

**PROPOSAL FOR GENERAL EXPLORATION (G2) FOR COPPER
MINERALISATION IN TONDA BLOCK,
EASTERN KHETRI COPPER BELT, JHUNJHUNU DISTRICT,
RAJASTHAN.**

Copper and Associated Minerals

By

**Mineral Exploration Corporation Limited
(A Government of India Enterprise)
A Mini Ratna Company
Seminary Hills, Nagpur-440 006 Maharashtra**

Place: Nagpur

Summary of the Block for G2 Stage Exploration

Features	Details
Block ID :	Tonda Copper Block
Current Exploration Agency	MECL
Previous Exploration Agency	GSI
Geological Report (Previous stage Geological Report)	Progress Report for the Field Season 1995-96 and 1996-97 Compendium on Khetri Copper Belt 9 BHs RTN-01 to RTN-09 total Drilling 1733.65m
Commodity :	Copper
Mineral Belt :	Eastern Khetri Copper Belt
Budget & Time Schedule to complete the project	- 650.39 Lakhs & 14 months
Objectives:	To assess and estimate the ore potential up to vertical depth of 250m and 500m.
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 :	MECL (By Proposing Agency)
Name/ Number of Geoscientists :	01 HQ (60 days) Field (210 days)
Expected Field days (Geology, Surveyor) (60 days)	
1.	Location: The proposed Tonda area is 15 km. East of Khetri town and 18 km. ESE of Khetri Nagar contiguous to the state highway connecting the Copper Town of Khetri Nagar to the National capital New Delhi, which is 175 km. From the prospect. The nearest railhead is Nizampur, which is 12 km. East of the area on Rewari-Phulera section of Western Railway. The nearest airport is Indira Gandhi International Airport, New Delhi which is 150 km. away towards NE from the proposed study area.
Latitude :	27° 58' 19" to 27° 58' 56"
Longitude:	75° 52' 28" to 75° 53' 11"
Villages :	Tonda
Tehsil/ Taluk :	Khetri
District :	Jhunjhunu
State :	Rajasthan
2.	Area (hectares/ square kilometres)
Block Area :	56.2 Ha
Forest Area :	-
Government Land Area	-
Private Land Area	-
3.	Accessibility
Nearest Rail Head :	The nearest railhead is Nizampur, which is 12 km. East of the area on Rewari-Phulera section of Western Railway.
Road :	Khetri is 15 km.
Airport:	Indira Gandhi International Airport, New Delhi is 150 km NE of the Study Area.
4.	Hydrogeology
The area has semiarid climate and water table is 10m to 12m below the ground. The major part of the area is covered by alluvium and soil upto 3m. thick. North easterly flowing nalah, on the eastern flank, marking a tributary of River Chandrawati represents the drainage of the area.	

Rivers/ Streams : Part of tributaries/water shed area of river Chandrawati.	
5.	Climate
Mean Annual Rainfall : The average annual rainfall in the area is reported total about 38-50 cm mainly during June to August.	
Temperatures (November- December) (Minimum) 1°C Temperatures (May-June) (Maximum) 47°C	
6.	Topography
Toposheet Number : 45M/13	
The major part of the area is covered by alluvium and soil is 395m to 350m above mean sea level. The general slope of the ground is north easterly.	
7	Availability of baseline Geoscience data
Geological Map	on 1:1000 scale
Geochemical Map	213 Nos
Geophysical Map	Interpreted map of Magnetic, IP (Chargeability) and SP map of GSI, Field Season: 1993-94 report.
8.	Justification for taking up G2 stage mineral exploration
The bore holes drilled by GSI intersected considerable copper mineralisation in bore holes RTN-02 (5.56 m X 1.62 % Cu), RTN-03 (2.55 m X 0.50% Cu), TRN-05 (3.89 m X 0.55 % Cu & 1.97 m X 0.50 % Cu), RTN-04 (4.92 m X 0.59% Cu), RTN-06 (2.46 m X 1.18% Cu, 1.17 m X 0.76% Cu), RTN-08 (3.38 m X 0.51% Cu), RTN-09 (2.91 m X 0.70% Cu, 3.23 m X 0.51% Cu). This block and associated old workings are confined in the vicinity of Babai - Papurna - Rampura lineament (Eastern Khetri Copper Belt) on the regional scale. As the area under review is soil covered, the encouraging recommendation made by BRGM and geophysical data are significant for the planning of exploration work. Deep penetration IP survey in this block has delineated an elongated chargeability zone-III which almost follows the magnetic and SP zones	

Proposal for General Exploration (G2) for Copper Mineralisation in Tonda Copper Block Eastern Khetri Copper Belt, Jhunjhunu District, Rajasthan State, under NMET

