CIN-U14105RJ2003GOI018093

# एफसीआई अरावली जिप्सम एण्ड मिनरल्स इण्डिया लिमिटेड
# FCI Aravali Gypsum and Minerals India Ltd.

भारत सरकार का उपक्रम (मिनीरत्ना -II)
Govt. of India Undertaking (Miniratna II)

**पंजीकृत कार्यालय :**
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रातानाडा, जोधपुर -342011
(राजस्थान)
फोन: 0291-2948265, 2948276

FCI Aravali Gypsum and Minerals India Ltd.

**Registered Office :**
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Ref. No.: FAGMIL- PROJECT/10(A)/ 179

Date : 03.05.2024

To,
The Director & HoD
National Mineral Exploration Trust (NMET)
Ministry of Mines
F-114, Shastri Bhawan
New Delhi-11 0001
Email:- nmet-mines@gov.in

**Subject: Submission of NMET Proposal for Reconnaissance Survey (G-4) for mineral – Rock Phosphate in Randha Block, Tehsil-Fatehgarh, District- Jaisalmer, Rajasthan**

1. FCI Aravali Gypsum and Minerals India Ltd. (FAGMIL) is a CPSE under the administrative control of the Department of Fertilizers, Government of India. The company is now notified as Central Government Exploration Agency vide Ministry of Mines, Gazette Notification No. S.O. 208(E) dated 12 January 2023. (Attached Annexure-1).
2. With reference to the captioned subject, we wish to undertake G-4 Level Reconnaissance Survey of the proposed Randha Block for mineral Rock Phosphate comprising an area of 9.25 Sq. Km in District Jaisalmer, Rajasthan through NMET.
3. Proposal prepared in accordance with the prescribed format by NMET. Therefore, we are Submitting Rock Phosphate block compromising of area 9.25 Sq.km in, District-Jaisalmer, Rajasthan for G-4 level Reconnaissance Survey. Details of the Block proposed are as per Annexure 2&3. The KML file is being sent via email as a soft copy.
4. We request the Block for Reconnaissance Survey through NMET, and our team is ready to initiate work promptly upon approval.
5. For further necessary action please.

Thanking You

For and on behalf of
FCI Aravali Gypsum and Minerals India Limited

(Rajendra Singh Rathore)
General Manager

रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

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EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

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No. 195] NEW DELHI, THURSDAY, JANUARY 12, 2023/PAUSHA 22, 1944

## खान मंत्रालय

## अधिसूचना

नई दिल्ली, 12 जनवरी, 2023

**का.आ. 208(अ).**—केन्द्रीय सरकार, खान और खनिज (विकास और विनियमन) अधिनियम, 1957 (1957 का 67) की धारा 4 की उप-धारा (1) के दूसरे परंतुक के अनुसरण में, उक्त अधिनियम की धारा 4 की उप-धारा (1) के दूसरे परंतुक के प्रयोजनार्थ केन्द्रीय सरकार की एक कंपनी, मैसर्स एफसीआई अरावली जिप्सम एंड मिनरल्स इंडिया लिमिटेड, को अधिसूचित करती है:

परंतु मैसर्स एफसीआई अरावली जिप्सम एंड मिनरल्स इंडिया लिमिटेड इसके द्वारा किए गए पूर्वेक्षण कार्यों के संबंध में, इसके द्वारा सृजित डेटा को संबंधित राज्य सरकार को सौंप देगा।

2. यह अधिसूचना राजपत्र में इसके प्रकाशन की तारीख से प्रवृत्त होगी।

[फा. सं. एम. VI-16/22/2022-खान VI]

डॉ. वीणा कुमारी डर्मल, संयुक्त सचिव

## MINISTRY OF MINES

## NOTIFICATION

New Delhi, the 12th January, 2023

**S.O. 208(E).—** In pursuance of the second proviso to sub-section (1) of section 4 of the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957), the Central Government hereby notifies the M/s. FCI Aravali Gypsum and Minerals India Limited, a Central Government Company, for the purposes of the second proviso to sub-section (1) of section 4 of the said Act:

Provided that the M/s. FCI Aravali Gypsum and Minerals India Limited shall make over the data generated by it, in respect of the prospecting operations undertaken by it, to the concerned State Government.

2. This notification shall come into force on the date of its publication in the Official Gazette.

[F. No. M.VI-16/22/2022-Mines VI]

Dr. VEENA KUMARI DERMAL, Jt. Secy.

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# PROPOSAL FOR RECONNAISSANCE SURVEY (G-4) FOR PHOSPHORITE IN RANDHA BLOCK, TEHSIL-FATEHGARH, (9.25 SQ.KM AREA) DISTRICT-JAISALMER, RAJASTHAN (PART OF TOPOSHEET NO 40J/16)

**COMMODITY: PHOSPHORITE**

**BY**

**FCI ARAVALI GYPSUM & MINERALS INDIA LIMITED**
**2, WEST PATEL NAGAR, CIRCUIT HOUSE ROAD**
**RATANADA, JODHPUR**
**RAJASTHAN**

**PLACE: JODHPUR**
**DATE: 24th APRIL 2024**

## Summary of the Phosphorite block proposed for Reconnaissance Survey (G-4)

### General Information about the block

<table>
<tr><th></th><th>Features</th><th>Details</th></tr>
<tr><td></td><td>Block ID</td><td>Randha block</td></tr>
<tr><td></td><td>Exploration Agency</td><td>FCI Aravali Gypsum and Minerals India Ltd.</td></tr>
<tr><td></td><td>Commodity</td><td>Phosphorite</td></tr>
<tr><td></td><td>Mineral Belt</td><td>Barmer-Sanchor sub-basin (Birmania formation)</td></tr>
<tr><td></td><td>Completion period with entire Time schedule to complete the project</td><td>6 months</td></tr>
<tr><td></td><td>Objectives</td><td>The objectives of current program would be:<br><br>1.Preparation of Geological map at 1:12,500 Scale.<br>2. To prove the mineralized zones by sampling from outcrops and trenches.<br>3. To estimate resources as per UNFC norms and prepare blocks with accordance Minerals (Evidence of Mineral Contents) Rules 2015 and Minerals (Evidence of Mineral Contents) Amendment Rules 2021.<br>4. To evaluate option to upgrade the block into G-3 and facilitate the Central govt. for auctioning of the block.</td></tr>
<tr><td></td><td>Whether the work will be carried out by the proposed agency or throughout sourcing and details thereof.<br><br>Components to be outsourced and name of the outsource agency</td><td>Work will be carried out by the proposed agency.</td></tr>
<tr><td></td><td>Name/Number of Geoscientists</td><td>Two No. Geoscientist</td></tr>
<tr><td></td><td>Expected Field days (Geology, surveyor)</td><td>105</td></tr>
<tr><td>1.</td><td>Location</td><td>The proposed block area falls partly under Survey of India Toposheet number 40J/16 in and around the villages Virbhani, Kohra & Randha of Tehsil-Fatehgarh, Dist: Jaisalmer, Rajasthan.</td></tr>
<tr><td></td><td>Latitude and Longitude</td><td>Co-ordinates of Corner Points of Randha Block
<table>
<tr><th rowspan="2">Block Cardinal Points</th><th colspan="2">DMS</th></tr>
<tr><th>Latitude</th><th>Longitude</th></tr>
<tr><td>A</td><td>26°12'20.60" N</td><td>70°54'19.79" E</td></tr>
<tr><td>B</td><td>26°13'11.55" N</td><td>70°57'26.56" E</td></tr>
<tr><td>C</td><td>26°12'13.56" N</td><td>70°57'34.63" E</td></tr>
<tr><td>D</td><td>26°11'26.87" N</td><td>70°54'33.18" E</td></tr>
</table></td></tr>
<tr><td></td><td>Villages</td><td>Virbhani, Kohra & Randha</td></tr>
<tr><td></td><td>Tehsil/ Taluk</td><td>Fatehgarh</td></tr>
<tr><td></td><td>District</td><td>Jaisalmer</td></tr>
<tr><td></td><td>State</td><td>Rajasthan</td></tr>
<tr><td>2.</td><td>Area(hectares/square kilometer)</td><td></td></tr>
<tr><td></td><td>Block Area</td><td>9.25 sq.km</td></tr>
</table>

