



REVISED DETAILED GEOLOGICAL REPORT

**PROPOSAL OF RECONNAISSANCE SURVEY (G-4 STAGE) FOR IRON ORE
IN ALENGA-NENDWADI BLOCK (120 SQ. KM),
DISTRICT: GADCHIROLI, MAHARASHTRA**

COMMODITY: IRON ORE

BY

GEMCOKATI EXPLORATION PRIVATE LIMITED

E-77 MIDC ROAD, CHANDRAPUR 442406, MAHARASHTRA

PLACE: CHANDRAPUR

DATE: 20TH APRIL'2023



Summary of the block for reconnaissance survey (G-4 stage) for Iron ore in Alenga-Nendwadi block (120 sq. km.), District: Gadchiroli, Maharashtra, Topo sheet No-65A/6.	
GENERAL INFORMATION ABOUT THE BLOCK	
Features	Details
Block ID	ALENGA-NANDWADI BLOCK.
Exploration Agency	Gemco Kati Exploration Pvt. Ltd.
Commodity	IRON ORE
Mineral Belt	The area belongs to the Bastar craton in Central Indian Peninsular shield, bounded by Satpura Mobile Belt in the Northwest, Eastern Ghat Mobile Belt (EGMB) in the East; Godavari graben in the South and the Deccan Trap in the West. The Bastar Craton covers parts of Southern Orissa, South eastern Madhya Pradesh, and Eastern and Southeastern Maharashtra.
Completion Period with entire Time Schedule to complete the Project	Time Line for Exploration work is 12 months.
Objectives	The block area falls in the vicinity of operational Surjagad Mines and proposed lease hold area for Iron on curvilinear Surjagad Hill range. The presence of host rock lithology for Iron viz. BIF and ferruginous Phyllites, encourages to take up the G4 Exploration in the area. Evaluation of previous work, work done by Pvt. Mines and exploration agencies and recent field investigation done by Gemcokati has indicated occurrence of encouraging values of Iron ore in and around the proposed block, as per suggestions of TCC,NMET during 51st deliberation vide agenda items [51.1.8 to 51.1.10] On the basis of evidences of mineralization, the present exploration program (G4) has been finally proposed incorporating the encouraging analytical values of field samples to fulfil the following objectives. 1) To carry out Geological mapping on 1:12,500 scale for demarcation of Iron ore bearing host rock with the structural features to identify the surface manifestations and lateral disposition of the mineralized zones. 2) To identify wall rock alteration zones, if any by study of Satellite Aster data. 3) To carry out Magnetic survey for 50 Lkm [2 km line X 400m spacing] 4) To collect bedrock samples, Channel samples and to analyse for Iron for further course of Exploration program.



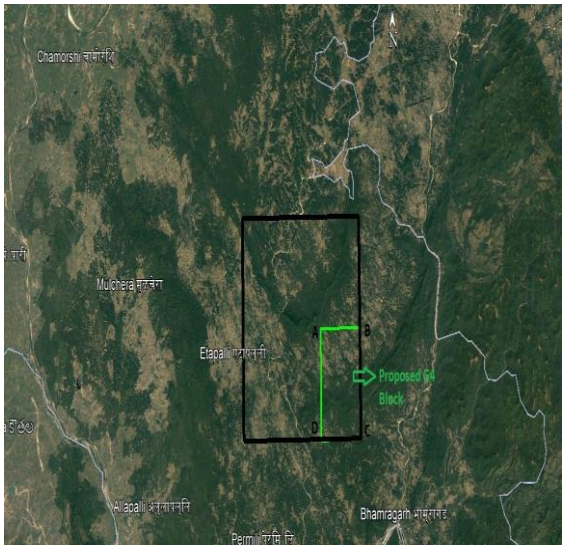
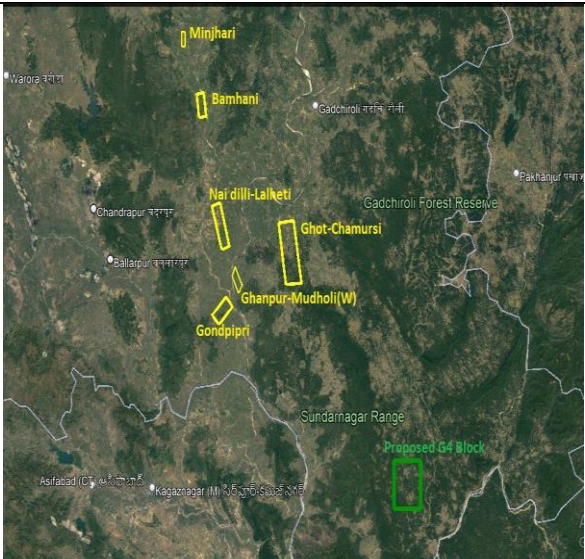
	5) To carry out systematic soil sampling/overburden material of areas overlying targeted host rocks and stream sediments of first and second order streams. 6) Petrological studies of possible host rock and their chemical analysis. 7) To estimate reconnaissance resources (334) along with accessory elements as per UNFC norms and Minerals (Evidence of Mineral Content) Rules-2015 at G-4.
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Whether the work is to be carried out by the proposed agency or through outsourcing and details thereof.	Work will be carried out by the proposed agency ie. Gemcokati Exploration Pvt. Ltd
Components to be outsourced and name of the outsourced agency.	Not applicable
Name /Number of Geoscientists	Two Geologist (2 G) Two Geophysicist (2 GP) Surveyor (01)
Expected Field Days (Geologist, Geophysicist, Surveyor)	Geologist- 240 days Geophysicist-45 days Surveyor – 30 days
1-Location	
Co-ordinates of the proposed block	1. A- 80° 25'00" -- 19° 37' 30" 2. B- 80° 30'00" - 19° 37'30" 3. C- 80° 30'00" – 19° 30' 00" 4. D- 80° 25'00" -- 19° 30' 00"
Villages	Nender, Titoda, Jambia, Pusumpalli, Alenga, Nendwadi, khandi
Tehsil/Taluk	Ettapalli
District	Gadchiroli
State	Maharashtra
2-Area (hectares/square km.)	
Block Area	120 Sq.Km.
Forest Area	The area is covered by mixed dense forest.

