PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR PHOSPHORITE IN NIMBLI BLOCK, TEHSIL-FATEHGARH, DISTRICT-JAISALMER, RAJASTHAN

COMMODITY: PHOSPHORITE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED
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SEMINARY HILLS
NAGPUR, MAHARASHTRA

PLACE: NAGPUR
DATE: 29th NOV, 2023

Summary of the block for proposed Nimbli block proposed for Preliminary Exploration (G-3)

General Information about the block

<table>
<tr><td></td><td>Features</td><td>Details</td></tr>
<tr><td></td><td>Block ID</td><td>Nimbli block</td></tr>
<tr><td></td><td>ExplorationAgency</td><td>Mineral Exploration & Consultancy Limited(MECL)</td></tr>
<tr><td></td><td>Commodity</td><td>Phosphorite</td></tr>
<tr><td></td><td>MineralBelt</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>12 months</td></tr>
<tr><td></td><td>Objectives</td><td>The objectives of current program would be:
1. To confirm the Phosphorite occurrence along the strike and dip continuity with subsurface drilling.
2. To Estimate Phosphorite resources at G-3 level
3. To facilitate the state 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.

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>1 (one) Geologist (Field) 180 days
1 (one) Geologist (HQ) 30 days</td></tr>
<tr><td></td><td>Expected Field days (Geology, surveyor)</td><td>180</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 & Nimbli of Tehsil-Fatehgarh, Dist: Jaisalmer, Rajasthan.</td></tr>
<tr><td></td><td>Latitude and Longitude</td><td>Co-ordinates of Corner Points of Nimbli Block in WGS84 (DMS)
<table>
<tr><th rowspan="2">Block Cardinal Points</th><th colspan="2">UTM Zone-42 (m)</th></tr>
<tr><th>Easting (m)</th><th>Northing (m)</th></tr>
<tr><td>A</td><td>690363.4099</td><td>2900741.7710</td></tr>
<tr><td>B</td><td>693116.3576</td><td>2902684.8000</td></tr>
<tr><td>C</td><td>692331.9713</td><td>2903129.3150</td></tr>
<tr><td>D</td><td>691118.5043</td><td>2900313.3370</td></tr>
</table></td></tr>
<tr><td></td><td>Villages</td><td>Virbhani, Kohra & Nimbli</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>2.70 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)	Minimum temperatures upto -10^0 C (Jan) 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. 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. Kohra block is part of Proposed Nimbli Block. 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%. 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 exploration was carried out by MECL with a total meterage of 3752m in 69 no of exploratory boreholes, and a total of 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 0.4 km strike length of Ladu Singh Sector (0.58 sq km). Thus, a total of 4.63 million tonnes resource of phosphorite in both Birmania and Ladu Singh Sector are estimated by MECL. v) To establish the strike (NNE-SSW) and depth continuity of the ore body through subsurface drilling, MECL proposes G-3 exploration in Nimbli block lying adjacent to the explored Birmani FAGMIL lease and Biramni phosphorite deposit explored by GSI.

PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR PHOSPHORITE IN NIMBLI BLOCK, TEHSIL-FATEHGARH, DISTRICT-JAISALMER, RAJASTHAN

1.0.0. **PREAMBLE**

1.1.0. Agriculture, including its allied sector, is the largest source of income in India. The agricultural sector's success largely depends on the fertilizer industry, which manufactures some of the most important raw materials required for production of crops. Rock phosphates or phosphorites are sedimentary phosphatic deposits comprising fine-grained mixture of various calcium phosphates, most important being hydroxylapatite, carbonate apatite, fluoro-apatite and their solid solutions. About 80% phosphate production in the world is derived from phosphate rocks (phosphorite) containing one or more phosphatic minerals, usually calcium phosphate of sufficient purity and quantity to permit its use directly or after concentration in manufacturing commercial products. Phosphate rock is processed to produce phosphorous, which is one of the three main nutrients most commonly used in fertilizers (the other two are nitrogen and potassium).India's dependency on import at present is to the extent of 90% in case of phosphates either as raw material or finished fertilizers. The increasing demand of phosphorus in the country could be eased with the exploration of new phosphorus deposits of economic importance.

1.2.0. **INDIA'S PHOSPHATE DEMAND**

1.2.1. 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.

1.2.2. 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, MECL has submitted proposal of consent to DGM, Rajasthan for carrying out preliminary exploration (G-3) in Nimbli block, Tehsil: Fatehgarh, District: Jaisalmer. Upon receiving the consent from the state of Rajasthan Herewith submitting for preliminary exploration (G-3) proposal for phosphorite in Nimbli block.

2.0.0 **BLOCK DESCRIPTION**

2.1.0 The Nimbli Block area falls in part of Survey of India Toposheet No.40 J/16 and covers an area of 2.70 sq. km in and around villages Virbhani, Kohra & Nimbli of district: Jaisalmer, state Rajasthan. The block location on topo-sheet is given as PLATE-I. The Co-ordinates of the corner points of the block area both geodetic and UTM are given in table below.

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

Block Cardinal Points	UTM Zone-42 (m)	
	Easting (m)	Northing (m)
A	690363.4099	2900741.7710
B	693116.3576	2902684.8000
C	692331.9713	2903129.3150
D	691118.5043	2900313.3370

2.2.0 **LOCATION AND ACCESSIBILITY**

2.2.1 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.

2.2.2 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.

2.3.0 **PHYSIOGRAPHY**

2.3.1 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.

2.3.2 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.

2.3.3 The area exhibits typical features of the desert climate. Temperatures reaching up to 49ºC common during the summer while 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 characterises 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. (Regional Geological Map is enclosed as Plate-II). 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 Khuiala	Chalky limestone, fossiliferous limestone and silt stone Gypseous shales and marls, fossiliferous hard limestone	470 m
		Unconformity	
Palaeocene	Sanu	Sandstone	200 m
		Unconformity	
Cretaceous	Parh Goru/abur Parihar	Sandstone Aranesous limestone, fragmental and fossiliferous limestone and quartzitic sandstone Feldspathic sandstones with occasional hard calcareous grits and ferruginous sandstone	1000 m
		Unconformity	
Jurassic	Bedesar Baisakhi Jaisalmer Lathi	Hard ferruginous and calcareous grits with inter-calatory sandstone Soft shales, sandy shales, silts, sandstone and quartzitic sandstone Conchoidal limestone and sandstone Sandstones, grits and shales	2000 m
		Unconformity	
Triassic	Shumarwali	Sandstone	700 m
		Unconformity	
Permian	Karampur	Sandstone, Shale, Clay	500 m
		Unconformity	
Cambrian	Birmania Randha		600 m
		Unconformity	
Pre-Cambrian	MalaniIgneoussuite Jalore-Siwana Granite	Granites, Rhyolites, Porphyries, metamorphics	

3.2.0 **REGIONALSTRUCTURE OF THE BLOCK**

3.2.1 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.

3.2.2 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 by MECL.

3.2.3 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.

3.2.4 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.

3.2.5 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.

3.0.0 GEOLOGY OF BLOCK

3.0.1 STRATIGRAPHY:

3.0.2 The proposed Nimbli block phosphorite falls in the Birmania basin which is an oval shaped

basin located in Thar desert of western Rajasthan, India. It is underlain by Malani Igneous Suite of rocks which belong to Cambrian (After DGH). The Birmania basin comprises around 900-metre-thick sedimentary sequence of siliciclastic, carbonate and phosphorite facies.

3.0.3 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	

3.0.4 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).

3.0.5 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. In the southern part of the proposed Nimbli block, 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 Nimbli block (in the southern part of the area) owing to their inter-calatory relationship.

3.1.0 **ROCK FORMATIONS:**

3.1.1 **Cherty limestone:** The cherty limestone forms the oldest rocks member in the area mapped and is exposed in the southern part of the proposed Nimbli block. 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.

3.1.2 **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.

3.1.3 **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**.**

3.1.4 **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 Nimbli 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.

3.1.5 **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. The variegated shale – siliceous limestone association intersected immediately above the Phosphate horizon, mainly seen in the southern part of proposed Nimbli 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.