| | | |
|---|---|---|
| | Forest Area | Non-Forest |
| | Government Land Area(Bilanam) | Data not available |
| | Charagaha | Data not available |
| | Private Land Area | Data not available |
| **3.** | **Accessibility** | |
| | Nearest Rail Head | Jaisalmer Railway Station (120 kms) & Barmer Railway Station(112Kms.) |
| | Road | The block is located at 120 km from Jaisalmer via Fatehgarh on the Jaisalmer-Barmer Road. The deposit is also approachable from Barmer via Sheo (village) at a distance of around 112 kms. Motorable/ metaled roads are available in the area. |
| | Airport | Jaisalmer (Rajasthan) which is 120km from the block. |
| **4.** | **Hydrography** | |
| | Local Surface Drainage Pattern (Channels) | The general drainage is towards the south and south-west, but constantly shifting sand dunes change the direction frequently. Localised ephemeral streams and water courses are present in the area, apart from local streams. |
| | Rivers/Streams | Regionally area is drained by Luni River which flows from Samdari and passes through Balotra. Luni river is also ephemeral, flowing only in response to heavy precipitation. In the year of drought there is no runoff. |
| **5.** | **Climate** | |
| | Mean Annual Rainfall | Average annual rainfall is 100 to 130mm |
| | Temperatures(December)(Minimum) Temperatures (June)(Maximum) | Mean Minimum temperatures upto $10^0$ C (Jan)<br>Mean Maximum temperatures upto $49^0$ C (May-June) |
| **6.** | **Topography** | |
| | Topo-sheet Number | 40J/16 |
| | Morphology of the Area | The general surface level of the flat lying regions in the area varies from 260 to 300 meter above the sea level. The area is sand covered terrain, with widespread sand dunes broken by isolated steeply rising hills and flat rocky areas. |
| **7.** | **Availability of baseline geoscience data** | |
| | Geological Map (1:50K/25K) | Available |
| | Geochemical Map | Not available |
| | Geophysical Map(Aeromagnetic, Ground geophysical, Regional as well as local scale GP maps) | Not available |
| **8.** | **Justification for taking up Reconnaissance Survey/ Regional Exploration** | i) FS: 1965-66, GSI has carried out test Geophysical surveys (Electromagnetic, Radiometric and Electrical Resistivity) in the Birmania area, Jaisalmer district, Rajasthan for assessing the utility of these methods in locating phosphorite deposits. Test surveys were carried out over phosphorite deposit did not show any characteristic anomaly.<br>ii) FS: 1966, GSI carried out Geology and Preliminary assessment of the Birmania phosphorite deposit, Jaisalmer district, Rajasthan. Birmania phosphorite deposit which is exposed over a strike length of 4km |

| | | |
|---|---|---|
| | | and width 500m was divided into three major blocks based on the geological structures and change in character of phosphorite i.e., into (a) Birmania, (b)Kohra and (c) Ladu Singh. Geological mapping on 1:500 scale, trenching and sampling. In all 63 trenches were dug in Birmania area, out of which 17 trenches are falling in Kohra block and based on trenches probable resource of 0.553 million tonnes with average grade of 8.26% $P_2O_5$ were estimated with recommendation of 30 no of boreholes with 1600m drilling.<br>iii) FS: 1968-70, GSI carried out Exploratory drilling for Phosphorite at Birmania deposit area on recommendation of 1966 exploration, Birmania block was selected for exploratory drilling owning to strike persistence of phosphorite over a strike length 2.2 km. A total 2053.89m of drilling was carried out in 68 no of boreholes and phosphorite was intersected in 55 no of boreholes at depths varying from 1.5 to 40.0 m. Resources were estimated at 10% $P_2O_5$ cut-off and minimum width of 1.5m and established 3.49 million tonnes with average grade 12.91%.<br>iv) FCI Aravali Gypsum and Minerals India Limited (FAGMIL) (PSE, Ministry of Chemical and Fertilizers), has a Notified area of 4 sq km i.e Birmania block where G2 level exploration was carried out by MECL. A total of 4.63 million tonnes resource of phosphorite in both Birmania and Ladu Singh Sector was established.<br>v) Hence, the proposed exploration would be instrumental in uncovering mineralized ore zones in this area. |

# PROPOSAL FOR RECONNAISSANCE SURVEY (G-4) FOR PHOSPHORITE IN RANDHA BLOCK, TEHSIL-FATEHGARH, DISTRICT-JAISALMER, RAJASTHAN

## 1.0.0. INTRODUCTION

1.1.0. Agriculture, along with its allied sectors, stands as the primary source of income in India. The success of the agricultural sector hinges significantly on the fertilizer industry, which plays a pivotal role in manufacturing crucial raw materials essential for crop production. Among these materials, rock phosphates or phosphorites hold a prominent position. They are sedimentary phosphatic deposits composed of a fine-grained mixture of various calcium phosphates, with hydroxylapatite, carbonate apatite, fluoro-apatite, and their solid solutions being the most significant. Approximately 80% of the world's phosphate production is sourced from phosphate rocks (phosphorite) containing one or more phosphatic minerals, typically calcium phosphate, in adequate purity and quantity to facilitate direct use or after concentration in the manufacturing of commercial products. Phosphate rock undergoes processing to yield phosphorous, which stands as one of the three primary nutrients extensively utilized in fertilizers (the other two being nitrogen and potassium). Currently, India's reliance on imports for phosphates, whether as raw materials or finished fertilizers, stands at a staggering 90%. However, the burgeoning demand for phosphorus in the country could be alleviated by the exploration and discovery of new phosphorus deposits of economic significance.

## 1.2.1. INDIA'S PHOSPHATE DEMAND

1.2.2. There is no substitute for phosphorus in agriculture. The reserves/ resources of chemical and fertilizer grades apatite and rock phosphate in India are very limited. Till the domestic resources of these two minerals are improved, the country has no alternative but to depend on imports. Only about 10-15% requirement of raw material for phosphate fertilizer production is met through indigenous sources. The remaining requirement is met through imports in the form of rock phosphate, phosphoric acid and direct fertilizers. Demand for phosphatic fertilizer is expected to increase gradually in tandem with the growth in population and corresponding increase in food requirements.

1.2.3. India aims to be self-reliant in overall fertilizer production as the government is constructing new manufacturing units to reduce dependency on imports. "India to explore indigenous deposits of phosphatic rock, a step towards becoming Aatma Nirbhar in fertilizer production," informed Minister of Chemicals and Fertilizers, Mansukh Mandaviya in the Parliament on Monday, July 26,2021.

1.3.0. **BACKGROUND**

1.4.0. The production of phosphorite/ rock phosphate in India was reported from four public sector mines. Of these, Chhatarpur, Sagar and Jhabua districts of Madhya Pradesh have one mine each, while Udaipur district of Rajasthan has the fourth mine. Rajasthan continues to be the principal producing State contributing about 92%of the total production and the remaining 8% share is contributed by Madhya Pradesh. Of the total reserves/ resources, 34% are in Jharkhand, 30% in Rajasthan, 19% in Madhya Pradesh, 8% each in Uttar Pradesh & Uttarakhand, respectively. (Indian Minerals Yearbook 2021).

1.5.0. In order to improve the availability of phosphate fertilizers and to reduce the dependency on imports by making India truly Aatma-Nirbhar in fertilizers, FAGMIL prepared a proposal of the Randha block for G- 4 level of exploration and put up to the upcoming meeting of TCC, NMET for technical evaluation. Hence the proposal is being put up for reconnaissance survey, which may facilitate Central government for auctioning of the block.

2.0.0 **BLOCK DESCRIPTION**

2.1.0 The Randha Block area falls in part of Survey of India Toposheet No.40 J/16 and covers an area of 9.25 sq. km in and around villages Virbhani, Kohra & Randha of district: Jaisalmer, state Rajasthan. The Co-ordinates of the corner points of the block area DMS are given in table below.

Co-ordinates of Cardinal Points for Randha Block, Tehsil: Fatehgarh, Dist: Jaisalmer.

| Block Cardinal Points | DMS | |
|---|---|---|
| | Latitude | Longitude |
| A | 26°12'20.60" N | 70°54'19.79" E |
| B | 26°13'11.55" N | 70°57'26.56" E |
| C | 26°12'13.56" N | 70°57'34.63" E |
| D | 26°11'26.87" N | 70°54'33.18" E |

2.2.1 **LOCATION AND ACCESSIBILITY**

2.2.2 The proposed block is located about 120 km north from Jaisalmer via Fatehgarh on the Jaisalmer-Barmer Road. The deposit is also approachable from Barmer lying in the south east via Sheo (village) at a distance of around 112 kms. The area is well connected by motorable/ metaled roads.

2.2.3 The nearest railway station is Barmer Railway Station (112 Kms.), Jaisalmer Railway Station (120 Km). Nearest airport is Jaisalmer and around 120 km north from the block.

2.3.1 **PHYSIOGRAPHY**

2.3.2 The general surface level of the block area is around 260 meter above the sea level, with low hills and mounds rising up to 300 in the south west and north eastern part of the block. Most of the area is sand covered, with widespread sand dunes broken by isolated steeply rising hills and flat rocky areas.

2.3.3 The general drainage is towards the south and south-west, but constantly shifting sand dunes change the direction frequently. Localized ephemeral streams and water courses are present in the area, apart from local streams. Regionally area is drained by Luni River which flows from Samdari, passes through Balotra. Luni river is also ephemeral, flowing only in response to heavy precipitation. In the year of drought there is no runoff.

2.3.4 The area exhibits typical features of the desert climate. Mean Maximum Temperatures reaching up to 49ºC common during the summer while Mean Minimum temperatures as low as 10ºC prevail during the winter. The diurnal changes in temperature are high, being of the order of 10ºC. On one hand hot and dusty high winds blow continuously over the region during summer while extreme cold characterizes the winter. The area receives a rainfall of 10 cm to 13 cm a year, mainly during the months of July and August. But this is also uncertain. The precipitation is generally torrential, often accompanied with hail and the run-off is considerably more than the seepage. A very noticeable feature during the monsoons is that heavy rain clouds pass continuously over this region at very low altitude without bursting.

