PROPOSAL OF RECONNAISSANCE SURVEY (G-4 LEVEL) FOR COPPER IN CHALIMA BLOCK (95.70 SQ.KM AREA) DISTRICT- GIRIDIH, JHARKHAND

COMMODITY: COPPER

BY

MINERAL EXPLORATION CORPORATION LIMITED

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SEMINARY HILLS

PLACE: NAGPUR

DATE: 27.09.2021

SUMMARY OF THE BLOCK FOR RECONNAISSANCE SURVEY (G-4 STAGE)
GENERAL INFORMATION ABOUT THE BLOCK

Features	Details
Block ID	CHALIMA-Adjacent to Bharaganda
Exploration Agency	Mineral Exploration Corporation Limited (MECL)
Commodity	Copper (Cu)
Mineral Belt	Copper mineralization is essentially confined to the folded schists, folding movement indicated by the echelon disposition of mica-schist bands occurring to the north of Kulhawa. Parsabera fold (which is 1.5km East of the proposed block) plunges 60^0 towards WSW, as shown by the corrugations and lineation.
Completion period with entire Time schedule to complete the project	14 Months
Objectives	Based on Exploration of Baraganda block at G-2 level by MECL, where resources established are 2.6 million tonnes with avg grade 1.41% at 0.5% Cu Cutoff. 1.1 million tonnes with avg grade 2.2% at 1.0% Cu Cutoff. Also, based on the previous assessment by GSI during FS 1961-62 and 1965-66. It is observed by the geologists the presence of copper mineralization in all the rock types present in the present proposed area. As reported in bulletin 23 of GSI (1964) Mr R.Oates, Mines Manager of Baraganda copper company during 1891- has reported 4 mineralized bands in Geyjadih ($24^0$03':$86^0$02'), which is part of the present proposed area. Further prospecting for the base metals like copper, lead and zinc in the area can be done by deep trenching, mapping together with detailed mapping of the structures. Further, based on the evaluation of previous work, the present exploration program has been formulated to fulfil the following objectives. i) To collect surface (Bedrock/soil/stream sediment) samples & analyze for Copper, Lead, Zinc for further course of Exploration program. ii) In case, collected surface/bedrock/stream sediment samples giving positive results, channels/trenches will be made and sample for expose the mineralization. then based on the results of sampling, 5 Nos. scout boreholes shall be drilled which in turn will decide the future course of

	Exploration program at G-3/G-2 category of UNFC. iii) To estimate reconnaissance Copper, Lead, Zinc etc., resources along with accessory elements as per UNFC norms and Minerals (Evidence of Mineral Content) Rules-2015 at G-4 level.
Whether the work will be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency	Work will be carried out by the proposed agency.
Name/Number of Geoscientists	Nos. of Geoscientists: 1
Expected Field days (Geology, Geophysics, surveyor)	Geologist Party days: 150
	Survey Party days: 15

1.	**Location**	
	Latitude - Longitude	A -24° 08' 9.59" - 86° 06' 28" B -24° 02' 31.06" - 86° 04' 26.26" C -24° 02' 32.51" - 85° 59' 57.52" D -24° 08' 4.85" - 86° 00' 0.29"
	Villages	Chalima, Amhadih, Baramasia, Karogadh, Kolha Golga, Domna Golga, Mangluwahar, Khurjio, Gangodih, Telkhara, Dhilbro and Kalhawar.
	Tehsil/Taluk	Dumri
	District	Giridih
	State	Jharkhand
2.	**Area (hectares/ square kilometers)**	
	Block Area	95.70 sq.km
	Forest Area	The block co-ordinates were subjected in the Decision Support System (DSS) of Forest department, Ministry of Environment, Forest and Climate Change (MOEFCC). **It has been found that the block area is under "not inviolate". (Go)-Non-Forest area.**
	Government Land Area (Bilanam)	Data not available
	Charagaha	Data not available
	Private Land Area	Part of the area is private, cultivated land
3.	**Accessibility**	
	Nearest Rail Head	Parasnath (10 Km), Gomo Junction (35 Km)
	Road	NH-2 crosses 10km in SSW from the block.
	Airport	Ranchi (165 km)
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	The dendritic drainage.
	Rivers/ Streams	
5.	**Climate**	
	Mean Annual Rainfall	Average annual rainfall is 1198 mm
	Temperatures (December)	Minimum temperatures 10^{O}C (Dec-Feb),

	(Minimum) Temperatures (June) (Maximum)	Maximum temperatures up to 45^{O}C (May)
6.	**Topography**	
	Toposheet Number	72 L /04
	Morphology of the Area	Most of the area in the block is flat with small hills which are present in east and west parts of the present proposed area whose height is about 550msl and, ground level topography is about 330-350msl.
7.	**Availability of baseline geoscience data**	
	Geological Map (1:50K/25K)	Bhukosh Geological Map (downloaded from GSI portal) of Study area (1:2,50,000 scale)
	Geochemical Map	-
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	-
8.	**Justification for taking up Reconnaissance Survey/ Regional Exploration**	i) Geyjadih (24^{0}03':85^{0}31'): copper mineralization has been found in the hill near Geyjadih, about 3km South west of Baraganda. According to Mr Oates, there are four mineralized zones in the area, on three of which old workings are still seen. The mineralization appears to be of the same nature of Baraganda mines. Specks and bunches of chalcopyrite and encrustations of peacock ore were found in the country rock. ii) Baraganda block which is part of the present proposed block is explored by MECL at G-2 level at 50X50 spacing, where resources established are 2.6 million tonnes with avg grade 1.41% at 0.5% Cu Cutoff. 1.1 million tonnes with avg grade2.2% at 1.0% Cu Cutoff. iii) Based on the evaluation of previous work, the present Reconnaissance Survey exploration program at G-4 level has been prepared. Geological mapping, surface sampling and pitting/trenching will be helpful in assessing the disposition of the mineralized zones, structural features like shears and faults if any. iv) MECL has collected few samples in NE 5km from Baranganda block and these samples were analysed for cu with hand held XRF, where cu values were varying from 1.81 – 6.44%. NGCM data was also checked for mineralization. v) The Exploration will be helpful in estimation of reconnaissance resources of copper and other accessory minerals in block area.

		vi) The Reconnaissance Survey (G4) will eventually help in planning for General exploration program (incase upgraded to G-3/G-2 level) which in turn will facilitate the state Government for action of block.