1.0 INTRODUCTION

- 1.1. The exploration proposal was discussed in 54th SGPB meeting held at Jaipur on 17th February-2020. It was decided that, the area shall be explored through NMET fund. Same was intimated to The Additional director, DMG, Khanij Bhavan, Jaipur, Rajasthan, vide Lr. No. MECL/Expl/DMG-Raj/20-21/2793 dated 10.06.2020 with the subject as Action taken report on the minutes of the meeting held on 17.02.2020.
- 1.2. MECL prepared the proposal and submitted to 24th Technical-cum-Cost Committee (TCC) meeting held on 07th, 08th and 09th Oct, 2020 through videoconferencing at Geological Survey of India, DGCO, A-II Pushpa Bhawan, New Delhi-62.
- 1.3. The proposal has been technically evaluated by the Committee for its various geological/geophysical components and their suitability in the G2 stage exploration. Committee suggested that the geological map of GSI may be used and bore holes may be planned along the borehole profiles of the drilled boreholes of GSI.
- 1.4. Committee also suggested that the geophysical survey, geophysical logging along with systematic drilling with maximum 200m vertical depth of intersection may be taken up by MECL.
- 1.5. Accordingly MECL revised the proposal and resubmitted to the Committee and Committee recommended the proposal for approval of General Exploration (G2) with estimated cost of Rs. 650.39 Lakhs including GST in time schedule of 14 months.

2.0 LOCATION AND ACCESSIBILITY

- 2.1 The study area of Tonda Copper Block is situated under Tonda Village of Khetri Tahsil, Jhunjhunu District, Rajasthan. Northing 27° 58' 19" to 27° 58' 56" and Easting 75° 52' 28" to 75° 53' 11" falls in Survey of India Toposheet 45M/13.
- 2.2 The proposed Tonda area is 15 km. East of Khetri town and 18 km. ESE of Khetri Nagar contiguous to the state highway connecting the Copper Town of Khetri Nagar to the National capital New Delhi, which is 175 km NE from the prospect. The nearest railhead is Nizampur, which is 12 km. East of the area on Rewari-Phulera section of Western Railway. The nearest airport is Indira Gandhi International Airport New Delhi which is 150 km. NE from the area.

3.0 REGIONAL GEOLOGY AND STRUCTURE

- 3.1 The arenaceous and argillaceous metasediments of Alwar and Ajabgarh Groups belonging to Delhi Supergroup constitute the regional geological sequence of the area. The major rock types exposed in the area are arkosic quartzite, amphibole quartzite, phyllite with or without andalusite, garnet and staurolite biotite schist, flaggy and massive quartzite, garnetiferous amphibolites, amphibolites and marble. Metasomatic syngenetic granitic rocks along antiformal cores have intruded the metasediments.

The geological succession of the Khetri belt after Heron (1923) and Dasgupta (1968) is as follows

Age	Formation	Rock types
Super Group (Proter)	Post Delhi Intrusive	Quartz Veins, Chert-Anirite Veins.
		Thin amphibolites dykes, pegmatites granite aplitic-granite, amphibolites (metamorphosed)
		Upper arenaceous unit: Biotite Schist, feldspathised biotite gneiss and

		amphibole-biotite gneiss.
	Ajabgarh Group	Upper pelitic unit: Phyllite, impure marble, calc-gneiss, amphibolites, amphibole quartzite, silicified phyllite, cherty carbonate rock. Middle arenaceous unit: Massive, thick bedded quartzite with rare intercalations of phyllite. Lower pelitic unit: Phyllite, sericite schist, biotite-chiastolite schist, feldspathic biotite schist, silicified schist, marble, carbonaceous phyllite, graphitic schist, quartzite, anthophyllite – cummingtonite rock and amphibolites.
	Alwar Group	Arkosic quartzite, amphibole quartzite, amphibole-quartz gneiss, actinolite marble, amphibole-biotite quartzite, phyllite and mica schist.

- 3.2. The contact between Alwar Group and Ajabgarh Group is gradational and the copper mineralisation in the area is confined to amphibole quartzite, garnetiferous amphibolites and albitised fault zone of the aforesaid Delhi Stratigraphy.
- 3.3. The area has been complexly deformed by multiple folding and regional scale faults or shears. Both non-diastrorphic and diastrorphic structures are preserved in the different rock types of area. Structure plays an important role in the control of mineralization in the Eastern Khetri Belt (EKB). The NE-SW trending Babai-Papurna-Rampura-Tonda lineament demarcates the south eastern flank of the mineralized zones in the EKB i.e.; base metal mineralisation occurs on the north western side of the lineament. The albitised fault zones are the favourable for the base metal mineralisation in the EKB in general, unlike the main Khetri Belt, where syn-sedimentary copper mineralization is persistent within same geological unit.
- 3.4. The area has undergone three phase of deformations, the earliest deformation has resulted in the development of NE-SW trending and south easterly dipping S1 schistosity, which is coplanar to S0-F2 folds have resulted in the development of S 2 crenulation cleave trending N-S to NE-SW with steep easterly dips. The open warps indicate third deformation, which has resulted in the change of trends of S1 and S2, at places.