3.1.6 **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.

3.1.7 **Cherty limestone:** Overlying the calcareous chert is a medium to fine grained, light buff coloured, calcareous sandstone in the proposed Nimbli 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.

4.0.0 PREVIOUS WORK/ BACKGROUNDINFORMATION:

4.0.1 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).

4.0.2 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.

4.0.3 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.

4.0.4 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. Kohra block is part of Proposed Nimbli Block.

4.0.5 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 40.0m.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.

4.0.6 In the year 2022, MECL has carried out G-2 level exploration in Notified Mining Lease area (about 4 sq.km) of FCI Aravali Gypsum and Minerals India Limited (FAGMIL) (PSE, Ministry of Chemical and Fertilizers),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 are estimated by MECL.

4.1.0 **OBSERVATIONANDRECOMMENDATIONSOFPREVIOUSWORK:**

4.1.1 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. Kohra block is part of Proposed Nimbli Block.

4.1.2 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.

4.1.3 MECL carried out G-2 level exploration in FY: 2022, in Notified Mining Lease area (about 4 sq.km) of FCI Aravali Gypsum and Minerals India Limited (FAGMIL) (PSE, Ministry of Chemical and Fertilizers), 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 Sector are estimated by MECL.

4.1.4 Based on the previous work and strike persistence of phosphorite bands in birmania phosphorite deposit, Nimbli block which is adjacent to Birmania block may be taken up for further G-3 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 Nimbli Block, the following scheme of exploration has been formulated. The details of different activities to be carried out are presented in subsequent paragraphs**.**

5.2.0 The exploration is proposed with the following objectives:

- Updating of Geological map on 1:2000 scale with structural details and decide on planning of exploratory borehole.
- Topographical survey at 1:2,000 Scale, with 1m contour interval.
- To establish the 2.5km strike (NNE-SSW) and depth continuity of the ore body through subsurface drilling in two phases, in phase-I boreholes will be drilled on 400m section interval and followed by 200m section interval in phase-II. A total of 1700m in 32 no of exploratory boreholes is proposed.
- To estimate Phosphorite resources as per UNFC norms at 5% cutoff (IBM threshold value) as per Minerals (Evidence of Mineral Contents) Rules 2015 amended upto 2021.
- To facilitate the state govt. for auction of the block.

5.3.0 **Geological Map**

5.3.1 The geological map on 1:500 scale is available in pdf format, which is not legible, hence Geological mapping will be carried out and map will be prepared on (1:2000 scale) based on structural data, surface samples, borehole locations, trenches etc. The available geological map will be used as base map for mapping work. Based on the structural mapping data, exploratory boreholes will be planned on 400 and 200 section interval.

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

5.4.1 During the geological mapping a total of 50 nos. of bed rock/channel samples will be collected from phosphorite bearing rocks.

5.5.0 **Topographical Survey**

5.5.1 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 drilled boreholes will be survey by DGPS.

5.6.0 **Surface Drilling**

5.7.0 The present exploration scheme is prepared by proposing total core drilling of 1700 m in 32 boreholes in two phases. In phase-I, after the completion of geological & structural mapping over the block area, MECL shall plan and drill exploratory boreholes on 400m section spacing and in phase-II which is based on the positivity of exploratory boreholes drilled in phase-I, infilling boreholes on 200m spacing will be carried out. Accordingly, Inclined/ Vertical exploratory boreholes are planned in 400m strike interval in 1st phase to establish resources, as phosphorite beds are shallow as well as deeper vertical boreholes are planned in synclinal trough axis and angular boreholes are planned perpendicular to the dip direction of ore body limbs to estimate true width of the phosphorite ore body.

5.8.0 Based on the exploratory drilling and trenching data of GSI and MECL average thickness of the ore body is 7.00 m (ore body has min 0.5m and max 17.0m in boreholes MBMP-14 and MBMP-01). Vertical depth of phosphorite ore body as encountered is 64.0m in MBMP-01 which is part of synclinal trough**.**

5.9.0 The proposed borehole locations are tentative and it may relocate after the updation of geological map. The details of proposed boreholes in the block are given below:

Sl No	Section Line	Proposed Borehole No	Meterage (m)	Dip	Azimuth
1	S-1A	PBH-01A	60.00	45°	N38°W
2	S-1	PBH-01	55.00	45°	S38°E
3		PBH-02	55.00	45°	N38°W
4	S-2	PBH-03	100.00	45°	S38°E
5	S-3	PBH-04	30.00	55°	S30°E
6		PBH-05	30.00	90°	
7		PBH-06	30.00	50°	N30°W
8	S-4	PBH-07	35.00	90°	
9		PBH-08	55.00	90°	
10		PBH-09	45.00	45°	S30°E
11		PBH-10	55.00	45°	N30°W
12	S-5	PBH-11	90.00	90°	
13		PBH-12	35.00	45°	S30°E
14	S-6	PBH-13	60.00	45°	S30°E
15		PBH-14	70.00	90°	
16	S-7	PBH-15	80.00	90°	
17	S-8	PBH-16	115.00	90°	
18	S-9	PBH-17	95.00	45°	S30°E

Sl No	Section Line	Proposed Borehole No	Meterage (m)	Dip	Azimuth
19	S-10	PBH-18	30.00	45°	S30°E
20		PBH-19	35.00	45°	S30°E
21		PBH-20	60.00	90°	
22		PBH-21	30.00	90°	N30°W
23	S-11	PBH-22	75.00	45°	N30°W
24		PBH-23	40.00	45°	S30°E
25		PBH-24	65.00	45°	N30°W
26	S-12	PBH-25	95.00	90°	
27	S-13	PBH-26	35.00	45°	S30°E
28		PBH-26A	40.00	45°	N30°W
29		PBH-26B	25.00	45°	S30°E
30		PBH-26C	25.00	45°	N30°W
31	S-14	PBH-27	25.00	90°	
32	S-15	PBH-28	25.00	90°	
		TOTAL	170.00		

5.10.0 **Drill Core Logging and Sampling**

5.10.1 Geological core logging will be carried out systematically by recording carefully the minute details and physical/lithological characters of the rock formations including colour, core recovery, grain size, weathered zone, texture, banding, mineralogical composition, micro-structural/structural details, lithological variations along with visual estimate in respect of P_2O_5 content encountered in boreholes."A SHAPIRO SOLUTION" will be used at field for identification of Phosphorite bearing zones in the drill cores during logging. Rock quality designation (RQD) shall also be carried out, while logging drill cores. On the basis of these parameters, grade of Phosphorite can be broadly assessed and it will also be helpful in sampling/ demarcating the Phosphorite zones**.**

5.11.0 **Core Sampling**

5.11.1 Entire drill core of one of the boreholes is proposed to be sampled at 1 m length in order to demarcate Phosphorite bearing horizons. In the remaining boreholes, samples will be restricted to Phosphorite zones demarcated based on Shapiro's solution results. The samples will be drawn at 1 m interval depending upon the change in lithology and core recovery a total 350 no of core samples will be drawn.

5.11.2 Drilled core will be split in to two equal halves for collection and preparation of primary samples. The other half portion of the drilled core sample will be kept as duplicate half for specific gravity determination, petrographic/ mineragraphic studies and for future

reference. The whole quantity of half portion of the sample as marked while logging will be crushed to (-) 120 mesh and 500gm representative sample of (-) 120 mesh will be drawn by coning and quartering method by gradual reduction. Two samples weighing 100 gm each will be drawn, out of which one will be sent to Chemical Laboratory MECL, Nagpur for Primary Chemical analysis for 5 radicals and the other will be kept for the purpose of check analysis. The remaining 300gm will be kept for preparation of Composite samples and for future reference.

5.11.3 Each sample shall be marked at every 1 m 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 shall be drawn to mark the floor of the Phosphorite zone decisively.

5.11.4 10% of the total primary samples need to be analyzed from any NABL accredited laboratory as external checks to test the reliability of sampling and analytical data.