PROPOSAL OF RECONNAISSANCE SURVEY (G-4 STAGE) FOR COPPER IN CHALIMA BLOCK (95.70 SQ.KM AREA) DISTRICT- GIRIDIH, JHARKHAND

1.0.0 Introduction

1.1.0 Preamble

1.1.1 Copper with its unique physical, mechanical and electrical properties, has played a vital role in the industrial growth of a nation. In India, around 75% of demand is met through imports. The increasing demand of copper metal in the country could be eased with the exploration of new copper deposits of economic importance.

1.1.2 During, preceding decades. No large-scale metal deposit has been discovered in India. However, the possibility of working of small mineral bodies in proximity to each other, though technological advances and increased operational efficiency, cannot be ruled out. Therefore, it is necessary and imperative to locate and explore such small copper deposits in cluster.

1.2.0 Background

1.2.1 Exploration for strategic, critical, precious, rare earths and PGE are given top priority by Govt. of India, after amendment of MMDR act 2015. Keeping in view, the present proposal is being put up for Reconnaissance Survey. Consequent upon positive outcome, the exploration program shall follow G3/G2, which may facilitate state government for auctioning of the block.

1.3.0 Location and Accessibility

1.3.1 The block is located in Dumri Tehsil, Giridih District, Jharkhand. The nearby railway station is Parasnath (10 Km in SE from block), Gomo Junction (26 Km in SE from block). The nearest airport is at Ranchi, which is away at about 165 Km. The area falls in Survey of India Toposheet No. 72 L/04.

1.4.0 Physiography

1.4.1 In general, the study area forms a general undulating platform except some isolated low rising hillocks, with no prominent hills.

1.4.2 The drainage pattern in the area is of dendritic type. Falls under drainage system of Barakar, which flows about 26km to the north east of the block area. In General, nalas and streamlines flow in north direction to join river Barakar. Most of them are seasonal, only a few being perineal, major part of the area is under cultivation.

1.5.0 Regional Geology

1.5.1 The geological formations of the area consist mainly of Metamorphic rocks, mainly different types of schists. **Table I.A.** Regional geological map with the proposed Block is given in **PLATE-II.**

Table I.A
Regional Stratigraphic sequence of Litho units (After GSI)

Age	Formation
Post Gondwana	Dolerite
Unconformity	
ARCHAEAN	Pegmatite and Quartz vein Granite (?)
	Granodioritic rocks
	Granite gneiss
	Amphibolite, Amphibole, pyroxene rocks and amphibole schists
	Schistose formations i.e quartz Mica Schist, mica schist, hornblende schist, quartzites etc

1.6.0 Geology of the Block

1.6.1 The area mostly exposes lithounits belonging to Archaen aged Granite Gneisses and Schists represented by the older Metamorphics, talc-muscovite-Biotite-schist, Muscovite-Biotite. Quartz schist, Chlorite-Muscovite-Biotite qtz schist, Garnetiferous Chlorite-Muscovite-Biotite-quartz schist and Tremolite schist. The trend of pegmatites and quartz veins is either discordant or concordant with that of foliation of the schists. Pegmatites are confined to northern part of the area. Granite appears to bear an intrusive relationship to the country rock (schists) and include numerous xenoliths which have retained their schistose character, and are remarkably conformable with foliation of adjacent schistose rocks.

Amphibolite bearing rocks are found in all the places and occur generally as concordant bands, they gradually pass into either amphibole pyroxene rock seen near Andhari or into amphibole schist and vice versa along the strike. These rocks are generally schistose in texture along the limbs of folds as seen near Chandnadih but exhibit a granulose texture at the nose (S of Lutuatanr). At places, these rocks are garnetiferous and melanocratic, but occasionally are also white or greenish white in colour. The pale coloured rocks consist mainly of tremolite and actinolite with a little anthophyllite at times. These amphibolites appear to be closely associated with the copper mineralisation, and the nature of the control though not apparent, whether lithologic or structural, but it is possibly lithologic.

Schistose formations i.e quartz Mica Schist, mica schist, hornblende schist: These rocks are generally conspicuously schistose, except the quartzites, which display interlocking granulose structure. The mica schists are mostly contorted due to presence of drag folds and corrugations within the planes of foliation. The rocks are feldspathic except for the mica-schists and hornblende-schists in some cases. The mica is generally biotite in the case of the quartz-mica-schist. Exposures of mica schist are found near Parsabera and Silhuwa, whereas the muscovite or green biotite is developed in mica-schists. The quartz-mica-schist is of widespread occurrence and ubiquitous. The mica in this rock is either muscovite or green biotite. Bands of other rock types are found within the quartz-mica-schist. All the rock types have a garnetiferous variant which is seen at many places, especially in the areas where copper mineralisation is indicated. The development of garnet probably indicates a variation in the grade of metamorphism. The quartzites, which also contain biotite are found to outcrop near Andhari, Jangidiri and Kasiadih etc. The paragenesis of the other rocks, viz, the amphibole bearing rocks in which epidote are one of the constituents is not clear. It is possible that some of those represent metamorphosed impure calcareous bands showing a variation in facies.

The rocks are isoclinally folded, conspicuously foliated and rarely faulted. The strike of foliation oscillates between N55°-85°W - S55°-85°E showing high dips either to the south or to the north.