2.4.0 **FLORA & FAUNA**

2.5.0 Natural fauna and flora are scarce, the former consisting mostly of small reptiles, rodents and insects. The vegetation is very sparse and consist of mostly xerophytic shrubs and grass. Trees are very uncommon and are seen only near water wells and in old stream courses marked by alluvium. The main crop of the area is Millet and Jeera, entirely dependent on rainfall. There is no lift-irrigation in this region**.**

3.0.0 **REGIONAL GEOLOGY**

3.1.0 Regionally area falls in Barmer-Sanchor sub-basin. Pokhran high separates the Bikaner-Nagaur sub-basin from Jaisalmer sub-basin. Devikot-Nachna uplift separated Jaisalmer sub-basin from Barmer-Sanchor sub-basin. The tectonic evolution of Rajasthan Basin took place in four distinct phases corresponding to Precambrian - Triassic plate movement - Breaking of Indian plate from southern continent during Jurassic - Collision of Indian plate with the Asian plate from Eocene onwards - Uplift of Sind-Baluchistan fold belt resulting

in filling up of the Indus shelf. Three major lineaments trends, along ~ NE-SW (Aravallis) direction, ~ ENE-WSW or EW direction and ~ NW-SE (Dharwarian) direction. The NE-SW trending lineament (Aravallis) being the oldest is offset by late sub-latitudinal lineaments. Both NE-SW and ENE-WSW or E-W trends are affected by younger NW-SE Dharwarian lineament, which resulted in the formation of Barmer-Sanchor Sub-basin.. Generalized stratigraphy of Barmer- Sanchor sub-basin is given in below table

Generalized Stratigraphy of Barmer-Sanchor sub-basin (After DGH, India)

| Age | Formation | Lithology | Max Thickness |
|---|---|---|---|
| Quaternary | Shumars | Laterised Ferruginous sandstones | 660m |
| Unconformity | | | |
| Eocene | Bandha<br>Khuiala | Chalky limestone, fossiliferous limestone and silt stone<br>Gypseous shales and marls, fossiliferous hard limestone | 470 m |
| Unconformity | | | |
| Palaeocene | Sanu | Sandstone | 200 m |
| Unconformity | | | |
| Cretaceous | Parh<br>Goru/abur<br><br><br>Parihar | Sandstone<br>Aranesous limestone, fragmental and fossiliferous limestone and quartzitic sandstone<br>Feldspathic sandstones with | 1000 m |
| Unconformity | | | |
| Jurassic | Bedesar<br><br>Baisakhi<br><br>Jaisalmer<br>Lathi | Hard ferruginous and calcareous grits with inter- calatory sandstone<br>Soft shales, sandy shales, silts, sandstone and quartzitic sandstone<br>Conchoidal limestone and sandstone Sandstones, grits | 2000 m |
| Unconformity | | | |
| Triassic | Shumarwali | Sandstone | 700 m |
| Unconformity | | | |
| Permian | Karampur | Sandstone, Shale, Clay | 500 m |
| Unconformity | | | |
| Cambrian | Birmania<br>Randha | | 600 m |
| Unconformity | | | |
| Pre-Cambrian | Malani Igneoussuite<br>Jalore-Siwana Granite | Granites, Rhyolites, Porphyries, metamorphics | |

3.2.1 **REGIONAL STRUCTURE OF THE BLOCK**

3.2.2 The phosphorite beds of Birmania are highly folded and thrown into asymmetric doubly

plunging longitudinal apex folding. Birmania phosphate area was further divided into three major blocks considering geological structures and change in the nature of phosphorite i.e., (i) Birmania, (ii) Ladu Singh, and (iii) Kohra.

3.2.3 Birmania block is having two doubly plunging anticline and two doubly plunging syncline where as in Ladu Singh block there is doubly plunging anticline and in Kohra block there is one anticline and one syncline. These anticlines and synclinal folds which are plunging northwards or southwards are connected by smaller folds which are clearly observed in field.

3.2.4 North East – South West is the general trend of the phosphorite beds. Strike length of the folds is more than the width of the longitudinal part of the folds. Strike length of the Birmania block is about 4 km, while width is aprroximately100m. Maximum longitudinal dimensions are seen in Birmania block, while these decrease in Ladu Singh and Kohra blocks. Dip of the beds varies between 35° to 80° with rolling dips towards eastwards and westwards. Axial plane of the folds is nearly vertical.

3.2.5 Most of the area is covered by sand and data cannot be measured due to intense folding in the region, however strike slip and oblique faults as displacement of beds is present near axial plane and near apex of folding, numerous minor folds are observed with frequent breaks.

3.2.6 The complex folding accompanied by doubly plunging minor folds make it difficult to measure the exact thickness. The most conspicuous feature of the area is the quartzitic sandstone-phosphorite sequence which can be used as a marker horizon for establishing the structures and stratigraphic succession. The members show facies change when traced along and across the strike. This is best exemplified by the phosphorite horizon. In the southern part of the Kohra block the phosphatic limestone is immediately overlying the quartzitic sandstone. When traced northwards, the phosphatic limestone becomes thinner and is absent for a strike length of about 400 metres where cherty limestone lies directly on the quartzitic sandstone. Traced northwards from this point the phosphorite changes over to a sandy shale with chert, which is the most common rock type in the Birmania block. In the Ladu Singh block this variation is very rapid and takes place within short distances.

## 3.3.0 GEOLOGY OF BLOCK

### 3.3.1 STRATIGRAPHY:

**3.3.2** Randha–Birmania sequence, located at the centre of the Thar Desert in western Rajasthan , is the westernmost Precambrian sequence in India, with very limited exposures.

It is oval-shaped, roughly trending north–south and is considered by a few researchers as an isolated remnant of the Marwar Basin (Maheshwari et al. 2002, 2007). Underlain by Malani suite of (780–680 Ma) and unconformably overlain by the Lathi Formation (Jurassic), it comprises 900 m thick sequence of siliciclastic, carbonate and phosphorite facies. The basin is divided into older Randha and younger Birmania formations (Singh 2006 and references therein).The Randha Formation, considered to be Ediacaran in age, is a sequence of mainly medium- to coarse-grained siliciclastic rocks. The exposures occur as numerous hillocks around Randha Village, after which this formation has been named. Most workers consider that the Randha Formation unconformably overlies the Malani Igneous Suite(Muktinath 1969; Srikantan et al. 1969; Deshmukh 1979; Husain and Banerjee 1986; Singh 2006).

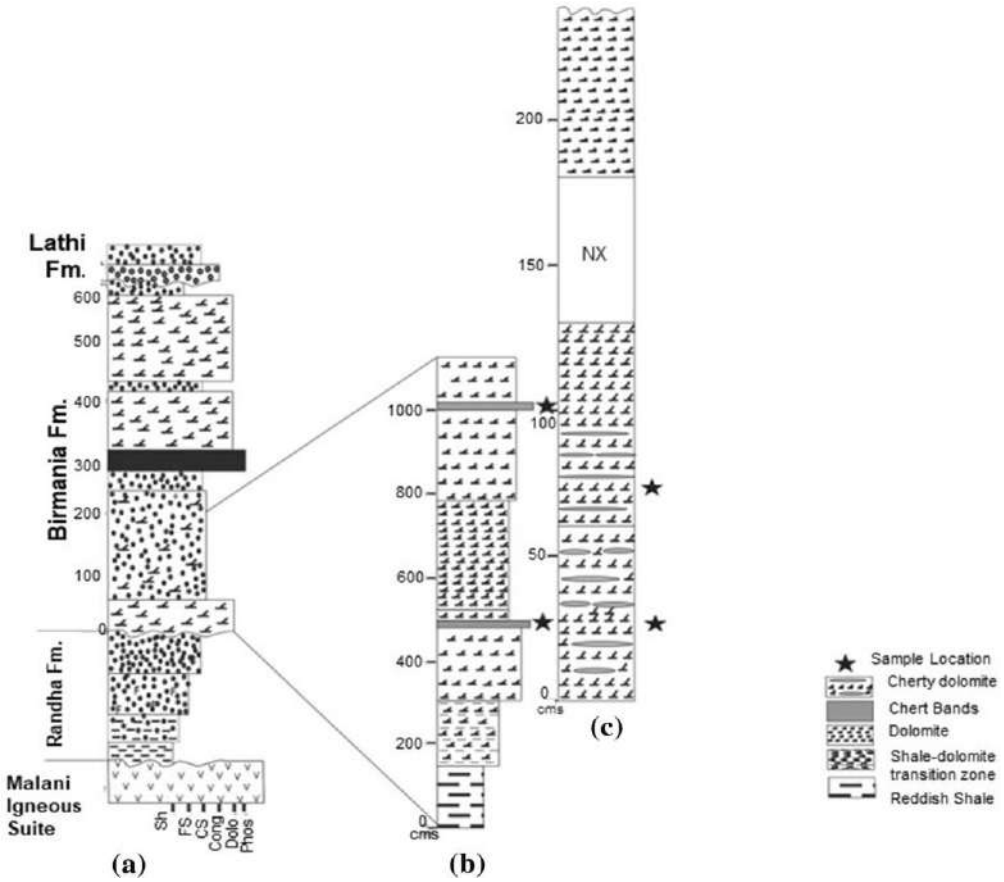
**3.3.3** All the rock formations described by the geologists of the Oil and Natural Gas Commission are not present in the area. The only two formations occurring which are the Birmania and the Lathi formations. The stratigraphic succession in the Birmania area built up on the basis of structure and sedimentary features is as follows:

General Stratigraphic sequence of the area (After GSI)

| Age | Formation | Lithology | Max Thickness |
|---|---|---|---|
| Jurassic | Lathi | Conglomerates, grits, sandstone and shale | 660 m |
| Unconformity | | | |
| Cambrian | Birmania | Dolomitic limestone, cherty limestone, shale, siltstone and sandstone | >90 |
| | | Shale white brown to variegated, arenaceous to carbonaceous with siltstone and sandstone bands | 60 |
| | | Phosphorite | Less than 1m to over 9m |
| | | Quartzite sandstone | 1-4m |
| | | Buff colour fine grained, calcareous sandstone, dark brown calcareous and ferruginous sandstone | 50-270m |
| | | Greyish yellow or cherty grey limestone | >80m |
| | Unconformity | | |
| | Randa | Sandstones and subordinate cancerous rocks and shales | |

**3.3.4** The oldest member exposed in the area is a cherty limestone, but the base of the Birmania formation is probably below the sand covered ground between this exposure and the Randa ridge. The contact between the Randa and the Birmania formations is not exposed anywhere. The youngest exposed member (the calcareous chert or its equivalent dolomitic limestone or sandstone) is overlain by the conglomeratic sandstone and grit of Lathi formation (Jurassic).

**3.3.5** The individual members of the formation show considerably variation in thickness when traced along and across the strike. The complex folding accompanied by doubly plunging minor folds make it difficult to measure the exact thickness. The most conspicuous feature of the area is the quartzitic sandstone-phosphorite sequence which can be used as a marker horizon for establishing the structures and stratigraphic succession. The members show facies change when traced along and across the strike. This is best exemplified by the phosphorite horizon. The phosphatic limestone is immediately overlying the quartzitic sandstone. Another feature which reflects this change is an increase in the ferruginous content in the calcareous sandstone from north to south. The calcareous and ferruginous sandstones cannot be marked separately in the proposed block (in the southern part of the area) owing to their inter-calatory relationship.




(a) General lithology of the Birmania Basin (modified from Hughes et al. 2015).
(b) Lithology of the sampled section behind Barsingha Village, lower part of Birmania Formation.
(c) Lithology of the sampled section before Barsingha Village, lower part of Birmania Formation.

### 3.4.0 ROCK FORMATIONS:

**3.4.1 Cherty limestone:** The cherty limestone forms the oldest rocks member in the area mapped and is exposed in the southern part. It is greyish- yellow or grey in colour, hard, feebly jointed and thick bedded (upto 1m) rock, breaking with a sub-conchoidal fractured. It is crystalline to micro crystalline and mainly composed of calcite, dolomite and chert, the last making about 20 % of the rock. Thin calcite, veins of secondary origin are also seen traversing the rock at places.

**3.4.2 Ferruginous and calcareous sandstone:** The ferruginous sandstone is a medium grained dark chocolate-brown coloured, usually thinly bedded rock which shows inter-calatory beds, upto 1 metre thick, of a lighter colour non-ferruginous calcareous sandstone. Bedding cleavage is well developed in the final grained variety. It is also slightly calcareous. Calcareous sandstone is generally fine to medium grained, thick bedded, buff coloured rock which shows good bedding and cross bedding at places. It is mainly composed of rounded to subrounded or sub angular grain of quartz with some calcite. The calcite makes up to 30 to 35 % of the rock.

**3.4.3 Quartzitic sandstone:** It is light grey and pale-brownish, fine to medium grained, hard, compact, well bedded and jointed rock, showing cross-bedding at places. The lower beds at the contact with the older calcareous sandstone, are fine grained. The upper beds show phosphate intercalations. The thickness of the quartzitic sandstone varies from 1 metre to about 4 m**.**

**3.4.4 Phosphorites:** The phosphate rock in the area is closely associated with quartizitic sandstone varies from thinly banded phosphatic calcareous shaly sandstone to a prominent banded limestone. The calcareous shaly sandstone, which is the most common phosphatic rock is the area, shows alternating layers of white to bluish-grey, sandy, calcareous shaly sandstone and black chert. It is associated with the sandy calcareous layers, interbanded with a lesser phosphatic bands show a characteristic bluish colour on the weathered surfaces. Calcite forms upto 35% of the bulk and is seen as irregular patches and anhedral collophane. Collophane occurs as translucent, dirty yellowish to brownish coloured, grains, pellets and rarely as laths and forms 30 to 40% of the rock. The banded phosphatic limestone is mostly seen in the southern parts of the proposed block. In this limestone, the phosphate bed occurs as thin, dark grey-coloured bands upto 5cm thick, alternating with a yellowish brown to grey coloured, fine-grained limestone.

**3.4.5 Variegated shales:** siliceous limestone; invariably overlying the phosphorite are shales, varying in colours light grey-yellowish to dull white and purplish red. The siliceous limestone is a fine grained, yellowish brown coloured rock in which bedding is concealed.

**3.4.6** The variegated shale – siliceous limestone association intersected immediately above the Phosphate horizon, mainly seen in the southern part of proposed Randha block. The variegated shales, interbanded with this limestone, are generally covered by a thin veneer of sand and have been exposed only in the trenches.

**3.4.7** **Dolomitic limestone:** The dolomitic limestone is a fine grained, dense, hard, bluish-grey thick bedded rock, the individual beds being between 2 and 10 m thick. It shows typical 'elephant skin' weather surface. Calcareous cherty limestone overlies Dolomitic limestone at the surface. Thin veins of calcite and rarely chert of secondary origin is seen traversing the rock. Bedding is very clearly seen in this rock.

**3.4.8** **Cherty limestone:** Overlying the calcareous chert is a medium to fine grained, light buff coloured, calcareous sandstone in the proposed Randha block. These rock units are the youngest members of the Birmania formation exposed in the area mapped. It is a dark grey coloured, soft rock, which on weathered surface shows a whitish-grey colour.

## 4.1.0 PREVIOUS WORK/ BACKGROUND INFORMATION:

4.1.1 Geological Survey of India (GSI) – W.T. Blanford (1877), C.A. Hacket (1881 & 1887) were the first stalwarts studied this region, followed by R.D. Oldham (1866 & 1893), T.D. La Touche (1911) and A.M. Heron (1932) and by Swaminathan (1960-62).

4.1.2 General account of the geology is given by A.M. Heron and E.W. Pascoe. Detailed geological mapping was carried out by Narayanan, J.S. Mishra, V.S. Depura, B.P. Srivastava and S. Srivasan of the Oil and Natural Gas Commission between 1959 and 1962.

4.1.3 FS: 1965-66, GSI FS: 1965-66, GSI carried out test Geophysical surveys (Electromagnetic, Radiometric and Electrical Resistivity) in the Birmania area, Jaisalmer district, Rajasthan for assessing the utility of these methods in locating phosphorite deposits. Test surveys carried out over phosphorite deposit did not show any characteristic anomaly. Also, no reliable depth estimates to the bedrock can be made by the study due to conductive nature of the saline bed.

4.1.4 FS: 1966, GSI carried out Geology and Preliminary assessment of the Birmania phosphorite deposit, Jaisalmer district, Rajasthan. Birmania phosphorite deposit which is exposed over a strike length of 4km and width 500m was divided into three major blocks based on the geological structures and change in character of phosphorite i.e., into (a) Birmania, (b) Kohra and (c) Ladu Singh. Geological mapping on 1:500 scale, trenching and sampling. In all 63 trenches were dug in Birmania area, out of which 17 trenches are in Kohra block and based on trenches a probable resource of 0.553 million tonnes with average grade of 8.26% $P_2O_5$ were estimated in kohra block with recommendation of 30 no of boreholes with 1600m drilling.

4.1.5 FS: 1968-70, GSI carried out Exploratory drilling for Phosphorite at Birmania, under Shri G.P. Deshmukh. Birmania block was selected for exploratory drilling owning to strike persistence of phosphorite over a strike length 2.2 km. A total 2053.89m of drilling was carried out in 68 no of boreholes and phosphorite was intersected in 55 no of boreholes at depths varying from 1.5 to 40.0 m. Resources were estimated at 10% $P_2O_5$ cut-off and minimum width of 1.5m and established 3.49million tonnes resources with average grade 12.91%. Ore beneficiation studies were carried out at Indian Bureau of Mines (IBM) during the same year and IBM opined that both "Air and Flotation type test found that the ore is not amenable for beneficiation on account of high percentage of lime and intimate association with amorphous collophane (phosphate mineral). It also observed that sample does not produce any concentration due to uniform distribution of phosphate from coarse to fine.

