

**PROPOSAL FOR EXPLORATION FOR LIMESTONE IN
RANIGAON-GONDAIYA BLOCK, TEHSIL - KOTA,
DISTT.- BILASPUR, CHHATTISGARH**

1.0.0. INTRODUCTION

- 1.1.0.** On enactment of MMDR Amendment Act 2015, Mineral (Evidence of Mineral Contents) Rule 2015 and Mineral Auction Rule 2015, Govt. of India directed State Governments to speed up exploration work for different Mineral Commodities in the respective states. Accordingly State Government of Chhattisgarh requested MECL to take up exploration work of Limestone in 2 Blocks in Nahardih-Madhaipur & Ranigaon-Gondaiya Blocks of Raipur & Bilaspur districts respectively and Bauxite in 2 Blocks in Sendurkhar & Saraipani Blocks District- Kabirdham (Kawardha) of Chhattisgarh.
- 1.1.2** Accordingly, MECL prepared the proposal for G-3 Level exploration in the proposed areas (Ranigaon-Gondaiya Block Tehsil- Kota, District- Bilaspur, Nahardih-Madhaipur Block, Tehsil- Tilda, District- Raipur for Limestone and Sendurkhar & Saraipani-Dadar Block, district- Kabirdham, Chhattisgarh for Bauxite) and put up for approval of Technical Committee of NMET.
- 1.1.3** Proposed area, as mentioned in the above coordinate lies between Ranigaon & Gondaiya village. On the basis of surface sampling the area having cement grade limestone with CaO% varies from 39.25% to 52.26%. MgO and SiO₂ percentage are under permissible limit. The proposed area covered by villages Kalmitar, Lachhanpur, Sajanpara etc.
- 1.1.4.** The proposal was put up for Technical evaluation to the Technical Committee of NMET in its first meeting held on 01-04-2016 & 02.04-2016 at GSI, Central Region, Nagpur. The committee has discussed the proposal in detail and in view of insufficient data exploration proposal was approved for G-3 level of exploration with modifications in the proposed scheme. MECL incorporated the modifications and put up the modified proposal for approval of Executive committee of NMET.

1.2.0. LOCATION & ACCESSIBILITY

Exploration block for limestone is located in Ranigaon & Gondaiya village of Kota Tehsil of Bilaspur district. The Block falls in Survey of India Toposheet No. 64 J/3 & J/4 The area falls between

Co-ordinates A: 22°16'00" – 82°05'00"
 B: 22°16'00" – 81°09'00"
 C: 22°13'00" – 82°09'00"
 D: 22°13'00" – 82°05'00"

The Katni Branch of South Eastern Railway passes from North to South to connect Bilaspur to Raipur in south and Anuppur in the north. All the important places in the area well connected by a network of State highways and all weathered roads. Seonath River flows easterly in the southernmost part of the district. Arpa River is the tributary of the Seonath River flowing from the western part of the proposed study area.

The proposed area is about 22 km away from district headquarter Bilaspur, It is approachable by Bilaspur – Ambikapur Road (National Highway NO 130) via Madanpur-Ranigaon. The area is connected with Bilaspur by all weather roads.

The nearest railway station is Bilaspur which is situated on Mumbai- Howrah mainline (SECR) the zonal headquarter of South East Central Railway and is about 22km from the proposed study area.

1.3.0 Topography & Drainage

Physiographically the area is almost plain with an average elevation of 291 m above mean sea level. The general slope of the area is due south.

The Arpa River & Chapi Nala along with their tributaries controls the principal drainage of the area. The Arpa River flows in N-S direction in the western part of the proposed study area. The drainage of the area is dendritic to sub dendritic pattern.

