Proposal for Bauxite exploration in Reldi Moti Block, Kachchh District, Gujarat State Reconnaissance Survey (G4 Stage) under NMET.

(Bauxite)

By

Critical Mineral Trackers

Place: Hyderabad
Date:12.12.2024

Summary of the Block for Reconnaissance Survey (G4 Stage)
GENERAL INFORMATION ABOUT THE BLOCK

	Features	Details
	Block ID	CMT/NMET/2024/GJ/BLOCK-D
	Exploration Agency	CRITICAL MINERAL TRACKERS HYDERABAD
	Commodity	Bauxite
	Mineral Belt	Deccan Trap
	Completion Period with entire Time schedule to complete the project	4 months
	Objectives	Search and assessment of Bauxite resources in Reldi Moti Block , Kachchh district,Gujarat
	Whether the work will be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency	Primarily, M/S Critical Mineral Trackers will carry out the work. However, CMT will outsource some specialised works like chemical analysis and drilling.
	Name/ Number of Geoscientists	Geo Scientists – 4 (2 senior and 2 junior) S.Rama Murthy/Uma Maheswara Rao P. Gandhi Two Junior Geologists
	Expected Field days (Geology) Geological Party Days	Total Field Man Days (Geologist) Approximately..___ 150 Man days Geological Party Days 75 Approximately
1.	**Location**	
	Latitude (DD)	23.320^0 to 23.344^0
	Longitude(DD)	69.899^0 to 69.930^0
	Villages	RELDI MOTI, RELDI NANI, PADHAR, LAKHOND, KUKMA AND BHUJ

	Tehsil/ Taluk	BHUJ
	District	KACHCHH
	State	GUJARAT
2.	**Area (hectares/ square kilometres)**	
	Block Area	7.95 SQ KM
	Forest Area	NA
	Government Land Area	NA
	Private Land Area	NA
3.	**Accessibility**	
	Nearest Rail Head	BHUJ
	Road	NH 341
	Airport	AHMEDABAD
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	Dendritic drainage pattern is common in the area with fourth and fifth order streams running parallel to the strike of the rocks towards the east or south. The prominent streams flow through the area viz. the southerly flowing laksekh Nadi in west and south-easterly flowing Song Nadi.
	Rivers/ Streams`	The prominent streams flow through the area viz. the southerly flowing laksekh Nadi in west and south-easterly flowing Song Nadi.
5.	**Climate**	
	Mean Annual Rainfall	Hot ,Semi-Arid climate with average rainfall : 460 mm

	Temperatures (December)(Minimum) Temperatures (June)(Maximum)	47.8°C 8°C
6.	**Topography**	
	Toposheet Number	41E/16
	Morphology of the Area	Gently undulating to Undulatory , ridges, pediment & pediplains
7	**Availability of baseline geoscience data**	
	Geological Map (1:50K/ 25K)	**Available , source GSI Bhukosh**
	Geochemical Map	**Available , source GSI Bhukosh**
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	**Ground geophysical data is available , source GSI Bhukosh**
8.	**Justification for taking up ReconnaissanceSurvey / Regional Exploration**	During the geological mapping and special thematic mapping by GSI, has reported that rocks of the Matanomadh Formation consist of ferruginous laterites, laterite/bauxite and clay, besides the Deccan Traps The proposed block was investigated by CGM in terms of trenching, pitting, and drilling, and pocket type of deposits were reported in the area (Kukma). An estimated resource of bauxite in Kukma area was found to be 2342 tons. The results of the chemical analysis of samples show average Al2O3% to be 51.29% and average SiO2% to be 4.78%. Thus, G4 level of exploration is recommended for this block.

1. Block Summary

Physiography

The area shows undulatory topography. The average elevation of the area is around 120 m with a gradual decrease in height from south to north. The physiography of the area is controlled by lithology and structure. The northern part of the area forms a relatively flat ground with average elevation of 120 m, above sea level

The Reldi Moti area forms an integral part of Kachchh mainland geomorphic province comprising east-west trending ridges arranged in a "step" like profile from north to south constituting the Deccan lavas. To its north, the ridge complex profile abruptly descends into vast plains underlain by

Mesozoic rocks, the southern limit of the Deccan lava ridge profile flattens out where Tertiary rocks can the lava flows. The range of elevation in the block area varies from 115 m in the northeast part of the block to 149 m MSL in the southwestern part of the block

Background Geology (Regional Geology, Geology of the Block).