4.1.6 In the year 2022, FAGMIL has carried out G-2 level exploration in Notified Mining Lease area (about 4 sq.km) through MECL which is part of Birmania phosphorite deposit. A total 3752.00m of drilling was carried out in 69 no of boreholes and phosphorite was intersected in 34 no of boreholes at depths varying from 0.5 to 64.0m with average thickness of 5.733 at 5% cut off. A total 4.54 million tonnes of Net in-situ resources of phosphorite with average grade of 10.04 % $P_2O_5$ have been established along 1.4km strike length of Birmania Sector (1.78 sq km) and 0.09 million tonnes of Net in-situ resources of phosphorite with average grade of 6.15 % $P_2O_5$ have been established along 0.4km strike length of Ladu Singh Sector (0.58 sq km). A total of 4.63 million tonnes resource of phosphorite in both Birmania and Ladu Singh Sector.

## 4.2.0 OBSERVATION AND RECOMMENDATIONS OF PREVIOUS WORK:

**4.2.1** FS: 1965-66, 66 & 68-70, GSI has carried out Geophysical surveys and Phosphorite exploration in Birmania block. Birmania block was divided into three blocks based on geological structures and nature of phosphorite i.e into (a) Birmania, (b) Kohra and (c) Ladu Singh blocks. GSI has carried out trenching work which includes 63 trenches in three blocks, out of 63 trenches 17 trenches are falling in Kohra block and based on trenches probable resource of 0.553 million tonnes with average grade of 8.26% $P_2O_5$ were estimated in kohra block with recommendation of 30 no of boreholes with 1600m drilling.

**4.2.2** FS: 1968-70, GSI carried out Exploratory drilling for Phosphorite at Birmania deposit area. Birmania block was selected for exploratory drilling owning to strike persistence of phosphorite over a strike length 2.2 km. A total 2053.89m of drilling was carried out in 68 no of boreholes and phosphorite was intersected in 55 no of boreholes at depths varying from 1.5 to 40.0 m. Resources were estimated at 10% $P_2O_5$ cut-off and minimum width of 1.5m and established 3.49 million tonnes with average grade 12.91%.

Further drilling was not recommended by GSI as the Birmania deposit was not economically viable in the year 1970.

**4.2.3** FAGMIL carried out G-2 level exploration in FY: 2022, in Notified Mining Lease area (about 4 sq.km) of, which is part of Birmania phosphorite deposit. A total 4.54 million tonnes of Net in-situ resources of phosphorite with average grade of 10.04 % $P_2O_5$ have been established along 1.4 km strike length of Birmania Sector (1.78 sq km) and 0.09 million tonnes of Net in-situ resources of phosphorite with average grade of 6.15 % $P_2O_5$ have been established along 0.4km strike length of Ladu Singh Sector (0.58 sq km). A total of 4.63 million tonnes resource of phosphorite in both Birmania and Ladu Singh.

**4.2.4** Based on the previous work and strike persistence of phosphorite bands in birmania phosphorite deposit, Randha block which is adjacent to Birmania block may be taken up for further G-4 level exploration to prove the continuity of the ore body.

## 5.0.0 PROPOSED EXPLORATION SCHEME

5.1.0 In accordance to the objective set for Randha Block, the following scheme of exploration has been formulated. The details of different activities to be carried out are presented in subsequent paragraphs**.**

5.2.1 The exploration is proposed with the following objectives:

- Preparation of Geological map on 1:12,500 scale.
- To identify the mineralized zone.
- To estimate Phosphorite resources as per UNFC norms, if any.
- To facilitate the Central govt. for auction of the block.

5.3.1 **Geological Map**

5.3.2 The geological map (1:12,500 scale) will be prepared based on structural data, surface samples, borehole locations, trenches etc. carried out during G4 stage. This map will be used as base map for future work.

5.4.1 **Surface Samples (BRS/ Channel Samples):**

5.4.2 During the geological mapping a total of 40 nos. of bed rock/channel samples will be collected from phosphorite bearing rocks.

5.5.1 **Topographical Survey**

5.5.2 Topographical survey will be carried out by DGPS and total station. Surface features, HT lines, water bodies will be marked and topographical map will be prepared on 2m contour interval. Block boundary and Base Station will be survey by DGPS.

5.6.0 **Exploratory Mining (Trenching)**

5.6.1 After surface mapping a provision of shallow trenching has been kept at suitable location to establish the strike continuity of the mineralized zone for phosphorite. Locations of trenches on ground will be decided by field geologist based on field observations.

**5.7.0 Sampling**

**5.7.1** Each sample should be marked at every 1m length in case of continuance of similar mineralogical composition down the borehole and no sample length should exceed 1m. The sample length towards the floor marked by non-ore zone needs also to be adjusted as per variations of the litho-units. Even if the floor is distinctly differentiated by the presence of non-mineralized zone, at least two nos. samples after the Phosphorite zone need to be drawn to mark the floor decisively**.**

## 5.8.0 Laboratory Studies

Chemical Analysis:

i. Primary Samples: Total 40 numbers of primary (BRS/Channel) samples and 6 number of check samples (10% of primary samples as External & 5% of primary samples as Internal) will be analyzed for 5 radicals i.e. $P_2O_5$%, $SiO_2$%, $Al_2O_3$%, $Fe_2O_3$% & LOI% by XRF method. External check samples will be sent to NABL accredited laboratory for analysis of 5 radicals i.e. $P_2O_5$%, $SiO_2$%, $Al_2O_3$%, $Fe_2O_3$% & LOI%.

ii. Trench Sampling: Total 40 numbers of primary samples and 6 number of check samples (10% of primary samples as External & 5% of primary samples as Internal) will be analyzed for 5 radicals i.e. $P_2O_5$%, $SiO_2$%, $Al_2O_3$%, $Fe_2O_3$% & LOI% by XRF method. External check samples will be sent to NABL accredited laboratory for analysis of 5 radicals i.e. $P_2O_5$%, $SiO_2$%, $Al_2O_3$%, $Fe_2O_3$% & LOI%.

iii. Composite samples: Around 5 composite samples will be prepared analyzed for 5 radicals.

iv. XRD studies will be done on 5 nos of composite samples to know the presence of trace elements.

v. Petrological Studies: About 6 nos of specimens will be studied.

vi. Mineragraphic Studies: About 6 nos of specimens will be studied.

## 6.0.0 Quantum of Work

6.1.0 The details of quantum of work block in Randha Block, Tehsil: Fatehgarh, Dist: Jaisalmer have been furnished below:

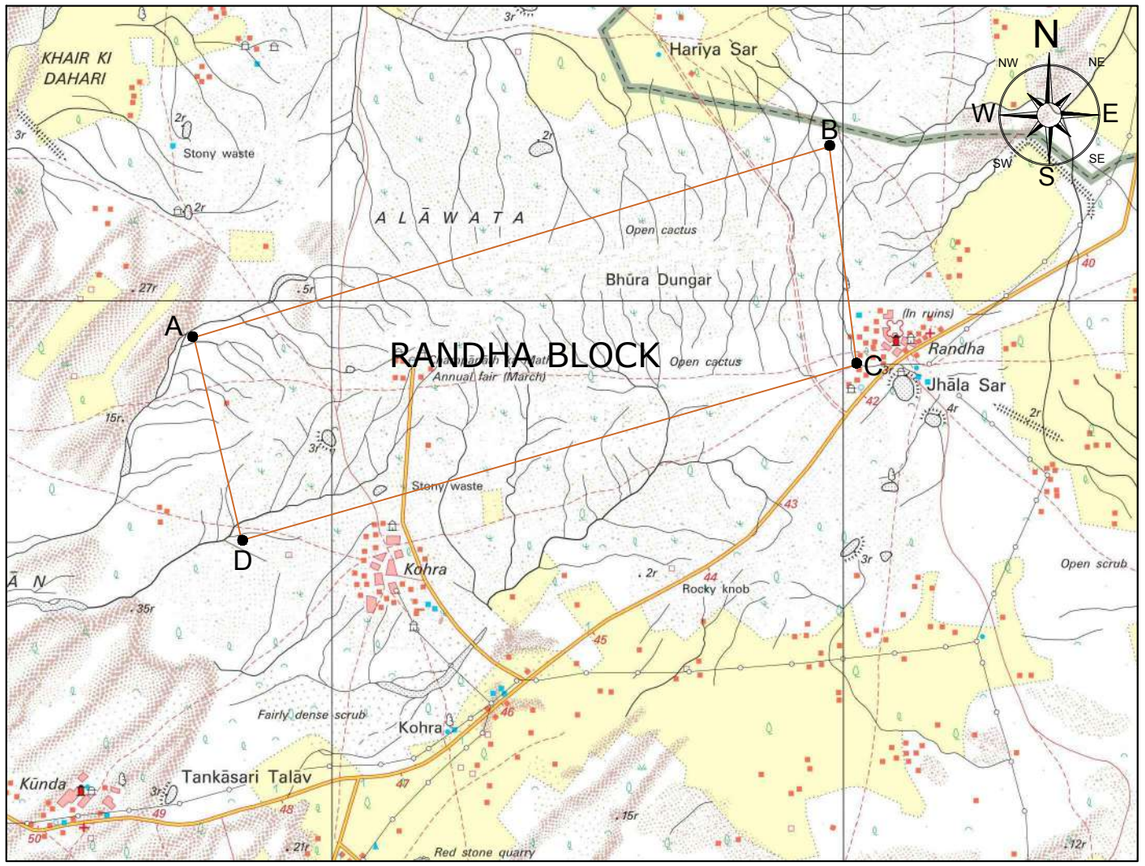
| **Proposed Quantum of Work for Reconnaissance Survey for Phosphorite, Randha Block District: Jaisalmer, Rajasthan** | | | |
|---|---|---|---|
| **Sl. No.** | **Item of Work** | **Unit** | **Proposed Quantum of work** |
| **1** | **Geological Mapping** (on 1:12,500 Scale) | Sq. km | 9.25 |
| **2** | **Geochemical Sampling** | Nos. | 40 |
| | Bed rock sampling/channel sampling for Phosphorite | | |
| **3** | **Exploratory Mining** | | |
| | Excavation (Trenching) | Cu. m. | 150 Cu.m. |
| **4** | **Laboratory Studies** | | |
| | **A. Surface samples (Bed rock sampling/channel sampling)** | | |
| | i) Chemical Analysis; Primary for 5 radicals i.e., $P_2O_5$, $SiO_2$, $Al_2O_3$, $Fe_2O_3$ and LOI | Nos. | 40 |
| | ii) Internal Check samples (5% of Primary samples) for analysis of 5 radicals i.e., $P_2O_5$, $SiO_2$, $Al_2O_3$, $Fe_2O_3$ and LOI | Nos. | 2 |
| | iii) External Check sample (10 %of Primary samples) for analysis of 5 radicals i.e., $P_2O_5$, $SiO_2$, $Al_2O_3$, $Fe_2O_3$ and LOI | Nos. | 4 |
| | **B. Trench samples** | | |
| | i) Chemical Analysis; Primary for 5 radicals i.e., $P_2O_5$, $SiO_2$, $Al_2O_3$, $Fe_2O_3$ and LOI | Nos. | 40 |
| | ii) Internal Check samples (5% of Primary samples) for analysis of 5 radicals i.e., $P_2O_5$, $SiO_2$, $Al_2O_3$, $Fe_2O_3$ and LOI | Nos. | 2 |
| | iii) External Check sample (10 %of Primary samples) for analysis of 5 radicals i.e., $P_2O_5$, $SiO_2$, $Al_2O_3$, $Fe_2O_3$ and LOI | Nos. | 4 |
| | **Composite Samples for five radicals** | Nos. | 5 |
| | **Physical Studies** | | |
| | Petrographic Studies | Nos | 6 |
| | Mineragraphic Study | Nos | 6 |
| | Report Preparation (Digital format) | Nos. | 1 No. |
| | | | |
| | | | |