5.11.5 After receipt of Primary analytical results of the borehole core samples, mineralized zones will have to be marked at 5% P_2O_5 cut off as specified by IBM (5-16% P_2O_5 Beneficiable grade, (+)16% P_2O_5 Soil Reclamation Grade, 25-30% P_2O_5 Blendable grade, (+)30% P_2O_5 Chemical and fertilizer grade) for each of the boreholes. For each of the Phosphorite zones encountered in boreholes, composite samples will have to be prepared by combining each primary sample within the respective zone in their length proportions and reducing the sample by coning and quartering method for drawl of final sample. The BH-core composite samples will be analyzed for14 radicals.

5.12.0 Laboratory Studies

5.12.1 Chemical Analysis:

5.12.2 Primary Samples: Total 400 numbers of primary (Core/bedrock/Channel) samples and 40 number of check samples (10% of primary samples as External) 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%.

5.12.3 Composite samples: Around 30 composite samples will be prepared analyzed for 14 radicals i.e.P_2O_5%, SiO_2%, Al_2O_3%, Fe_2O_3% & LOI%, CaO%, MgO%, TiO_2%, Na_2O%,

K_2O%, F%, Cl%, V_2O_5% and organic carbon%, also all the 30 no of samples will be analyzed for 34 elements by ICP-MS method.

5.13.0 XRD studies will be done on 10 nos of composite samples to know the presence of trace elements.

5.14.0 Petrological Studies: About 20 nos of drill core specimens will be studied.

5.15.0 Mineragraphic Studies: About 10 nos of drill core specimens will be studied.

5.16.0 Specific Gravity Determination: Specific Gravity studies will be done on around 10 no's of drill core specimen.

6.0.0 Quantum of Work

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

Proposed Quantum of Work for Preliminary Exploration (G-3) for Phosphorite in Nimbli block, Tehsil: Fatehgarh, Dist: Jaisalmer

Sl. No.	Item of Work	Unit	Proposed Quantum ofwork
1	Geological Mapping (on 1:2,000 Scale)	sq km	2.70
	Topographical Survey (on 1:2,000Scale)	sq km	2.70
	Bore Hole Fixation	Nos	32
	RL & Coordinate Determination	Nos	37
2	Geochemical Sampling	Nos.	50
	Channel sampling		
3	Exploratory Drilling(Core drilling)	m	1700 m (32 BHs)
5	Laboratory Studies		
	A. Surface samples(Bedrock 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.	50
	ii)External Check samples (10% of Primary samples) for analysis of 5 i.e. P_2O_5, SiO_2, Al_2O_3,Fe_2O_3 and LOI	Nos.	5
	B. **Primary samples for Borehole**		
	i) Chemical Analysis; Primary for 5 radicals i.e. P_2O_5, SiO_2, Al_2O_3, Fe_2O_3 and LOI by XRF method	Nos.	350
	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.	35
	C. Composite sample from zones of borehole samples		
	Composite samples will be analyzed for14 radicals i.e.P_2O_5, SiO_2, Al_2O_3, Fe_2O_3, LOI, CaO, MgO, TiO_2, Na_2O, K_2O, F, Cl, V_2O_5 and organic carbon	Nos	30
6	**Physical Studies**		
7	Trace element study by IC-PMS (34elements)	Nos.	30

Sl. No.	Item of Work	Unit	Proposed Quantum ofwork
8	XRD studies	Nos	10
9	Petrographic Studies	Nos	20
10	Mineragraphic Study	Nos	10
11	Specific Gravity Determination	Nos	10
12	Report Preparation (Digital format)	Nos.	1 No.

6.0.0 Cost Estimate

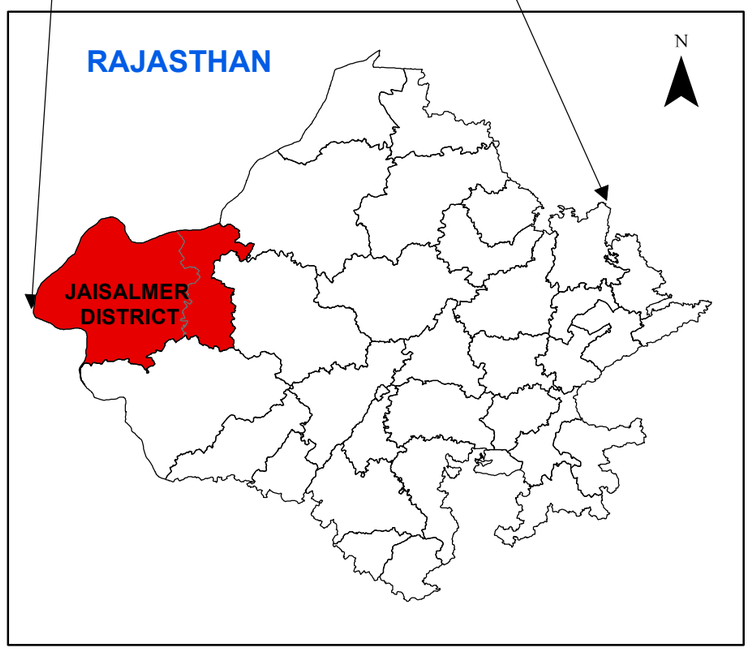
6.1.0 Cost has been estimated based on actual schedule of rates mandated in the circular OM No.61/1/2018/NMET dated 31st March 2020 for NMET Funded Projects. The total estimated cost is Rs. 355.98 Lakh. The summary and details of cost estimates is given below**:**

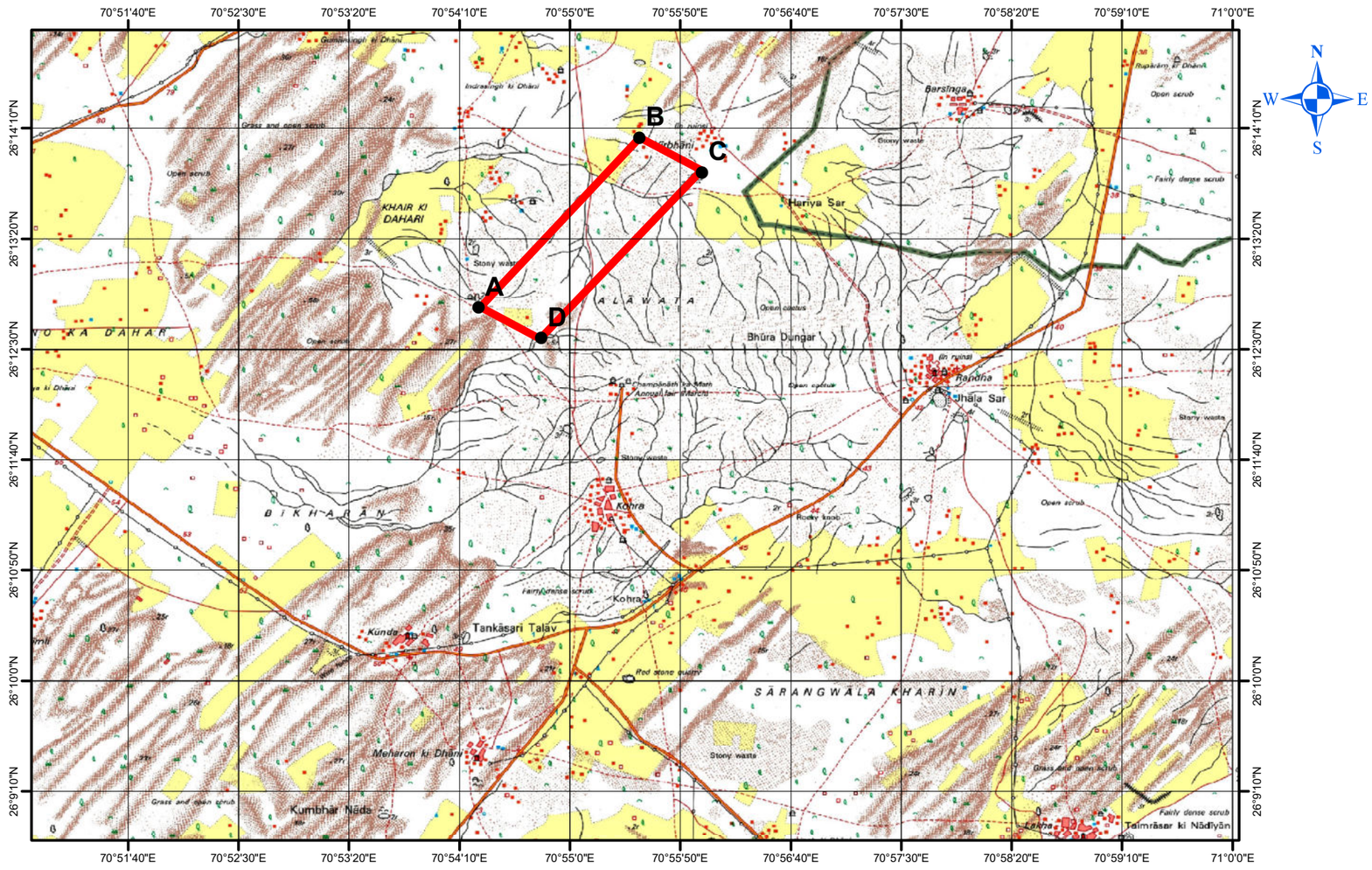
Sl. No.	Item	Estimated Cost INR (₹)
1	Exploratory Drilling	2,26,64,280
2	Geology & Survey	38,42,700
4	Laboratory Studies	22,67,680
	Sub total	**2,87,74,660**
6	Report	8,63,240
7	Peer Review	30,000
8	Proposal Preparation	5,00,000
	Total	**3,01,67,900**
9	GST (18%)	54,30,222
Total cost including 18% GST		**3,55,98,122**
SAY, in Lakhs		**355.98**