The proposed Reldi Moti block forms part of the Kachchh basin which has been an important site for the deposition of Mesozoic and Cenozoic sediments.

The Mesozoic sediments are represented by the Chari Formation of Middle to Upper Jurassic, the Katrol Formation of Upper Jurassic to Lower Cretaceous and the Bhuj Formation of Lower to Upper Cretaceous period.

Fine- grained basalt flows belonging to the Deccan volcanics occur as capping at number of hillocks in the area. A number of east-west trending basic dykes occur as intrusives in the area between Modsar in the east and Lodai in the west. They intrude both the Meozoic sediments as well as the Deccan lava flows. Three intertrappean beds are recorded near Bhachau beside the Ahmedabad – Bhuj highway. Ash beds of about half meter are found exposed near the high way as well as along the railway pass near the Bhachau railway station, above the basalt lava flows.

Basic dykes and sills are observed intruding Mesozoic rocks and lava flows.

The Tertiary sequence commences with an unconformity marked by a polymictic boulder conglomerate. Gypseous shale, massive grey and mottled calcareous clay, marl, intra-formational conglomerate, shale interbedded with thin calcareous sandstone and thick medium-grained grey micaceous sandstone completes the Tertiary sequence, though these are not consistent throughout the area.

Holocene sediments comprise alluvium, aeolian sands, and riverbed deposits.

The study of sedimentary structures in the area indicates repetitive tectonic disturbances. The autoclastic intraformational conglomerate, warping, open folds; faults and sand-dykes provide ample evidences of paleoseismicity in the area.

The geology of the Reldi Moti Block comprises laterite of the Matanomadh Formation which is associated with shale, clay, and sandstone of the Sandhan Formation. The area also includes basalt of

the Anjar Volcanics and clay of the Khadi Nari Formation. The bauxite deposit covers a surface area of 3370 square meters. The average thickness of the bauxite zone is 0.60 meters. The pocket's northern and western edges are surrounded by ferruginous laterite, and its southern and eastern edges are formed by agricultural land.

Mineral potentiality based on geology, geophysics, ground geochemistry etc. Scope for proposed exploration. As per the compilation by the Commissioner of Geology and Mines, Gujarat, on Mineral resources of the Gujarat, the proposed block comprises of Deccan traps and the analysis of the satellite imagery of the proposed block indicates the presence of laterite/bauxite deposits. And the previous works of GSI between 1895 and 2022 also indicated the potential occurrence of lateritic bauxite and bauxite associated with lithounits of Matanomadh Formation and Anjar volcanics of Deccan Traps

Observation and Recommendations of previous work.

During the geological mapping and special thematic mapping by GSI, has reported that rocks of the Matanomadh Formation consist of ferruginous laterites, laterite/bauxite and clay, besides the Deccan Traps. As per the compilation by the Commissioner of Geology and Mines, Gujarat, on Mineral resources of the Gujarat, the proposed block comprises of Deccan traps and the analysis of the satellite imagery of the proposed block indicates the presence of laterite/bauxite deposits.

2. Previous Work..

Ghevariya et al mapped the adjoining area of the Nadapa block and delineated Mesozoic rocks belonging to Chari (Jumara), Katrol (Jhuran) and Bhuj Formations. As per them , Deccan Trap is represented by interstratified volcano sedimentary sequence and lava flows; Tertiary Formations are represented by Madh, Mandaviya and Antarjal Formations and Quaternary is represented by grapestone and Miliolite limestone.

