Reconnaissance Survey (G-4) for Magnetite and associated minerals in Pipradih Area,
District: Giridih,
State: Jharkhand, India.

1.0 Introduction:

Iron, the metal of common man has its use in every sphere of life. Since the IRON AGE 800 BC and there on it forms the backbone of the industrial growth of a nation. The stage of growth in iron and steel industry of a nation is a measure of its economic status among the world communities. With a total of about 22.487 billion tonnes of Iron ore resource, India is among the few leading iron ore producing countries of the world. India has about one-fourth of the total resources of the world. Haematite and Magnetite are the most important iron ore minerals in India. Haematite ore forms about 83% of the iron ore reserves of the country and rest is the magnetitic & limonitic ores. Odisha alone produces 40% of the total iron ore production of the country (99.61m tonnes in 2016-17) followed by Karnataka (14%) and Jharkhand (11%) respectively as per Indian Minerals Year Book-2017, of IBM.

Magnetite is one of the main iron ores, with the chemical formula $Fe^{2+}Fe^{3+}{}_2O_4$. It is consists of the oxides of iron, and is ferromagnetic; it is attracted to a magnet and can be magnetized to become a permanent magnet itself. With the exception of extremely rare native iron deposits, it is the most magnetic of all the naturally occurring minerals on Earth. Naturally magnetized pieces of magnetite, called lodestone, will attract small pieces of iron, which is how ancient peoples first discovered the property of magnetism.

An MOU has been signed between Department of Mines and Geology (DMG), Government of Jharkhand and Central Mine Planning & Design Institute Limited (CMPDI) for exploration of various mineral blocks by CMPDI in the state of Jharkhand.

2.0 Location of the Block:

The proposed block falls in southwestern part of Giridih District of Jharkhand. The block area is located at 55km northeast of Hazaribagh district headquarters. The Hazaribagh – Koderma national highway No. NH-33 passes outside of the northwestern corner and

Delhi – Calcutta national highway No. NH-2 passes near the south-eastern corner of the block boundary. The area is quite accessible by roads and motorable tracts. The nearest railway station is at Hazaribagh Road Rly. Station, located on the Eastern Railway Grand Chord Line which passes through the north-eastern portion of the block. The block is covered in Survey of India Toposheet No. 72 H/16. The location map attached as Plate-I. The Co-ordinates of the corner points of block boundary are given below:

Latitude	24° 6' 54.2448"	24° 6' 54.2448"
Longitude	85° 54' 24.282"	85° 55' 54.7968"

3.0 Physiology and Drainage:

The area is of undulating terrain with some isolated hillocks. The highest peak of 578 m from mean sea level is on the part of hillock at the middle of the western boundary of the block. The general ground level is around 290 m to 320 m from mean sea level. The NE-SW patches in the western and Eastern portion of the block are under protected forest area. The streams in the block area show dendritic drainage pattern forming Nalas, which in turn form tributary system of the Barakar River. The streams are flowing north-easterly. The Khero Nadi, a tributary of Barakar River flows through the north-western part of the block.

4.0 Previous work:

The geological account of area was first presented by Mc Clelland (1850), Smith (l857), Mallet (l874), Oates (1895) and subsequently systematically mapped by, Srivastava (1956& 1960). Srivastava mapped the area on a scale of 1:63,360 and clubbed the lithounits under unclassified Metamorphic, Chhotanagpur Gneissic Complex and Bihar Mica Belt etc. He reported the occurrence of malachite and azurite encrustations on garnetiferous-quartz-actinolite-talc schist outcrops in the talc quarry at Kusmarja.

Sen (1964), carried out detailed geological mapping and noted galena in Dondlo talc quarry and to the north of Dhibra.

Hoda (1967) reported malachite stains and galena disseminations from the southern quarry of Dondlo, and also from north of Dhibra, east of Banpura (Sirishdiha) and near Kusmarja village.

In F.S.P 1965-66 and 1967-68. Geophysical investigation by S.P. and magnetic methods were carried out in and around Parasia, Kusmarja, Dhibra and Dondlo area (Mitra et. al., 1965-66 and Rao et.al., 1969). During later part of F.S. 1967-68, Chakraborty and Kar (1968) carried out large scale geological mapping around Dondlo and Dhibra villages to decipher control of Copper Lead mineralization.

