**Proposal**

**For**

# Preliminary Exploration (G3 Stage) for Graphite around Nawadih, Balrampur District, Chhattisgarh, under NMEDT

**(Basemetals/ Ferrous/ Non-Ferrous/ Industrial/ Strategic & Critical/ Precious metals etc.)**

**Prepared by**


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**Date:**

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# 1 SUMMARY OF NAWADIH GRAPHITE BLOCK:

| | **Features** | **Details** |
|---|---|---|
| | Block ID | Nawadih Graphite Block |
| | Current Exploration Agency | United Exploration India Pvt. Ltd. (UEIPL) |
| | Previous Exploration Agency | United Exploration India Pvt. Ltd. (UEIPL) |
| | Commodity | Graphite |
| | Mineral Belt | Chhotanagpur Granite Gneissic Complex |
| | Completion period with entire time schedule to complete the project | 12 months |
| | Objectives | In a time marked by global push for sustainable energy, graphite stands out as a key material. Globally, most natural graphite is used in electrodes, refractories, lubricants, foundries, batteries, graphite shapes, decarburizing, steelmaking, and friction products such as brake linings. Demand for this mineral commodity is increasing day by day.<br>Based on the evaluation of geological and geochemical data available, the present exploration program has been formulated to fulfill the following objectives.<br>i. Geological & Structural mapping on 1:4000 scale to delineate graphite bands and other lithological units in the area.<br>ii. Topographical Contouring on 1:4000 scales, by means of surface contouring at 2 m interval.<br>iii. Delineation of the potential subsurface mineralized zones by Geophysical Surveys (SP survey).<br>iv. Pitting/Trenching will be carried out at suitable intervals in the anomalous zones marked by geophysical survey to establish the continuity of the |

<table>
<tr><th></th><th>Features</th><th>Details</th></tr>
<tr><td rowspan="4"></td><td></td><td>mineralization along strike directions which is covered by the soil.<br>v. Collection surface (Bedrock) samples & analyses for Graphite and decide further course of Exploration program.<br>vi. After the positive outcomes of the above activities exploratory drilling in ten (20nos) of boreholes at suitable strike spacings for first level (40m. vertical depth intersections (know the subsurface extension of ore body will be drilled based on analytical results of surface samples.<br>vii. To estimate Inferred Mineral Resources (333) as per UNFC norms and Minerals (Evidence of Mineral Contents) Rule-2015 at G-3 level mineral exploration.</td></tr>
<tr><td>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 outsourced agency</td><td>UEIPL and its associates</td></tr>
<tr><td>Name / number of the geoscientists</td><td>5 geoscientists will involve (2 geologist, 1 geophysicist, 1 resource geologist, 1 GIS specialists)</td></tr>
<tr><td>Expected field days (Geology, Geological party days)</td><td>6 months</td></tr>
<tr><td>1</td><td>Location</td><td></td></tr>
<tr><td></td><td colspan="2">The coordinates of the corner points of the proposed Nawadih Graphite Block are as follows:
<table>
<tr><td colspan="3">Block Boundary Co-ordinates of Nawadih Graphite Block, District - Balrampur, Chhattisgarh, Area 9.98 sq. km, (Toposheet No. 64M/10)</td></tr>
<tr><td>Points</td><td>Latitude</td><td>Longitude</td></tr>
</table></td></tr>
</table>

| | Features | Details |
|---|---|---|
| | A | 23° 39'18.788"N | 83° 36'3.224"E |
| | B | 23° 40'45.038"N | 83° 35'58.498"E |
| | C | 23° 40'54.555"N | 83° 38'23.610"E |
| | D | 23° 39'26.378"N | 83° 38'1.832"E |
| | Village | Nawadih |
| | Tehsil/Taluk | Balrampur |
| | Districts | Balrampur |
| | State | Chhattisgarh |
| 2 | **Area (hectares/square Kilometers)** | |
| | Block Area | 9.98 Sq. Km. |
| | Forest Area | Partly falling in forest land. |
| | Govt Land Area | Data Not Available |
| | Private Land Area | Data Not Available |
| 3 | **Accessibility (Arial Distance)** | |
| | Nearest Rail Head | Barwadih (50 km), Ambikapur (90 km) |
| | Road | NH-343 is located approximately 1.5 km east of the eastern boundary of the block boundary.<br>Chhattisgarh-Jharkhand state boundary is within 9 km from the eastern boundary. |
| | Airport | Ranchi (180 km), Varanasi (210 km), Raigarh (220 km) |
| 4 | **Hydrography** | |
| | Local/Surface Drainage Pattern | The drainage pattern is dendritic to sub-dendritic with moderate drainage density and is primarily controlled by Sendur river & its tributaries. |
| | Rivers/Streams | Sendur river is passing within 1 km from the western boundary of the proposed block |
| 5 | **Climate** | |
| | Mean Annual Rainfall | 120 cm |
| | Temperature (December)(Minimum) Temperatures (June)(Maximum) | The climate of the study area is tropical. The summer begins from middle of March to early June and is characterized by stretches of humid to very hot dry months with maximum |