Talc schist generally occurs in the form of lenses and pockets in association with the tremolite-actinolite rocks

1.7.0 Mineral Potentiality based on geology and ground geochemistry etc.

1.7.1 Mineralisation of copper is indicated by the presence of Malachite and Azurite stains in all types of rocks mentioned above except dark amphibolites. On the other hand, the presence of sizeable old workings is significant. The area was worked by Baraganda copper company during the years 1882-1892. The company carried out underground mining by sinking 5 shafts on the mineralised zone,

mining was carried out in 5 levels, one of the shafts is located in this present proposed area i.e near village Chalima (5km west of Persabera). As per Mr R.Oates, who was once a manager of Baraganda copper company states that ore body did not show any signs of depletion laterally or in depth. (FS 61-62, GSI & FS 65-66 of GSI)

1.7.2 Geyjadih ($24^0$03':$85^0$31'): copper mineralization has been found in the hill near Geyjadih, about 3km South west of Baraganda. According to Mr Oates, there are four mineralized zones in the area, on three of which old workings are still seen. The mineralization either during the course of prospecting appears to be of the same nature of Baraganda mines. Spots and bunches of chalcopyrite and encrustations of peacock ore were found in the country rock in the three prospecting shafts put down by the Baraganda Copper company.

1.7.3 Baraganda copper block which is part of the proposed block (Plate-I) is explored by MECL at G-2 level. Salient features of the baraganda block is as follows.

1. Area : 0.59 sq.km
2. Strike length and Depth persistence :1030m and 250m
3. Host Rock : Chl.-bio. Qtz Schist, Garnetiferous Chl.-Bio qtz schist, Silicified Qtz-Bio rock, Musc-bio-qtz-shist,
4. Meterage Drilled and Boreholes : 5490.50m in 30 no of Boreholes
5. Average true thickness :5.00 m
6. Resources estimated :

Methods of Resource Estimation	Cut-off Grade	Gross Resource (Tons)	Net in situ Resource (Tons)	Grade (Cu %)	Metal Content (Tons)
Geological Cross Section	0.5% Cu	2655012.716	2389511.44	1.41	33692.11
	1.0% Cu	1131310.555	1018179.5	2.24	22807.22

1.8.0 Scope of Proposed Exploration

1.8.1 The Reconnaissance survey at G-4 stage exploration program proposed comprises, Remote sensing study, Geological mapping (1:12,500 scale), Surface Geochemical sampling (Bedrock/Channel, Soil, Stream sediment), Pitting/Trenching, Geophysical survey, drilling of 5 Nos of scout boreholes involving about 500m drilling along with associated survey, chemical analysis, physical analysis and Report preparation.

1.9.0 Observation and Recommendations of previous work

1.9.1 Mineralization

1.9.2 Soapstone quarry which is located to south of Chandadih, about 1.5km east of Persabera shows indication of copper mineralisation. Talc schist is associated with a concordant band of tremolite-actinolite rock and also talc-tremolite schist. Here tremolite occurs in fibrous form. All the rocks have the staining of azurite and malachite, staining is more prominent in this area.

1.9.3 No control of mineralisation can be definitely deciphered, as malachite staining occurs in almost all types of rocks showing that lithology is not of much consequence. As mentioned earlier mineralisation appears to the strictly confined to areas where small scale folding is noticed. The mica schists particularly show drag folding. The undisturbed character of the rocks found to the north and south of the mineralised ridge showing development of local folds suggests relative E-W transcurrent movement of the northern and the southern blocks. This structural feature appears to have facilitated mineralisation in the region, and may be one of the major factors controlling mineralisation. It is also noticed that the malachite staining is best developed and is generally confined to the parts of the belt where cross corrugation lineation in either the mica schist or talc schist is at best developed. The two sets of lineations plunge (l) at 65° to the WSW and (2) at 30° to the ESE respectively.

2.0.0 Previous Work

2.1.0 The earliest account of the area was given by R.Oates (1895) saying mines abandoned here were as old as Singhbhum area.

2.2.0 Later the area was worked by Baragnada Copper company during 1882-1892. Company carried out underground mining by sinking 5 shafts on the mineralized zone. Primary mineral worked for copper by company was chalcopyrite. Average tenor from Baraganda mines ranged between 1.00% to 1.5% according to R. Oates, whereas Mallet states that an average sample collected from 250tons of richer ore yielded 3.04% copper.

2.3.0 During the F.S. 1961-62, A.K.Sen, carried out investigation for copper in an area around Baraganda, Hazaribagh district, Bihar (Now Dist- Giridih, Jharkhand) which falls under toposheet 72 L/4 area lies between the latitudes 24°2'40" and 24°6'20" N and longitudes 86°0'00" and 86°10'00" E. The work consisted of detailed mapping of 102 sq. km. on a scale of 1:15,840, and plane-table mapping of 0.39 sq.km. on 1:1000 Scale. In addition, 277 cubic metres of excavation was done during the course of pitting and trenching. As per the report chief economic mineral

deposit is of copper. Primary mineral is chalcopyrite. At the surface mineralized zone has been indicated by malachite and azurite staining specks at the oxidized zones, even though not prominent. Recommended drilling of 6 boreholes in Baraganda area to confirm extent of mineralisation.

2.4.0 During the F.S. 1965-66, Preliminary appraisal of the Baraganda Copper Deposit, Hazaribagh dist, Bihar (Now Dist- Giridih, Jharkhand) was done by N.K.Mukherje and B.K.Dhruva Rao, GSI. Scope of this work included rapid assessment of the potentiality of the area and drawing up the scheme of exploration. Inference of mineralization as per the report is as below

a) The mineralization can be traced over a strike length of 1020 m. out of which a strike length of 715 m. covered by ancient and old workings is better mineralized, the rest of the strike length being poor.

b) The mineralization is in the form of a wide zone of poor sulphide disseminations, within which there are richer veins.

c) The lodes are conformable and are generally vertical, though dips of upto 65° towards north or south are occasionally noticed.

d) The mineralization appears to be in the form of fracture fillings; the fractures are lined with drossy quartz resulting in comb structure often with vugs. Thus, there are chances of finding low temperature minerals like mercury and antimony in parts of the deposit. There are old workings for gold and tin in the neighbouring areas. Thus, if all these minerals occur, there may be zones of mineralization. The ore body may have a steep pitch of about 65^0, as inferred from structural evidences. The individual veins are arranged an-echelon with dextral shifts.

e) The chief ore mineral is chalcopyrite with pyrite. Smaller quantities of ores of lead, zinc and precious metals may also be present. The main gangue is quartz with mica, chlorite and garnet.

f) The host rocks are highly sheared, structurally weak mica-schists.

g) The average width of/the lodes may be around 4.5 m. The average grade of the deposit is likely to be around 2.0% Cu.