B.K. Sahu et al mapped the area during 2004-2005 to study the structural set up, paleoseismicity and geomorphic changes due to 2001 Bhuj earthquake in the area, strip mapping along KMF with a widh of 5 km was done for 300 sq km on 1:25000 scale

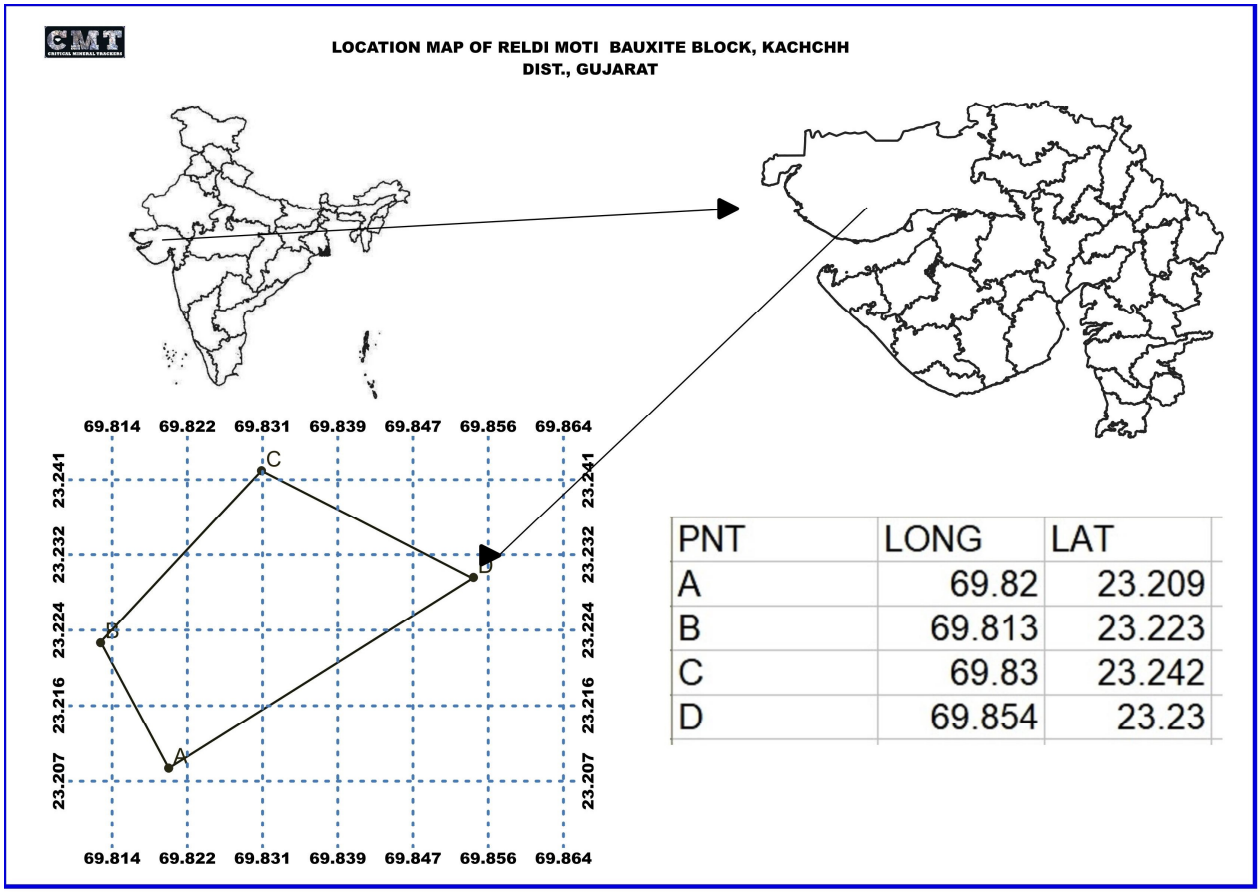
Specialized Thematic Mapping of Inter- Trappean beds of Anjar Volcanics, in an around Anjar, Kachchh District, Gujarat, with Special Investigation on Sedimentology and Vertebrate Paleontology was carried out by Shreya Basu et al during FS 2021-22. They too reported occurrence of laterite/bauxite in association with lithounits belonging to Mathnomath Formation and Anjar volcanics in the area

The proposed block was investigated by CGM in terms of trenching, pitting, and drilling, and pocket type of deposits were reported in the area (Kukma). An estimated resource of bauxite in Kukma area was found to

be 2342 tons. The results of the chemical analysis of samples show average Al2O3% to be 51.29% and average SiO2% to be 4.78%. Thus, G4 level of exploration is recommended for this block.