| | Features | Details |
|---|---|---|
| | | temperature up to 45°C. The area receives heavy rainfall, from early June to September. Winter starts from November to mid-February, and temperature fluctuates between 16° to 24°. |
| 6 | **Topography** | |
| | Toposheet Number | 64 M/10 |
| | Morphology of the area | The area consists of highly rugged topography with hills running along the southern side of the block having steep slopes and scraps. Topographic slopping down radially from south to north. |
| 7 | **Availability of baseline geoscience data** | |
| | Geological Map (1.50k/25k) | Available |
| | Geochemical Map | Not Available |
| | Geophysical Map (Aero-physical, Ground geophysical, regional as well as local scale GP maps) | NGPM Data is available on NGDR portal |
| 8 | **Justification for taking up Reconnaissance Survey/ Regional exploration** | The proposed block is potential for graphite mineralization.<br>➢ Geologically the area falls in the graphite schist belt where presence of graphite mineralization was reported by GSI.<br>▪ In 1967–68, T. S. Radhakrishna of Geological Survey of India conducted mineral exploration between Kennapara and Manikpur in Surguja (now Balrampur), Chhattisgarh, forming the basis for graphite exploration in the Nawadih area. Graphite mica schist occurs as lenses (3–80 m long, 0.16–13 m wide), with 35 occurrences reported and inferred reserves of ~2350 tonnes containing 10–22% graphite.<br>➢ Proposed G3 exploration block is part of 32.04 sq.km G4 exploration block, which was previously investigated by United Exploration India Pvt. Ltd, F.Y: 2023-2026. The G4 |

| | Features | Details |
|---|---|---|
| | | exploration work shows the presence of Graphite in the western part of the area and occurs as discontinuous body within quartz mica schist. Analysis results of graphite bearing samples reveals that the block is estimated as 85,961.12 tonnes, with an average Fixed Carbon (F.C.) content of 5.23 wt%.<br>➢ Based on the outcomes of the previous exploration (G-4) in the area UEIPL recommends for upgrading the block area of 9.98 sq.km into G-3 stage of investigation. |

# 2 DETAILED DESCRIPTION OF THE PROPOSAL:

## 2.1 Block Summary:

### 2.1.1 PHYSIOGRAPHY:

Physiographically, the area is occupied by crystalline rocks marked by rugged and undulating topography with linear low-lying ridges. The Gondwana and Decan trap areas are manifested by highly rugged topography with hills and plateau with steep slopes and scraps.

In the proposed block, elevation varies from 433m to 552m. General slope of the area is from South to North. E-W trending hill range noted in the southern part of the proposed block.

#### 2.1.1.1 Drainage:

The drainage pattern is dendritic to sub-dendritic with moderate drainage density. The drainage system of the area is primarily controlled by Sendur River and Kanhar & its tributaries.

### 2.1.2 BACKGROUND GEOLOGY (REGIONAL GEOLOGY & GEOLOGY OF THE BLOCK):

#### 2.1.2.1 Regional Geology

The mapped area is occupied by Precambrian rocks and Gondwana. The Precambrian's comprise gneiss, quartzite, phyllite, mica schists, calc-gneiss and migmatites. Granite occurs as intrusive into the schists and gneisses. The Precambrian rocks form the basement for the Gondwana sediments. The area is traversed by pegmatites and quartz veins. The granite, gneiss and migmatites with the inclusion of older suite of mica schist and hornblende schist, phyllite, amphibolite and quartzite have described together as Precambrian of Archaean to Proterozoic age.

Major Portion of the of the area is consist of Archean age rock and thereafter by rock of Chhotanagpur gneissic complex. Dominant lithology at the Northern part of the Balrampur district is consist of Archean age rocks whereas rocks of Chhota Nagpur Gneissic complex are mainly found at the southern part of the district. Central and Southern part of the district is mainly covered with Gondwana sediments.

Gondwana are represented by Talchair, Barakar, Raniganj, Panchet, and Mahadeva formation. The contact between Precambrian age rock and

Gondwana sediments appeared to be faulted and Many Nonconformities have been found at such places where Igneous and metamorphic rock are underlain by Gondwana sediments.

**Table 1:** Stratigraphy of Balrampur district, Chhattisgarh

| AGE | LITHO STRATIGRAPHY | | LITHOLOGY |
|---|---|---|---|
| Cenozoic | | | Laterite with Bauxite |
| Upper Cretaceous to Eocene | Deccan Trap | | Basalt Capped by Laterite; Trap Basalt / Dykes |
| Cretaceous | Lameta formation | | Cherty Limestone, Gritty Sandstone, Clay |
| Lower Middle Jurassic to Upper Triassic | Gondwana Supergroup | Mahadev formation / Supra Panchet formation / Pansora formation | Sandstone, Shale |
| Triassic | | Panchet formation | Sandstone, Shale |
| Lower Triassic | | Kamthi formation | Sandstone, |
| Upper Permian | | Raniganj formation | Sandstone, Shale, Carbonaceous Shale with Coal Seam |
| Lower Permian | | Barakar formation | Sandstone, Shale with Coal Seam |
| Lower Permian | | Talchir formation | Sandstone, Shale, Tillite |
| Archean - Proterozoic | Chhotanagpur Gneissic Complex | | Granite Gneiss, Biotite Gneiss, Granite, Biotite granite |
| Archean | | | Calc-silicate rock, Marble, Amphibolite, Quartz-Staurolite-Kyanite Schist and Graphite Schist |

*(Source- District survey report of Balrampur, Chhattisgarh)*

### 2.1.2.2 Local Geology

Litho units which are encountered during preliminary site visit of the project block are described below.