4.0 GEOLOGY OF THE AREA

- 4.1 The outcrops in the prospect are sparse, so the geology is inferred by interrelating the geology of adjoining areas, old workings, dug well data, bore hole data and geophysical data. Feldspathic quartzite garnetiferous amphibolites, garnet-staurolite-biotite schist, anthophyllite-cummingtonite rock and para-amphibolites belonging to Alwar and Ajabgarh Group of Delhi Supergroup represent major lithounits of the area.

The generalized stratigraphic succession of the prospect is as follows:

Recent	Alluvium and soil	
	Intrusives	Quartz veins Amphibolite dykes Ultramafics Basic Volcanics (?)
Delhi Supergroup	Ajabgarh Group	Garnet-Staurolite-Biotite Schist with bands of anthophyllite-cummingtonite rock, Garnetiferous para-amphibolites.
	Alwar Group	Amphibole-Biotite quartzite with bands of para-amphibolites. Feldspathic biotite quartzite basal arkose.

- 4.2 Arkose exposed in the north eastern and south western parts of the prospect is the oldest unit of the block. The basal arkose is fine to medium grained, has a granitic look on weathered surface, and shows feeble foliation trending NW-SE. The main mineral constituents identified are pink to white potash feldspar, quartz, biotite, hornblende, tremolite and magnetite. The feldspathic quartzite overlies the basal arkose.

- 4.3 The feldspathic quartzite unit occupies the hill in the north-western part of the prospect. The rock is pale to buff in colour, medium to fine grained and the feldspars are unaltered indicating nearness of granitic \ gneissic source of their origin. This unit is highly brecciated, silicified and shows signs of metasomatic albitisation. The felspathic quartzite gradually passes into overlying amphibole-biotite quartzite as recorded in the borehole sections. The amphibole-biotite quartzite is melanocratic due to presence of biotite and hornblende and is fine to medium grained. Sills of para-amphibolites were noticed in borehole sections as well as on surface outcrops. These para-amphibolites are grey to dark grey in color, 20 cm to 2.5m thick and show concordant relationship with the amphibole – biotite quartzite. This often gives an impression that the amphibole-biotite quartzite and para-amphibolites might be alternate bands of felsic and mafic volcanic [?].
- 4.4 The amphibole-biotite quartzite representing the top of the Alwar Group gradually passes into overlying garnetiferous para-amphibolites, garnet-staurolite-biotite schist with bands of Anthophyllite - cummingtonite rock of Ajabgarh Group.
- 4.5 The amphibolite dykes noticed in the north western segment of the prospect are represented as the late intrusives in the area. These amphibolite bodies can be differentiated from para-amphibolites by virtue of their criss-cross nature with the country rock, lesser metamorphism and absence of foliation. The quartz veins mark the last intrusive unit of the prospect (Sharma and Brij Kumar 1996).
- 4.6 **Structure:** The structure plays an important role for the exploration of basemetals in the EKB in general and Toda block in particular, as the mineralisation here is structurally controlled, unlike main Khetri belt, where it is more or less strata bound. The NE-SW trending fault or Shear Zone at Tonda is associated with a transverse magnetic break and 6-channel gradual decay airborne electromagnetic anomaly [Ghosh 1983]. This lineament is of regional scale and called as Papurna-Babai-Rampura linement. Mapping of the area by the A.K. Sharma (F.S. 1995 – 96 and F.S. 1996-97) reveals that ore units associated rocks are dipping south-easterly with an angle of 70° (Steep). Taking into consideration the dip of the fault the boreholes were planned from southeast to northwest. The geophysical survey carried out during field season 1993-94 also supports the existence of the fault, as NE-SW trending strong IP, SP, and magnetic axes were recorded parallel to each other in Tonda block [Zone-III], which parallel other geophysical anomaly axes [Zones I, II, ID, and IV] and oblique to Zone-V geophysics anomaly. The schists are internally folded with minor folds plunging towards SSW.