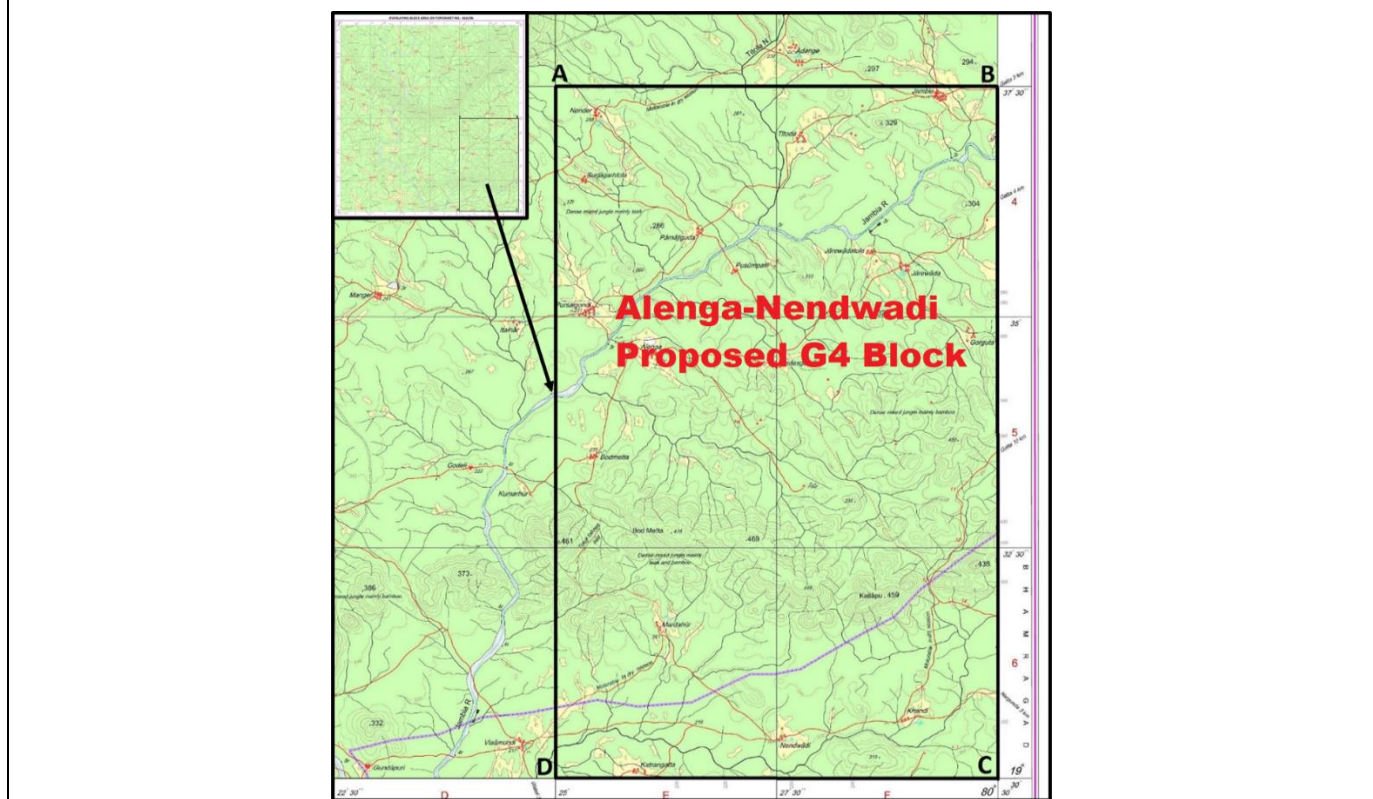
Government Land Area	-
3-Accessibility	
Nearest Rail Head	Mul is the nearest Railway stations operated by Central and South-Central Railways connecting Nagpur and Chandrapur cities.
Road	The study area well connected with Nagpur/Chandrapur Towns by State Highway No.70B and accessible throughout the year via the District Headquarters Gadchiroli, which is about 100 km NNW of Ettapalli and connected by District Main Road, Bhamragarh a prominent tribal village in the area which is 20 km south of Jinjgaon. Ettapalli is Tehsils Hqrs. and of 215 Kms away from Chandrapur and 289 km from Nagpur. Ettapalli and Ahiri are also well connected through Gondia-Chandrapur narrow gauge Railway line.
Airport	Nagpur Airport: 290 km from Block area
4-Hydrography (Local Surface Drainage Pattern- Channels)	
Rivers and Streams	Within the area of the Toposheet, the first order streams of the area is controlled by both lithology and structure of the rocks. These streams join to or small rivulets which can be categorized as second order streams, the prominent being Titola nala flowing north to south in the northern part and join the Jambia River, a perennial tributary of Indrāvati River.
5-Climate	
	The area is having dry and partly humid climate. The southwest monsoon commences from June and continuous till September. The winter starts from late October/early November and continue to February.
Mean Annual Rainfall	The area experiences an annual average rainfall of about 140 cm during monsoon between June to October. A thick soil cover aided by a good rainfall has given rise to moderately thick vegetation forming deciduous type of forests.
Temperature	The highest and lowest temperatures of the area vary between 45°C and 15°C. May is the hottest month of the season, whereas December is the coldest month.
December (Minimum)	10°C
May (Maximum)	40° - 45° C [Average varies from 10°C to 30°C]
6-Topography	
Topo sheet No	65A/06
Morphology of the area	The area exhibits a matured topography having attained peneplanation and surrounded by high hills. The area is represented by hilly forested terrain with intermittent valleys in between. The relief difference is not much, the highest and lowest points being 475m near Bod Metta and 216m on Nandewadi Visamundi road.

