1. EXECUTIVE SUMMARY:

The salient features of the project include:

Proposal	Setting up Banadungri Uranium Project of capacity 0.9 million TPA
Location of Project	Villages: Hartopa, Hitku, Murgaghutu and Kadma Block: Potka, Golmuri, Dist. East Singhbhum, State – Jharkhand. The Banadungri area is located in the central part of Singhbhum Shear Zone
Latitude	22° 42′ 23.26″ N
Longitude	86° 15′ 35.07″ E
Land Ownership of Lease Area	Mining lease area: 133.47 ha under villages Hitku, and Kadma. Ore processing plant and secured land disposal facilities will be set up over an area of 120 ha outside ML area of the project in villages of Hartopa and Murgaghutu which falls within the UCIL's Narwapahar mine lease.
Method of Work	Mechanized underground working by Horizontal Cut and Fill (HCF) method.
Mineral Reserve	29.14MT as on Aug 2016
Production capacity	Proposed: 0.9 million TPA
Waste Generation	Total 0.43 million during project life
Waste disposal	100% of the waste rock shall be utilized in stowing u/g Voids. However waste rock generated during shaft sinking 50000 tons. Only about 0.22 million tons of waste rock will be brought to the surface and dumped in the designated site in the project lease.
Mineral Transport	By Conveyor to Ore Processing Plant (~1 km haulage)
Mineral Processing	Ore Processing Plant adjacent to mine of 0.9 million TPA to extract uranium peroxide. The product will be dispatched to Nuclear Fuel Complex Hyderabad for further processing.
Working Regime	3 shifts per day; 300 working days per year.
Life of Mine	28 years
Peak Water Demand	Total: 7250 m^3/day. Industrial: 7000 m^3/day, Potable: 250 m^3/day
Source of water	Mine discharge water for industrial purpose: 1200 m^3/day. Gara River a tributary of Subarnarekha River: 5250 m^3/day. Drawn at UCIL's Barrage at Jaduguda. Raw water is treated in WTP and shall be piped to Banadungri.
Power Demand	20 MW
Source of power	Jharkhand State Electricity Board
Man Power	2500
Explosive Consumption	3 tons /day
Fuel Consumption	HSD: 1.5 kl/day, LDO: 8 MT/day

Infrastructure	Land requirement, Electric power, Water, Canteen, Office buildings, Decline, New Winding and hoisting system and allied facilities
Proposed Investment	1500 crores.
Production Cost	Classified Information
CSR Budget	2% of net profit

The proposed project will improve the supply of uranium ore which will provide fuel for India's expanding nuclear energy programme. The project will generate both direct and indirect employment. The project will pave the way for peripheral development in a predominantly tribal area.

2. INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION :

2.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT:

Banadungri uranium deposit is located in the central part of the SSZ in District: East Singhbhum, Jharkhand. The deposit lies in Survey of India toposheet no. The area is well connected by Tar Road from Tatanagar Railway Station via Sundernagar and by a 4 km Tar & metalled road from the existing Narwapahar mining area. Banadungri deposit is the western contiguity to the existing Narwapahar uranium mines.

UCIL's existing mining operations are spread over Jharkhand and Andhra Pradesh. UCIL is operating six underground mines (Jaduguda, Bhatin, Bagjata, Turamdih, and Mohuldih in Jharkhand and Tummalapalle in Andhra Pradesh) and one open cast mine (Banduhurang in Jharkhand). UCIL also operates uranium ore processing plants at Jaduguda and Turamdih in Jharkhand and Tummalapalle in Andhra Pradesh to extract the yellow cake which is dispatched to Nuclear Fuel Complex, Hyderabad for further processing.

2.2 BRIEF INFORMATION OF THE PROJECT:

Banadungri uranium deposit is located in Potka and Golmuri blocks of east Singhbhum about 15km of Jamshedpur city. Banadungri lease area measures 133.47 ha. The leasehold area consists of private land and Government land. The production of the mines is planned at 1.05 million TPA.

There is no litigation pending against the project.