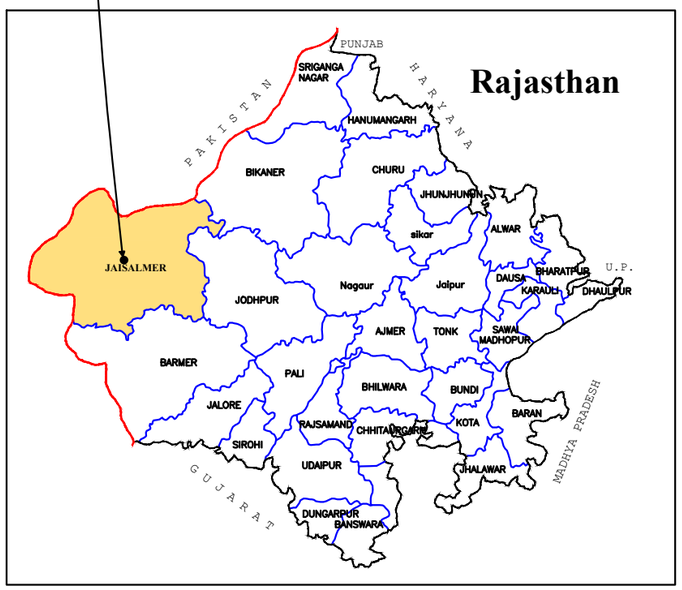
## 6.0.0 Cost Estimate

**6.1.0** 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 NMET Funded Projects. The total estimated cost is Rs. 49.13 Lakh. The summary and details of cost estimates is given below**:**

| SUMMARY OF COST ESTIMATED | | |
|---|---|---|
| **Sl. No.** | **Item** | **Estimated Cost (Rs.)** |
| 1 | Geology Work | 22,55,091 |
| 2 | Laboratory | 9,88,183 |
| 3 | Excavation | 4,99,500 |
| 4 | Survey | 1,34,400 |
| | **Sub Total (1 to 4)** | **38,77,174** |
| 5 | Exploration Report | 1,98,859 |
| 6 | Exploration Proposal | 77,543 |
| 7 | Peer Reviewer Charges | 10,000 |
| | **Grand Total** | **41,63,576** |
| 8 | GST 18% | 7,49,444 |
| | **Total:** | **49,13,020** |
| | **Say Rs. in Lakhs** | **49.13** |

# Location Map of Proposed Randha Block(9.25 Sq.Km.)at G4 Level Exploration For Rock Phosphate Mineral
# District: Jaisalmer,State:Rajasthan(Part Of Toposheet No:40J/16)


Scale- 1cm = 500 Mts.

1 0 1 2 3cm.

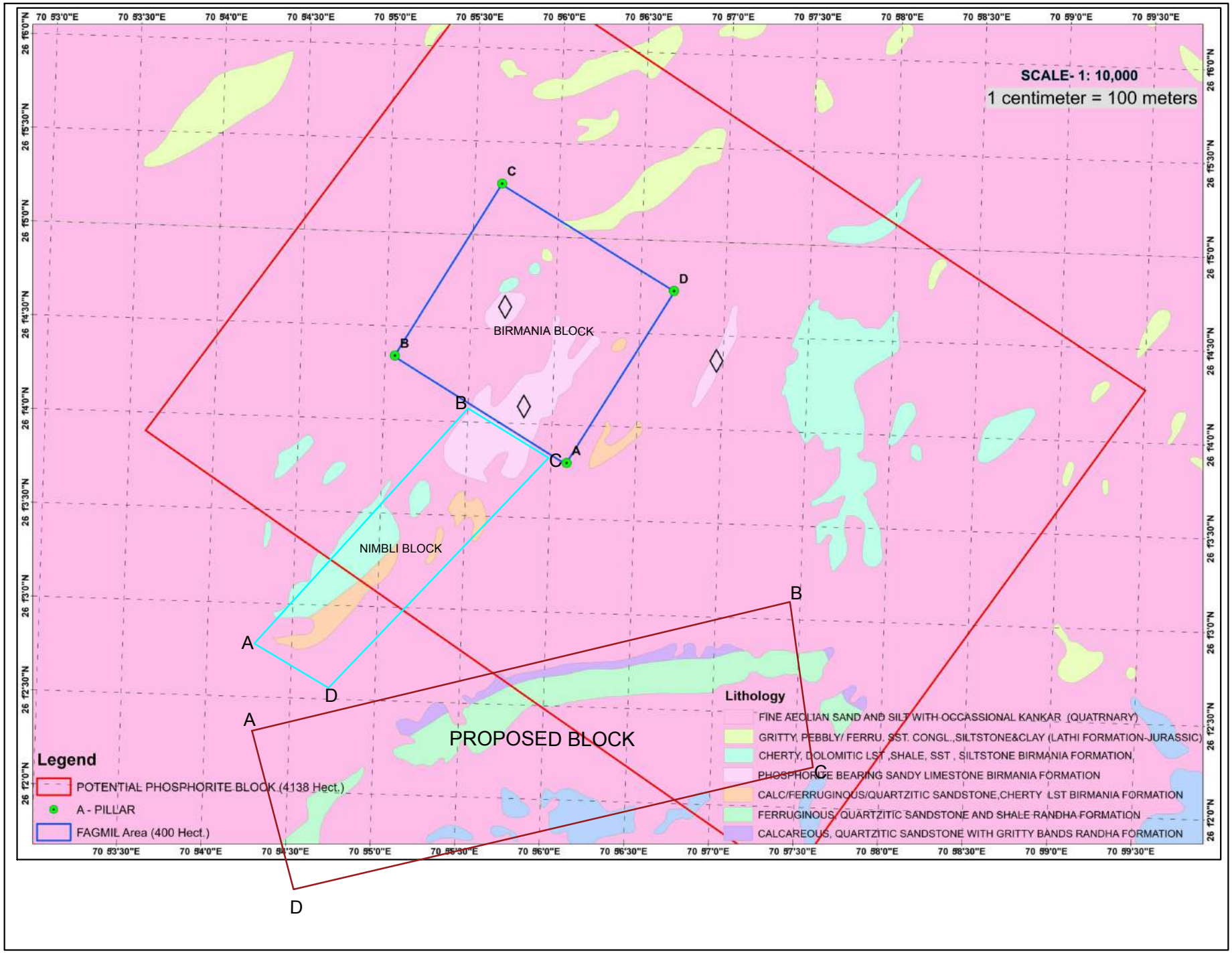
500 0 500 1000 1500 mtr.