**Graphite mica schist**

The Graphite Bearing mica schists are well exposed in the western part of the project area and are trending nearly NE-SW to E-W. These schistose rocks are silver grey in colour and contain graphite, biotite, a minor amount of quartz and other felsic minerals. At places, intrusion of pegmatite veins is observed.

**Quartz Mica Schist**

The quartz mica schists are predominantly made up of mica and quartz and are grey in colour. However, exposures of these rocks are weathered and appears yellowish brown in colour. Schistosity is well preserved within the rocks. The quartz mica schists have NE-SW trend and at places these schists are found to be associated with graphite schists.

**Granite Gneiss**

Granite gneiss noted along Sendur river consist of porphyroblasts/augens of predominantly feldspar surrounded by micaceous minerals and quartz. These rocks are medium to coarse grained and are banded in nature.

**Banded Gneiss**

The banded gneiss covers most of the eastern part of the block. These medium to coarse grained rocks are grey, whitish grey to pinkish grey in color and show distinguish light and dark-colored alternate bandings between quartzo-felspathic mass and mafic minerals. The gneissic bands are showing general trend along E-W to ENE-WSW.

**Pegmatite**

Numerous pegmatite veins are found within the study area mainly associated with quartz mica schist and graphite schist. It crosscut to the older metamorphic rock, and the direction of intrusion is parallel to foliation plane and are trending nearly ENE-WSW. These very coarse-grained pegmatite veins are mainly composed of alkali felspar quartz and mica.

**Quartz Vein**

It is found to intrude frequently across the older metamorphic country rocks and the trend of quartz veins is nearly E-W to NE-SW. Thickness of the quartz veins ranges between 1 cm to 10 cm.

Figure 1a: Outcrops of Graphite mica schist

Figure 1b: Outcrop of quartz mica schist

Figure 1c: Outcrop of granite gneiss

Figure 1d: Outcrop of banded gneiss

Figure 1e: Outcrop of pegmatites

Figure 1f: Outcrop showing quartz veins intruded within schistose rocks

**Figure 1:** Photographs of litho-units recorded during site visit

### 2.1.3 MINERAL POTENTIALITY BASED ON GEOLOGY, GEOPHYSICS, GROUND GEOCHEMISTRY):

The prospect area and the adjacent areas are occupied by rocks belonging to the Chhotanagpur gneissic complex, which have been intensely sheared along the Tatapani- Ramkola fault in the northern part and a patch of Gondwana rocks comprising Talchir, coal bearing Barakar, Raniganj and Panchet occur in the northwestern part of the area.

Occurrences of various important major minerals are found at Balrampur District are Coal, Pisolitic and massive Bauxite, Graphite and Polymetallic mineralization of Calc-silicate rocks with Galena-Chalcopyrite-Sphalerite Scheelite association and Pyrite-Arsenopyrite-Chalcopyrite association have been observed here.

Geologically the proposed block fall on Graphite schist belt. Graphite-mica schist is mostly found associated with the meta-sedimentaries. It is generally found in association with grey quartzite and quartz-mica schist. At places it is also found associated with calc-silicates. Graphite mica schist consists of flaky graphite, mica and minor amounts of quartz.

In the proposed area graphite occurs within schistose rocks as bands and as well as lenses formed by metamorphism in this area which resulted in the flaky nature of the graphite. Graphite in the graphite schist samples occur as metallic flakes mixed with quartz and micaceous minerals. Flaky graphite mostly shows metallic luster and soils the hand due to its extreme softness and greasy nature. In some area graphite schist contains some yellowish and

reddish material which may be due to iron staining or alteration of minerals. The graphite schists range in length from 1 m to 25 m.

Graphite occurs mostly in 3 zones as discontinuous bands which are situated in the western part of the Nawadih graphite block. Graphite is mostly associated with quartz mica schist. Structurally, bodies are mostly showing ENE-WSW trend with dip varying between 050°-070°. Graphite bodies show dips mostly towards south-east having dip angles varying from 45°-80°.