Plates:

1. Location Plan of Nimbli block
2. Regional Geological map showing Nimbli Phosphorite (G-3 block)
3. Nimbli Block Geology Map.
4. Geological cross sections of Nimbli Phosphorite (G-3 block)

Location Map of Proposed Nimbli Block (2.70 sq. km.) at G3 Level Exploration for Phosphorite Mineral
District: Jaisalmer, State: Rajasthan (Part of Toposheet No: 40J/16)





1 cm = 1 km

0 0.5 1 2 3 4 Kilometers

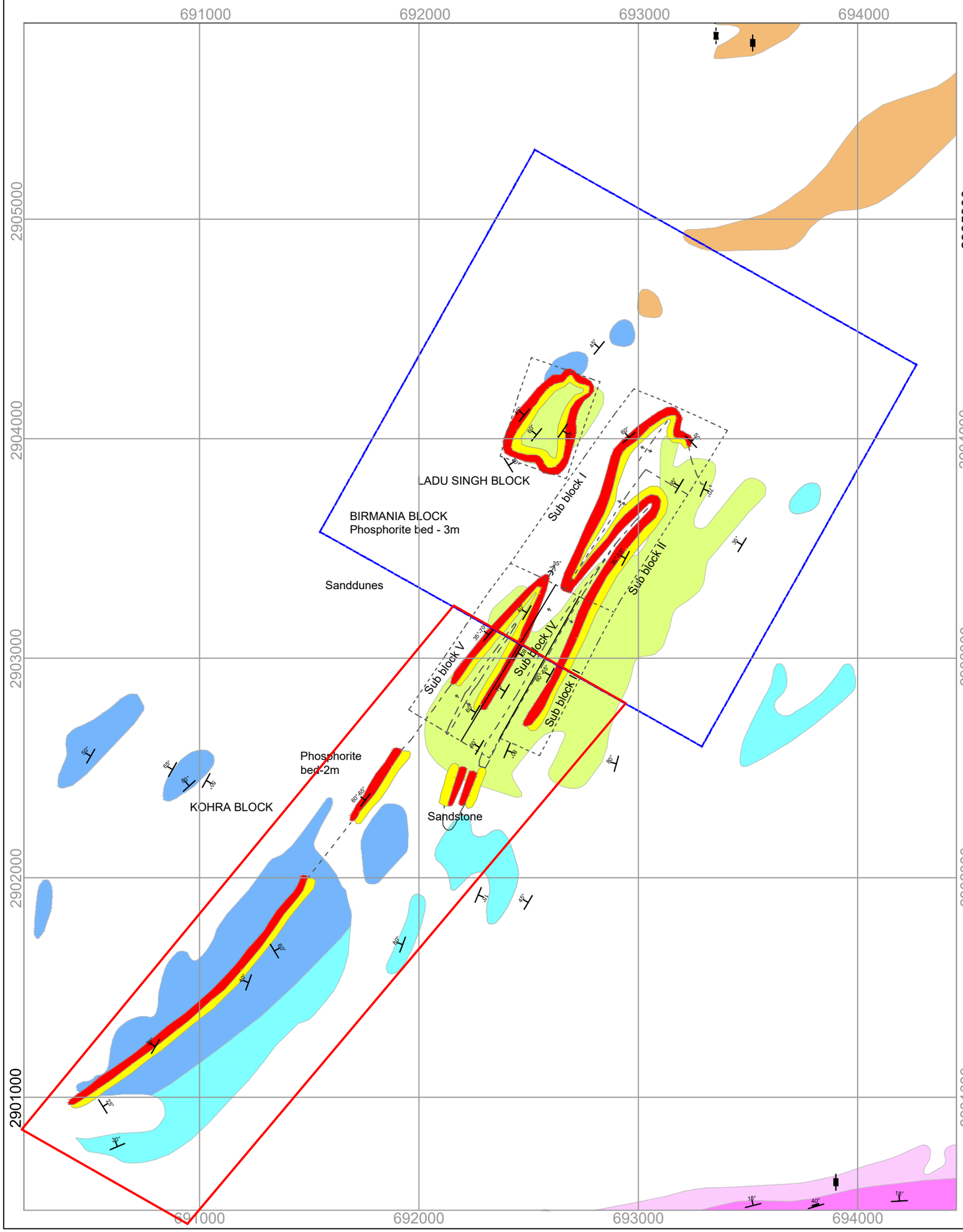
Block Cardinal	UTM Zone-42 (m)	
	Easting (m)	Northing (m)
A	690363.4099	2900741.7710
B	693116.3576	2902684.8000
C	692331.9713	2903129.3150
D	691118.5043	2900313.3370

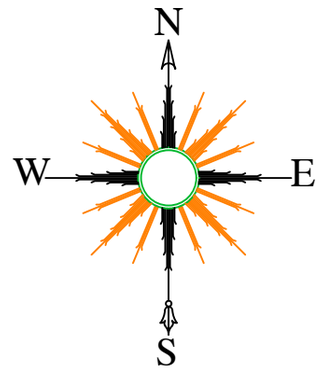
Legend

- Nimbli Block CornerPoints
- Proposed Nimbli (G-3) Block

MINERAL EXPLORATION AND CONSULTANCY LTD.
(Formerly Mineral Exploration Corporation Ltd.)
Ministry of Mines, Govt of India Enterprise, MINIRATNA-I CPSE
An ISO 9001:2015, 14001:2015 & 45001:2018 Certified Company
MECL

REGIONAL GEOLOGICAL MAP OF PROPOSED NIMBLI BLOCK, FATEHGARH-TAHSIL, JAISALMER-DISTRICT, RAJASTHAN.