Recommendations of the report are as below

a) There is no direct evidence There is no conclusive and direct evidence regarding the grade and depth of persistence of ore in this area. The assumptions made in estimating the anticipated reserves are speculative and based mostly on indirect evidences. Since the deposit is small it can be worked provided the grade is reasonably high. Therefore, it will be necessary to obtain, in the first instance, direct evidence regarding the grade and width of the ore body by drilling

b) It is proposed to carry out the exploratory program in two phases and the first phase would consist of drilling a few pilot boreholes at intervals of 200 m, for obtaining factual information

regarding the grade, width and nature of mineralization. If the first phase of work confirms the assumptions made regarding the grade, width and strike persistence, a program for further detailed proving can be drawn up.

c) The lodes appear to be vertical, with swings in dip towards north and south resulting in local dips of up to 65°, the boreholes should be drilled at a low inclination of 30°

2.5.0 During the F.S. 1965-66, IBM notified "Area recommended for notification under section 17 sub section (2) & (4) for the purpose of detailed exploration and proving of copper-lead-zinc and other associated minerals and metals, including tin, nickel, silver, gold, mercury, etc. by the Indian Bureau of Mines in the Baraganda area Hazaribagh district, Bihar state (Now Dist- Giridih, Jharkhand). Geographical co-ordinates are 24°4'45" N: 86°4'15" E and area is covered under toposheet 73 L/4. Area includes villages Bharaganda, Koluwa, Fatehpur and Behra Suidih.

3.0.0 Block Description

3.1.0 The proposed G-4 block for copper falls in Survey of India Toposheet No. 72 L/04 and covers an area of 95.70 sq. km in and around villages Chalima, Amhadih, Baramasia, Karogadh, Kolha Golga, Domna Golga, Mangluwahar, Khurjio, Gangodih, Telkhara, Dhilbro and Kalhawar. of Giridih District, State Jharkhand. The block location is given in **PLATE-I.** The Co-ordinates of the corner points of the block area both geodetic and UTM are given in **Table No.-III.A**.

Block Corner points	**1. UTM Zone-44 (m)**	
	Easting (m)	**Northing (m)**
A	409366.8676	2669572.264
B	405839.6014	2659182.571
C	398248.9791	2659279.196
D	398399.9513	2669500.326

4.0.0 Planned Methodology

The Exploration shall be carried out as per Minerals (Evidence of Mineral Content) Rule-2015. Accordingly, the following scheme of exploration is formulated in order to achieve the objectives. The details of different activities to be carried out are presented in subsequent paragraphs:

4.1.0 Geological Mapping

4.1.1. Geological mapping will be done in the entire 95.70 sq km area on 1:12,500 scale. Rock types, their contact, structural features will be mapped. Surface manifestations of the ore bodies available along with their surface disposition will be marked on map.

4.2.0 Geochemical Sampling

4.2.1. **Surface Sampling (Bed Rock/ Channel/ Soil Sample/ Stream Sediment):** During the course of Geological mapping the Bed rock/Channel samples shall be collected from the outcrops along with soil and stream sediment samples. A total 300 primary samples will be collected for assay 34 element Package analysis by ICP-MS for surface samples and 58 nos (primary and check) for assay of Au and Ag will be collected. Total 45 Nos Check samples (5% internal + 10% External) will be analyzed for assay of 34 element Package analysis by ICP-MS for surface samples.

4.2.2 **Surveying:** Geological traverses, geological features and location of surface samples will be marked with hand held GPS. During exploratory drilling of scout borehole, fixation and determination of reduced level and co-ordinates of the boreholes only will be undertaken by DGPS/ Total station. The anomalous zone demarcated on the basis of Geological mapping and Geo-chemical sampling where drilling will be carried out can be surveyed on topographic plan in 1:50000 and contour map will be prepared at 2m contour interval.

4.3.0 Exploratory Mining (Trenching/Pitting)

4.3.1. Shallow trenching/pitting (Excavation) shall be carried out in the potential zones identified based on the results of Geological Mapping and Geochemical Sampling. A provision of shallow trenching/pitting of 200 cubic meter is kept. Pitting shall be done for correlation of mineralized zones on surface up to a depth of 1-2 m after removal of soil/weathered column in the area. Locations of pits/trenches on ground will be decided by field geologist based on field observations. A provision of 230 Nos of primary & check (5% internal+10% External) trench/pit samples is kept for analysis of assay 34 element Package analysis by ICP-MS for surface samples 35 Nos samples (primary and check) for assay of Au and Ag analysis. The trench /pit walls will be mapped on 1:200 scale. Thus, a total of 200 cu m of shallow trenching/pitting work along with associated geological & laboratory studies have to be carried out.

4.4.0 Core Drilling:

4.4.1. Based on Geological mapping, Geochemical studies, pitting and trenching, the extension of the mineralized zones (ore bodies) will be marked. To find out the potentiality of mineralized zones in strike & dip, 5 Nos scout boreholes involving 500m of drilling will be carried out for shallow level intersection of mineralized zones.

4.5.0 Drill Core Logging:

4.5.1. The drill core will be logged for rock types, structural features, textures, intersection of ore zones, types of mineralization and occurrence of various ore minerals. The logging for determination of Rock quality determination (RQD) will also be undertaken.