5.0 MINERALISATION

- 6.1 Old workings are distributed over a strike length of about 600 meters. The pattern of old workings suggests an echelon pattern of the ore lenses. However it may not be guiding factor. The mineralised zone occurs 50 meters below the surface. As mentioned earlier the outcrop density in the prospect is poor, the surface manifestations of mineralisation are restricted to the central part of the proposed area as outcrops of gossans and old workings. This zone is exposed 30-50m thick as old workings and has a strike of N43°E-S43°W and dips steeply south-easterly. It contains specks of sulfides which are partly oxidized and limonitised. The oxidation of chalcopyrite has imparted green malachite stains at many places in this zone. The original metasediments in this zone of cataclasis have been highly felspathised and silicified, leaving no trace of original constituents of the rock in this fault zone.

6.0 PREVIOUS WORK

- 6.1 The Khetri belt was mapped by Heron [1917] and Dasgupta [1968]. The exploration work in the Eastern Khetri Belt [EKB] was carried out by the Airborne Mineral Survey and Exploration (AMSE) wing from 1969 to 1975 and from 1980 to 1982, after the mineralized

zones of Eastern Khetri Copper Belt (EKB) were emerged as targets for exploration using integrated airborne Electro Magnetic (E.M.) anomaly zones indicated by the Geophysical Survey carried out in Rajasthan during 1967-68, under the project "Operation Hard Rock". During that period several smaller prospects have been located in Tonda, Naila-Ki-Dhani blocks along with Ajitsager, Rampura, Malwali, and Bokri blocks.

6.2 The geological concepts had been modified in late eighties and early nineties, as Gathania [1988] changed the monometallic [Cu] character of Khetri belt to polymetallic [Cu-Pb-Zn] character and the sequence had been marked by some workers [Chakraborty and Gupta.1993] as belonging to Pre-Delhi and Mangalwar Group in contrast to Delhi Group suggested by Heron [1923] and Dasgupta [1968]. Under the Geological Survey of India- BRGM collaboration programme an appraisal of copper mineralisation in the EKB and other areas of Khetri belt have been made, which included detailed Geological, Geophysical and Geochemical work. The EKB had been mapped on 1:10,000 scale by Gathania [1997] and Geophysical Survey comprising IP; SP and Magnetic methods had been carried out during F.S. 1993-94. As the area under review is soil covered, the encouraging recommendation made by BRGM and Geophysical data are significant for the planning of exploration work.

6.3 During the field seasons 1995-96 and 1996-97, an area of 0.6 sq.km on 1:2000 scale was mapped to delineate various geological features. 55 soil geochemical samples were collected from the soil covered area and **nine boreholes were drilled RTN-01 to RTN-09. The quantum of work done by GSI is as follows:**

Detailed Mapping 1:1000 scale	0.5 sq.km
Geochemical sampling	213 nos.
Drilling (9BHs)	1733.65m

Table: Details of Borehole drilled by GSI in Tonda Block, Dist- Jhunjhunu, Rajasthan

Sl	BH No	Section Line No	Reduced Level	Inclination from horizontal	Azimuth	Total drilled depth	Mineralises zone			
							From	To	Thickness	Cu %
1.	RTN-7	S1 & S2	372.59	Vertical	Vertical	152.35				
2.	RTN-1	S-3	365.11		S47°E	163.70				
3.	RTN-5	S-4	363.17		N47°W	332.90	122.75	126.70	3.95	0.55
							132.00	134.00	2.00	0.50
4.	RTN-4	S-5	369.32		N47°W	241.70	236.00	241.70	5.70	0.59
5.	RTN-2	S-6	375.67		N47°W	159.15	94.70	100.55	5.85	1.62
6.	RTN-3	S-7	382.54		N47°W	154.05	100.35	102.99	2.64	0.50
7.	RTN-6	S-8	364.22		N47°W	172.95	72.80	75.30	2.50	1.18
							136.65	138.00	1.35	0.76
8.	RTN-9	S-9	351.76		N47°W	172.35	113.45	115.85	2.40	0.70
							148.25	151.60	3.35	0.51
9.	RTN-8	S-10	351.00	Vertical	Vertical	184.50	38.90	42.30	3.40	0.51

7.0 SCOPE FOR PROPOSED EXPLORATION

- 7.1 GSI has completed 9 drill holes. Report reveals that, two parallel copper mineral lodes running parallel, intersected thickness ranges from 1.17 m to 5.56 m and grade ranges from 0.50 to 1.62% Cu, up to a maximum depth of intersections of 220mRL which is approximately 150m vertical depth from surface.
- 7.2 In view of the above, MECL planned to explore up to 200m vertical depth in 100m strike interval. Resource estimation shall be categorized as per UNFC and MEMC Rule 2015.