7- Availability of Baseline Geoscience Data	
Geological Map (1:50K/1:25K)	1:50, 000 Scale Geological Map is available and was downloaded from GSI Portal (Bhukosh).
Geochemical Data	Area is not covered yet by NGCM.
Geophysical(Aeromagnetic, ground geophysical, Regional and local GP maps)	Area is not covered yet by NGPM.
8-Justification for taking up Reconnaissance Survey/Regional Exploration	
	i) The proposed area falls within Western Bastar Craton which hosts numerous Iron Ore deposits in and around Surjagad, Gadchiroli District and Base Metal deposits around Minjhari to Nei-Delli Lal Heti to Thanewasna to Ghanpur-Mudholi along the long shear zone in the adjacent Chandrapur District. ii) Mineralization of Iron is occurring around the area associated with Banded Iron Formation (BIF) and ferruginous Phyllites. iii) Iron ore Mines at Surjagad is operational right now, is the only exploration activity prevailing in the close vicinity of the block area. iv) Geological activities had not been conducted in this part of Gadchiroli District since last 40 years by any Govt./Private agencies. v) Even two most prestigious National Programs ie.National Geochemical Mapping (NGCM) and National Geophysical Mapping (NGPM) coupled with STM work have not yet been initiated in this part of Maharashtra. vi) Among 14500 sq km area of Gadchiroli District, almost 1200 sq km is yet to be explored. vii) Major part of Gadchiroli District is designated “Obvious Geological Potential” Area (OGP) and remain unexplored. viii) Gemcokati is a Maharashtra (Chandrapur) based NPEA and presently camping at Surjagad for drilling work of M/s-Lloyd Steel, has a locational advantage and willing for initiating exploration activities in this part. ix) GEMCOKATI has conducted field visit in the proposed block. During geological traverses, GEMCOKATI has identified BIF and Phyllites at several places, along with enclaves of BMQ within the block area, collected few samples and analysed them for Iron ore and Base Metal from M/s Tata Steel, Joda and Shiva Lab. Bangaluru. Samples are showing values upto 68.14 % Fe.

	x) Based on the above facts and mineralization evidences of Iron, the present Reconnaissance Survey program at G-4 level has been proposed through Geological mapping, Geophysical mapping and surface sampling. xi) This G4 work will be helpful in estimation of reconnaissance resources of Iron. Geochemical sampling of BRS/CS/ will be helpful in assessing the disposition and grade of mineralization. xii) The Reconnaissance Survey (G4) will eventually help in planning of detailed exploration program (in case upgraded to G-3 level) which in turn will facilitate the state Government for auctioning of block.
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Block area shown on google map. (Topo sheet-65A/06) Alenga-Nendwadi Block.	Status map showing previously explored blocks in adjacent Chandrapur District on google map.
	

Location of the proposed block demarcated on Survey of India(SOI) Toposheet(s) 65A/06





Detailed proposal for Reconnaissance Survey (G4) for Iron Ore in Alenga-Nendwadi Block (120 sq.km), District: Gadchiroli, Maharashtra, Topo sheet no-65A/06.

1.0.0. Block Summary

1.1.0 Preamble:

1.1.1 Iron is the second most abundant element after Aluminum, constituting 5.6 per cent of the Earth's crust. The vast majority of it is found in form of oxides, besides its occurrences are also known in form of silicates, and less commonly as carbonate and supplied minerals. Iron ore is the raw material used to make pig iron utilized ultimately in the manufacture of steel. Realizing its vast utility in modern day world, it is unanimously considered to be "more integral to the global economy than any other commodity, except perhaps oil". The ore is usually in form of oxide either hematite or magnetite, varies in colour from dark grey, bright yellow, deep purple, to rusty red.

1.1.2 Iron has been known to mankind since antiquity. Iron is ubiquitous in the lithosphere as either a major constituent or in trace amounts. By far the most important use of iron is in the making of steel, which is essentially an alloy of iron with carbon and other elements depending on end use. India is one of the earliest manufactures and users of iron and steel in the world. Literature survey reveals many documentary evidences such as making of various surgical instruments in the 3rd & 4th century B.C. Till 18th century iron and steel making in India was at par with that of Europe in the form of village crafts. The scene was totally changed with the invention of the Bessemer process in 1856 and the Basic Open-Hearth Process in 1878. These developments led to significant increase in the world steel production from 0.5 Mt in 1870 to 28 Mt in 1900.

1.1.3 Iron ore in India is found in form of either hematite and/or magnetite. About 79% haematitic ore deposits are found predominantly in the Eastern Sector (Chhattisgarh, Jharkhand and Odisha) while about 93% magnetite ore deposits occur in Southern Sector (Karnataka, Goa, Andhra Pradesh, Kerala & Tamil Nadu). Karnataka alone contributes nearly 72% of magnetite deposit in India. Of these, hematite is considered to be superior because of its higher grade. Indian deposits of hematite belong to the Precambrian Iron Ore Super group of rock. The ore zone occurring as capping is restricted to bands/interbeds of banded iron formation lithounit (BIF in short) comprises massive, laminated, friable and powdery ore types from top to bottom.