4.6.0 Drill Core Sampling:

4.6.1. During geological logging of drill core, mineralized zone will be marked on basis of concentration and lithology. Total 115 Nos of primary and check (5% Internal Check+10% External Check) samples will be analysed for Cu, Pb & Zn, Co & Mo assay, 29 Nos samples (5% Internal Check+10% External Check) for assay of Au & Ag (Gold). If surface samples for REE assay gives positive result then one borehole shall be drilled for REE within 5 scout boreholes. In that case 50 Nos. of samples (primary) will be analysed for REE by ICP-MS method. 15 Nos of composite samples will be analysed for Cu, Pb, Zn, Co, Mo and 10 Nos for Se & Te analysis.

4.7.0 Petrological & Mineralogical Studies:

4.7.1. During the course of Geological mapping and core logging 50 samples from various litho units from surface and intersected in boreholes will be studied for petrography and mineralized zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc in polished sections.

4.8.0 Nature Quantum and Target

4.8.1. Details of the particular, Quantum and the targets are tabulated in **Table No.-IV.A.**

Table No-IV. A

Envisaged Quantum of proposed work in Chalima Block

Sl. No.	Item of Work	Unit	Target
1	**Geological Mapping** (on 1:12,500 Scale)	Sq km	95.70
2	**Topographical Survey*** (on 1:12,500 Scale in potential Zone Areas)	Sq km	As per

Sl. No.	Item of Work	Unit	Target
			requirement
	Bore Hole Fixation* (Scout Boreholes)	Nos	5 Nos
	RL & Coordinate Determination*	Nos	5 N0s
3	**Geochemical Sampling** (Taken up in Anomalous areas) a) Bed rock sampling/channel sampling b) Soil sampling c) Stream sediment sampling	Nos.	400 Nos
4	**Exploratory Mining**	**M**	**200 Cu m**
	Excavation (Trenching/Pitting)	Cu. m.	200 Cu m
5	**Drilling (coring)***	**m**	**500m (5 Bhs)**
6	**Geological work**		
	a) Geological Core Logging, Sample Preparation etc.*	m	500m (5 Bhs.)
7	**Laboratory Studies**		
	i) Surface Sampling/Soil/Stream (Primary samples) a) 34 element Package analysis by ICP-MS for surface samples b) Au by Fire assay	**Nos**	300 Nos 50 Nos
	ii) Check samples (5% Internal + 10% External)) a) 34 element Package analysis by ICP-MS for surface samples b) Au by Fire assay	Nos	45Nos 08 Nos
	v) Trench Primary & Check Samples (5%Internal+10%External)		
	a) 34 element Package analysis by ICP-MS for surface samples	Nos	230 Nos
	b) Au by Fire assay	Nos	35 Nos
	vi) Drill Core (Primary + check) Samples*		
	a) For Cu, Pb, Zn, Co, Mo	Nos	115 Nos
	b) Au by Fire assay	Nos	29 Nos.
8	**Petrological Samples (Surface & BH Core Samples)**		
	a) Preparation of Thin Section b) Study of Thin Section	Nos Nos	10 Nos 10 Nos
9	**Mineragraphic Studies (Surface & BH Core Samples)**		
	a) Preparation of Polished Section b) study of Polished Section c) Digital photomicrograph of thin polished section	Nos Nos Nos	10 Nos 10 Nos 10 Nos
10	**Report Preparation (Digital format)**	Nos.	01 Nos
*** The 2nd Level of work to be decided after review of Geological Mapping &**			

Sl. No.	Item of Work	Unit	Target
Geochemical Sampling			

5.0.0 Manpower Deployment

5.1.0 Manpower deployment List will be provided later.

6.0.0 Break-up of Expenditure

6.1.0 Tentative Cost has been estimated based on Schedule of Charges (SoC) of projects funded by National Mineral Exploration Trust (NMET) w.e.f. 01/04/2020. The total estimated cost is Rs. **209.33 Lakh**. The summary of tentative cost estimates for Reconnaissance Survey (G-4 Level) is given in **Table No.-VI. A** and details of tentative cost estimates is given in **Table No.–VI.B**. Tentative Time schedule/action plan for proposed Reconnaissance Survey (G-4) is given in **Table No. VI-C.**

Table No-VI. A

Summary of Tentative Cost Estimates for Reconnaissance Survey (G-4 Level) Exploration

Sl. No.	Item	Total Estimated Cost (Rs.)
1	Geological Mapping (LSM), Other Geological Work	24,58,900
2	Trenching & Pitting	6,66,000
3	Drilling & associated works	74,99,820
4	Laboratory Studies	54,34,745
5	Geologist at HQ	5,40,000
	Sub Total (1 to 6)	1,65,99,465
6	Exploration Report Preparation	7,50,000
	Proposal Preparation	3,80,000
7	Peer review charges	10,000
	Sub Total (1 to 7)	1,77,39,465
8	GST 18%	31,93,104
	Total:	**2,09,32,569**
	Say Rs. In Lakh	**209.33**

Estimated cost for Reconnaissance Survey (G-4) for Copper (Cu) in Chalima Block, Giridih, Jharkhand
Total Area - 95.70 sq km; Nos. of Borehole - 5 ; Borehole depth range - 100m avg ; Completion Time - 14 Month