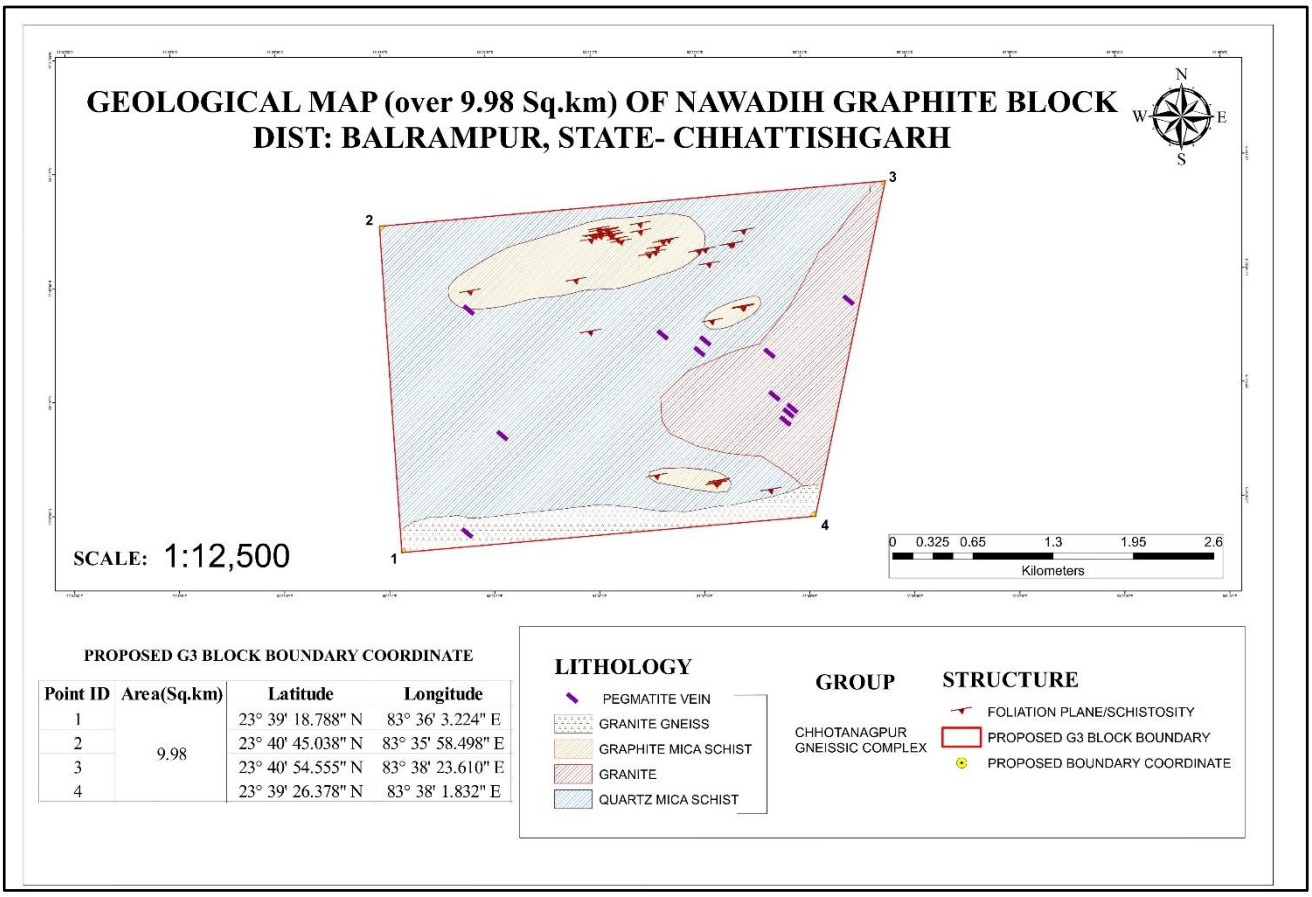


**Figure 2**: Geological map in and around proposed block

### 2.1.4 SCOPE FOR THE EXPLORATION:

a. Geological mapping on a 1:4000 scale
b. Topographical survey on a 1:4000 scale
c. Geophysical investigation (SP Survey)
d. Geochemical Sampling
e. Pitting and trenching
f. Drilling at 200m spacing
g. Petrographic study
h. Chemical analysis
i. Geological report preparation

### 2.1.5 OBSERVATION AND RECOMMENDATIONS OF PREVIOUS WORK:

In 1967-68 T.S. Radhakrishna of GSI have done the Mineral exploration on Graphite occurrences between Kennapara and Manikpur in Surguja district, Chhattisgarh. It was reported that graphite schist occurs as lenses ranging from 3 to 80 m in length and 0.16 o 13 m in width. A total of 35 occurrences were reported. Inferred gross reserve of 10 to 22% graphite is estimated at 2350 metric tons. About 60 metric tons containing 5 to 8% graphite is available in the area.

With respect to the above findings, a G4 stage investigation for graphite has been conducted by United Exploration Inia Pvt Ltd for Nawadih Graphite block of 32.04 sq.km area. The study includes large-scale geological mapping at a 1:12,500 scale. A total of 29 locations has been identified in the field where graphite bands are observed. These graphite occurrences are mainly recorded in the western part of the project block and are concentrated within three distinct zones. The graphite bodies occur predominantly as discontinuous bands and lensoidal forms, associated with quartz mica schist in the area. Chemical analysis of bedrock samples show that the average fixed carbon content of the graphite varies from 0.7% to 18.52%.%. Based on the above findings of the previous G-4 level exploration in the area, United Exploration India Pvt. Ltd. Has identified a 9.98 sq. km area in the block and recommended its upgradation to the G-3 level of exploration.

## 2.2 Previous Work:

In 1967-68 T.S. Radhakrishna of GSI did the Mineral exploration on Graphite occurrences between Kennapara and Manikpur in Surguja district, Chhattisgarh. He reported that graphite schist occurs as lenses ranging from 3 to 80 m in length and 0.16 o 13 m in width. A total of 35 occurrences were reported. Inferred gross reserve of 10 to 22% graphite is estimated at 2350 metric tons. About 60 metric tons containing 5 to 8% graphite is available in the area.

K.C. Dass, Animesh Mukherjee and Vivek. V. Kumar (FS 2013-15) of GSI has carried out Specialized thematic mapping in Bilaspur-Raigarh-Surguja metamorphic belt in Birjnagar-Dhamini area, Surguja district, Chhattisgarh. they have mapped an area of 700 sq km on 1:25,000 scale in parts of toposheet nos. 64M/5 and 64M/6. The mapped area and the adjacent areas are occupied by rocks belonging to the Chhotanagpur gneissic complex, which have been intensely sheared along the Tatapani-Ramkola fault in the northern part and a patch of Gondwana rocks comprising Talchirs, coal bearing Barakar, Ranigan and Panchets occur in the northwestern part of the area. Their study also reveals occurrences of Graphite in this area.