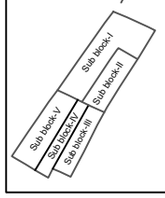
SCALE 1:20,000

LEGEND

- PHOSPHORITE BEDS
- SAND STONE
- PHOSPHORITE BEARING SANDY LIMESTONE
- CALC/FERUGINOUS/QUARTZITIC SANDSTONE, CHERTY LIMESTONE
- CHERTY, DOLOMITIC LIMESTONE, SHALY SST, SILTSTONE
- GRITTY, PEBBLY/FERRUGINOUS SST, CONGLOMERATE, SILTSTONE, CLAY
- FERRUGINOUS, QUARTZITIC SANDSTONE AND SHALE
- CALCAREOUS, QUARTZITIC SANDSTONE WITH GRITTY BANDS
- FINE AEOLIAN SAND AND SILT WITH OCCASSIONAL KANKAR

INDEX

- FAGMILL LEASE BOUNDARY
- PROPOSED NIMBLI BLOCK BOUNDARY
- 25° BEDDING
- 40° INCLINED JOINT
- VERTICAL JOINT
- 35° FOLD AXIS



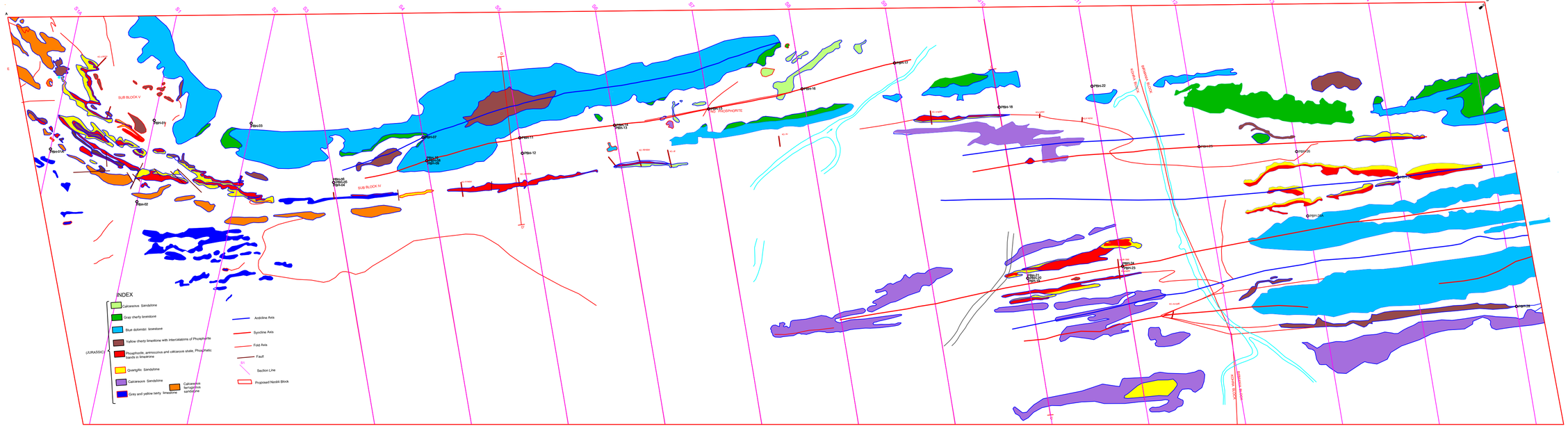
KEY MAP FOR SUB BLOCKS

PLATE-II

SOURCE:

1. SKETCH MAP OF SANDSTONE-PHOSPHORITE BASIN THE BIRMANIA AREA, JAISALMER DISTRICT (Based on planetable map of the area on 1:500 Scale) Scale 1cm=200 metre(Approx) by G.S.I (RAJ) D.O.No-48/66
2. BHUKOSH, GSI

GEOLOGICAL MAP OF NIMBLI PHOSPHORITE (G-3 BLOCK) TEHSIL FATEHGARH, DISTRICT: JAISALMER, RAJASTHAN, SCALE: 1:5,000



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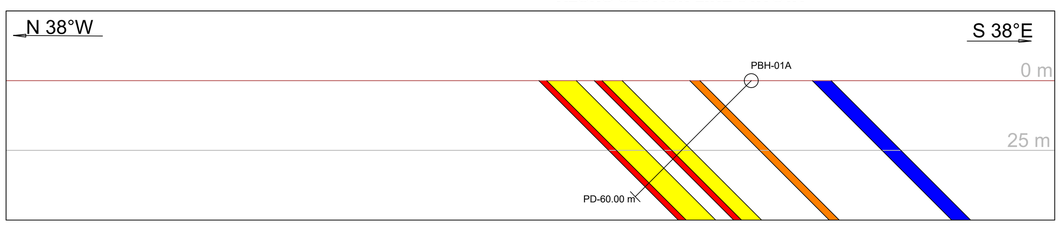

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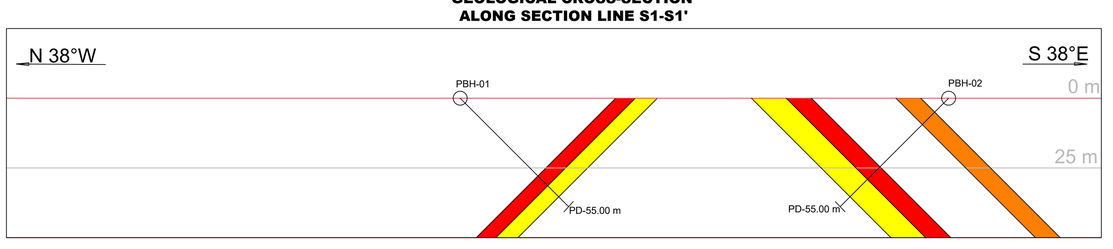

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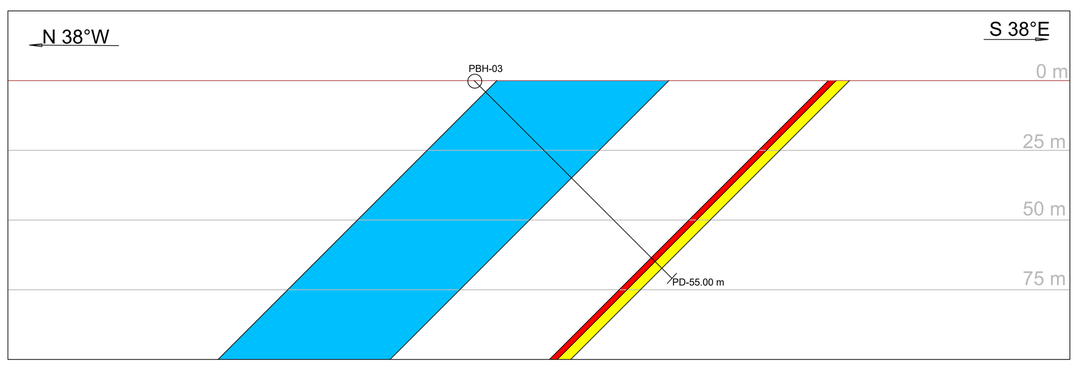

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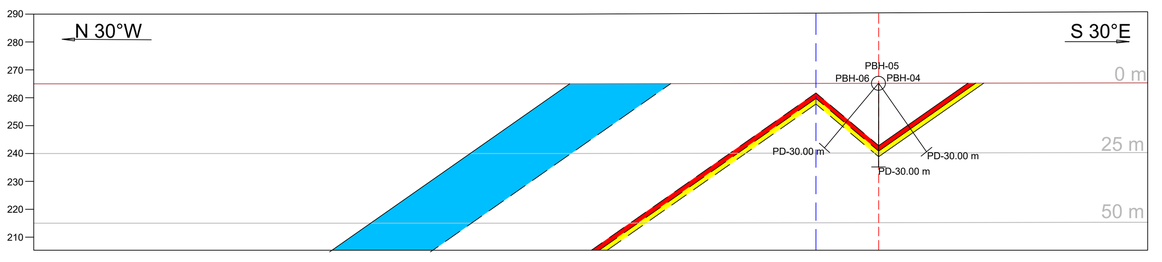

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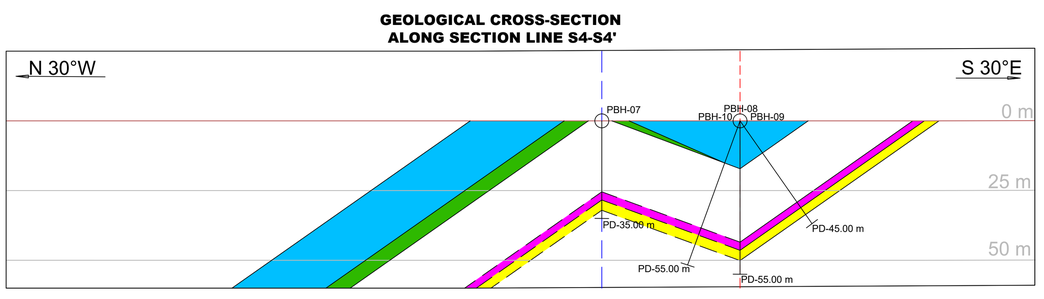