1.1.4 Maharashtra:

Iron ore deposits are found associated with the Iron ore Group rocks of Archaean age. It comprises older schist and unclassified crystalline overlain by metamorphosed sedimentary rocks such as quartzite, banded ferruginous quartzite, schist and phyllites. These metasedimentary rock formations are intruded by dolerite, granite, gneisses etc. The iron ores are derived from banded ferruginous quartzite (BHQ) by leaching of silica. The economically viable deposits in Maharashtra occur in Chandrapur, Gadchiroli, Bhandara in the Eastern part and Sindhudurg district (Shiroda, Reddi mines area) on the seacoast in the western part of the State. Minor occurrences are reported from Nagpur, Nanded, Satara and Yavatmal districts of Maharashtra. They are mostly concentrated in the Vidarbha region on the Eastern part of the State where ore bodies occur as lenses in banded hematite quartzite. The ore minerals are mainly hematite and minor magnetite.

1.2.0 Physiography

The proposed area is an undulating country with occasional ridges with laterite capping, thickly forested with intervening valleys. The southern part of the study area is characterized by higher ridges traversing EW in NW extension of Damkod-Wadvi Hill Range south of main Surjagad Hill Range. The area is covered by vast dense revenue forest and isolated hillocks. The highest and lowest points being 475m near Bod Metta and 216m on Nandewadi

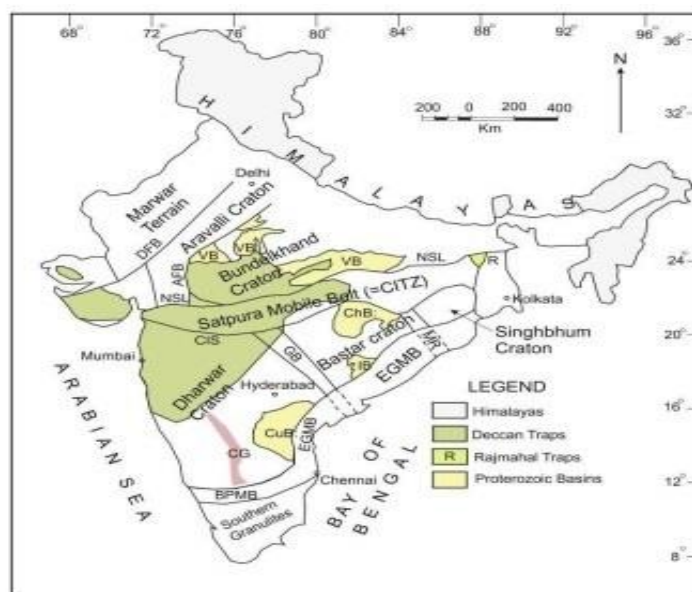
Visamundi road. The general slope of the area is towards west and south west. Higher order streams are meeting with Jambia River towards western part only.

1.3.0 Background of Previous work:

The areas in and around adjoining Topo sheets were mapped by GSI (Phadtare and Rajarajan-1965-66), Phadtare (1966-67) in sheet No. 65A/02. Hemmady (1967-68) in Toposheet No. 65A/03, Rajarajan, K. (1964-65) in Toposheet No. 64D/07, 64D/11. R. Raman, (1969-70) in Toposheet No. 65A/01. D. Subramaniam (1968-69) in Toposheet No. 65B/01, 56N/13. The Geological mapping of this Surjagarh and surrounding areas was carried out by GSI by T. Krishnama Charlu and K. Kumaran (1978-79), S.K. Pattnaik & S.K. Sengupta (1977-78), R.V. Iyer (1969-70).

During 1963-1970, the DGM Maharashtra had carried out Exploration work across the curvilinear Surjagad Hill range and inferred resources of Iron ore was estimated. However, the reference of this work viz. Geological report, information about Borehole location, depth, chemical analysis etc. are not available in public domain.

1.3.1 [Regional Geology] Description of stratigraphic units:



Generalized tectonic map of Indian subcontinent: Precambrian Cratons, Mobile Belts and Lineaments. AFB = Aravalli Fold Belt, DFB = Delhi Fold Belt, EGMB = Eastern Ghats Mobile Belt, SMB = Satpura Mobile Belt, NSL = Narmada-Son Lineament, CIS = Central Indian Suture and BPMP = Bhavani–Palghat Mobile Belt. Proterozoic Rifts and Basins include IB = Indravati Basin, ChB = Chhattisgarh Basin, GB = Godavari Basin; MR = Mahandi Rift; CuB = Cuddapah Basin, VB = Vindhyan Basin. CG = Closepet Granite (after from Rao and Reddy, 2002 and Meert et al., 2010).

The litho assemblage consists of granite gneisses with enclaves of meta pelites, calc gneisses, amphibolite, (BIF/BMQ/BHQ), quartzite, ultra mafites, mafic intrusives and younger granites under Bengpal Group. Bailadila Group comprises Banded Haematite quartzite, Banded Haematite Chert, Banded Magnetite quartzite, Banded Magnetite chert, chert, phyllite, quartz arenite, ferruginous shale and meta greywacke. They form linear ridges with a regional N-S trend, often with lateral displacement due to faulting and complex folding. The main ridges where Bailadila Group of rocks are exposed are the **Bailadila Range, Rowghat, Sonadehi, Dalli Rajhara hills and Surjagad Hill Range.**

Amphibolite/Hornblende schist/Actinolite schists:

Most common rock type in the area, at times extending over a length of about 500 meters with width ranging from a few meters upto a hundred meters and more. It also occurs as restites in the migmatites which is best exposed in the **Bande River section**. The rock is highly weathered and is traversed by thin quartzofelspathic veins.