8.0 OBJECTIVES

- 8.1 The surface manifestation of mineralization are less and oxidization zone is more, 70% of the areas fall under soil coverage. Based on the GSI exploration report following objectives have fixed for exploration:
- To drill 13 BHs to intersect mineralised zones at 200m vertical depth in 100m strike interval
 - To estimate Geological resource of copper (G2 level).
 - Ore resource could be estimated as per UNFC and MEMC Rule -2015

9.0 PLANNED METHODOLOGY

- 9.1 It is proposed to take up the investigation with intersection of mineralised zones at a vertical depth of 200m (50mRL) since GSI drill holes maximum depth was **250mRL** and suggested deeper holes to avoid oxidation on mineralized zones. Total 13 BHs with 3440 m of drilling proposed

The details of proposed drill holes are as follows:

Section No	PBH No	PROPOSED DETPTH (m)	AZIMUTH (°)	INCLINATION wrt Horizontal
S2-S2'	PBH-01	170	N313	55°
S3-S3'	PBH-02	170	N313	55°
S3-S3'	PBH-03	290	N313	55°
S4-S4'	PBH-04	320	N313	55°
S5-S5'	PBH-05	140	N313	55°
S6-S6'	PBH-06	400	N313	55°
S7-S7'	PBH-07	350	N313	55°
S8-S8'	PBH-08	370	N313	55°
S9-S9'	PBH-09	340	N313	55°
S10-S10'	PBH-10	310	N313	55°
S11-S11'	PBH-11	200	N313	55°
S11-S11'	PBH-12	310	N313	55°
S12-S12'	PBH-13	180	N313	55°
TOTAL		3350.00		

10.0 BOREHOLE CORE LOGGING

- 10.1 Detailed drill core logging will be done with consideration of lithological details, structural features, e.g. joints, veins foliations, mineralization pattern, visual estimation of copper

content and other associated minerals in percentage etc. for entire length of all the holes and determination of Rock Quality Designations (RQD) for entire length of each borehole.

11.0 BOREHOLE GEOPHYSICAL LOGGING

- 11.1 Borehole Geophysical logging including Induced Polarisation, Resistivity, SP& Spectral Gamma is proposed in all the boreholes in the Block.

12.0 PRIMARY SAMPLE

- 12.1 The borehole cores will be spitted into two equal halves by using core splitter. One half will be powered to -200 mesh size and the other half will be kept for future studies. The powdered material will be mixed thoroughly and about 100 gram of samples will be taken for chemical analysis by successive coning and quartering as primary samples and rest of the material (-200 mesh size) will be kept as duplicate and Check samples for future reference. This will generate about 300 nos primary samples which will be sent to MECL Lab. for analysis of copper.
- 12.2 Check samples will be prepared around 15 nos. (5% samples analysis will be done at internal lab and 10% sample (30 Nos) analysis will be done at external laboratories for Cu.
- 12.3 Composite samples will be prepared zone wise based on primary sample data. This will generate about 50nos.of composite samples which will be analysed for radicals such as Cu, Ni, Co, W and Mo.

13.0 PETROGRAPHY AND MINERAGRAPHY & SPECIFIC GRAVITY STUDIES

- 13.1 20 nos. samples each from mineralised zones shall be subjected through polished section and thin section for petrographical and mineralogical studies at MECL Lab.
- 13.2 20 nos. samples each will be studied for specific gravity determinations by Walkers steel yard balance.

14.0 GEO-TECHNICAL STUDIES

- 14.1 Geo-technical Studies viz., Tensile Strength, Compressive Strength, Young's modulus, Protodynakavo test, Density etc., would be conducted on the cores of exploratory borehole cores from the mineralised zone along with foot wall and hanging wall at National Laboratory / NIT as to ascertain rock characteristics.

15.0 BULK SAMPLES FOR BENEFICIATION TEST

- 15.1 A representative bulk sample would be drawn from the duplicate half core samples and would be sent for laboratory scale beneficiation studies in IBM Laboratory.

16.0 NATURE QUANTUM AND TARGET

- 16.1 Nature and Quantum of work proposed is given below:

SL. No.	Description and Nature of Work	Unit	Target
I	a) Topographic Survey (1:2000 Scale)	Sq.Km.	Update
	b) Geological Mapping (1:2000 Scale)	Sq.Km.	Update
II	Exploratory Drilling	m	3550 (13 BHs.)
III	Laboratory Studies		
	a) Primary + Check Samples for Copper	Nos.	345
	b) Composite Sample		
	i) For 5 radicals (Cu, Ni, Co, Mo and W)	Nos.	60

	c) Petrographic Studies	Nos.	20
	d) Mineragraphic Studies	Nos.	20
	e) Specific Gravity determinations	Nos.	20
IV	a) Geo-Technical Studies (on BHs)	Nos.	1
	b) Beneficiation Studies	Nos.	1
	c) Ore body modelling	Nos.	1
V	Geological Report preparation (Digital and Hard Copy Format)	Nos.	1

17.0 COST ESTIMATE

- 17.1 The cost has been estimated based on actual schedule of rates mandated in the circular OM No. 61/1/2018/NMET dated 31st March 2020 for promotional projects of MOM, which is Rs 1194.70 Lakhs.