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC- Item- S. No.	Rates as per SoC	Qty.	Total Amount (Rs)	
1.0	**Geological, Sampling Days**						
1.1	Large scale (LSM) Geological mapping/ Trenching/ Drilling					-	
	a) Geologist man days (1 No) for Geological Mapping/Trenching/Drilling (Field)	days	1.2	11,000	150	16,50,000	
	b) Labour (field) for Geological mapping work (Total 4 Nos i.e. 2 workers per one geologist)	per worker	5.7	427	300	1,28,100	Amount will be reimburse as per the notified rates by the Central Labour Commissioner (Rs. 427/- per day) or respective State Govt. whichever is higher
	c) Sampling man days -1 Sampler (Geochemical /Trenching/Drilling) Labour charge not included	day	1.5.2	5,100	100	5,10,000	
	d) 4 labours/ party (Rs 427/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	427	400	1,70,800	Amount will be reimburse as per the notified rates by the Central Labour Commissioner (Rs. 427/- per day) or respective State Govt. whichever is higher
	Sub-Total A					**24,58,900**	
2.0	**Mineral Investigation**						
2.1	Trenching/Pitting$						
	a) Excavation of trenches & pits	per cu m	2.1.1	3,330	200	6,66,000	
	Sub-Total B					**6,66,000**	
3.0	**Drilling**					-	
3.1	a) Drilling up to 300m Rigs) (Medium Hard Rock)	per m	2.2.1.4 a	11,500	500	57,50,000	
3.2	Borehole deviation survey	per m	2.2.6	330	500	1,65,000	
3.3	Borehole pillaring					-	
	a) construction of concrete pillar (12"x12"x30")	perborehole	2.2.7.a	2,000	5	10,000	
3.4	Transportation of drill rigs & truck associated per drill (To & Fro from HQ)	per km	2.2.8	36	2200	79,200	
3.5	Monthly accommodation charges for drilling camp	monthly	2.2.9	50,000	5	2,50,000	
3.6	a) Drilling camp setting (2 rigs)	per drill	2.2.9a	2,50,000	1	2,50,000	
3.7	b) Drilling camp winding (2 rigs)	per drill	2.2.9b	2,50,000	1	2,50,000	
3.8	Approach road making in rugged- hilly terrain (Partly rugged-hilly terrain)	per km	2.2.10b	32,200	5	1,61,000	
3.9	Drill core preservation	per m	5.3	1590	150	2,38,500	
3.10	Land/crop compensation	per borehole		20000	5	1,00,000	
3.11	Demarcation Fixation of borehole and determination of co-ordinates & Reduced Level (RL) of the boreholes by DGPS	Per point of observation	1.6.2	19,200	5	96,000	
3.12	a) Surveyor man days (1 Nos) (the area surrounding drill points/mineralized zones (ore bodies)/potential area will be contoured)	days	1.6.1.a	8,300	15	1,24,500	the area surrounding mineralized zones (ore bodies)/potential area will be contoured
3.13	b) 4 labours/ party (Rs 427/day/labour) (As per rates of Central Labour Commissioner)	per worker	5.7	427	60	25,620	the area surrounding mineralized zones (ore bodies)/potential area will be contoured
	Sub-Total C					**74,99,820**	
4.0	**Laboratory Studies**						
4.1	Chemical Analysis						
	i) Surface sampling (Bed Rock Samples/Soil/Stream Sediment)						
	a) 34 element Package analysis by ICP-MS for surface samples	per sample	4.1.14	7,731	300	23,19,300	
	b) For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	4,760	50	2,38,000	
	ii) Check Samples (Bed Rock/Soil/Stream Sediment Samples) - 5% Internal & 10% External					-	
	a) 34 element Package analysis by ICP-MS for surface samples	per sample	4.1.14	7,731	45	3,47,895	
	b) For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	4,760	8	35,700	
4.2	**Pit & Trench, Primary Samples**					-	
	a) 34 element Package analysis by ICP-MS for surface samples	per sample	4.1.14	7,731	200	15,46,200	
	b) For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	4,760	30	1,42,800	
	ii) Check Samples - 5% Internal & 10% External					-	
	a) 34 element Package analysis by ICP-MS for surface samples	per sample	4.1.14	7,731	30	2,31,930	
	b) For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	4,760	5	21,420	
4.3	**ii) BH Core Sampling, Primary & Check samples (5% internal +10% External)**					-	
	a) For Cu, Pb, Zn, Co, Mo	per sample	4.1.7b	2,506	100	2,50,600	
	b) For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	4,760	25	1,19,000	
	ii) Check Samples - 5% Internal & 10% External					-	
	a) For Cu, Pb, Zn	per sample	4.1.7b	2,506	15	37,590	
	b) For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	4,760	4	17,850	
4.4	**Petrological / Mineralographic studies**					-	
	a) Preparation of thin section	per sample	4.3.1	2,353	10	23,530	
	b) Study of thin section for petrography	per sample	4.3.4	4,232	10	42,320	
	c) Preparation of polished section	per sample	4.3.2	1,549	10	15,490	
	d) Study of polished section for mineragraphy	per sample	4.3.4	4,232	10	42,320	
	e) Digital photomicrograph of thin polished section	per sample	4.3.7	280	10	2,800	
	Sub-Total D					**54,34,745**	
5.0	**Geologist man days (1 No.) for Geological map & Report (HQ)**	**days**	1.2	**9,000**	**60**	**5,40,000**	
6.0	**Total (1.0 to 5.0)**					**1,65,99,465**	
7.0	**Geological Report Preparation**	Nos	5.2	A Minimum of Rs. 7.5 lakhs or 3% of the work whichever is more	1	**7,50,000**	For the projects having cost up to exceeding Rs. 150 Lakhs but less than 300 Lakhs: A Minimum of Rs. 7.5 lakhs or 3% of the work whichever is more and Rs. 3000/- per each additional copy.
8.0	**Preparation of Exploration Proposal**	**Nos**	**5.1**	**380000**	**1**	**3,80,000**	EA has to submit the Hard Copies and the soft copy of the final proposal along with Maps and Plan as suggested by the TCC-NMET in its meeting while clearing the proposal.
9.0	**Report Peer Review Charges**	**lumpsum**	**As per EC decision**	**11500**	**1**	**11,500**	
10.0	**Total Estimated Cost without GST (7+8+9+10)**					**1,77,40,965**	
11.0	**Provision for GST (18%)**					**31,93,374**	GST will be reimburse as per actual and as per notified prescribed rate
12.0	**Total Estimated Cost with GST**					**2,09,34,339**	
					Say, in Lakhs	**209.34**	
Note:							

Note -
1. If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC. In case of execution of the project by NEA on its own, a Certificate regarding non outsourcing of any component/project is required.
2. Rates are calculated as per NMET SOC issued on 31st March 2020 without escalation. Although billing for subsequent financial years will be done as per the actual escalations as per RBI Indices.