Legend

- Randha Block Corner Point
- Proposed Randha(G-4) Block

## RANDHA BLOCK

| POINT | LATITUDE | LONGITUDE | AREA |
|---|---|---|---|
| A | 26°12'20.60" | 70°54'19.79" | 9.25 Sq KM |
| B | 26°13'11.55" | 70°57'26.56" | |
| C | 26°12'13.56" | 70°57'34.63" | |
| D | 26°11'26.87" | 70°54'33.18" | |


SCALE- 1: 10,000
1 centimeter = 100 meters
BIRMANIA BLOCK
NIMBLI BLOCK
PROPOSED BLOCK
A
B
C
D
Legend
POTENTIAL PHOSPHORITE BLOCK (4138 Hect.)
A - PILLAR
FAGMIL Area (400 Hect.)
Lithology
FINE AEOLIAN SAND AND SILT WITH OCCASSIONAL KANKAR (QUATRNARY)
GRITTY, PEBBLY/ FERRU. SST. CONGL.,SILTSTONE&CLAY (LATHI FORMATION-JURASSIC)
CHERTY, DOLOMITIC LST ,SHALE, SST , SILTSTONE BIRMANIA FORMATION
PHOSPHORITE BEARING SANDY LIMESTONE BIRMANIA FORMATION
CALC/FERRUGINOUS/QUARTZITIC SANDSTONE,CHERTY LST BIRMANIA FORMATION
FERRUGINOUS, QUARTZITIC SANDSTONE AND SHALE RANDHA FORMATION
CALCAREOUS, QUARTZITIC SANDSTONE WITH GRITTY BANDS RANDHA FORMATION

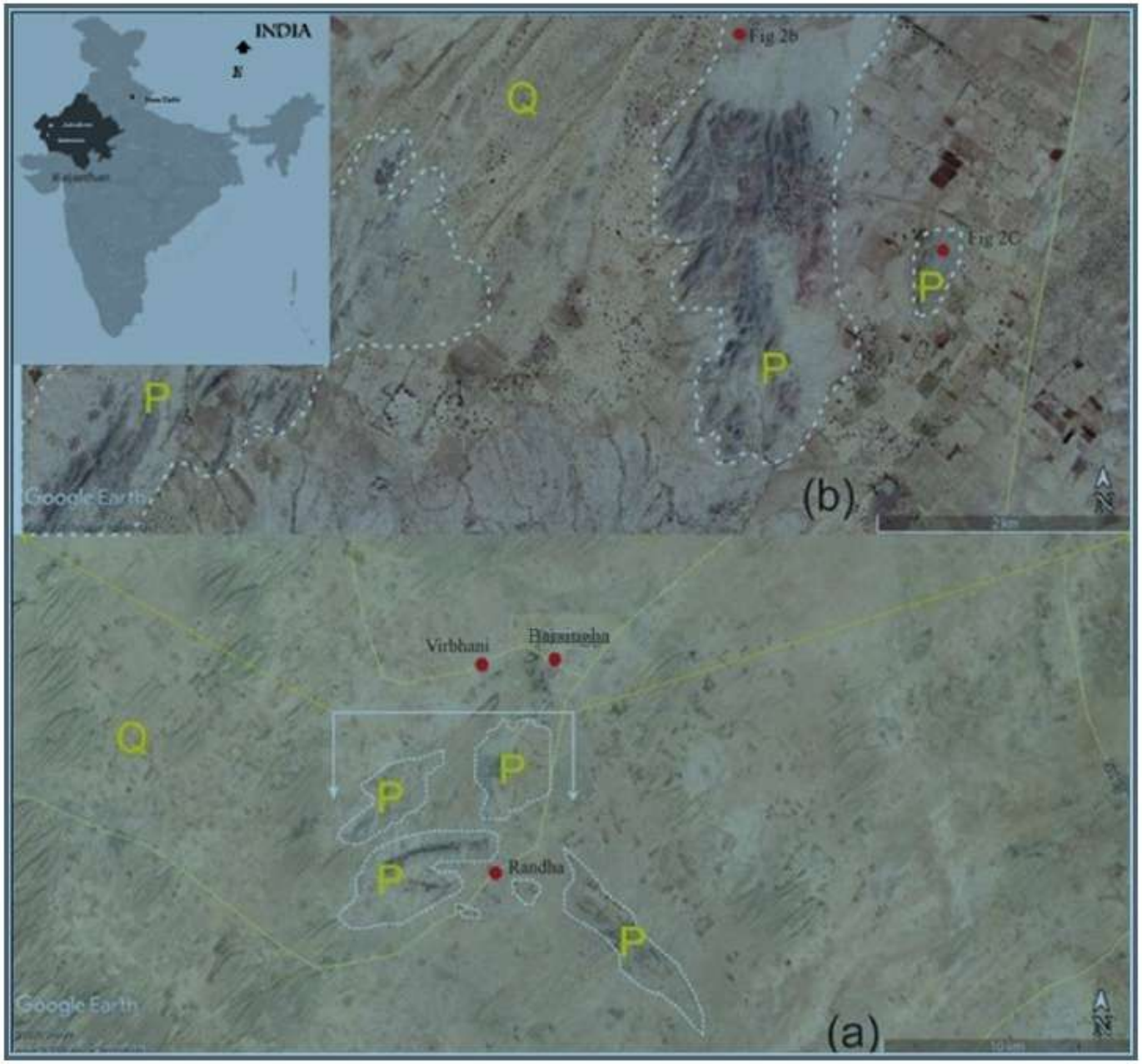
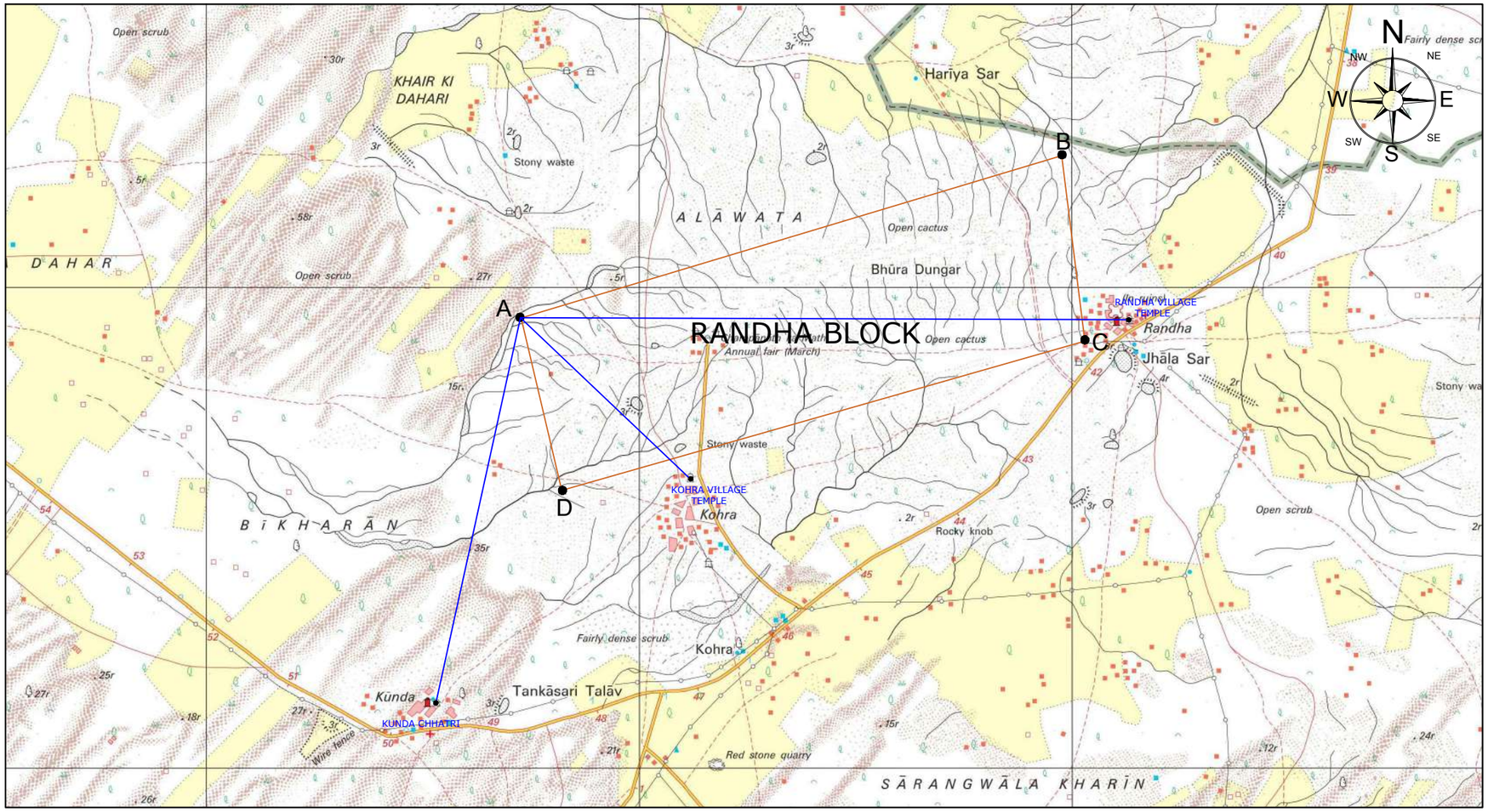



Figure 1. Location map of the study area. The inset map of India shows the study area. (a) Google image marking the relative positions of Randha, Birmania/Virbhani and Barsingha villages. (b) Google image showing the location of the sampled sections.