Summary of Cost Estimates

Sl. No.	Item	Estimated Cost INR (₹)
1	Exploratory Drilling	454,37,900
2	Geology & Survey	46,08,600
3	Borehole logging	17,25,300
4	Laboratory Studies	17,30,507
	Sub total	535,02,307
6	Report	16,05,069
7	Peer Review	10,000
8	Proposal Preparation	0
	Total	551,17,376
11	GST (18%)	99,21,128
	Total cost including 18% GST	650,38,504
	SAY, in Lakhs	650.39

18.0 TIME SCHEDULE

- 18.1 The proposed exploration programme envisages surveying, updation of geological mapping exploratory drilling, deviation survey, sample preparation and laboratory studies, which will be completed within 10 months by deploying 2 drill rigs, geological report preparation will require 4 more months. Therefore, a total of 14 months is planned for completion of the entire programme.

19.0 JUSTIFICATION

- 19.1 Existed GSI drilled bore holes intersected considerable copper mineralisation in bore holes RTN-02 (5.56 m X 1.62 % Cu), RTN-03 (2.55 m X 0.50% Cu), TRN-05 (3.89 m X 0.55 % Cu & 1.97 m X 0.50 % Cu), RTN-04 (4.92 m X 0.59% Cu), RTN-06 (2.46 m X 1.18% Cu, 1.17 m X 0.76% Cu), RTN-08 (3.38 m X 0.51% Cu), RTN-09 (2.91 m X 0.70% Cu, 3.23 m X 0.51% Cu).
- 19.2 The proposed exploration block alongwith associated old workings are confined in the vicinity of Babai - Papurna - Rampura lineament (Eastern Khetri Copper Belt) on the regional scale.

- 19.3 As the area under review is soil covered, the encouraging recommendation made by BRGM and Geophysical Studies are significant for the planning of exploration work. Deep penetration IP survey in this block has delineated an elongated chargeability Zone-III which almost follows the magnetic and SP zones

PLATES:

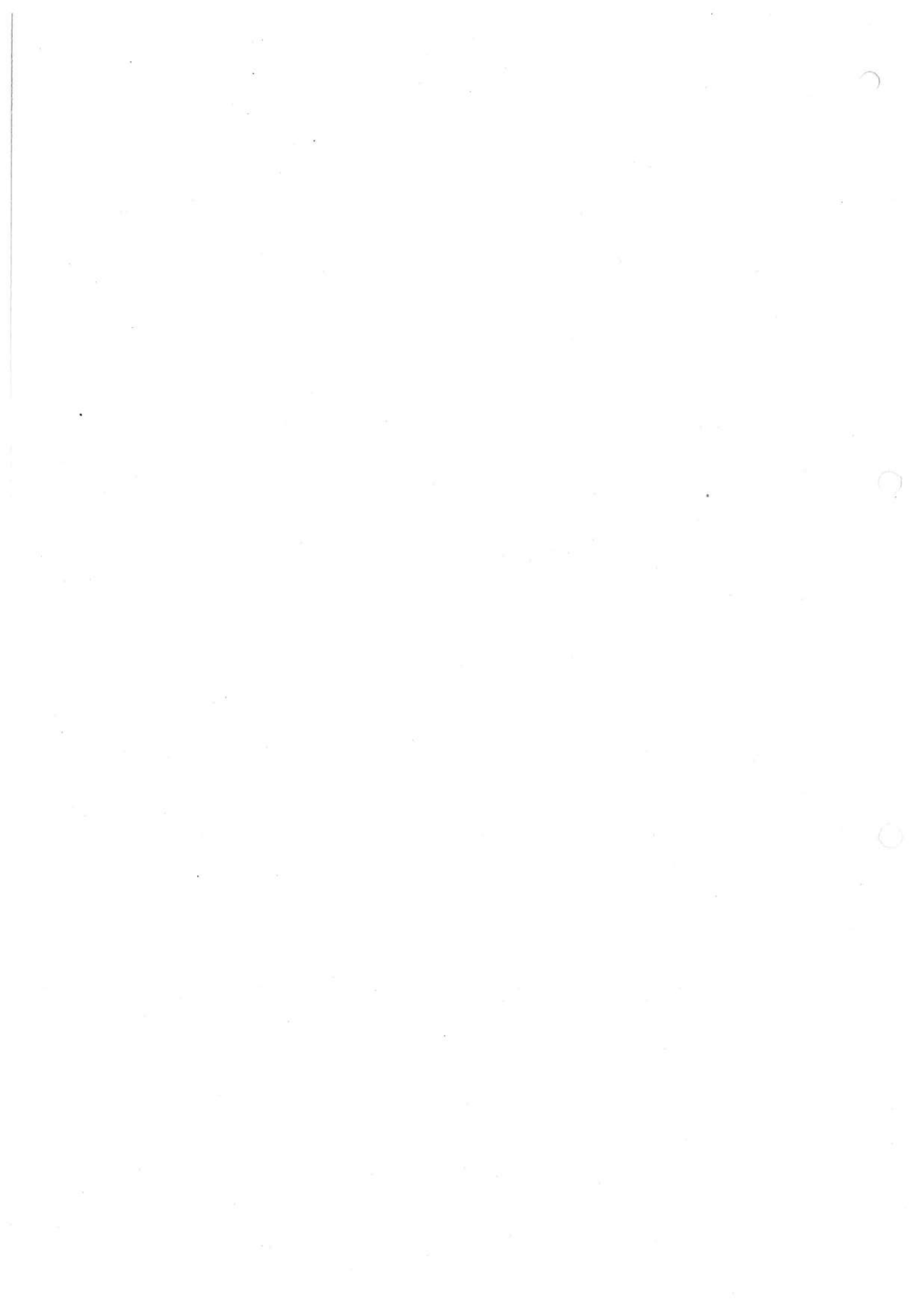
Sl.No	Description	Plate No.
1	Location map Tonda Block	1
2	Regional Geological Map of North Khetri Copper Belt.	2
3	Geological and Topographical Map of Tonda Copper Block.	3
4	Geological Cross Sections S1 to S12	4A & 4B
5	Longitudinal Vertical Section of Tonda Copper Block	5