2.3 NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY OR REGION :

Govt. of India has planned to increase nuclear power generation from 6780 MWe at present to 20,000 MW by the year 2020. This will lead to increased demand for Uranium. In order to meet the increased demand for uranium, UCIL has planned to increase the production from

its existing mines besides developing new mines. Proposing Banadungri Uranium project is part of this programme to meet the increasing demand for uranium for India's nuclear power industry. India's uranium resources are scarce, only about 0.8% of the world's uranium deposits. However India contains 20 – 25% of the world's thorium deposits. India is developing the technology to utilise thorium in its nuclear power programme in a three stage programme. The first two stages require uranium. India has to exploit the existing uranium deposits. The proposed project programme will increase the availability of nuclear fuel for the 1st two stages of the country's nuclear power programme. The proposed project will also generate employment for local inhabitants in a predominantly tribal area. UCIL will spend part of the profits from the expanded mine for peripheral development which will benefit local villagers.

2.4 DEMAND AND SUPPLY GAP :

Demand of fuel for nuclear reactor is not fully met by indigenous uranium. At present with 6780 MW of installed nuclear power capacity, about 32% of fuel requirement is met by imported uranium. With addition of more nuclear power reactors, demand and supply gap of uranium is likely to increase.

2.5 IMPORT VS INDIGENOUS PRODUCTION:

Refer clause 2.4 above.

2.6 EXPORT POSSIBILITIES:

There is no possibility of any export of uranium ore or concentrate from India.

2.7 DOMESTIC / EXPORT MARKET:

There is no possibility of domestic and export market for uranium ore supply.

2.8 EMPLOYMENT GENERATION:

The total manpower required for the project would be 2500,

Executives	150
Non-Executives	450
Contract workers	1900

3.0 PROJECT DESCRIPTION

3.1 TYPE OF PROJECT INCLUDING INTERLINKED AND INTERDEPENDENT PROJECT

The present project envisages setting up a new mine and processing plant at Banadungri. The deposit is located in Potka and Golmuri blocks of east Singhbhum. The new processing plant is proposed to be set at a distance of 1km from the mine. The ore from the mine will be transported to the processing plant by conveyor system.

3.2 LOCATION:

Banadungri uranium deposit is located in the central part of the SSZ in District: East Singhbhum, Jharkhand. The deposit lies in Survey of India toposheet no. 73J/6 which is about 15 km SW of Tatanagar. The latitude and longitudes of the deposit are 22° 42′ 23.26″ N and 86° 15′ 35.07″ E respectively. The area is well connected by Tar Road from Tatanagar Railway Station via Sundernagar and by a 1 km Tar & metalled road from the existing Narwapahar mining area. Banadungri deposit is the western contiguity to the existing Narwapahar uranium mines.

3.3 DETAILS OF ALTERNATIVDE SITE

Since it is a mining project which is site specific alternate site can not be selected

3.4 SIZE AND MAGNITUDE OF OPERATION:

Mining lease area will be spread over 133.47 ha under villages Hitku and Kadma. Ore processing plant and secured land disposal facilities will be set up over an area of 120 ha outside ML area of the project in villages of Hartopa and Murgaghutu which falls within the UCIL's Narwapahar mine lease. The proposed capacity of the mine and ore processing plant is 0.9 million TPA.

3.5 MINE DESCRIPTION

3.5.1 Geology and Exploration

The area lies between Narwapahar in east and Garadih in west and constitute a part of Pre-Cambrian metasediments along the western part of SSZ. The area is mainly soil covered with few detached exposures of quartz chlorite schist, quartz sericite schist, feldspathic schist/ soda granite and quartzite. This area is dominated by quartz chlorite schist and is part of the Chaibasa Formation of Singhbhum Group of rocks.

All the rock types are highly deformed and brecciated. The first generation fold is isoclinal low angle overturned fold, southern limb being overturned. The general foliation/ schistosity trend N310°-320° could be the axial plane schistosity of the first generation fold. The dip of the foliation/ schistosity varies from 25° to 45° due north / north-easterly. The second generation fold is asymmetric in nature with longer southern limb and shorter northern limb. Reclined folds are formed due to second phase over printing on the first phase overturned folds. Crenulation cleavage is well developed during second phase deformation. Mineral lineation / striation observed in the rocks, is prominent in quartzite. Third generation deformation is represented by broad warping with N-S to NNW-SSE axial planes.