3. Block description

Block Corner points Cardinal Points	Latitude	Longitude
PNT	LAT	LONG
A	23.209	69.82
B	23.223	69.813
C	23.242	69.83
D	23.23	69.854



4.

Planned Methodology

1. Collection of the previous data pertaining to Geological, Geochemical and Geophysical etc..
2. Reconnoitory traverses – to understand major lithologies exposed in the block area.
3. Systematic Geological Mapping of the block area on 1:25000
   - Systematic sampling of bedrock samples
   - Pitting and Trenching would be carried out in a grid pattern in the block area to identify the mineralised zones of Bauxite
   - Sample Collection in pits will be collected at an interval of 200m
   - Samples within the trenches will be at one metre interval.
   - The samples generated in field are sent to chemical, petrological & Ore microscopy studies.
   - Analysis of the samples in NABL accredited laboratories for REE minerals/elements.
   - Preparation of elemental contour diagram and variation diagrams for associated elements
   - Resource Estimation

5. Nature Quantum and Target

Nature and Quantum of work proposed

Components	G4 Stage
Aerial reconnaissance	Remote sensing
Geological Survey	i) 1.25K/ 12.5K ii) Assessment of lithology, structure, surface mineralisation.
Geochemical Survey	i) Regional Grab / chip / Stream Sediment / Soil Sampling ii) Recording of broad geomorphology, drainage, etc.
Pitting/ Trenching	Five to ten to expose mineralised zone. The location of Pitting and trenching will be judiciously planned to cover the entire mineralised body, to delineate the strike extension and also for planning scout boreholes. Sample length to be specified
Scout drilling / Systematic drilling	Few boreholes if required along the positive profiles delineated by surface sampling/pitting trenching, if necessary

Grab and Chip sampling	A few samples from bed rock (few representative samples from all the exposed rocks in the area for first-hand information and more samples from rocks which host the mineralisation). Fewrepresentatives samples to be subjected to Davis tube recovery test in case of BMQ.
Petrographic and mineragraphic studies	Principal rock types, mineral assemblage, identification of minerals of interest
Synthesis of allavailable data	i) Integration of regional geophysical, geological and geochemical data.Synthesis of all available data and Report writing

6. Manpower deployment

- Two senior Geologists
- Two junior geologists
- Two labour for each team(4 labour)
- One sampler +2 labour for sample collection & preparation.

V. Summary of Expenditure

COST ESTIMATE FOR RECONNAISANCE SURVEY (G4) OF NADAPA BLOCK KUCHCHH District ,GUJARAT State		
S.NO.	**ITEM**	**COST ESTIMATE(in Rupees)**
A.	Geological Work	**2,228,740**
B.	Survey Work	134,400
C.	Core Drilling(4 Bore Holes) 30m Depth Each	730,880
D.	Laboratory Studies & Petro logical Studies	712,957
E.	Preparation of Project Proposal	**76,140**
F.	Preparation of Final Geological Report 5 Additional Copies	**190,349**
	Total(Excluding GST)	**4,078,465**

7. References

- Systematic Geological Mapping Of The Area West And South Of Anjar, Kachchh District, Gujarat Ghevariya,Z.G, 1984-85
- Specialized Thematic Mapping of Inter- Trappean beds of Anjar Volcanics, in an around Anjar, Kachchh District, Gujarat, with Special Investigation on Sedimentology and Vertebrate Paleontology ; Shreya Basu &Pantawane Harshawardhini K, GSI Unpub report FS2021-22
- Report On The Systematic Geological Mapping Of The Area West Of Anjar ,Kachchh District, Gujarat by Srikarni,C, Ghevariya,Z.G, GSI Unpub report FS 1986-87
- Special Thematic Mapping In The Area Along Kachchh Mainland Fault, Gujarat Sahu,B.K, Singh,P.K GSI Unpub report FS 2004-2005
- Gujarat's Mineral Wealth: A Ressponsible Exploration Paradigm by the Commissioner of Geology and Mines, Gujarat, 2024