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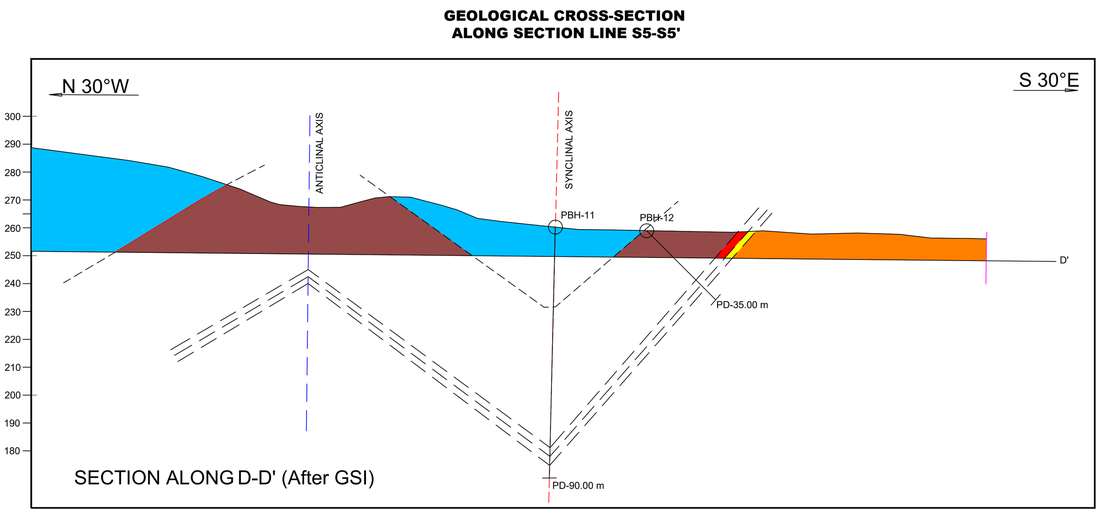

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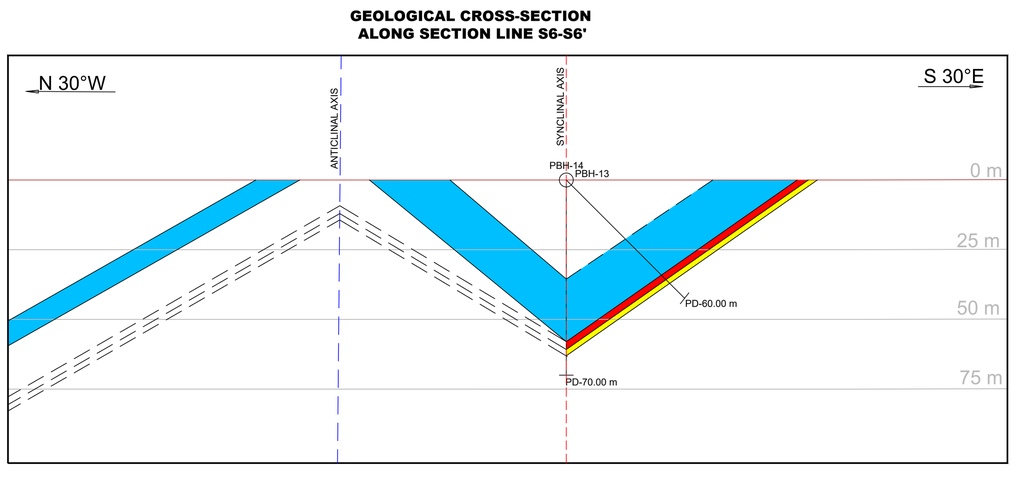

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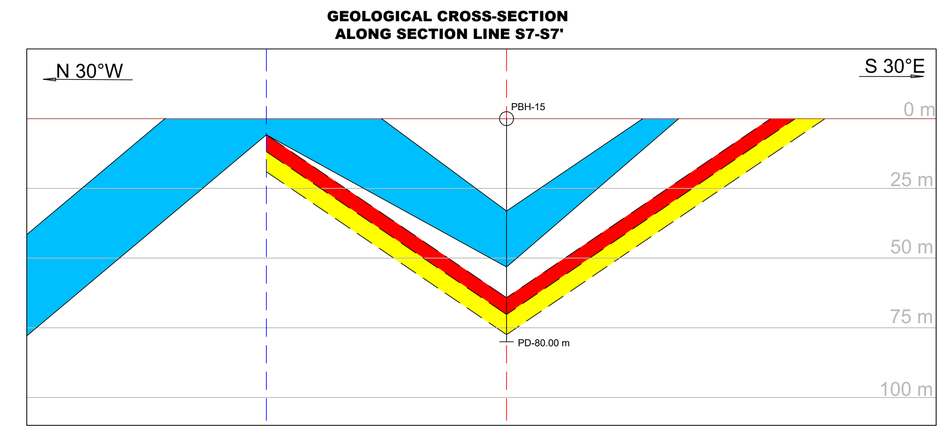

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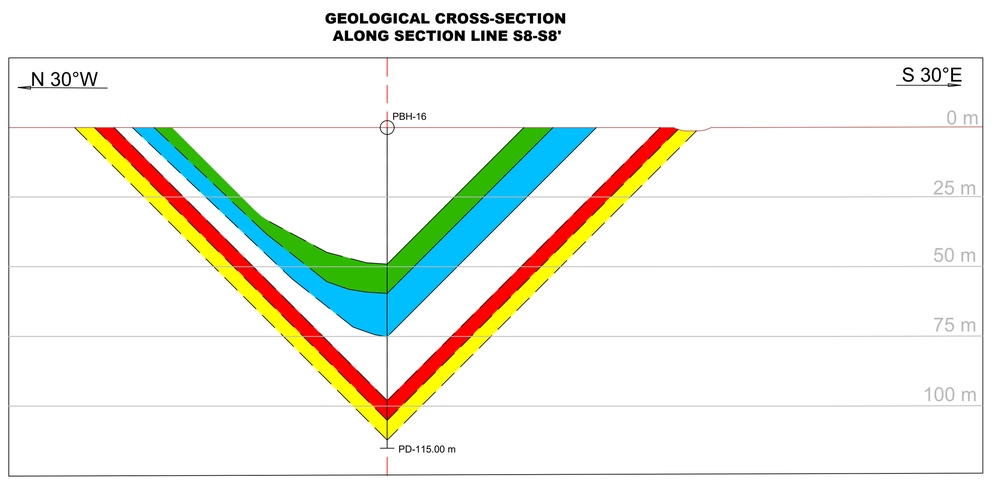

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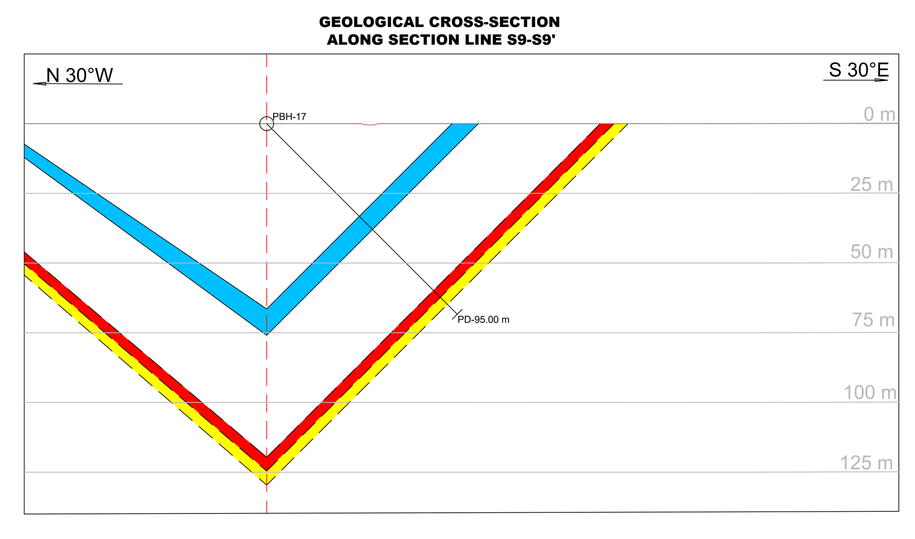