Tentative Time schedule / Action plan of Reconnaissance Survey (G-4) for Copper (Cu) in Chelima Block, Giridih, Jharkhand															
S.No.	Activities	MONTHS													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Camp setting							Review							
2	Geological mapping & Sampling														
3	Sample preparation														
4	Analytical work for Surface samples														
5	Exploratory mining for trenching														
6	Sample preparation (Trench samples)														
7	Analytical work														
8	Drilling 500m														
9	Sample preparation for Drill core samples														
10	Survey work for area surrounding mineralized zones														
11	Camp winding														
12	Analytical work dril core samples														
13	Geological report														
14	Peer Review														
* Commencement of project will be reckoned from the day the exploration acreage is available along with all statutory clearances															
*Time loss on account of monsoon/agricultural activity/forest clearance/ local law & order problems will be addition to above time line.															

7.0.0 References:

1. Preliminary report on the: Investigations of the Baraganda Copper Deposit Dist: Hazaribagh, State: Bihar by A.K.Sen, Geologist – GSI 1961-62

2. Preliminary appraisal of the Baraganda copper deposits, Dist: Hazaribagh, State: Bihar by N.K.Mukherjee & B.K.Dhruva Rao – GSI 1965-66

3. Report on the Investigations for the Base-metal, Ore deposits in the Baraganda – Parasia Belt, District: Giridih, State: Bihar by S.N.Mitra, Sr. Geologist – GSI 1975-76

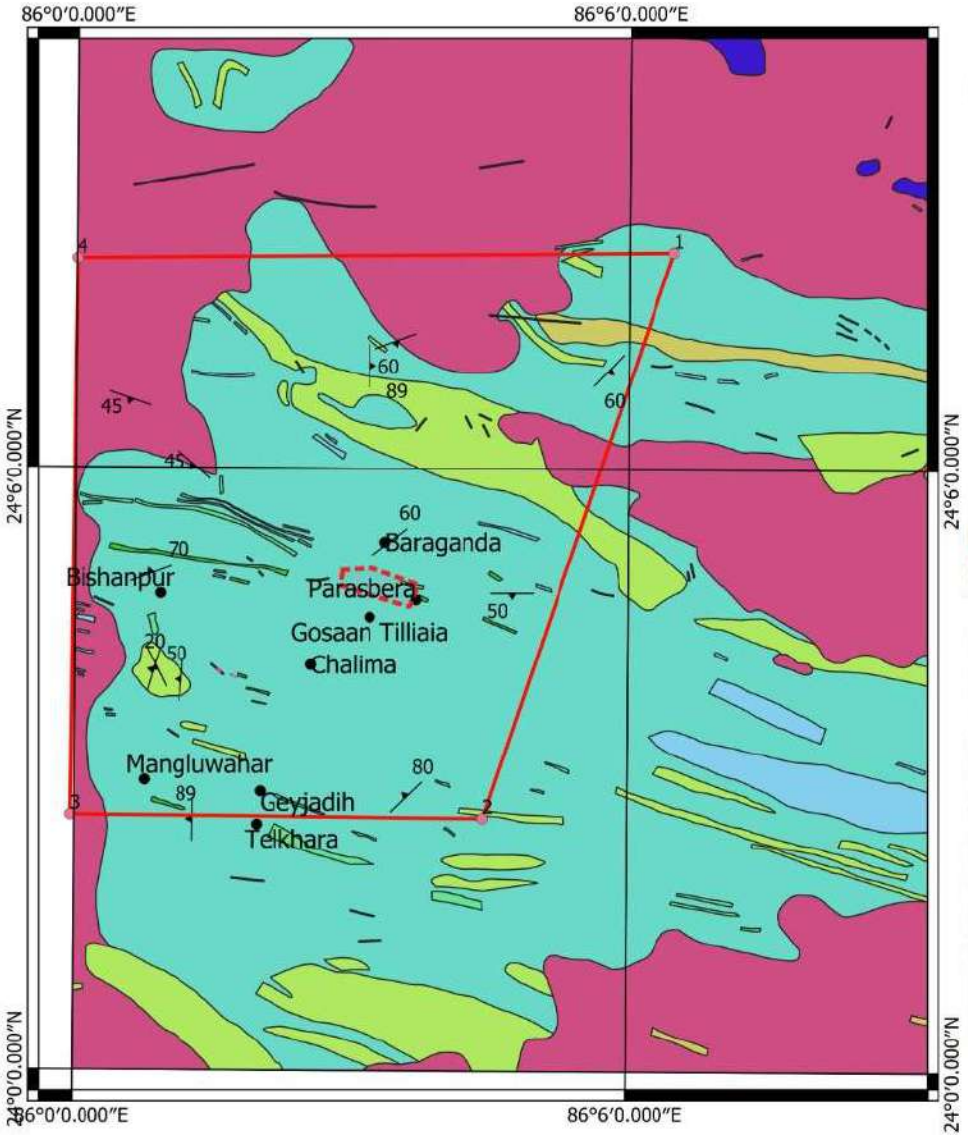
4. A report on the reconnaissance survey of the Hotsprings in Dist: Hazaribagh, State: Bihar by Kallol Guha and P.Bandopadhyay – GSI 1983-84.