During the field season 2013-14 GSI decided to cover the entire terrain by National Geochemical Mapping (NGCM) with the objective of creation of baseline geochemical data and delineation of anomalous areas for base metal. In course of NGCM mapping geological traverse around Ambadih and Khamra area of Toposheet 72 H/16, study of brecciated amphibolite unit to the south of Ambadih village indicated sulphide mineralization in the form of malachite and limonitic stains. Assay value of one rock sample from this unit has reported 1038 ppm Zinc, 115 ppm Copper, 52 ppm Lead, 38 ppm Cadmium and 32 ppm Cobalt by Sahu and Parida (2013).

MECL carried out **Reconnaissance survey (G-4 level)** for Copper, Lead and Zinc in Kusmarja and adjoining areas, Block id: ER-JH-08, district: Giridih, state: Jharkhand (toposheet no. 72 H/16) in end of January,2017. The field work commenced in end of January, 2017 and concluded in the month of May, 2017. During the work Remote Sensing study, detailed mapping on 1: 12,500 scale was carried out covering 100 sq. km area supported by Bedrock, Stream sediment and Soil sampling to locate probable mineralized zones. The results of detailed mapping and sampling in Kusmarja and surrounding area have shown few detached positive pockets of Cu, Pb and Zn mineralization. These pockets include the occurrences near Banpura, Kusmarja, Pipradih, Dhibra, Dondlo and Lutyano. All these occurrences have been explored by geochemical, geophysical methods and exploratory drilling near Kusmarja by GSI in their different field sessions, but no base metal deposit of economic interest could be located anywhere. Further to that, MECL has also reported occurrence of **Magnetite** with these rocks near Pipradih, Banpura and Kusmarja old quarry.

5.0 Geology and Structure:

Regional Geology and Structure of the Area.

A vast area in Eastern Indian Shield is occupied by gneisses and granitic rocks commonly referred as “Chhotanagpur Gneissic Complex” (CGC). The lithounits

exposed in and around the block area are the Unclassified Metamorphic rocks of Archaean to lower Proterozoic age as basement. The rock of Archaean to Proterozoic age are represented by granite gneiss, biotite gneiss and hornblende gneiss, which are intruded by dolerite dykes of Jurassic to Cretaceous age and pegmatite, quartz of upper Proterozoic age.

Age	Super group	Group	Formation	Lithounits
Recent				Alluvium
Jurassic to Cretaceous				Dolerite
~~ ***Unconformity*** ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Up. Proterozoic			Intrusive.	Pegmatite, Vein Quartz, Fault Breccia, Brecciated Quartz.
Archaean to Proterozoic			Chotonagpur Gneissic Complex	Granite Gneiss, Biotite Gneiss, Hornblende Gneiss
Archaean to Proterozoic			Unclassified Metamorphic	Quartzite, Quartz Schist, brecciated Quartzite, Amphibolite, Hornblende schist, Meta Dolerite, Calc-Granulite, Mica Schist, Phyllite, Talc-tremolite schist.

This area of investigation lies in the northcentral part of Chhotanagpur Gneissic Complex flanked further north by well-known Bihar Mica Belt. The area is occupied mainly by Precambrian unclassified metamorphites, comprising quartz mica schist with interbedded bands of amphibolites/hornblende schist and calc magnesian schist. Quartzite with quartz mica schist is also found in some places.

6.0 Objective of the proposed exploration programme:

Available basic Geoscience data of GSI and MECL has been studied and evaluated. During the field visit in the proposed area occurrences of Magnetite have been encountered. In view of above the present exploration program has been formulated to fulfill the following objectives.

- To find out the potential zone of Magnetite mineralization, if any.
- To carry out geological mapping on 1:4,000 scale & Ground Geophysical Survey (Magnetic survey) to demarcate the rock types of Magnetite bearing formations with the structural features to identify the surface manifestations and lateral disposition of the ore body.

- To collect surface samples to analyze them for Magnetite to decide further course of exploration program.

7.0 Proposed scheme of Exploration:

The following scheme of exploration is formulated in order to achieve the objective. The details of different activities to be carried out are presented in subsequent paragraphs.

7.1 Geological mapping:

Geological Mapping will be done in the total area of **7 Sq. Km**. on 1:4,000 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. Surface samples of various litho-units for petrological studies and from ore bodies with accessory minerals will be taken during the course of geological mapping.