With respect to the above findings, a G4 stage investigation for graphite has been conducted by United Exploration Inia Pvt Ltd for Nawadih Graphite block of 32.04 sq.km area. The study involves large Scale Geological Mapping in 1:12500 scale. There are 29 locations identified in the field where graphite bands are noted. These Graphite bodies are mainly recorded in the western part of the project block and are concentrated in 3 zones.

- In Zone-I, graphite schist occurs as lensoidal bodies with varying dimensions. Width of the bodies range between 1 m to 25 m and length varies between 3 m to 25 m. The graphite bodies in this zone have general trend NE-SW with dip varying between 45° to 70° southeasterly.
- In Zone-II, graphite occurs as bands of graphite Schist with length varying between 2 m to 10 m and width varying between 1.5 m to 5 m. The schists are ENE-WSW trending and dipping 70°-80° towards southeast.
- And in Zone-III, graphite occurs as hard compact graphite bearing mica schist of length ranging between 2 m – 30 m and width between 5.3 m - 23 m. The graphite bearing schists of this zone are also trending NE-SW and dipping southeasterly. Chemical analysis results of the bed rock samples show that the average fixed carbon of the graphite deposits varies from 0.7% to 18.52%.

Based on the above findings of G4 exploration, a block of 9.98 sq.km area has been identified for G3 level of exploration.

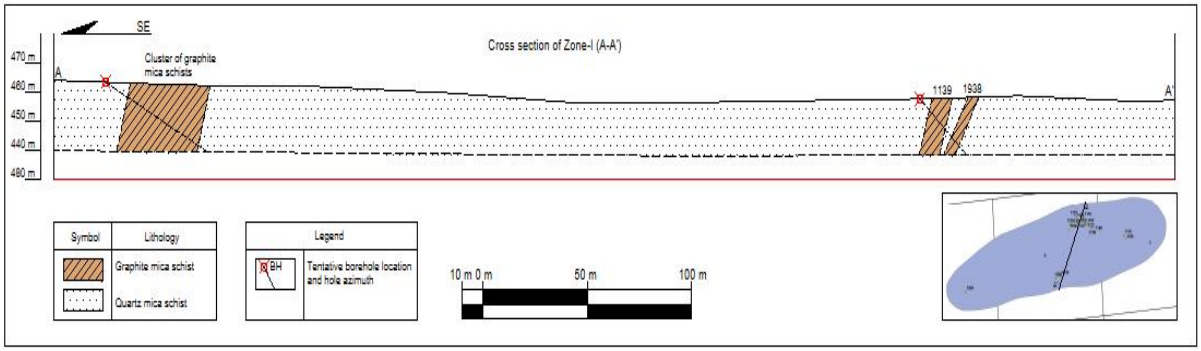


Figure 4a: Tentative Cross Section of Zone-I (A-A')

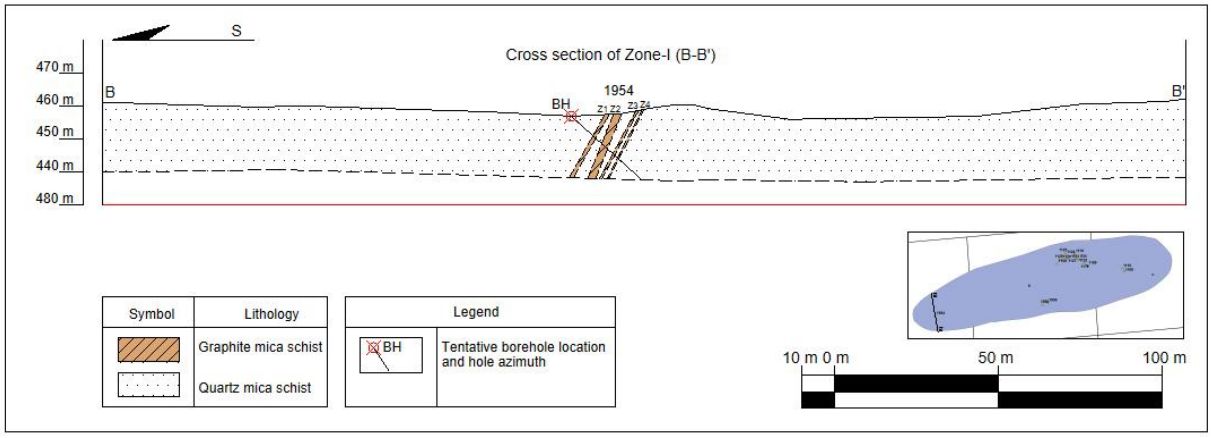


Figure 4b: Tentative Cross Section of Zone- I (B-B')

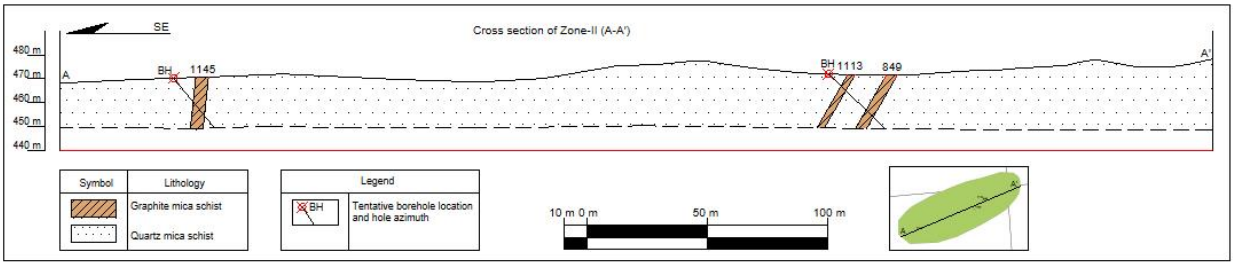


Figure 4c: Tentative Cross Section of Zone- II (A-A')