There are different generations of quartz and quartzo-feldspathic veins. First phase of quartzo-feldspathic layers are affected by successive phases of deformation and thus developing drag folds.

3.5.2 Mineral Resource

The ore resources of Banadungri were jointly evaluated by AMD and UCIL on the basis of the information derived upto 2016 AMD drilling programme. The following criteria are used for defining ore grade material:

1. Cut off grade 0.02% U3O8, including low grade zones up to 0.02 % eU3O8 grade in selected areas.
2. A minimum thickness of 1.5 m true width.
3. Material above the 100 mRL was considered to be thoroughly oxidized and therefore excluded from the calculation.
4. The specific gravity of the ore was taken to be 2.8.

The exact ore resources and grade have not been furnished in this report as the same is restricted information as per Section 3 of Atomic Energy Act 1962.

3.5.3 Method of Mining

3.5.3.1 Underground Mining:

The proposed mining method at Banadungri project is Horizontal Cut and Fill (HCF). HCF is a method to excavate one slice of ore and filling back the same by waste rock, mill tailings etc. This fill forms the platform for men and machinery to work on to excavate the next slice. The slices are taken from lower level to the upper level leaving requisite sill pillar to for the upper level. The mine works 300 days / year. The proposed Banadungri project would be a highly mechanized underground mine with entry through 8^{o} decline and vertical shaft. Latest technology of trackless mining system would be adopted in this mine with decline as mine entry and ramps for access in stopes. ROM and waste shall be hauled up by trackless method using LHD/LPDT combination and subsequently by skip hoisting system through shaft. The various underground equipments to be used in the mine are Drill Jumbos, LPDTs, LHDs, service Transport vehicles like Supply Truck, Service Truck, Passenger Carrier, Road Grader, Scissor Lift and Explosive Van and explosive bulk carrier etc. Other underground auxiliary equipments are pumps, auxiliary fans, jack hammer drill machine, diamond drill machine etc. The various surface equipments are winders, main mechanical ventilation fans, compressors, dozer, pay-loader, various transport vehicles, workshop equipments, D.G. set for emergency power etc. Sand stowing will be practiced to fill the voids created by excavation. The ore will be transported by conveyors to the new Process Plant. The major part of waste rock will be used for backfilling of voids in underground workings and only small portion brought to surface. Such waste rock will be dumped at designated area, acquired for the project.

Mine discharge water will be 2000 cubic meter per day.

3.5.3.2 Mine Design Parameters

1. Cross section of drive, drift and cross cuts will be 6.5 X 4.5 m.
2. During jumbo drilling, depth of hole will be 5.0 m to get a pull of 4.5 m.
3. Back support by rock-bolting at 2 m x 2 m grid pattern. However, this pattern varies with experience.

3.5.3.3 Mode of entry (Adit/incline/shaft/decline)

Proposed Decline of size 6.5 m X 4.5 m size at 8^0 inclinations from surface for flexible movement of all trackless diesel equipment. Proposed Vertical shaft of 7.5m finished diameter up to a depth of 800 m from surface. Vertical shaft will be concrete lined for entire depth and connected to 105 mRL, 150 mRL, 195 mRL, 240 mRL, 285 mRL, 330 mRL, 375 mRL , 420 mRL ,465 mRL 510 mRL, 555 mRL ,600 mRL, 645 mRL,690 mRL,735 mRL, 780 mRL, (crushing & loading point)

3.5.3.4 Underground Layout

The proposed mine is accessed by 8^0 decline and a vertical shaft. Horizontal cut & fill method will be adopted for exploitation of ore and same is proposed to be continued in near future. During shaft sinking 50000 tons of waste will be generated. The decline will reach 7^{th} level till 3^{rd} year and about 382241 tons of waste will be generated from it. During this, development of drives and raises will generate about 264796 tons of ore. ore pass shall be constructed from 195 ml to 780 ml.