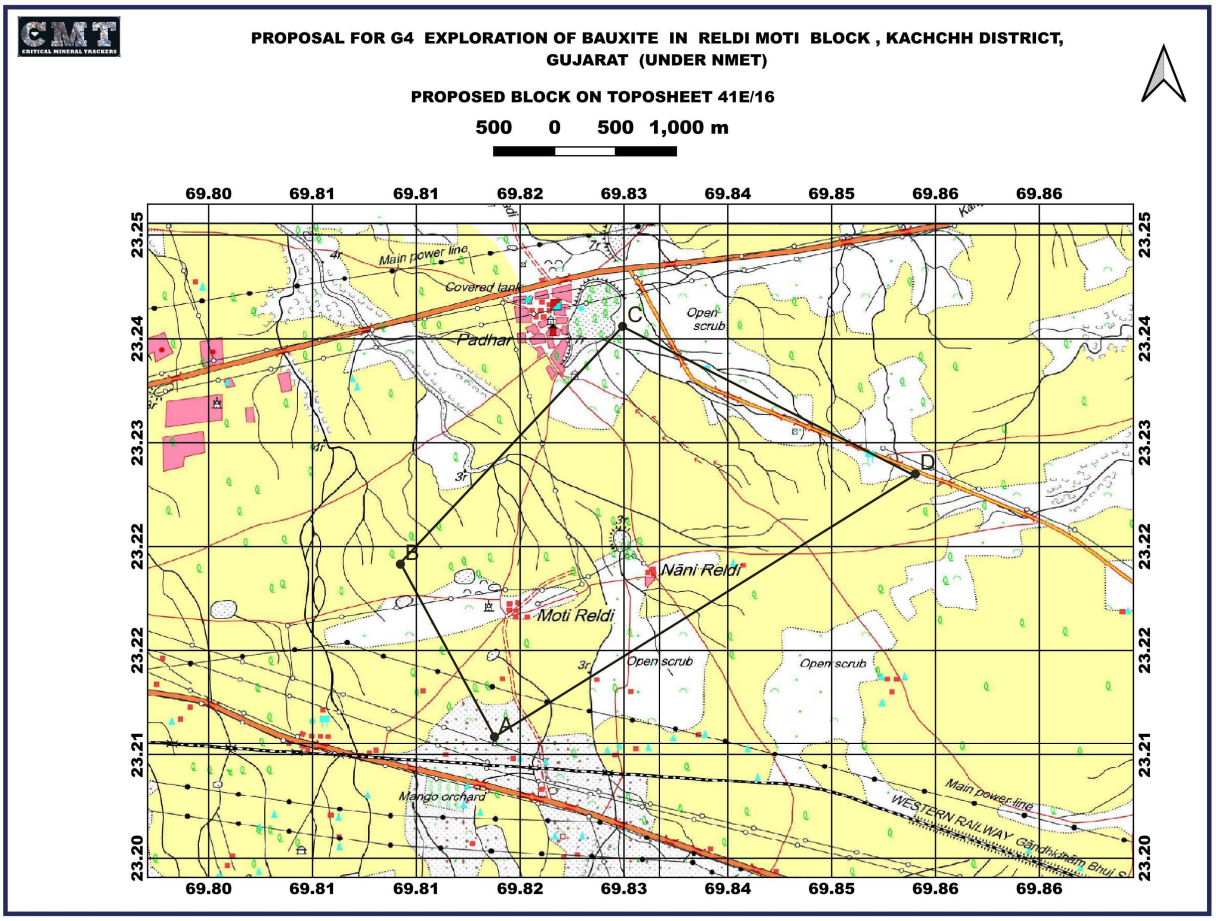
List of Plates

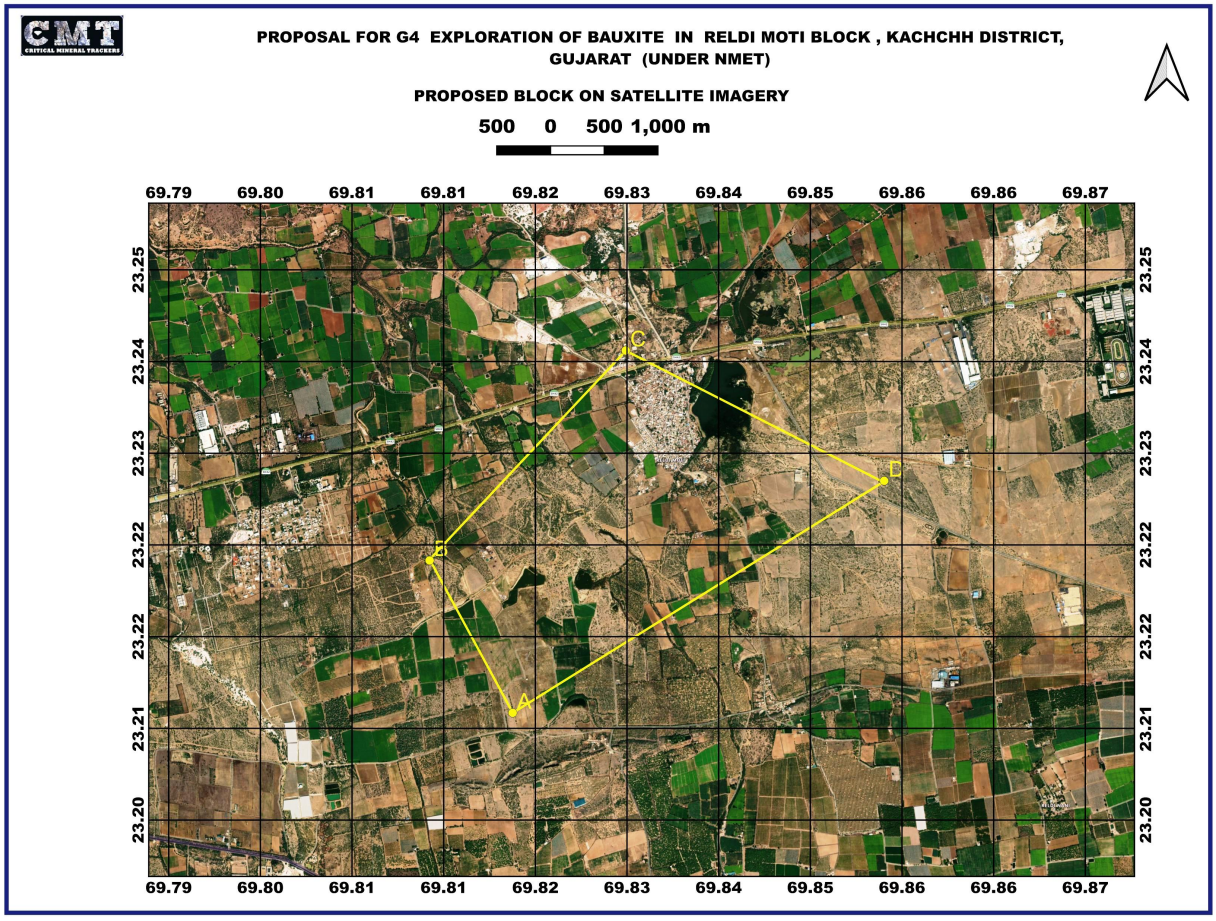
Plate: Location map.

Plate: Proposed block boundary over topographic map.