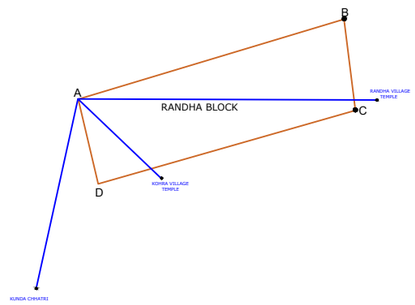

## THREE REFERENCE POINT

| POINT ID | LATITUDE | LONGITUDE | FROM | TO | DISTANCE METER(M) | BEARING |
|---|---|---|---|---|---|---|
| KOHRA VILLAGE TEMPLE | 26°11'30.65" | 70°55'17.79" | KOHRA VILLAGE TEMPLE | A | 2227.00 M | 313°43'49.6" |
| KUNDA VILLAGE CHHATRI | 26°10'20.30" | 70°53'49.58" | KUNDA VILLAGE CHHATRI | A | 3798.00 M | 12°44'42.1" |
| RANDHA VILLAGE TEMPLE | 26°12'20.04" | 70°57'49.65" | RANDHA VILLAGE TEMPLE | A | 5827.00 M | 270°11'22.5" |

## RANDHA BLOCK

| POINT | LATITUDE | LONGITUDE | AREA |
|---|---|---|---|
| A | 26°12'20.60" | 70°54'19.79" | 9.25 Sq KM |
| B | 26°13'11.55" | 70°57'26.56" | |
| C | 26°12'13.56" | 70°57'34.63" | |
| D | 26°11'26.87" | 70°54'33.18" | |

Randha Block for Mineral Rock Phosphate Block
(Area 9.25 Sq KM )



CIN-U14105RJ2003GOI018093

# एफसीआई अरावली जिप्सम एण्ड मिनरल्स इण्डिया लिमिटेड
# FCI Aravali Gypsum and Minerals India Ltd.

भारत सरकार का उपक्रम (मिनीरत्ना -II)
Govt. of India Undertaking (Miniratna II)

**पंजीकृत कार्यालय :**
2, वेस्ट पटेल नगर,
सर्किट हाउस रोड,
रातानाडा, जोधपुर -342011
(राजस्थान)
फोन: 0291-2948265, 2948276

FCI Aravali Gypsum and Minerals India Ltd.

**Registered Office :**
2, West Patel Nagar,
Circuit House Road,
Ratanada, Jodhpur - 342011
(Rajasthan)
Tel: 0291-2948265, 2948276
E-mail: fagmil-rj@nic.in
Website : www.fagmil.nic.in

Ref. No.: _____

Date : _____

## Certificate

To,

The Director & HoD
National Mineral Exploration Trust (NMET)
Ministry of Mines
F-114, Shastri Bhawan
New Delhi-11 0001

It is certificated that:

1. Project titled **"Reconnaissance Survey (G-4) for mineral – Rock Phosphate in Randha Block, Tehsil-Fatehgarh, District- Jaisalmer, Rajasthan"** along with estimated cost Rs 49.13 lakhs is submitted for consideration of NMET funding.

2. The project proposal is prepared following the guidelines prescribed in Minerals (Evidence of Contents) Rules, 2015 in case of mineral Reconnaissance Survey project proposals.

3. The proposal has been duly examined and concurred by associate finance in accordance with canons of financial propriety.

4. The same project proposal or project proposal with similar objectives has not been submitted to any other funding agency by this organization and the project proposal bears no duplication with existing work /ongoing project undertaken by this agency.

Date : 03.05.2024
Place : Jodhpur

For and on behalf of
FCI Aravali Gypsum and Minerals India Limited

(Rajendra Singh Rathore)
General Manager

# COST SHEET FOR RECONNAISSANCE SURVEY (G-4) FOR PHOSPHORITE MINERALS IN RANDHA BLOCK DISTRICT: JAISALMER, RAJASTHAN

## Total Area - 9.25 Sq Km; Completion Time - 06 Months

| S.N | Item of Work | Unit | Rates as per NMET SoC 2020-21 | | Estimated Cost of the Proposal for | | Remarks |
|---|---|---|---|---|---|---|---|
| | | | SoC-Item -Sl No. | Rates as per SoC | Qty. | Total Amount (Rs) | |
| A | **GEOLOGICAL WORK** | | | | | | |
| 1 | **Mapping ,Excavation,sampling & report writing** | | | | | | |
| a | Charges for one Geologist per day at HQ for monitoring, data processing etc. | day | 1.3 | **9,000** | **60** | **5,40,000** | |
| b | Charges for Geologist per day at field for mapping, channel sampling and logging. | day | 1.3 | **11,000** | **105** | **11,55,000** | Calculated on the basis of 2 Geologist Party Mapping- 2.5 months , trenching-30 days |
| c | Labour Charges(3 Nos) for two Geologist; (Base rate - Rs.504/-+PF Rs.65.2/-+ESI- Rs.16.38/-+Bonus- Rs.41.98/-+EL-Rs.28.22/-=Rs. 656.11/-) | day | 5.7 | **656.11** | **315** | **2,06,675** | Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higherCalculated on the basis of 2 partys |
| d | Charges for Sampler (1 party) | one sampler per day | 1.5.2 | **5,100** | **50** | **2,55,000** | |
| e | Labour Charges (3 Nos)for Sampling Work; (Base rate - Rs.504/-+PF Rs.65.2/-+ESI- Rs.16.38/-+Bonus- Rs.41.98/-+EL-Rs.28.22/-=Rs. 656.11/-) | day | 5.7 | **656.11** | **150** | **98,417** | Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher |
| | **Total - A** | | | | | **22,55,091** | |
| B | **EXCAVATION** | | | | | | |
| 1 | Trenching | per Cu.m | 2.1.1 | **3,330** | **150** | **4,99,500** | |
| | **Total - B** | | | | | **4,99,500** | |
| C | **Survey (1:10,000)** | | | | | | |
| a | Determination of boundary points and base station by DGPS | Per Point of observation | 1.6.2 | **19,200** | **7** | **1,34,400** | 4 Boundary Point & 3 Base station |
| | **Total - C** | | | | | **1,34,400** | |
| D | **LABORATORY STUDIES** | | | | | | |
| 1 | **Chemical Analysis** | | | | | | |
| i) | **Primary samples (BRS/Channel)** | | | | | | |
| | a. For 5 radicals i.e. P2O5, SiO2, Al2O3,Fe2O3 and LOI | Nos | 4.1.3 | **9,805** | **40** | **3,92,200** | |
| | **Check samples Internal (5%) and External(10%)** | | | | | | |
| | a. For 5 radicals i.e. P2O5, SiO2, Al2O3,Fe2O3 and LOI | Nos | 4.1.3 | **9,805** | **6** | **58,830** | |
| ii) | **Primary samples (Trench)** | | | | | | |
| | a. For 5 radicals i.e. P2O5, SiO2, Al2O3,Fe2O3 and LOI | Nos | 4.1.3 | **9,805** | **40** | **3,92,200** | |
| | **Check samples Internal (5%) and External(10%)** | | | | | | |
| | a. For 5 radicals i.e. P2O5, SiO2, Al2O3,Fe2O3 and LOI | Nos | 4.1.3 | **9,805** | **6** | **58,830** | |
| iii) | **Composite Samples** | | | | | | |
| | a. composite samples will be analyzed for 5 radicals | Nos | 4.1.3 | **9,805** | **5** | **49,025** | |
| iv) | **Petrographic Study** | | | | | | |
| i | Preparation of thin section | Nos | 4.3.1 | **2,353** | **3** | **7,059** | |
| ii | Study of Thin Section | Nos | 4.3.4 | **4,232** | **3** | **12,696** | |
| v) | **Mineragraphic Study** | Nos | | | | | |
| i | Preparation of polished section | Nos | 4.3.2 | **1,549** | **3** | **4,647** | |
| ii | Study of polished section | Nos | 4.3.4 | **4,232** | **3** | **12,696** | |
| | **TOTAL - D** | | | | | **9,88,183** | |
| E | **Sub Total (A to D)** | | | | | **38,77,174** | |
| F | **Geological Report Preparation** | | 5.2 | **For the projects upto Rs. 50 Lakhs : A Minimum of Rs. 1.5 lakhs or 5% of the work whichever is more** | 1 | **1,98,859** | EA has to submit the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET. |
| 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. 3.8 Lakhs whichever is lower** | 1 | **77,543** | 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. |
| H | **Peer review Charges** | | As per EC decision | | | **10,000** | |
| I | **Total Estimated Cost without GST** | | | | | **41,63,576** | |
| K | **Provision for GST (18% of GST)** | **%** | | | | **7,49,444** | GST will be reimburse as per actual and as per notified prescribed rate |
| L | **Total Estimated Cost with GST** | | | | | **49,13,020** | |
| | | | | ***or Say Rs. In Lakhs*** | | ***49.13*** | |

***Note - If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC.***