Once the levels are developed up to 7^{th} level, 18 nos. of stopes will be in operation, out of this 12 stope will be under production, 6 stopes would be under stowing/ under preparation for stowing. Out of 3000 tpd ore, 2200 tpd will be produced from 12 nos. of stopes and 800 tpd ore will be from development faces. About 500 tpd of waste rock will be generated from development works. Rock bolt system would be practiced to support the rock wherever necessary. The spacing of the rock bolts are determined on case to case basis based on the experience acquired on the rock strength during the operation of the mine.

3.5.3.5.1 Method and sequence of stoping

The proposed sequence of operation at Banadungri for the horizontal cut and fill method are as follows:

- The ore body at Banadungri is lenticular and is of irregular shape in horizontal as well as vertical directions, it is necessary to define stope extremities establish the exact ore geometry before regular slices can be taken.
- The ore drive, approximately 5.5 m X 4.5 m would be developed along the footwall contact from one end of the proposed stope block to other end along the

strike. Often each stope is a distinct ore lens and the above development of ore drive establishes the length and behavior of the ore body at the level. Ore drives would be developed in similar manner at the upper and the lower levels.

- The ore drives as developed above would be widened to expose the hangwall subject to a maximum width of 10.5 m. Above this width regular 4 m X 4 m pillars would be left in the dip direction systematically. This establishes the exact width of the ore body in the proposed stope block.
- The drift along the strike and in footwall rock approximately 20 m to 40 m away from footwall contact of the ore body would be developed. This follows the development of the ore drive maintaining a lag of about 50 m. This is done to provide permanent access to the level and serves as the hauling roadway as the ore drives get filled on commencement of stoping operations.
- At both extremities of the proposed stoping block, raises would be put up to connect the lower level to the upper level.
- A ramp would be developed in ore/footwall rock either from upper level to lower level or from lower level to upper level or a combination of the two to provide access for the trackless equipments like Jumbos & LHDs to the stope.
- The back of the ore drive would be stripped up to a height of 5 m to provide access to Physics and Geology personnel to establish the vertical geometry of the ore body. The above completes the development and stoping commences by cyclic slicing and filling. This progresses from the lower level to the upper level.

3.5.3.6 Drilling and Blasting

The proposed Banadungri project would be a mechanized hard rock mine, where excavation of rock would be done by breaking it by conventional drilling and blasting method. There are two types of blasting practiced in UCIL: Inverted 'V' pattern for slice blasting at stopes and burn cut pattern for development headings. Blasting will be carried out at the end of shift. Emulsion explosive will be used with short action detonators (millisecond delay detonators).

3.5.3.7 Equipment

The Jumbo drills along with Jack hammers will be deployed for drilling purpose. For loading the muck from the face, trackless equipment have preferred. After a face blast for 5 m x 3 m x 3m size about 45m³ muck is generated. To clear the face high capacity loader will be essential. As such, LHD (load haul dump) of about 6.0 m³ capacity has been selected for this purpose. Since LPDT around 50 t capacities is only matching hauling equipment with LHD 6.0 m³ capacity, the same would be selected.

The required fleet of major mining and auxiliary equipment are given in Table 1.

Table 1: List of Mining Equipment

Machine	Fleet strength
Load Haul Dump (LHD)	18
Mine Truck (MT)	15
Drill Jumbo	12
Service equipments	20

Ore from levels will be dumped at main ore pass grizzlies at different levels .The ore from the main ore pass is fed into the underground jaw crusher. Capacity of crusher is 300 t/hr of –200 mm size. Crusher feed size is 800 mm x 1000 mm. The crushed material is hoisted by skip to surface and discharged in the ore bin. Skip will have 15 t capacity and can make average 20 trips/hour. So the hoisting system can handle 3000 t ore by operating 12 hours/day. The ore and waste will be transported to the surface by LPDT and stored at the designated stock piles till vertical shaft is commissioned. After that ore will be hoisted through vertical shaft and sent to the adjacent processing plant through conveyors.