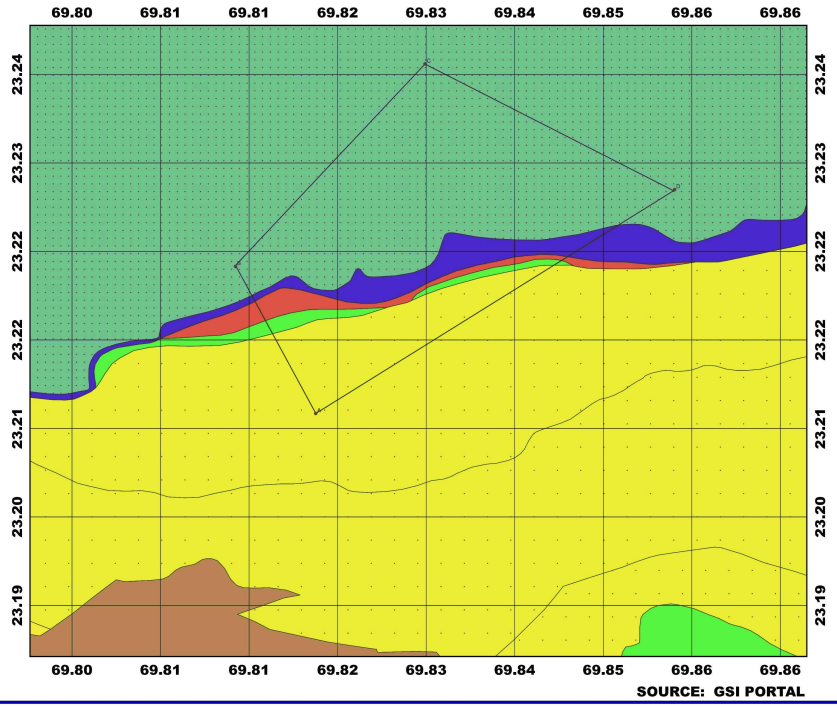
Plate: Proposed block boundary over satellite imagery.

Plate: Proposed block boundary over Geological map.


PROPOSAL FOR G4 EXPLORATION OF BAUXITE IN RELDI MOTI BLOCK , KACHCHH DISTRICT, GUJARAT (UNDER NMET)
PROPOSED BLOCK ON TOPOSHEET 41E/16
500 0 500 1,000 m
69.80
69.81
69.81
69.82
69.83
69.84
69.85
69.86
69.86
23.25
23.24
23.23
23.22
23.22
23.21
23.20
Main power line
Covered tank
Padhar
Open scrub
C
D
B
Nāni Reldi
Moti Reldi
Open scrub
Open scrub
A
Mango orchard
Main power line
WESTERN RAILWAY Gandhidham Bhuj


PROPOSAL FOR G4 EXPLORATION OF BAUXITE IN RELDI MOTI BLOCK , KACHCHH DISTRICT, GUJARAT (UNDER NMET)
PROPOSED BLOCK ON SATELLITE IMAGERY
500 0 500 1,000 m
69.79
69.80
69.81
69.81
69.82
69.83
69.84
69.85
69.86
69.86
69.87
23.25
23.24
23.23
23.22
23.22
23.21
23.20
A
B
C
D

PROPOSAL FOR G4 EXPLORATION OF BAUXITE IN LAKHOND BLOCK , KACHCHH DISTRICT, GUJARAT (UNDER NMET)
GEOLOGICAL MAP OF LAKHOND BLOCK



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Formation	Group	Supergroup	Age
SANDHAN			PLIOCENE
KHARI NADI			OLIGOCENE
MATANOMADH			pALEOCENE
ANJAR VOLCANICS	KACHCHH	DECCAN TRAPS	LATE CRETACEOUS
BHUJ			EARLY CRETACEOUS
KATROL			LATE JURASSIC
CHARI			,MID-LATE JURASSIC

SOURCE: GSI PORTAL

Title of Project – PROPOSAL FOR BAUXITE EXPLORATION IN Title of Project – PROPOSAL FOR BAUXITE EXPLORATION IN							
"RELDI MOTI BLOCK"							
KACHCHH DISTRICT,GUJARAT STATE (G4 STUDY) Name of the Exploration Agency – Critical Mineral Trackers, Hyderabad Total Area -4.95sq.km ; No of Boreholes- 3 ; Completion Time -4 months							
S.No	Item of Work	Unit	Rates as per NMET SoC		Estimated Cost of the Proposal		Remarks
			SoC-Item-Sl No.	Rates as per SOC	Qtm	Total Amount(Rs)	
A	Geological Work						
1	Geological Mapping(1:25,000) & sampling – Geologist field-days	6.12	1.2	11000	110	1,210,000	man days
2	Geologists(HQ)days, pre & post field interpretation 15 +20 days	One Geologist Per Day	1.2	9000	35	315,000	man days(icluding Remote sensing studies
3	Pitting-20nos each one size 1*1*1m(1 Cu.m each)	Per Cu.m	2.1.2	3800	20	76,000	20 cu.m
4	Trenching-5 nos, each one size 10*1*1(10 cu.m each)	Per Cu.m	2.1.1	3300	50	165,000	50 cu.m