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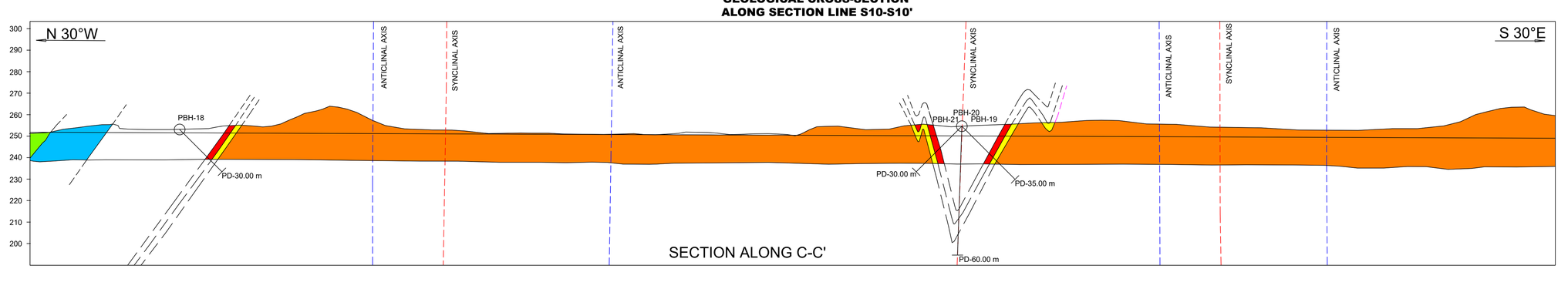

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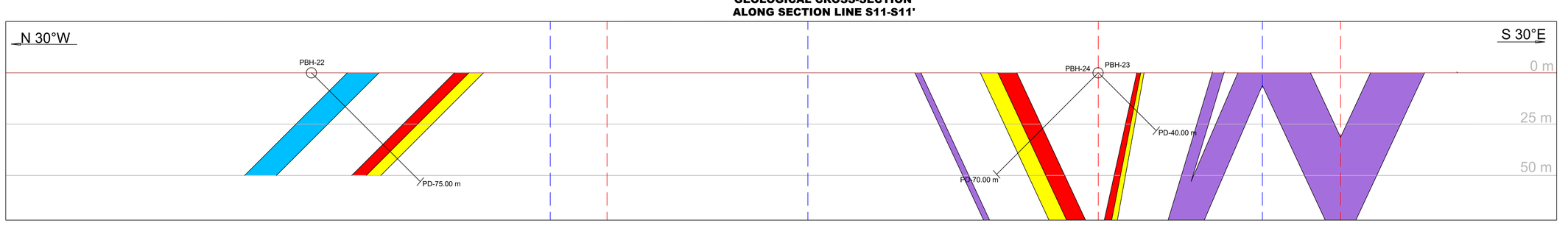

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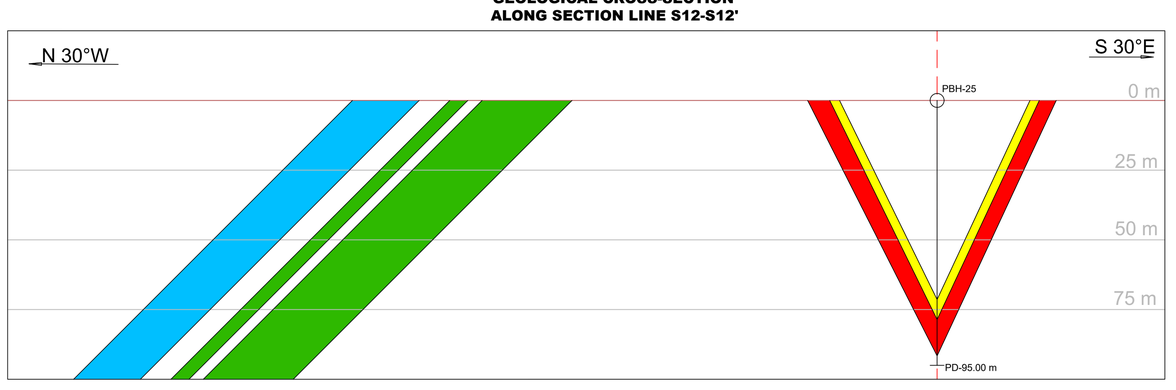

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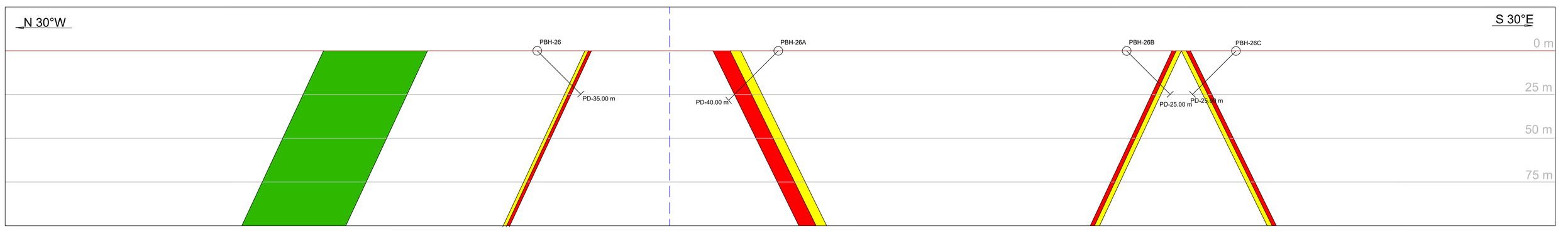

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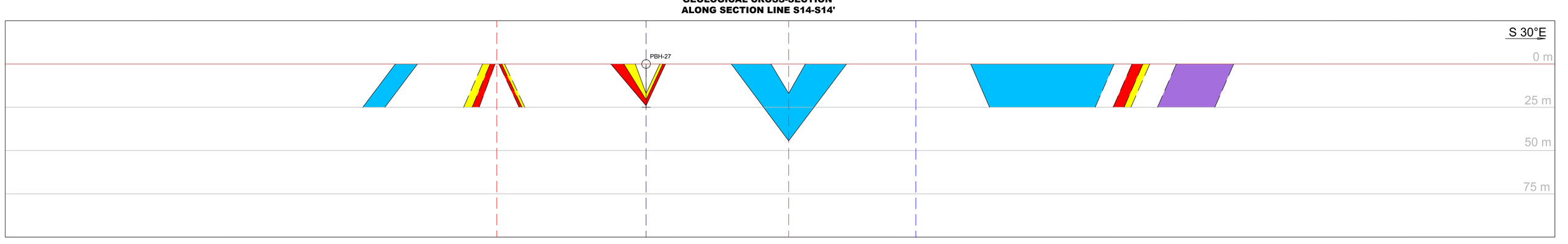
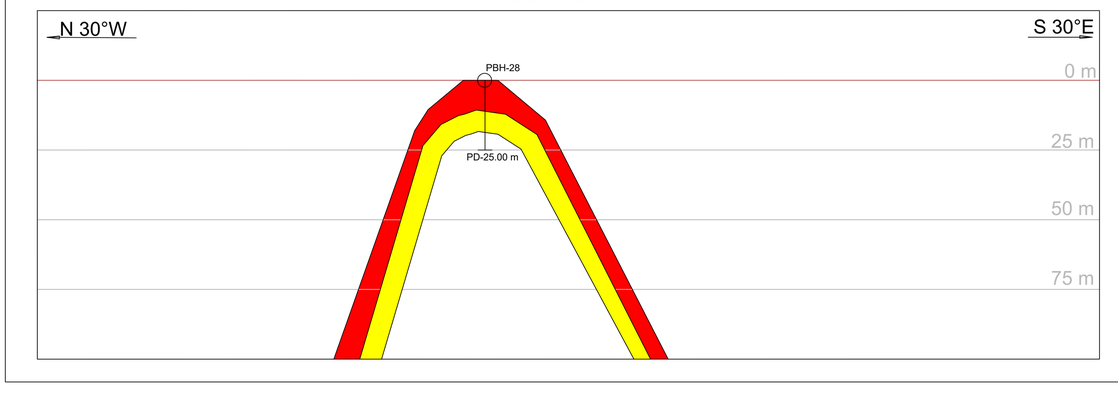