REFERENCES:

1. Report on Geophysical Investigation for Base Metals in Rampura-Tonda and Kushalpura Areas, Khetri Copper Belt, Jhunjhunu District, Rajasthan, F.S. 1993-94. By L. N. Singh, Geophysicist (Jr.), S. L. Singh, Assistant Geophysicist, Murali Ram S.T.A (Geophysics).
2. Exploration for Base Metal in the Rampura-Tonda-Naila Ki Dhani Area, Eastern Khetri Copper Belt, Jhunjhunu District, Rajasthan Progress Report for Field Season 1995-96. by A.K. Sharma, Geologist (Sr), Brij Kumar, Geologist (Sr.).
3. Exploration for Base Metal in the Rampura-Tonda-Naila Ki Dhani Area, Eastern Khetri Copper Belt, Jhunjhunu District, Rajasthan Progress Report for Field Season 1996-97. by A.K. Sharma, Geologist (Sr)
4. Compendium on Khetri Copper belt, Rajasthan, Suggestions for future search of Ore by Mineral Exploration Corporation Limited.

S.N	Item of Work	Unit	Rates as per NMET SoC		Estimated Cost 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item No.	SoC-Rates as per SoC	Qty.	Total Amount (Rs)	Qty.	Total Amount (Rs)	
3	Borehole deviation Survey by Multishot Camera	m	2.2.6	330	1,500	495,000	2,050	676,500	1,171,500
4	Land / Crop Compensation (in cases the BH falls in agricultural Land)	per BH	5.6	20,000	6	120,000	7	140,000	260,000
5	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	6	12,000	7	14,000	26,000
6	Transportation of Drill Rig & Truck associated per drill	Km	2.2.8	36	2,600	93,600	2,000	72,000	165,600
7	Monthly Accommodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	3	150,000	4	200,000	350,000
8	Drilling Camp Setting Cost	Nos	2.2.9a	250,000	2	500,000	-	-	500,000
9	Drilling Camp Winding up Cost	Nos	2.2.9b	250,000	-	-	2	500,000	500,000
10	Road Making (Flat Terrain)	Km	2.2.10a	22,020	8	176,160	7	154,140	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
11	Drill Core Preservation	per m	5.3	1,590	200	318,000	450	715,500	1,033,500
	Sub Total C					19,252,760		26,185,140	45,437,900
D LABORATORY STUDIES									
I Chemical Analysis									
i)	Primary samples								
a. for Cu		Nos	4.1.7a	2,506	50	125,300	250	626,500	751,800
ii)	Check samples Internal (5%) and External (10%)								
for Cu		Nos	4.1.7a	2,506	5	12,530	40	100,240	112,770
iii)	Composite Samples								
a) For 3 Radicals (Cu, Ni, Co, W, Mo)		Nos	4.1.7a	2,506	-	-	60	150,360	150,360
b) Geo-Technical Sample		Nos	N.A	14,663	-	-	10	146,630	will be reimbursed as per actual
c) Benification Study *		Nos	4.7.2 as per IBM Rate	283,927	-	-	1	283,927	will be reimbursed as per actual
	Sub-Total -D					137,830		1,307,657	1,445,487
E Petrological samples (Surface & Bh Core Samples)									
i)	Preparation of thin section	Nos	4.3.1	2,353	5	11,765	15	35,295	47,060
ii)	Study of Thin Section	Nos	4.3.4	4,232	5	21,160	15	63,480	84,640
	Sub-Total -E					32,925		98,775	131,700
F Mineralogical Studies (Surface & Bh Core Samples)									
a)	Preparation of polished section	Nos	4.3.2	1,549	5	7,745	15	23,235	30,980