A list of the other equipment necessary for carrying out miscellaneous mining operations are given in Table 2:

Table 2: List of auxiliary equipment

Mines

Type	Nos.
Bull Dozer	1
Pay loader	1
Explosive van	1
Lub truck	1
Scissor lift	6
Supply truck	2
Passenger carrier	6
Weigh Bridge	1
Arch Room	1
Ambulance van	1
Pick up van	5
Sumo/bolero	4
Explosive charging van(SMS)	4

3.5.3.8 Mine ventilation

The mine will be ventilated by 3 nos. axial flow main fans each of 220 m^3/sec capacity. These fans will be installed at the mouth of east and west ventilation shaft. All fans will jointly take out air from underground. The raises, drives will form the return air path for ventilating circuit. Fresh air from surface will enter the mine through the main vertical shaft and decline. Intake air will be distributed to each level through these decline and shaft as per requirement. All working stopes have separate intake and return paths. Intake air enters the working through the access X-cut / ramps and ventilates the face and the exhaust air pass the stope raise located at the

stope boundary. The stope raises will be connected to the main fans by a system of end raises and ventilation drives. Since fresh air is taken to the level first, the mine workers work in fresh air. The blind headings will be ventilated by auxiliary fans whenever necessary. Air from auxiliary fans will be taken to the working face by means of ventilation duct. Ducts of different sizes would be used depending upon the requirement. Ventilation doors, stopping and regulators would also be used in underground for proper coursing the ventilating air. The total designed capacity of the 2 main fans i.e. 415 m^3/sec. The actual ventilation network and arrangement shall be designed after study by consultant.

Mine de-watering

Adequate capacity of pumping arrangement will be installed up to 750 meter depth. As the mine will be deepened, multi stage pumping shall be required.

ORE PROCESSING PLANT

A process plant based on acid leaching route with a capacity to process 3000 tonnes of ore per day is planned in the vicinity of the captive mine to extract the final product as uranium peroxide. The plant shall receive ore of (-6") size through conveyors from the mine hoisted through shaft. Facility comprising of an open storage yard, ground hoppers (3x150 ton) with stationary grizzly, jaw crusher, conveyors etc to handle the uncrushed mine ore produced prior to the commissioning of the shaft hoisting system shall also be constructed. This facility will subsequently be utilized to handle uncrushed mine ore brought up from the decline from the upper levels and during schedule maintenance of winders. The primary crushed ore from mine ore bins or jaw crusher shall be finally reduced to below 20 mm in a secondary crushing circuit operating in close circuit with screens. Fine ore bunkers to store one day requirement shall be provided ahead of wet grinding circuit. Dust Extraction system will be an integral unit of the crushing facility.

Laboratory scale studies will be carried out through to establish the techno commercial feasibility of Rod mill ball mill circuit for ore with suitable modification in the crushing unit for its adoption on preference because of economics.

Conventional crushing cum grinding unit has been considered for the project. 2(Two) sets of conventional close circuit grinding circuit of 1500 tpd capacity each consisting of rod mill, ball mill and single stage hydro-cyclones with subsequent density control and water recycle through two nos. of high rate thickeners and 3(Three) nos. of horizontal belt / disc filters to ensure water recycle for proper feed density to leaching circuit. Sulphuric acid leaching will be carried out in multiple mechanically agitated open tanks at elevated temperature of 45-50^{0}C in the presence of suitable oxidant. Two sets of gas fired/oil fired boilers shall be installed to generate steam for direct heating during leaching.

Uranium rich liquor will be separated from the leached slurry in four nos of 85-90 m^2 horizontal belt filters with counter current washing and further clarified in a 10 m clarifier and 3(Three) sets of 12' dia x 16' face pre- coat filters to make it fit for processing in 4(four) sets of 4x10 m^3 columnar fixed bed ion exchange units. Chloride elution shall be adopted for removal of the adsorbed uranium from ion exchange with split elution technique. Excess sulphate and iron from the strong eluate shall be separated out in multiple iron precipitation tanks, thickener and filter. Uranium peroxide shall be precipitated out from the upgraded uranium liquor coming out from iron precipitation unit by addition of hydrogen peroxide and ammonium hydroxide solution in controlled process condition. The product peroxide slurry after thickening and washing in horizontal belt filter shall be dried to 600^{0}C either in a set of spray dryer and rotary tunnel dryer in two stages or in a rotary tunnel dryer in a single stage.