Volcanics:

The rocks occur as along, parallel bands associated with migmatite and amphibolite. It is a fine to medium grained, amygdular, well foliated rock. The rock maintains a sharp contact with the associated migmatite, amphibolite and granite gneiss, as found in the Bande River section near **Kandudi**.

Sillimanite schist:

1. Sillimanite schists occur as lenses and pockets near **Gundapuri** (65A/06 and 65A/07).
2. At the confluence, at several localities such as of **Jambia nala with the Bande River**.
3. In the area NW of Wateli
4. In the **Jhirmal nala section**
5. In the valley NE of **Boria** and
6. In the **Indravati River section**.

The outcrops vary in length and width ranging from a few meters to over 300 meters and from a few meters upto 20 meters respectively.

Quartzite:

Quartzite's occupy a large area occurs as high hill ranges, the slopes of which are covered with scree and boulders of quartzite. The only quartzite member i.e. 1. Fuchsite quartzite never occurs as hills. It occurs as conformable bands with the metabasics and quartz mica schist in the Bande River section near **Gundapuri**.

Pyroxene quartzite/ferruginous quartzite:

This member of the quartzite group is the most dominant one and occupies a large area particularly in the highest contour in the area. The one containing pyroxene crystals as inclusions, much of which have been altered and weathered leaving only ferruginous stain in patches, occurs north of **Phakur**. At places it is sparsely mineralized with disseminated specks of pyrite and chalcopryite.

Banded Magnetite Quartzite/Ferruginous Phyllite:

It has a fairly large areal extension, best exposed as high hills near **Katrangatta, Boria, north of Botanphundi, Bod Meta** and near **Irkeduma**. Ferruginous Phyllite which is laterally continuous or merges with the BMQ in the hill near Boria occurs as long band with a width of about 2 meters to 3 meters.

Migmatite Gneisses:

Migmatites have been located in a considerably large area in the Bande River section, Indravati River section (Near Boria), **Birmilli, Jhirmalnala and Jambia** nala sections and in other areas. The exposures occur as long, wide and parallel bands associated with metabasics, gneisses and metavolcanics. The host rock is invariably a meta-basic one having an amphibolitic composition.

Pegmatites:

A number of small (unmappable dimension), pegmatite veins cutting across the gneissic country rock have been located. These veins pinch out and thus occur and consist of buff coloured quartz only.

1.3.2 A Mineral potentiality based on Geology

After carrying out geological mapping in these areas during late sixties reference of any further work in recent past is not available in public domain in parts of Gadchiroli District.

The proposed area falls under Western Bastar Craton which hosts numerous **Iron Ore** occurrences in and around Surjagad and **base metal** occurrence around **Minjhari to Thanewasna and Nei-Delli Lal Heti** areas of adjacent Chandrapur District. The base metal deposit is confined within the brittle shear zone, extends for a strike length of over 100 km from Govindpur in north to little beyond Kansari in the south, from which many blocks viz. **MINJHARI, BAMHANI, NAI-DELLI-LAL-HETI, GHOT-CHAMURSI, GHANPUR-MUDHOLI AND GONDPIPRI** blocks have been curved out and subsequently few blocks are auctioned.

In course of geological mapping in **late seventies** a number of localities with incidences of mineralization were recorded by GSI and **not yet been validated** viz.

Base metal occurrences:

At one km south of Georgette (65A/06) and in the nala bed between 459m and 438m hill in Khaitarpur range, silicified cherty quartzite band trending E-W showed polymetallic mineralization in the form of Pyrite, chalcopyrite, Galena, for **a strike length of about 10m over a width of about 10 m, are needed to be validated.**

Iron ore mineralization:

The proposed area falls under Western Bastar Craton which hosts numerous **Iron Ore** occurrences along three distinct parallel arcuate ridges starting from Surjagad Hill range in the north (65A/06) to Damkod Wadvi Hill Range (65A/06 & 65A/10) in the middle and Bhamragad Hill Range (65A/11) in the southern most part. The DGM Maharashtra is the pioneer Govt. Agency in initiating the investigation during 1963-64 and continued till 1970-71, where 4034m drilling meterage was drilled in 57 Boreholes in parts of **Wureea Hill within Surjagad Hill Range** (Toposheet area of 65A/06). **The proposed block falls within the Damkod-Wadvi Hill Range (65A/06), where Iron ore is seen exposed on hill tops with spreading of float ore in the slope. Thus, in view of the potentiality of the area G4 item is proposed.**

1.3.2 B Mineral potentiality based on Geophysics and ground Geochemistry

Area within Gadchiroli and adjoining Districts in this part, were not been covered either by National Geochemical Mapping [NGCM], National Geophysical Mapping [NGPM] and National Aero Geophysical Mapping Programme [NAGMP]. Hence, there are no data available yet on Geochemistry and Geophysics.

1.3.3- Scope of proposed exploration

Previous work:

The area was first geologically mapped by Saxena et.al in parts of TS-65A/06 followed by Jain and Patnaik in remaining areas of TS-65A/06 during FS-1978-79. As follow up action, few preliminary appraisal work was also taken up subsequently by Kameswar Rao in FS-1981-82 for Sillimanite, by Sengupta and Das in FS-1982-83 for Base metal occurrence, by Patnaik in FS-1982-83 for stream sediment survey and Integrated survey by Charlu and Kumaran in FS-1978-79.