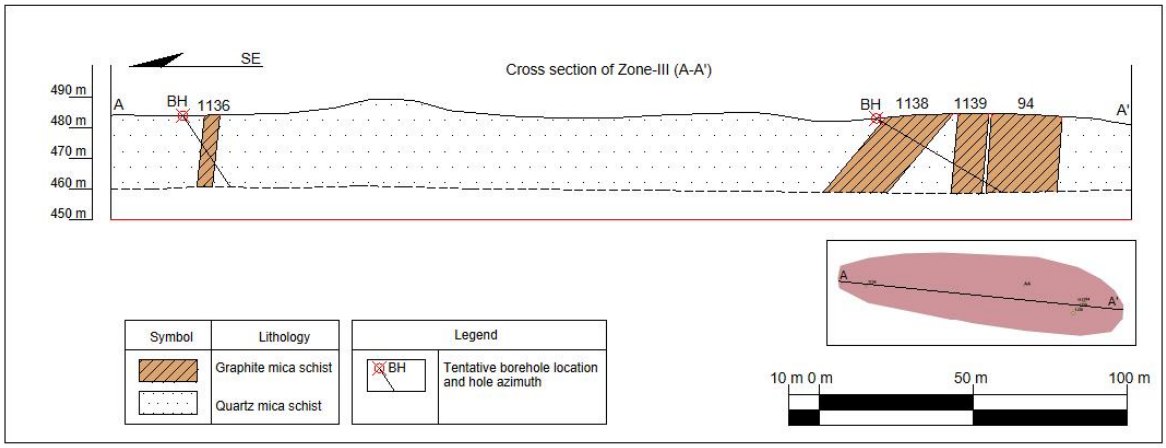


Figure 4d: Tentative Cross Section of Zone- III (A-A')

## 2.3 Block Boundary:

The Co-ordinates of the corner points of the proposed block area are given below.

**Table 2: Boundary Co-ordinate of the proposed block**

| Points | Latitude | Longitude |
|---|---|---|
| A | 23° 39'18.788"N | 83° 36'3.224"E |
| B | 23° 40'45.038"N | 83° 35'58.498"E |
| C | 23° 40'54.555"N | 83° 38'23.610"E |
| D | 23° 39'26.378"N | 83° 38'1.832"E |

## 2.4 Planned Methodology

The exploration program is proposed in accordance with the objective set for Preliminary Exploration (G-3) of the block. The Exploration shall be carried out as per Minerals (Evidence of Mineral Contents) Rule-2015. Accordingly, the following scheme of exploration is formulated to achieve the objectives. The details of different activities to be carried out are presented in subsequent paragraphs.

i) **Detailed Geological Mapping:** Geological mapping will be done in the entire area on 1:4000 scale. Rock types, their contact, structural features will be mapped. Surface manifestations of mineralization, along with their surface disposition will be marked on map.

**ii)** **Topographic Survey:** Topography surveys will be carried out in the area (9.98 sq. km) and all the surface features will be marked on the 1:4000 scale. The area surrounding drill points/mineralized zones (ore bodies)/potential areas will be contoured with the help of DGPS survey.

**iii)** **Geochemical Survey:** Regional channel and chip sampling of lithounits, exposed in the study area, is to be carried out at regular intervals.

**iv)** **Geophysical Survey**: Detailed Self Potential survey is conducted to assist in the delineation of graphite-bearing bands in the study area.

**v)** **Pitting/Trenching:** Shallow trenching/Pits (Excavation) shall be carried out in the potential zones identified based on the results of geological mapping and geophysical survey.

**vi)** **Drilling:** Based on Geological Mapping, Geochemical Sampling, and Geophysical investigation, the extension of the mineralized zones (ore bodies) will be demarcated. To find out the potentiality of mineralized zones in strike & dip direction, 13 no boreholes involving 1000m of drilling will be carried out for intersection of mineralized zones.

**vii)** **Geochemical Analysis:** All samples need to analyze for Fixed carbon content along with major and trace elements using ICPMS, including analysis for vanadium.

**viii)** **Petrographic study:** Thin sections will be done to identify targeted minerals.

**ix)** **Data verification and Quality Check:** Standard reporting of resources is classified and estimated by using two types of data. Data acquired from previous exploration and data generated by exploring the block. Data verification and Gap analysis are interpretive or indirect methods. Interpretive Data may include results from mapping, seismic, magnetic, gravity and other geophysical and geological surveys. Interpretive Data may be used in conjunction with Explored Data to improve confidence levels.

QA/QC will be strictly followed during the collection, recording and storage of any of the data ultimately used in the geological report preparation. This program should be concerned with, but not limited to,

data verification, drill sample recovery, sample size, sample preparation, analytical methods, the use of duplicates/blanks/standards, effects of multiple periods of data acquisition and consistency of interpretation in three dimensions.

