be no or minimum risk associated with this as the tailings will be received in the slurry form and will also be pumped back as slurry only. Slurry will be pumped through closed conduit therefore exposure to air is not expected or insignificant. Automization for various control and online monitoring system will be installed and therefore proposed Plant can be put under emergency shutdown in case of any eventuality. As the ore is handled in wet condition, risk due to dust is insignificant.

1.3 Spillage of chemicals and product

Spillage of chemicals and resultant fire constitutes a potential risk. Adequate fire fighting devices will be installed within the plant at identified places. Additionally all workers will be informed that in case of any fire, whosever notices the fire will sound the alarm and inform the in-charge. The in-charge will inform security personnel and arrange to evacuate all personnel, except those who are required for fire fighting, from the area. The fire brigade shall be summoned to deal with the emergency. Concerned district officials will be informed. The hospital will be informed to standby to handle casualties.

Tailing slurry from the recovery plant will be pumped back to HCL's Copper Concentrator Plant for safe containments. Adequate supports and structural stability will be provided while installation of the pipeline. Following arrangements shall be made for prevention and control of leakage of slurry:

a) Slurry will be transfer through closed conduits
b) Material of construction of all pipeline will be MSRL
c) Inspection road / path will been constructed along the pipeline
d) Standby pump and pipelines will be provided
e) Online flow meter will be installed

In case of leakage, pumping of slurry will be switched over to standby system and the damaged pipeline will be rectified.

1.4 Associated radiological hazards due to external exposure, inhalation, ingestion

The proposed Mosabani Uranium recovery plant will process radioactive materials of low specific activity. The tailings grade being low, the associated hazard potentials with respect to external and internal exposures at various stages of recovery process is less compared to those with the high grade ores. The comprehensive discussions, on baseline radiological data for the terrain, identification, prediction, assessment and control of the radiological impacts encountered during different stages of operations, are presented in chapters-3 and 4 of EIA-EMP report. The control measures will be practiced in accordance with the recommendations of International Commission for Radiological Protection and the National Regulatory Authority. Moreover, efforts will be made to keep the exposures as low as reasonably achievable i.e., the ALARA principle of radiation protection. A comprehensive radiological surveillance will be carried out which involves measurement and evaluation of overall radiological as well as chemical constituents of the work areas, individuals and the environment.

Control measures proposed during operation of the plant are as under:

- Adequate ventilation inside the process building will be provided.
- In water suppression system, all the spray nozzles will be regularly maintained. The nozzles will be connected group wise, therefore, isolation of the same can be done and maintenance will be done without stopping the total water spraying in particular point.
- Spillages in thickener, clarification, production separation area shall be contained and recycled back to the system through thickeners.
- Fuel oil storage area, sump pump will operate to contain the spillages/rapture, if any.
- In the overall system standby pump and pipeline will be provided in the slurry system.
- In wet section of the plant area, water for floor washing etc. shall be provided through pipe header and flexible hose with valve.
- Spare impeller of each type of centrifugal / axial flow fans for ventilation and fume extraction system shall be procured and kept at plant to take care proper functioning of the system.
- Use of standard codes & Design practice. For selection of material of construction of major equipment, basic criteria are abrasion and corrosion. Abrasions and corrosion control are taken in following areas:-

i. Slurry lines will be MSRL.
ii. Pumps of neutral slurry shall be CSRL & casing and impeller shall be made up high chrome.
iii. Rollers, vacuum box, receiver, moisture trap etc. for Horizontal Belt Filters are SS-316 or MSRL.

- All electrical equipment and materials conform to latest applicable standard publications of International Electro-technical Commission (IEC) or equivalent standards published by the Bureau of Indian Standards (BIS) and Indian Electricity Rules.

1.5 Accident at the time of transport

As mentioned earlier, Mosabani Uranium Recovery Plant will process radioactive materials of low specific activity. The tailings grade being low, the recovered uranium bearing material grade is also very low. The associated hazard potentials with respect to external and internal exposures during transportation is less due to low grade material. The recovered concentrate material will be sent to Jaduguda Ore Processing Plant via trucks for further processing. In case of accident the area will be cordoned and the expert from UCIL and nearest BARC office will be informed for necessary action.

2.0 ONSITE EMERGENCY PLAN

To take care of emergencies which may occur during recovery operations an Onsite Emergency Plan has been prepared. The plan contains instructions to be followed in case of an emergency, major or serious accident, Fire etc.

Conditions for applying Emergency Plan:

If an emergency arises due the following causes, threatening seriously the safety of persons employed in, or property belonging recovery plant such as:

i. Fire in the recovery plant
ii. Any other major mishap

In emergency procedure is to be followed:

1. Any person who notices any emergency as mentioned above shall take immediate action to deal with the same if it falls within his scope and if more than one person is present there, one of them shall proceed for getting assistance and to give warning.
2. If the person notices that the emergency is of such type or magnitude that it cannot be tackled by him or if he fails to control the same as described above, he shall proceed to give warning.
3. Any person detecting such emergency shall take steps to give warning by the fastest means to the nearest available officer in- charge.
4. The official to whom warning of emergency is given shall send warning by fastest means to
   i. Manager and his deputies
   ii. In charge of recovery plant
   iii. First Aid Room.

iv. Telephones where available, would be used to convey warning to different parts of the plant.

5. As per gravity of the situation and if required, the steps will be taken to withdraw the persons from workings area All emergency situations will be dealt in prompt manner as per the requirement. Trained personnel and rescue team are available to handle the various emergency situations. External regulatory authorities will also be taken in confidence to tackle the emergency situation.