7.2 Surface sampling (Bed Rock Samples/Soil Samples)

During the course of Geological mapping the Bed rock samples shall be collected from the out crops. A total of 15 no's bed rock samples shall be collected, prepared and analyzed for 8 radicals Major Oxides. Further to that samples will be collected for analysis for carrying out Petrographic Studies and Mineragraphic Studies.

7.3 Surveying:

Survey party will be associated with Bed rock sample collection by taking up the points and plotting its location on map for proper interpretation of the sample data. Survey party will also be associated with Geological Mapping of Rock types, their contact, structural features etc. will be observed during Geological mapping and the Litho-contacts will be plotted for finalization of Geological map on 1:4,000 scale. Further to that Topographic survey in contour interval of 2meter will be carried out.

7.4 Trenching/Pitting:

Since most of the block is expected to be under cover of soil cover. Thus to expose the underneath rock type for understanding ad collection of suitable samples, 50 Cu.M of Pitting/Trenching may be required for carrying out analysis of 8 radicals.

7.5 Petrological Studies:

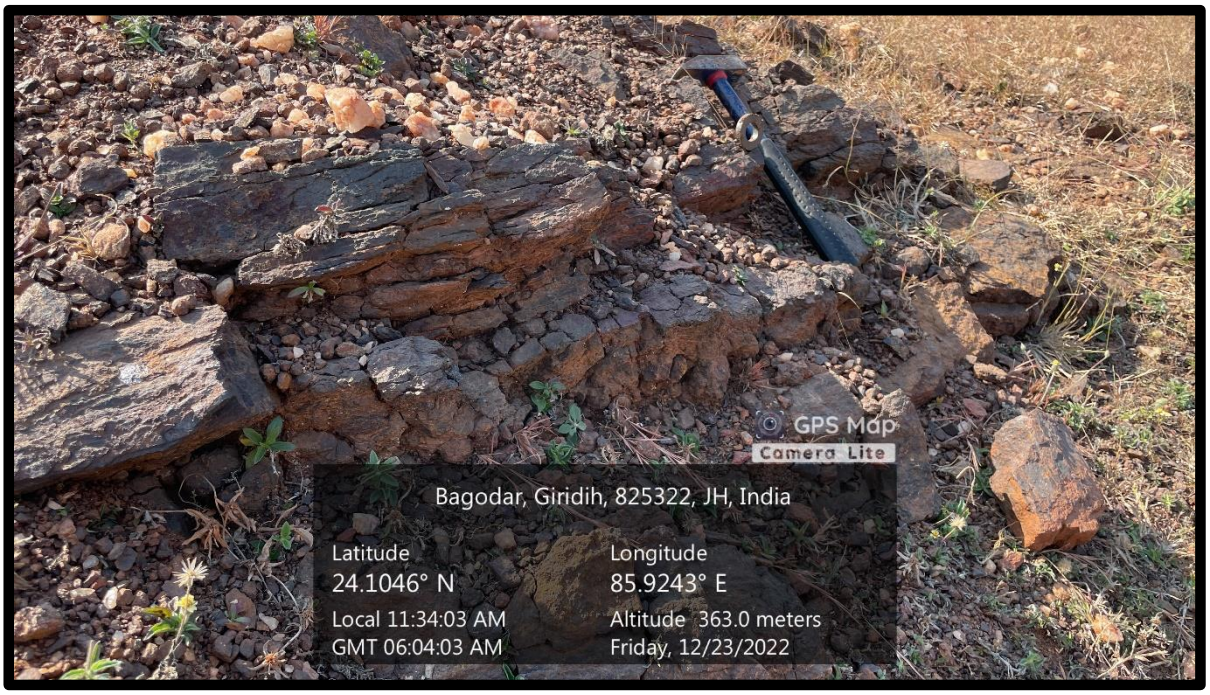
During the course of Geological mapping and drill core logging 5 nos of samples from various litho-units from surface and intersected in boreholes will be studied for petrography and 5 samples from mineralized zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc in polished sections.