## 2.5 Nature Quantum and target

| Components | | Unit | Quantum of Work |
|---|---|---|---|
| **Geological Mapping (1:4000)** | | sq.km | 9.98 |
| **Topographical Survey (1:4000)** | | sq.km | 9.98 |
| **Geophysical Survey** | | Line km | SP Survey: 15 |
| **Trenching** | | Cu.m | 50 |
| **Core Drilling** | | m | 12 BH<br>Total 1000m |
| **DGPS Survey** | | Points | 12-BH and BP-4= 24 |
| **Laboratory Studies** | **Proximate Analysis** | Nos | BRS-50, Trench Sample- 50, Core Sample-250= 350 and 10% check samples.<br>**Total 375** |
| | **Geochemical Analysis** | Nos | ICPMS: 70<br>Vanadium: 70<br>XRF:10 |
| **Petrological Studies** | | Nos | Petrographic study: 2 |
| **Bulk Density Determination** | | Nos | 5 |
| **Raman Spectroscopic Study** | | Hrs | 10 |
| **Report Preparation** | | Nos | 1 |

## 2.6 Reference

Geological report on Reconnaissance survey (G4) of Nawadih Graphite Block (32.04 sq.km.) Nawadih, Balrampur District, Chhattisgarh.

Pradhan Rajesh Kumar; Interim Report on Geochemical Mapping in Toposheet No. 64m/6 In Parts of Balrampur and Surajpur District, Chhattisgarh, F.S. 2017–18.

Radhakrishna T.S.; Geological Survey of India Progress report, geology of a part of Surajpur Tahsil, Surguja District, Madhya Pradesh, F.S. 1967–68.

## 2.7 Project schedule

| Sl. No. | Particulars | Month-1 | Month-2 | Month-3 | | Month-4 | Month-5 | Month-6 | | Month-7 | Month-8 | Month-9 | | Month-10 | Month-11 | Month-12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Camp Setting/ mobilization | | | | | | | | | | | | | | | |
| 2 | Geological Mapping | | | | | | | | | | | | | | | |
| 3 | Topographical Survey | | | | | | | | | | | | | | | |
| 4 | Geophysical survey | | | | | | | | | | | | | | | |
| 5 | Pitting/ Trenching | | | | **Review** | | | | Review | | | | Review | | | |
| 6 | DGPS Survey | | | | | | | | | | | | | | | |
| 7 | Drilling | | | | | | | | | | | | | | | |
| 8 | Sample Preparation | | | | | | | | | | | | | | | |
| 9 | Sample analysis | | | | | | | | | | | | | | | |
| 10 | Petrographic study | | | | | | | | | | | | | | | |
| 11 | Report Preparation | | | | | | | | | | | | | | | |

## 2.8 Project cost

| Preliminary Exploration (G3 Stage) for Graphite in Nawadih Block,District: Balarampur-Ramanujganj , Chhattisgarh ; Total Area: 9.98 sq.km; | | | | | | | |
|---|---|---|---|---|---|---|---|
| **S. No.** | **Item of Work** | **Unit** | **Rates as per NMEDT SoC 2025** | | **Estimated Cost of the Proposal** | | **Remarks** |
| | | | **SoC-Item -Sl No.** | **Rates as per SoC** | **Qty.** | **Amount (Rs)** | |
| **A** | **GEOLOGICAL MAPPING OTHER GEOLOGICAL WORK & SURVEYING** | | | | | | |
| **1** | **Detailed Geological Mapping (1:4000)** | per sq.km | 1.1 | 18,300 | 9.98 | 182634 | |
| i | Charges for Geologist per day (Field) for Geological mapping & Trenching work, drilling activity | day | 1.2.1a | 14,500 | 120 | 1740000 | |
| ii | Charges for Geologist per day (HQ) | day | 1.2.1a | 10,500 | 30 | 315000 | |
| iii | Labours Charges; Base rate | day | 5.8 | 556 | 240 | 133440 | |
| **2** | **Geophysical Survey** | | | | | | |
| | Self-Potential (8-20 line km) | Line Km | 3.3a | 62140 | 15 | 932100 | |
| **3** | **Trenching** | | | | | | |
| | Trenching | cu.m | 2.1.1 | 4125 | 50 | 206250 | |
| **4** | **Survey Work** | | | | | | |
| | Charges for one qualified surveyor (Topographic survey, surface contouring at specific interval) | per day | 1.3.1 | 10500 | 30 | 315000 | Topographical Survey on 1:4000 (2 m contour interval) |
| | DGPS Survey for BH fixation and Cardinal Points of block | per point of observation | 1.3.2 | 24000 | 16 | 384000 | 12 BHs and 4 boundary coordinates |
| **4** | **Samples Preparation** | | | | | | |
| i | Charges for one Sampler per day | one sampler per day | 1.2.1b | 7,850 | 59 | 463150 | |
| ii | Labours Charges; Base rate (4 nos.) | day | 5.8 | 556 | 236 | 131216 | |
| **6** | **LABORATORY STUDIES** | | | | | | |
| **1** | **Chemical Analysis (Surface Samples)** | | | | | | |