The discharge cake of leach belt filters shall be re-pulped with the lean barren liquor of ion exchange and neutralised with milk of lime to a pH of 9.5 in 40(four) nos of 300 m^3 capacity mechanically agitated tanks. Coarser particles shall then be separated out in the hydro-cyclones and transferred to the mines for using as back-fill. The remaining finer solid fraction of hydro-cyclone will be concentrated in a 30 m thickener and filtered in 3(three) sets of disc filters. Thickener overflow along with filtrate of disc filters shall be transferred to effluent treatment plant

Tailings Disposal facility

The disc filter cake shall be transported through conveyor belt to multiple above secured land fill solid waste disposal facility proposed in the vicinity of tailing treatment plant. Each such

facility will be planned for 5 years life, where after it will be contained/ covered as per AERB guidelines. Facility of partial coverage during rainfall will be kept.

Effluent Treatment

The effluent along with excess mine water, after primary chemical treatment to fix and remove heavy metals and radio activity, shall be treated in ultra filtration cum RO unit to generate about 40-50% of the incoming volume as industrial water for reuse. Facility will be constructed for solar evaporation of the rejects of RO along with parallel arrangement of its transfer to ETP, Jaduguda for final disposal via Mine water pond of Narwapahar. Additional requirement of industrial and drinking water shall be met from existing Jaduguda barrage with permission from the state government. An ultra filtration cum RO unit at ETP Jaduguda and storage capacity augmentation of Jaduguda barrage shall also be undertaken under this project for overall water management.

Housing, schooling and medical will be provided from existing Narwapahar unit. Requirement of 20 MW Power shall be met from the existing HT line of the ICHRA grid adjacent to Narwapahar with suitable tapping and construction of a main receiving station.

List of Equipments:

S.No	Equipment name
1	Jaw crusher
2	Standard Head Cone Crusher
3	Screen(single deck/double deck)
4	Grinding Circuit (Rod mill/Ball mill)
5	Hydro cyclone
6	Neutral High rate Thickener
7	Leaching Tanks (CSTR)
8	Lime slacker
9	Boiler
10	compressor
11	Horizontal Belt Filters
12	Precoat filters
13	Ion Exchange system

14	Precipitation Tanks
15	Iron thickener
16	Product high rate thickener
17	IGC belt filter
18	Product belt filter
19	Horizontal belt filter
20	Spray dryer
21	Bag filters
22	Rotary kiln (Calcination)
23	Packing system
24	Automatic weighing & sampling system
25	Neutralization Tank
26	Disc filter (Neutral + Tailings)
27	Dust Extraction system

Mineral Transport

Ore will be transported to new ore processing plant adjacent to the mine.

3.5.8 Life of the Project

Life of the will be 28 years from zero date

3.6 RAW MATERIALS

The major raw materials required for the proposed ore processing plant is tabulated in the table given below:

Sl. No	Raw Material	Consumption (MT/year)	Means of Transportation
		Proposed	
1.	Sulphuric acid	30000	Road by Tanker
2.	Pyrolusite	8100	Road by Truck
3.	Burnt Lime	23000	Road by Truck
4.	Grinding Media	1000	Road by Truck

Sl. No	Raw Material	Consumption (MT/year)	Means of Transportation
		Proposed	
5.	Precoat Material	550	Road by Truck
6.	Sodium Chloride	4050	Road by Truck
7.	Barium Hydroxide	120	Road by Truck
8.	Ion Exchange Resin	55 m^3/ year	Road by Truck
9.	Caustic soda	90	Road by Truck
10.	Flocculant	90	Road by Truck
11.	Hydrogen peroxide	360	Road by Tanker
12.	Ammonium hydroxide	140	Road by Tanker

3.7 RESOURCE OPTIMIZATION / RECYCLING AND RESOURCE

About 2000 m3/d of water will be discharged from the mine. Mine discharge water will be fully reused in industrial operation.

3.8 SITE SERVICES

3.8.1 Water Requirement:

Industrial water requirement for the new project is estimated at 7250 m3/day. This requirement would be met by utilizing treated mine discharge water (2000 m3/day) and fresh water of 5250 m3/day drawn from Gara River, a tributary of the Subarnarekha River, at Jaduguda.