GEOLOGICAL CROSS-SECTION ALONG SECTION LINE S15-S15'



INDEX

- CHERTY LIMESTONE
- GREY CHERTY LIMESTONE
- BLUE DOLOMITIC LIMESTONE
- YELLOW CHERTY LIMESTONE
- PHOSPHORITE- (CALCAREOUS SANDY SHALE)
- QUARTZITIC SANDSTONE
- CALCAREOUS SANDSTONE (WHERE FERRUGINOUS)
- CALCAREOUS SANDSTONE

SYNCLINE AXIS

ANTICLINE AXIS

PBH-37 / PD-25.00 m — MECL PROPOSED BOREHOLE

0 10 20 30 40 50 METRES

SCALE=1:1000

MINERAL EXPLORATION AND CONSULTANCY LIMITED
(Formerly Mineral Exploration Corporation Limited)

GEOLOGICAL CROSS SECTION
ALONG SECTION LINES S1A TO S15

PROPOSED NIMBLI PHOSPHORITE BLOCK (G-3)

DISTRICT - JAISALMER — STATE- RAJASTHAN

RF. 1:1000

MECL/EXPL./NOV-2023 — PLATE- IV

COST ESTIMATE FOR PRILIMINARY EXPLORATION (G-3) FOR PHOSPHORITE IN NIMBLI BLOCK, BIRAMNIA BASIN, TEHSIL: FATEHGARH, DISTRICT: JAISALMER, STATE: RAJASTHAN.
Total Area - 2.70 sq km; Nos. of Borehole - 32 (Tentative) ; Completion Time - 12 Months, Review: after 2 months

S.N	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Total Amount (Rs)	
A	**GEOLOGICAL WORK**						
1	**Detalied Mapping, Topographical Survey, Borehole logging & sampling & report writing**						
a	Charges for one Geologist per day at HQ	day	1.3	9,000	30	2,70,000	
b	Charges for Geologist party per day at field	day	1.3	11,000	180	19,80,000	
c	Labour (2 Nos each party)	day	5.7	504	360	1,81,440	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
d	Charges for one Sampler per day (1 Party)	one sampler per day	1.5.2	5,100	55	2,80,500	
e	Labours (4 Nos)	day	5.7	504	220	1,10,880	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
2	**Survey (on 1:2000 Scale)**						
a	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes and Boundary points by DGPS	Per Point of observation	1.6.2	19,200	37	7,10,400	BH-32 nos (Tentatively) & Base Station 1 Nos and Block boundary 4 nos
b	Surveyor	per day	1.6.1a	8,300	30	2,49,000	
c	Labour	day	5.7	504	120	60,480	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub-Total A					**38,42,700**	
B	**DRILLING (After Review:2 months)**						with Structural Ma
1	Drilling up to 300m (Hard Rock)	m	2.2.1.4a	11,500	1,700	1,95,50,000	bh:32
3	Borehole deviation Survey by Multishot Camera	m	2.2.6	330	-	-	
4	Land / Crop Compensation (in case the BH falls in agricultural Land)	per BH	5.6	20,000	32	6,40,000	Amount will be reimbursed as per actuals or max. Rs. 20000/- per BH
5	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	32	64,000	
6	Borehole plugging by cement	m	2.2.7b	150	-	-	
7	Transportation of 2 no of Drill Rig & Truck associated per drill	Km	2.2.8	36	7,360	2,64,960	To: 2 rig (Nagpur to Virbhani, Jaisalmer) =1840*2 km
8	Monthly Accommodation Charges for drilling Camp (Rs 50000/- per Month upto 2 rigs	month	2.2.9	50,000	5	2,50,000	
9	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	2	5,00,000	
10	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	2	5,00,000	
11	Road Making (Flat Terrain)	Km	2.2.10a	22,020	6	1,32,120	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
12	Drill Core Preservation	per m	5.3	1,590	480	7,63,200	
	Sub Total B					**2,26,64,280**	
C	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i)	**Primary samples**						
	a. Analysis of 5 radicals i.e. P_2O_5, SiO_2, $A_{l2}O_3$, Fe_2O_3 and LOI	Nos	4.1.15a	4,200	400	16,80,000	350 Core samples and 50 bedrock/channel samples
ii)	**Check samples External(10%)**						
	a. Analysis of 5 radicals i.e. P_2O_5, SiO_2, $A_{l2}O_3$, Fe_2O_3 and LOI	Nos	4.1.15a	4,200	40	1,68,000	
iii)	**Check samples Internal(5%)**						
	a. Analysis of 5 radicals i.e. P_2O_5, SiO_2, $A_{l2}O_3$, Fe_2O_3 and LOI		4.1.7a	2,506	-	-	
iii)	XRD analysis for identification of minerals (Random)	Nos	4.5.1	4,000	10	40,000	
Iv)	34 elemental Trace Elemental studies on composite samples (alongwith U & Th)	Nos	4.1.14	7,731	30	2,31,930	
	Sub-Total -1					**21,19,930**	
2	**Physical Laboratory**						
i.	Specific Gravity Determination	No.	4.8.1	1,605	10	16,050	
ii	Complete Petrographic/ore microscopic study/Minerographic report of rock samples	No.	4.3.4	4,232	20	84,640	
	Preparation of Standard Thin Section		4.3.1	2,353	20	47,060	
iv	**Sub Total- 2**					**22,67,680**	
E	**Total - A to D**					**2,87,74,660**	
G	**Geological Report Preparation**		**5.2**	**Reconnaisance Survey/Preliminary exploration / General exploration / Detailed exploration exceeding Rs 150 laksh but less than 300 lakhs: A minimum of Rs. 7.5 lakhs or 3% of the value**		**8,63,240**	EA has to submit the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET
H	**Peer review Charges**		**As per EC decision**			**30,000**	
	Preparation of Exploration Proposal (5 Hard copies with a soft copy),	5 Hard copies with a soft copy	5.1			**5,00,000**	EA has to submit the Hard Copies and the soft copy of the final proposal along with Maps and plan as suggested
J	**Total Estimated Cost without GST**					**3,01,67,900**	
K	**Provision for GST (18% of GST)**	**%**				**54,30,222**	GST will be reimbursed as per actual and as per notified prescribed rate
L	**Total Estimated Cost with GST**					**3,55,98,122**	
				Rs. Lakhs		***355.98***	
Note:							

TIME SCHEDULE/ACTION PLAN FOR PRILIMINARY EXPLORATION (G-3) FOR PHOSPHORITE IN NIMBLI BLOCK, BIRAMNIA BASIN, TEHSIL: FATEHGARH, DISTRICT: JAISALMER, STATE: RAJASTHAN.

Sl. No.	Activities	Unit	MONTHS											
			1	2	3	4	5	6	Review	7	9	10	11	12
1	Camp Setting	day												
2	Core Drilling (2 rigs)	m.												
4	Geologist Party days (1 Party)	day												
5	Sampling Party days, Core Sampling	day												
6	Camp Winding	day												
7	Laboratory Studies	Nos.												
8	Geologist Party days (1 Party), HQ	day												
10	Report Writing & Peer review	day												
NOTE														
1	**Commencement of project may be reckoned from the day the exploration acreage is available along with all stautory clearances.**													
2	**Time loss on account of monsoon/agricultural activity/forest clearence/local law & order problem/ lockdown etc will be additional to above time line.**													