Cost Estimate for General Exploration (G2) Proposal for Estimation of Copper Ore in Tonda Copper Block											
S.N	Item of Work	Unit	Rates as per NMET SoC		Estimated Cost 2020-21		Estimated Cost 2021-22		Estimated Cost of the Proposal		Remarks
			SoC-Item No.	-SI Rates as per SoC	Qty.	Total Amount (Rs)	Qty.	Total Amount (Rs)	Qty.	Total Amount (Rs)	
A	GEOLOGICAL WORK										
1	Borehole logging & sampling & report writing										
a	Charges for one Geologist per day at HQ	day	1.3	9,000	10	90,000	50	450,000	60	540,000	
b	Charges for one Geologist per day at field	day	1.3	11,000	90	990,000	120	1,320,000	210	2,310,000	
c	Labour (2 Nos) Base rate - Rs.350 X 2 = 700	day	5.7	700	90	63,000	120	84,000	210	147,000	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
2	Survey (on 1:2000 Scale)										
a	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes by DGPS	Per Point of observation	1.6.2	19,200	5	96,000	8	153,600	13	249,600	
b	Charges of one Surveyor (1 Party)	one surveyor per day	1.6.1a	8,300	30	249,000	30	249,000	60	498,000	
c	Labours (4 Nos) Base rate - Rs. 350 x 4 = 1400/-	day	5.7	1,400	30	42,000	30	42,000	60	84,000	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
d	Charges for one Sampler per day (1 Party)	one sampler per day	1.5.2	5,100	30	153,000	90	459,000	120	612,000	
e	Labours (4 Nos) Base rate - Rs. 350 x 4 = 1400/-	day	5.7	1,400	30	42,000	90	126,000	120	168,000	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub-Total A					1,725,000		2,883,600		4,608,600	
B	Borehole Geophysical Logging										
1	Base log	Per m	3.11a	151	1,500	226,500	2,050	309,550	3,550	536,050	
2	Induced Polarisation (IP)	Per m	3.11p	93	1,500	139,500	2,050	190,650	3,550	330,150	
3	Resistivity	Per m	3.11c	39	1,500	58,500	2,050	79,950	3,550	138,450	
4	SP	Per m	3.11b	39	1,500	58,500	2,050	79,950	3,550	138,450	
5	Spectral Gamma	Per m	3.11o	164	1,500	246,000	2,050	336,200	3,550	582,200	
	Sub-Total B					729,000		996,300		1,725,300	
C	DRILLING										
1	Drilling up to 300m (Medium Hard Rock)	m	2.2.1.4a	11,500	1,350	15,525,000	1,900	21,850,000	3,250	37,375,000	
2	Drilling 301 to 600 m (Medium Hard Rock)	m	2.2.1.4b	12,420	150	1,863,000	150	1,863,000	300	3,726,000	



EASTERN KHETRI COPPER BELT, JUNJHNU DISTRICT, RAJASTHAN.

Sl. No.	Activities	Unit	MONTHS														Total	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		
1	Camp Setting	Month	1														1.00	1 month
2	Core Drilling (2 rigs)	m.		500	500	500	500	500	500	550							3550.00	3550m (in 13 Bhs)
3	Borehole Geophysical Studies	m.		250	500	500	500	500	500	750							3500.00	3500m (in 13 Bhs)
4	Survey Party days	day		15	15				15	15							60.00	60 days
5	Geologist Party days (1 Party)	day		15	30	30	30	30	30	30	15						210.00	210 days
6	Sampling Party days, Core Sampling (1 party)	day			15	15	15	15	15	15	30						120.00	120 days
7	Camp Winding	Month									1						1.00	1 month
8	Laboratory Studies	Nos.				50	60	60	60	80	80	85					475.00	475 Nos (Primary/ Check/ Composite/Physical)
9	Geologist Party days (1 Party), HQ	day										10	10	10	10	20	60.00	60 days
10	Report Writing	Month										1	1	1	1	1	5.00	5 month
NOTE																		
1	Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.																	
2	Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem/ lockdown etc will be additional to above time line.																	