| **Preliminary Exploration (G3 Stage) for Graphite in Nawadih Block,District: Balarampur-Ramanujganj , Chhattisgarh ; Total Area: 9.98 sq.km;** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **i** | **Primary & Check samples for Graphite** | | | | | | |
| | Proximate analysis of Graphite | Nos | 4.1.18 | 3,614 | 100 | 361400 | 50 Trench samples+50 BRS |
| | b-External(10%) Check samples | Nos | 4.1.8 | 3,614 | 10 | 36140 | |
| | Major oxides (WD XRF)- (oxides +traces - 24 elements) | Nos | 4.1.17a | 4,200 | 10 | 42000 | |
| | b-External(10%) Check samples | Nos | 4.1.17a | 4,200 | 1 | 4200 | |
| ii | **ICPMS for Trace elements** | | | | | | |
| | Analysis of one rock/ soil sample for quantitative analysis of 14 REE elements +9 trace element (U, Ta, Ge, Be, Hf, Sn, As, Rb, Th) by ICP-MS (sequential technique) | Nos | 4.1.15 | 7,400 | 20 | 148000 | |
| | Check samples | Nos | 4.1.15 | 7,400 | 2 | 14800 | |
| iii | Analysis for Vanadium | Nos | 4.1.17b | 421 | 20 | 8420 | |
| | Analysis for Vanadium (Check Samples) | Nos | 4.1.17b | 421 | 2 | 842 | |
| **2** | **Physical & Petrological Studies** | | | | | | |
| i | Preparation of polished thin section | Nos | 4.3.2 | 800 | 10 | 8000 | |
| ii | Complete petrographic study report | Nos | 4.3.4 | 2,800 | 10 | 28000 | |
| iii | Raman Spectroscopic study | per hour | 4.5.1 | 2,700 | 10 | 27000 | |
| iv | Bulk Density | Nos | 4.8.3 | 2,500 | 5 | 12500 | |
| | **Sub Total A** | | | | | **5494092** | |
| **B** | **DRILLING** | | | | | | |
| i | Drilling upto 400m (Hard Rock) (1 rig ) | m | 2.2.1.1d | 10,000 | 1,000 | 1,00,00,000.00 | |
| ii | Land / Crop Compansation | per BH | 5.6 | 30,000 | 12 | 360000 | As per actuals with 30000 being maximum ceiling) |
| iii | Construction of concrete Pillar (12"x12"x30") | per borehole | 2.2.7 | 2,000 | 12 | 24000 | |

| **Preliminary Exploration (G3 Stage) for Graphite in Nawadih Block,District: Balarampur-Ramanujganj , Chhattisgarh ; Total Area: 9.98 sq.km;** | | | | | | | |
|---|---|---|---|---|---|---|---|
| iv | Borehole plugging by cement | lumsum per borehole | 2.2.8 | 10,000 | 12 | 120000 | |
| v | Misc Charges (Transportation of drilling rig, accommodation for Drill Camp, Camp setting and winding, construction of Approach rod and Drill core preservation | Lumsum | 2.2.9.3 | 20,00,000.00 | 1 | 20,00,000.00 | For drilling cost more than 1 crore and less than 2 crore: 25% of the Drilling Cost. |
| vi | Core Preservation: One complete borehole plus mineralised cores of all the remaining Bhs | m | 5.3 | 1,590 | 300 | 477000 | 1 complete BH+ mineralised zone |
| **6** | **LABORATORY STUDIES** | | | | | | |
| **1** | **Chemical Analysis (Core samples)** | | | | | | |
| **i** | **Primary & Check samples for Graphite** | | | | | | |
| | Proximate analysis of Graphite | Nos | 4.1.18 | 3,614 | 250 | 903500 | |
| | b-External(10%) Check samples | Nos | 4.1.8 | 3,614 | 25 | 90350 | |
| ii | **ICPMS for Trace elements** | | | | | | |
| | Analysis of one rock/ soil sample for quantitative analysis of 14 REE elements +9 trace element (U, Ta, Ge, Be, Hf, Sn, As, Rb, Th) by ICP-MS (sequential technique) | Nos | 4.1.15 | 7,400 | 50 | 370000 | |
| | Check samples | Nos | 4.1.15 | 7,400 | 5 | 37000 | |
| iii | Analysis for Vanadium | Nos | 4.1.17b | 421 | 50 | 21050 | |
| | Analysis for Vanadium (Check Samples) | Nos | 4.1.17b | 421 | 5 | 2105 | |
| | **Sub Total- B** | | | | | **1,44,05,005.00** | |
| **D** | **Sub Total A + Sub Total B** | | | | | **1,98,99,097.00** | |
| **E** | **Geological Report Preparation** | | **5.2.iii** | exploration with cost of work exceeding ₹ 50 lakh: ₹1.50 lakh | | **7,50,000.00** | |

| **Preliminary Exploration (G3 Stage) for Graphite in Nawadih Block,District: Balarampur-Ramanujganj , Chhattisgarh ; Total Area: 9.98 sq.km;** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **F** | **Peer review Charges** | | **As per EC decision** | | | **30000** | |
| **G** | **Preparation of Exploration Proposal (5 Hard copies with a soft copy)** | **5 Hard copies with a soft copy** | **5.1** | 2% of the Cost or Rs. 5 Lakhs whichever is lower | | **3,97,982** | |
| **H** | **Total Estimated Cost without GST** | | | | | **2,10,77,078.94** | |
| **I** | **Provision for GST (18% of H)** | | | | | **37,93,874.21** | |
| **J** | **Total Estimated Cost with GST** | | | | | **2,48,70,953.15** | ***or Say Rs.248.71 Lakh*** |