2.0.0 Block description:

The study area is well connected with Nagpur/Chandrapur towns by state highway No.70B and accessible throughout the year via the district headquarters **Gadchiroli**, which is about 100 km NNW of **Ettapalli** and connected by District Main Road, **Bhamragarh** a prominent tribal village in the area which is 20 km south of **Jinjgaon**. **Ettapalli** is Tehsils Hqrs. and of 215 Kms away from Chandrapur and 289 km from **Nagpur**. **Ettapalli** and **Ahiri** are also well connected through Gondia-Chandrapur narrow gauge Railway line.

Table: - 1 Block Description

Boundary corners	LONGITUDE			LATITUDE		
(A)	80 ⁰	25'	00"	19 ⁰	37'	30"
(B)	80 ⁰	30'	00"	19 ⁰	37'	30"
(C)	80 ⁰	30'	00"	19 ⁰	30'	00"
(D)	80 ⁰	25'	00"	19 ⁰	30'	00"

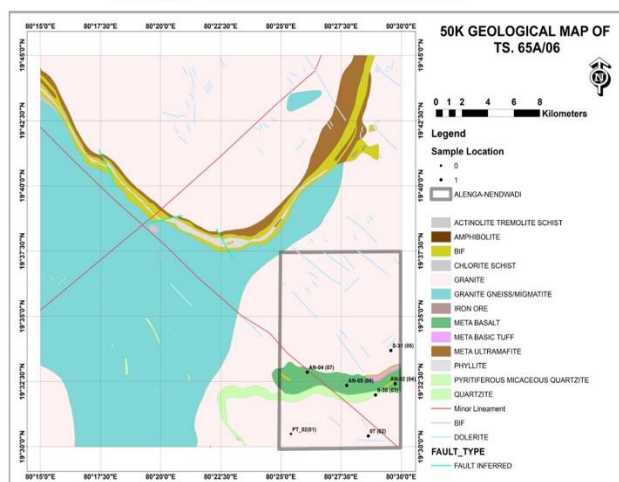
3.0.0 Field visit by GEMCOKATI

GEMCOKATI has conducted field visit in the proposed block. During geological traverses, Gemcokati has identified the host rocks viz. BIF and Phyllites at several places. 7 no. of Samples are collected and analyzed through Tata Steel, Joda & Shiva Lab Bangaluru. The analytical results are shown in following Table.

Table II –



ALENGA – NENDWADI ANALYSIS REPORT



Chemical Analysis Report- Tata steel ltd Mines division -Joda (In %)

Sr.No.	LATITUDE	LONGITUDE	SAMPLE NO.	Fe%	SiO2%	Al2O3%	P%	Mn%	TiO2%	K2O%	MgO	CaO	S
1	19°32'25.12"	80°29'45.35"	AN-02	68.14	0.68	0.66	0.071	0.015	0.011	0.046	0.021	0.039	0.005
2	19°32'51.51"	80°26'5.87"	AN-04	59.82	12.11	0.81	0.06	0.016	0.013	0.031	0.026	0.028	0.002
3	19°32'21.00"	80°27'44.35"	AN-05	65.23	2.56	1.63	0.069	0.015	0.046	0.035	0.04	0.039	0.005
4	19°31'59.26	80°28'56.19	NO-30	48.1	29	0.4	0.031	0.019	0.01	0.024	0.111	0.049	0.007
5	19°33'41.52	80°29'34.59	NO-31	64.2	3.62	2.24	0.049	0.032	0.078	0.032	0.045	0.049	0.006

SHIVA LAB BANAGALURU - SAMPLE ANALYSIS FOR BASE METAL (In ppm)

Sr.No.	LATITUDE	LONGITUDE	Ag	Al	As	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	K	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sn	Sr	Te	Ti	Tl	V	W	Zn	Zr
1	19°30'29.82	80°25'25.15	<1	73287	<5	419	<10	11556	18	9	137	54	19421	14	17225	5142	222	<10	33880	12	854	288	341	<10	<10	380	<10	1767	<10	33	<10	62	64
2	19°30'24.93	80°28'37.96	<1	75985	<5	785	<10	8433	16	13	163	74	24517	15	35490	6055	609	<10	21045	17	601	90	131	<10	<10	465	<10	2148	13	44	<10	53	99

Planned Methodology

The exploration program is proposed in accordance to the objective set for reconnaissance survey (G-4) as per Minerals (Evidence of Mineral Contents) Rule-2015.

3.1.0 Remote Sensing Studies

Remote sensing study shall be carried out in the proposed area covering **300 sq.km** using free Aster data to identify the lineaments, alteration zones and other structural features for targeting the mineral potential zones.

3.2.0 Geological Mapping

Geological mapping of **120 sq. Km** area of the block would be carried out on **1:12,500 scale**. Various litho units, their contact relationship, textural characters and structural features will be mapped. Surface manifestations of the mineralization available along with their surface disposition will be marked on map.

3.3.0 Geochemical Sampling

3.3.1 Bed Rock and Soil Sampling:

During the course of geological mapping the bed rock samples shall be collected from the outcrops exhibiting indications of mineralization like supplied enrichment, shearing, brecciation, oxidation, silicification, ferruginisation and alteration.

A total **40 nos. bed rock samples** from targeted location would be collected by either chip, groove or channel sampling method for assay of (Au and Ag). Total **6 nos. check** samples (5% internal + 10% External) will be analyzed for assay of (Au and Ag by Fire Assay). **10 soil samples** would be collected from suitable locations and Total **2 nos. check** samples (5% internal + 10% External) will also be analyzed for assay of (Au & Ag).

3.3.2 Stream Sediment Sampling

40 nos. stream sediment samples shall be collected from the Block area of 120 sq Km mainly from 1st order streams and after panning, coning and quartering the samples would be analysed for Cu, Au & Ag along with **6 nos check** samples

4.0.0 Geophysical Survey

Magnetic survey would be conducted along 50 Lkm in 20 stations in 1 L km [20 X 50 = 1000 stations.