3.8.2 Power Requirement

The proposed power consumption will be 20 MW. The power shall be supplied by Jharkhand State Electricity Board (JSEB) through its main sub-station at Ichra sub-station.

3.8.3 Amenities

Banadungri would be a new mine with a sound infrastructure. The following facilities have been proposed.

1. Canteen
2. Pit head baths
3. Locker Room for workers
4. Cloth washing facility
5. Shelter
6. Vocational Training centre
7. Creche.

Narwapahar township close to the new project site has 990 dwelling units. Two schools (Atomic Energy Central Schools), one up to Middle school, the other up to higher Secondary standard are located within the township. It has a small post office, a bank, a shopping centre, entertainment facilities etc. A 25 bedded hospital meets the immediate medical needs of the residents.

3.9 WASTES

About 432241 t of waste rock will be generated during project stage. 95% of the waste rock will be utilised for filling underground voids. Only about 21620 t/yr of waste rock will be brought to the surface and dumped in the designated site in the project lease.

4.0 SITE ANALYSIS

4.1 CONNECTIVITY

Banadungri is located at an aerial distance of about 4 km west of Asanboni railway station on the Tatanagar – Ghatsila section of Howrah-Mumbai BG line of SE Railways, but there is no road linkage to this station. The nearest stations with proper road linkages are Tatanagar Junction and Rakha Mines, both ~ 15 km away by road. The project is linked to Jaduguda mine and Jamshedpur city by a metalled road. From Jamshedpur to Sundarnagar the road is a State Highway. From Sundarnagar to Jaduguda, the road has been constructed by UCIL. Although this road is a public road, it is maintained by UCIL to facilitate transport of men and materials. At present the road is adequate to handle the traffic. The nearest functional airport is Sonari at Jamshedpur which is about 20 km NW of the mine.

4.2 LAND FORM, LAND USE, OWNERSHIP

The leasehold area consists of private land, and government land

4.3 TOPOGRAPHY

The leasehold area is situated at the bottom of series of hills on southern side. Ground level within leasehold area slopes from southern side towards northern periphery of the lease area. Most of the lease area lies at altitude between 120 m AMSL and 150 m AMSL. However, on the southern side of the lease area there is a steep hill (Narwapahar) rising to 327 m AMSL. The area is bounded by hill on the southern side, Gara River on the eastern side, a small Harkarjuriya nala on the western side and villages on the northern side. Most of the 10 km radius area is plain or gently undulating with scattered hillocks. In the south eastern part of the study area there is a steep escarpment, Ranga pahar, which rises to 560 m AMSL. This escarpment originates from the southern part of the lease area and runs in the NW – SE axis. This escarpment is covered with sal forests. The west central part of the study area is marked with three numbers of prominent ridges with east-west to NW-SE trend at Talsa Pahar, Nandup and Banduhurang. Banduhurang ridge extends for 2.5 km with a lateral extension of about 1 km. The highest level of the ridge has been recorded at 228 mRL with steep slopes along northern and southern flanks. The ridge confluences the general ground level of the surrounding area at 148 mRL in the north and 166 mRL in the south. The ridge has been marked with 3 nos. of protrusion occurring along the axis of the ridge with maximum elevations of 226 mRL, 228 mRL and 207 mRL in the eastern, central and western part respectively. The elevations of the area vary from 120m to 150m above main sea level. The area is bounded by hill on the southern side, Gara River on the eastern side, a small juria nallah on the western side and on the northern side villages exist. The land area is mainly covered by thick soil cover and the rocks are mica schist. There is no national park, biosphere reserve, sanctuary, and habitat for migratory birds, archeological site, defense installation, and airports within 10 km of the periphery of core/ buffer zone. The area does not fall in seismically active or land slide prone zone.

4.5 EXISTING INFRASTRUCTURE

Refer Clause 3.8.3 above

4.6 SOIL CLASSIFICATION

As per the District Planning Map of Purbi Singhbhum, published by National Atlas and Thematic Mapping Organisation, Kolkata the soil of the area where Singridungri-Banadungri will locate is classified as “Red Loamy Soil”.