5	sampler	45 days	1.5.2	5100	45	229,500	man days
6	Labour(2 labour) attached to sampler	90 labour days	1.5.2	476	90	42,840	labour days
7	Labour (100Field days) per team:2 workers : 100*4 for two geoglist teams	Per Team of 2 Geologists (2*2=4) Labour/Field workers	5.7	476	400	190,400	labour days
	Sub-Total -A					**2,228,740**	
B	**Survey Work:**						
1	Surveyor: Fixation & connection of boundary points(4 nos),3 Bh by Total station/DGPS	One surveyor	1.6.2	19,200	7	134,400	Total 7 points
	Sub-total-B					**134,400**	
C	**Core Drilling**						
1	Scout drilling(coring) :3 points(each 30m deep) 3*30	Per meter	2.2.1.1b	5,242	90	471,780	90m,soft rock
2	Construction of BH pillar(12”*12”*30”)	Per pillar	2.2.2a	2000	3	6,000	3 pillars
3	**Mob & demob drilling machine & iner BH shifting	Per shifting	lumpsum			50,000	Lumpsum
4	Compensation for 3 Bhs		5.6	20,000	3	60,000	3 BHs

5	Drill core preservation in GI boxes	Per meter	5.3	1590	90	143,100	90m core
	Sub total-C					**730,880**	
D	**Laboratory Studies**						
1	Trench Samples (5*5=25nos):by AAS method	First five radicals+2	4.1.7a &7b	2841	25	71,025	25 samples
2	Pitting Sample: (20*1=20nos)-AAS method	First five radicals+2 radicals	4.1.7a &7b	2841	20	56,820	20 samples
3	Core drilling Samples-3*60=180 Total depth 30m each, samples will be collected at every 0.5m interval. AAS method	First five radicals+2 radicals	4.1.7a &7b	2841	180	511,380	180 samples
4	Analysis for REE(14 elements/radicals) by ICP-MS	14 elements/radicals	4.1.13	5380	4	21,520	4 samples
5	Combined determination of THA,MHA and Reactive silica		4.1.17a	6700	4	26,800	4 samples
6	Preparation of standard thin section	Per sample	4.3.1	2353	4	9,412	4 sections

7	Complete petrographic/oremicroscopic/mineragraphic studies		Not recommended				
8	XRD analysis for identification of minerals(random)	Per sample	4.5.1	4000	4	16,000	4 samples
	Sub-total-D					**712,957**	
E	**Surface Geophysical Survey**		**May not be required**				
1	Electrical resistivity	Per Station					
2	gravity surveys	Per station					
3	Geo Physicist Man days (Field Man-days)						
4	Geo Physicist Man days (HQ)						
	Sub-total-E						
	TOTAL (A+B+C+D)					**3,806,977**	
F	**Preparation of Exploration Proposal** (5 Hard copies with a soft copy)		5.1	2% of the project	1	76,140	2% of the Project cost.

				cost subject to a maximum of 5 lakhs			
G	**Geological Report** (5 Hard copies with a soft copy)		5.2	5% of the Project cost		190,349	5% of the Project Cost.
	Additional Copy			1000	5	5000	
	Project Cost without GST					**4,078,465**	
	18% GST					**734,124**	
	Total Project Cost					**4,812,589**	

VI. Time Line: Four months (120 Days)

Sno	Activity	Unit	Months				
			1	2	3	4	
1	Geologist Party Days HQ	Days					35 days
2	Geologist Party Days Field	Days					75 days
3	Sampling (Pitting & Trenching)	Days					40 days
4	Laboratory Studies	Days					90 days
5	Core Drilling	Days					30 days
6	Survey Party Days	Days					15 days
8	Post Field Interpretation	Days					15 days
9	Report Compilation & Submission	Days					10 days