5.0.0 Surveying

The 50 Km survey lines for geophysical survey will be fixed by the Survey party.

6.0.0 Whole Rock Analysis

Whole Rock analysis for major oxides viz. SiO₂, Al₂O₃, Fe₂O₃, TiO₂, MnO, CaO, MgO, Na₂O, K₂O, H₂O, P₂O₅, & S radicals will be carried out on 46 nos. of rock samples to check the rock types, their variation in Chemical composition.

6.1.0 Petrological & Mineragraphic Studies

During the course of Geological mapping 10 nos. of samples from various litho units from outcrop will be studied for petrography and 8 number of PCS will be analysed in addition to 2 nos. of samples from mineralized zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc in polished sections (Mineragraphic studies).

6.4.0 XRD & Spectroscopy Studies

Five (5) samples shall be subjected for XRD studies for mineral phase analysis. 5 selected samples will be studied by EPMA for identification, textural characterization and paragenesis of sulphide mineral.

7.0.0 Quantum of Work

The following Table shows the Nature & Quantum of Work to be carried out during Reconnaissance survey

Table: - 2 Quantum of proposed work in Alenga-Nendwadi Block

Sl.	Item of Work	Unit	Target
1	REMOTE SENSING	Nos	1
	a) Imagery procurement	Nos	1
	b) Cost of interpretation in terms of Geologist man days	Days	15
2	Geological Mapping (on 1:12,500 Scale)	Sq km	120
	a) Charges for one Geologist per day at HQ	Days	30
	b) Charges for one Geologist per day in Field	Days	240
3	Survey*		
	a) Charges of one Surveyor per day (without labour)	Days	15
	b) Labour (4 Nos) Base rate - Rs. 420 x 4 = 1680	Days	15
	c) Geophysical Survey (Magnetic)	Stations	1000
4	a) Geophysicist (in field)	Days	30
	b) Geophysicist (in Hqs)	Days	15
5.	Geochemical Sampling	Nos.	
	a) Bed Rock Sampling		46
	b) Soil Sampling		12
	c) Stream Sediment Sampling		46
6.	Laboratory Studies		
	i) Bed rock samples (Au & Ag Fire Assay) & check samples		46
	ii) Soil samples (Primary samples) & check samples	Nos	12
	Au & Ag Fire Assay		
	iii) Stream sediment samples (Primary samples)	Nos	46
	Au & Ag Fire Assay		
7	Physical Studies		
	a) XRD	Nos.	5
	b) ICP-MS studies (34 Trace Elements-Cd, Sn, W, Sb, Ce, Nb, Ba, La, Bi, Co, Ni, Sr, Mo, V** etc).	Nos.	10
	c) EPMA studies	Nos.	5
8	Petrological Samples		
	Preparation and Study of Thin Sections	Nos	10
9	Mineragraphic Studies		
	Preparation and study of Polished Section	Nos	5
	Whole Rock Analysis		
10	For SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , MnO, CaO, Na ₂ O, K ₂ O+H ₂ O, MgO, P ₂ O ₅ , CO ₂ , & S.	Nos	10
11	Report Preparation (5 Hard copies with a soft copy)	Nos.	1
12	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Nos.	1



Table: - 3 Summary of Cost Estimates for Reconnaissance Survey (G-4 Level) Exploration

Sl. No.	Item	Total Estimated Cost (Rs.)
1	Mapping (LSM), Other Geological/Geophysical Work	52,87, 120
2	Laboratory Studies	26,60,965
3	Geologist at HQ	270,000
4	Sub Total (1 to 3)	83,84,085
5	Exploration Report Preparation	750,000
6	Proposal Preparation	380,000
7	Peer review charges	10,000
8	Sub Total (1 to 7)	95,24,085
9	GST 18%	17,14,335
10	Total:	1,12,38,420
	Say Rs. In Lakh	112.38

**Estimated cost for Reconnaissance Survey (G-4) for Iron Ore in Alenga-Nendwadi Block, Gadchiroli District,
Maharashtra Total block area- 120 sq km; Completion Time- 12 Months**

			Rates as per NMET		Estimated Cost of the Proposal		
SI			SoC 2020-21				
no	Item of Work	Unit	SoC-	Rates as		Total Amt	Remarks
			Item-	per SoC	Qty.		
			SI No				
1	Large scale (LSM) Geological mapping/ Trenching/ Drilling						
1.1	Satellite imagery/Aster data interpretation						
	a) Cost of interpretation in terms of Geologist man days0 (HQ)	days	1.1b	9,000	30	2,70,000	
1.2	Large scale (LSM) Geological mapping/ Trenching/ Drilling					-	
	a) Geologist man days (1 No) for Large scale (LSM) Geological mapping/ Trenching/ Drilling	days	1.2	11,000	240	26,40,000	

	b) Labour (field) for (Total 4 Nos i.e. 2 workers per one geologist)	per worker	5.7	477	480	2,28,960	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner (Rs. 427/- per day) or respective State Govt. whichever is higher
1.3	Geophysical mapping by magnetic method 20 stations in 1 line km (20*50=1000 Points))	Stations	3.4b	1,800	1000	18,00,000	
	a) Geophysicist man days (1 No) in field	days	3.18	11,000	20	2,20,000	
	b) Geophysicist man days in HQ for data processing and report	days	3.18	9,000	10	90,000	
	c) Labour (field) for (Total 4 Nos i.e. 2 workers per one geophysicist)	per worker	5.7	477	80	38,160	
	Sub-Total A					52,87,120	
3.11	a) Surveyor man days (1 Nos)	days	1.6.1.a	8,300	20	1,66,000	Bore hole fixation and geophysical line fixing
	Sub-Total C					1,66,000	
4	Laboratory Studies						
4.1	Chemical Analysis						
	i) Surface sampling (Bed Rock Samples/Soil/Stream Sediment)						
	For Fe & oxides	per sample	4.1.5a	4,200	40	1,68,000	