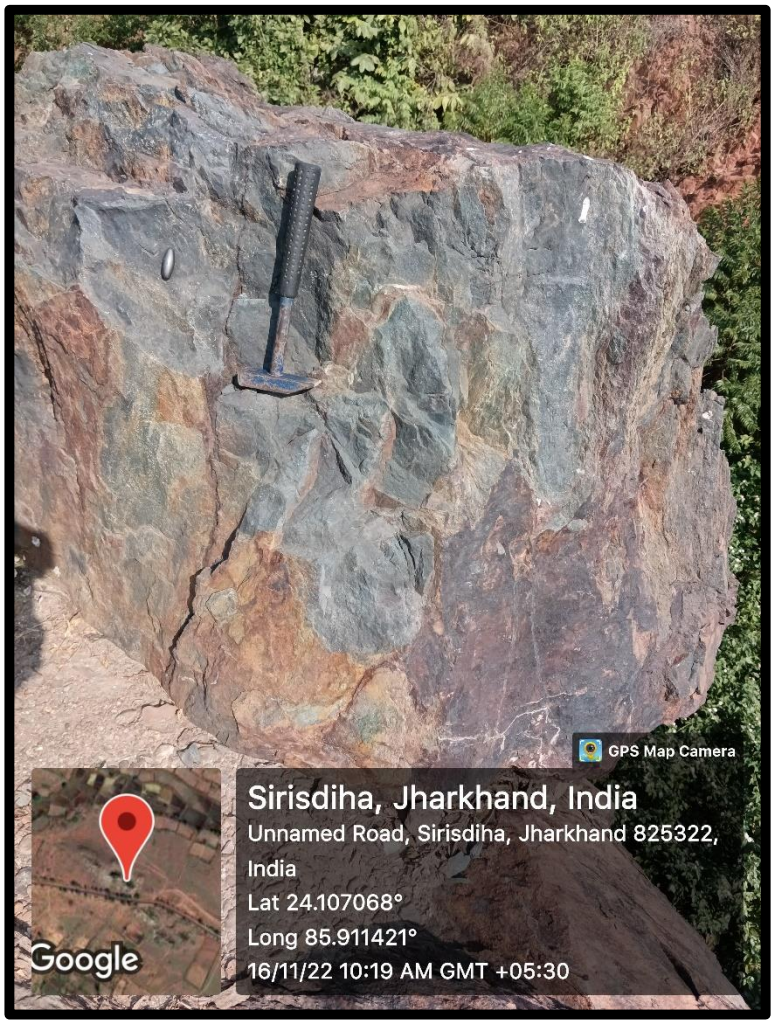
7.6 Geophysical Survey:

For identification of sub-surface magnetite body and its extension, Magnetic Survey is proposed. Total 30 line km of magnetic survey with station interval of 25m is to be carried out during the proposed exploration program.

Field Photographs:


GPS Map
Camera Lite
Bagodar, Giridih, 825322, JH, India
Latitude
24.1044° N
Longitude
85.9246° E


GPS Map
Camera Lite
Bagodar, Giridih, 825322, JH, India
Latitude
24.1046° N
Longitude
85.9243° E
Local 11:34:03 AM
GMT 06:04:03 AM
Altitude 363.0 meters
Friday, 12/23/2022



Plates:

1. Location Map
2. Topographical Map
3. Geological Map (1:12500)

Annexure-A

Proposed Quantum of Works

Sl no.			Particularas	Unit	Proposed Quantity
1			***Geological Mapping (on 1:4000 Scale).***	Sq. Km	7
2			***Trenching and Pitting***		
			Trenches/Pit	Cu.Meter	50
3			**Ground Geophysical Survey**		
			Magnetic Survey (25m station interval)	Line km	30
4			***Sample Preparation and Laboratory Studies***		
	A.		**BRS samples**		
		i.	Chemical analysis For Five Radicals (Fe,Ni,Co, Cr & Mn)	No	15
		ii.	Chemical analysis For Major Oxides	No.	10
		iii.	Internal Check samples (5% of Primary samples)	No	1
		iv.	External Check samples (10% of Primary samples)	No	2
	C		**Pit/Trench Samples**		
		i.	Chemical analysis For Five Radicals (Fe,Ni,Co, Cr & Mn)	No	50
		ii.	Internal Check samples (5% of Primary samples)	No	3
		iii.	External Check samples (10% of Primary samples)	No	5
5			***Petrographic Studies***		
	A.		Preparation of Thin Section	No	5
	B.		Study of Thin Section	No	5
6			***Mineragraphic Studies***		
	A.		Preparation of Polished Section	No	5
	B.		Study of Polished Section	No	5
7			***SEM/EDX***	No	3
8			***Geological Report Preparation***	No	1
9			***Exploration Scheme Preparation***	No	1