5. Bulletin 23 (copper) published by GSI.

List of Plates:

1. **Plate-I: Block Location Map of Chalima Block area, District: Giridih, State: Jharkhand**
2. **Plate-II: Regional Geological Map with Proposed Chalima block location (Downloaded on plotted on Bhukosh Map of the respective district from website of GSI).**

REGIONAL / BLOCK GEOLOGICAL MAP



Regional geological map with the proposed Chalima copper exploration (G-4) block, Dist: Giridih, Jharkhand
(Area 95.70 sq.km)

(Source: Bhukosh, GSI)

0 1 2 3 4 km

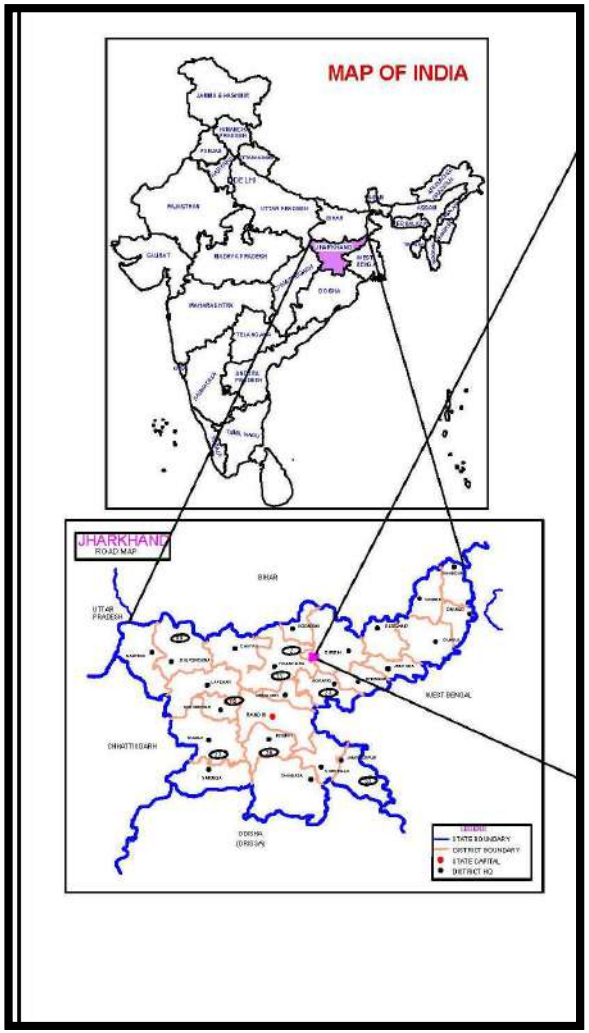
Baraganda data
- Chemila Block Boundary
- Baraganda Block Boundary
- Locations
- Old Pits

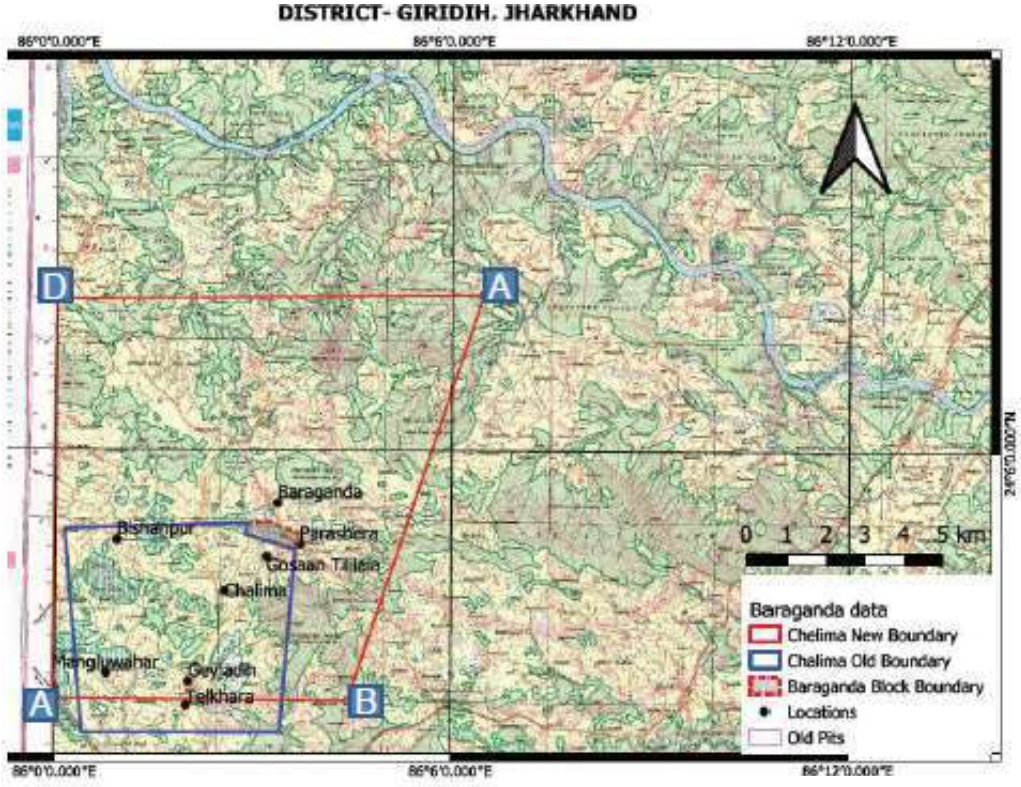
Structure

Lithology
- DOLERITE / BASIC INTRUSIVES
- GRANITE GNEISS
- GRAPHITE SILLIMANITE SCHIST
- HORNBLENDE SCHIST,AMPHIBOLITE,META ULTRABASITI
- MICA SCHIST / SCHIST
- PEGMATITE & QUARTZ VEIN
- PHYLLITE, SHALE, SLATE
- QUARTZITE,QUARTZ SCHIST
- SHALE, SANDSTONE, CONGLOMERATE

LOCATION OF CHALIMA BLOCK

- Block falls in toposheet no 72 L/4, District Headquarter, Giridih is 50 Km East & nearest station is Parasnath which is 10 Km from the Block.





Block area:
95.70 Sq km

Co-ordinates of the proposed Chalima block for G-4 exploration for copper (area 95.70sq.km) Topo sheet - 72 L/04		
Point	Latitude	Longitude
A	24° 08' 9.59"	86°06'28"
B	24° 02' 31.06"	86°04'26.26"
C	24° 02' 32.51"	86°59'57.52"
D	24° 08' 4.85"	86°00'0.29"