	ii) Check Samples (Bed Rock/Soil/Stream Sediment Samples) - 5% Internal & 10% External						
	For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	4,200	6	25,200	
4.2	Pit & Trench, Primary Samples						
	For Au & Ag (Gold) by Fire Assay including Check Samples	per sample	4.1.5a	4,760	230	10,94,800	
4.3	i) BH Core Sampling, Primary samples						
	For Au & Ag (Gold) by Fire Assay including check samples	per sample	4.1.7b	4,760	230	10,94,800	
4.5	X-RD Studies for identification of minerals on composite sample	per sample	4.5.1	4,000	5	20,000	
4.6	ICP-MS studies (34 Trace elements-Cd, Sn, W, Sb, Ce, Nb, Ba, La, Bi, Co, Ni, Sr, Mo, V** etc).	per sample	4.1.14	7,731	10	77,310	
4.7	EPMA studies	Per hour	4.4.1	8,540	5	42,700	
4.8	Whole rock studies	per sample	4.1.15a	4,200	10	42,000	
4.8	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	5	7,745	

	d) Study of polished section for mineragraphy	per sample	4.3.4	4,232	5	21,160	
	e) Digital photomicrograph of thin polished section	per sample	4.3.7	280	5	1,400	
	Sub-Total D					26,60,965	
5	Geologist man days (1 No.) for Geological map & Report (HQ)	days	1.2	9,000	30	2,70,000	
6	Total (1.0 to 5.0)					83,84,085	
7	Geological Report Preparation	Nos	5.2		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	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	Report Peer Review Charges	lumpsum	As per EC decision	10000	1	10,000	
10	Total Estimated Cost without GST (7+8+9+10)					95,24,085	



11	Provision for GST (18%)					17,14,335	GST will be reimbursed as per actual and as per notified prescribed rate
12	Total Estimated Cost with GST					1,12,38,420	
					Say, in Lakhs	112.38	
	Note:						
*	Marked items not indicated in SoC and required to be taken up during the course of exploration shall be charged separately (as per actuals)						
\$	Trenching/Pitting dimensions are tentative may vary depending upon the geology and field conditions						
#	2nd level of work shall be carried out after review of 1st level work i.e. Geological mapping, geochemical sampling and analysis						

Table: - 5 Tentative Time schedule/action plan for proposed Reconnaissance Survey (G-4) for Iron Ore.

		2023								2024			
		May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr
Sl. No.	Activities	1	2	3	4	5	6	7	8	9 Review	10	11	12
1	Remote sensing study												
2	Camp setting												
3	Geological mapping and sampling												
4	Sample preparation												
5	Analytical work												
6	Geophysical Survey and interpretation												
9	Analytical work												
12	Camp winding												
14	Report Preparation												
15	Peer Review												

	Table: - 6 Reference: Authors
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5	Gadre, R.J. 1961 Report on the iron ore investigation of Fusar, Tahsil Garhchiroli, District Chanda, D.G.M., Maharashtra.
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16	Upadhye, S.N. and Tarafdar, P. (1994) - Report on resource evaluation for gold in Pandripani area , Raigarh distt., M.P., Opn. M.P.III, Raipur. Geol. Surv. India. Unpublished report.

Fig. 1- Block boundary on google map.



Fig. 2- Block Boundary on Toposheet.

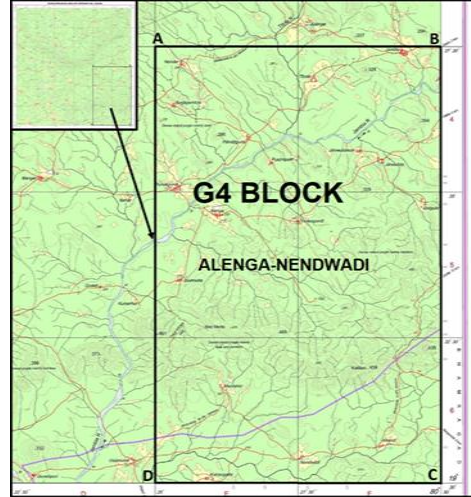


Fig. 3- Block Boundary on Geological Map.

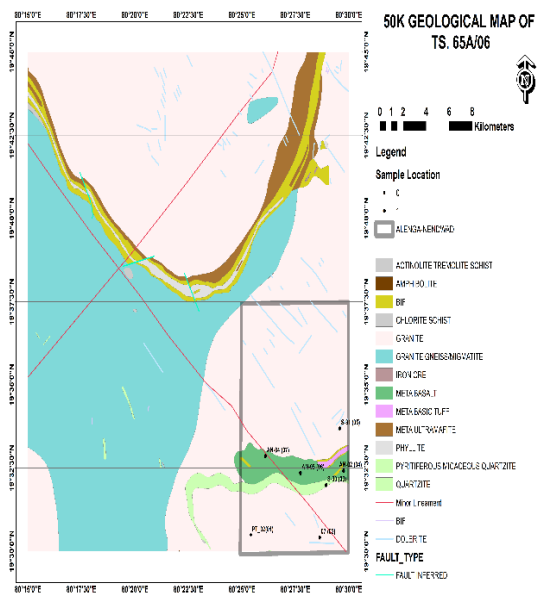


Fig. 4- Map of OGP Area.