4.7 CLIMATE

The study area lies in tropical region where climate is characterized by very hot summers and cool winters. The nearest observatory of India Meteorological Department (IMD) is at Kadma Colony in Jamshedpur, about 16 km away. Summer is typically from mid March to mid June when temperature ranges from a maximum of 40.1°C during day time to a minimum of 18.6°C at night. Winter is from

December to February when the maximum temperature during day goes up to 29.4°C and minimum temperature at night becomes 11.6°C. The average annual rainfall is 1321 mm. The South-west monsoon lasts from mid June to mid September and the area gets more than 80% of the annual rainfall during this period.

4.8 SOCIAL INFRASTRUCTURE AVAILABLE:

The mine is located in a rural area. The nearest town / city Jamshedpur is about 15 km from the project, which has all necessary social infrastructures. The social infrastructure will be constructed in the project is described under clause 3.8.3 above.

5.0 PLANNING BRIEF:

5.1 PLANNING CONCEPT:

The entire infrastructure would be required for the new project. All the machineries also needs to be available. The production will be achieved by deploying higher capacity machineries. The proposed capacity of the project, i.e 0.9 million TPA shall be attained after the receipt of necessary statutory clearances.

5.2 LAND USE PLANNING:

When the reserves are exhausted, the mine will be shut down as per the Approved Mine Closure Plan. Some of the infrastructure will be dismantled. Others will be handed over to the State Government or the local village panchayats. The waste dumps will be stabilized and biological reclaimed.

5.3 ASSESSMENT OF INFRASTRUCTURE DEMAND

Most of the infrastructure such as Mine Office, surface material handling plant, electrical sub-station, stores, explosive magazine, workshop, weigh bridge, rest shelter, canteen, vocational training centre, medical unit etc. will be constructed in project. Some of these such as surface material handling plant, explosive magazine and workshop will have to be expanded to cater to increased excavation and handling of ore.

5.4 AMENITIES / FACILITIES

All necessary amenities such as rest shelters, canteens, pit head baths, vocational training centre etc. are proposed for the project.

6.0 PROPOSED INFRASTRUCTURE:

As mentioned earlier, the new Singridungri-Banadungri project will start after receipt of all clearances. The following infrastructure is proposed for the project.

1. Compressor House and Compressors
2. Electric Sub Station and Power distribution net work
3. Surface workshops
4. Main Ventilation system
5. Explosive Magazine
6. Lamp Room
7. Time Office
8. Canteen
9. Pit head baths & Locker Room for workers
10. Office complex.
11. CR&D
12. Substation
13. Training centre.
14. Creche.
15. Effluent treatment plant
16. Sewage treatment
17. Secured land fill disposal facility.
18. Roads.
19. WTP.
20. Green belt development.
21. Community hall

7.0 REHABILITATION & RESETTLEMENT (R&R) PLAN:

The proposed Banadungri project will start after receipt of all clearances. The proposed project will envisage leasing and / or acquisition of land. Accordingly, the rehabilitation & resettlement plan would be applied as per LARR Act 2013.

8.0 PROJECT SCHEDULE & COST ESTIMATE

About 5 years shall be required for commissioning of the project after approvals. The total cost estimate is about 1500 crores.

8.1 LIKELY DATE OF START OF CONSTRUCTION AND LIKELY DATE OF COMPLETION:

The project shall start immediately after approvals and shall take about 5 years for completion.

8.2 ESTIMATED PROJECT COST ALONG AND ECONOMIC VIABILITY OF THE PROJECT

The total estimated project cost would be 1500 crores which involves construction of necessary infrastructure (see clause 3.8.3) above.

9.0 ANALYSIS OF PROPOSAL (FINAL RECOMMENDATION)

The proposed Banadungri project will have the following benefits:

- Improve supply of indigenous uranium ore and thereby increase supply of fuel for India's nuclear programme.
- Generate direct as well as indirect employment.
- Pave way for further peripheral development of a predominantly tribal area.

The project will generate direct and indirect employment. Peripheral development by UCIL will benefit local villagers most of whom are tribals.