2.0.0 Regional Geology of the area

2.1.0. The rock formations of the Bilaspur districts ranges in age from Archaean to Recent and are exposed in the area. They include granites, gneisses and older metamorphics of the Precambrian age, rocks of Chhattisgarh Supergroup of upper Proterozoic age, Gondwanas of Permian age, Lametas of Upper Cretaceous age, Deccan trap of upper Cretaceous to Eocene age and Laterites (with Bauxite) of Cainozoic age

Age		Stratigraphic Status		Un its	Lithology	Nature & Characteristics
Cainozoic			Laterite	11	Laterite / Bauxitic Laterite	Reddish brown, hard & massive
Upper Cretaceous to Eocene			Deccan Trap	10	Basalt Flows	Fine to medium grained dark grey volcanic rocks
Cretaceous			Lametas	9	Limestone, arkosic sandstone, clays	Cherty siliceous Limestone & Felspathic sandstone
Lower Permian	Gondwana Super Group		Barakar Formation	8	Sandstone , shale and coal seam	Sandstone, shale & carbonaceous shale with coal seams
			Talchir Formation	7	Boulder Bed , Sandstone & Shale	
			Kodwa Formation	6h	Argillaceous dolomite	Grey argillaceous dolomite

Meso Neo Proterozoic	Chhattisgarh Supergroup	Raipur Group	Tarenga Formation	6g	Calc- argillite, dolomite	Compact calc argillaceous dolomite to brownish limestone
				6f	Calc chert shale	
			Chandi Formation	6e	Pink dolomite & shale	Hard dolomite with shale intercalations
				6d	shale with limestone intercalations	Grey shale, chert, Flaggy Limestone & stromatolitic Limestone & sandstone.
				6c	Stromatolitic limestone	Hard Stromatolitic limestone
				6C'	Dolomite	Hard compact dolomite
			Gunderdehi Formation	6b	Shale with Flaggy Limestone	Hard & compact Shale with Flaggy Limestone
				6a	Grey shale	Fine grained shale & Fine grained Limestone
			Raipur Group (Unclassified)	6	Unclassified Shale , Limestone	Fine grained hard shale & medium to Fine grained Limestone
			Chandrapur Formation	5	Sandstone & Conglomerate	Medium to coarse grained hard sandstone
Meso Proterozoic				4	Quartz & Pegmatite Veins	Acid intrusives of quartz, feldspar & mica
				3	Dolerite and basic Intrusives	Grey to greyish black hard compact hard basic rock
Archaean to Proterozoic	Chhota-Nagpur Gneissic Complex			2	Unclassified granites and gneiss	Medium grained granites to coarse grained biotite gneisses.
				1	Unclassified Metamorphics	Phyllites, quartzites, biotite chlorite schist, dolomitic marbles, mica schist and schistose rocks.

3.0.0 Geology of the proposed Study Area

3.1.0 The rock formations of the proposed area comprises Limestone & Dolomite of **Raipur group**. The unclassified shale also exposed at some places in the area. Limestone is hard, compact grey to pink in colour and sometime stromatolitic rings are seen on the body of limestone. The general strike of the formation is NE-SW and beds 2° to 4° dipping. The exposure of limestone is seen in Bhadriadih, Kalmitar, Gondaiya, Ranigaon, Lachhanpur and Sajanpara villages.

3.2.0. The dolomite rocks of the area is grey to dark grey and even pink, also very hard and compact with stromatolites. It belongs to Chandi Formation of Raipur Group. Dolomite is well exposed along the Arpa River sections around village Dhanuhar para, Chhuhapara, Lachhanpur, Ranigaon, Saleghori and Nawapara.

The rock formations of the proposed study area are sedimentary and belongs to Chandi Formation of Raipur Group of Chhattisgarh Supergroup. The Stratigraphic Succession of the area is given below:-

Age	Formation	Group	Super Group	Lithology
Recent to Quaternary				Soil / Alluvium
Meso-Neo Proterozoic	Chandi Formation	Raipur Group	Chhattisgarh Super Group	Pink to Greyish Pink Stromatolitic Limestone and dolomite with intercalations of Shale.

3.3.0 Chandi Formation

It consists of mainly dolomite and Limestone with intercalations of Shale. Dolomite occurred in the area is horizontally bedded, fine grained, grey to light grey, hard & compact with stromatolites. The limestone of the area is grey to pinkish grey in colour with stromatolitic structure.

4.0.0 Objectives: - The following are the objectives of proposed exploration:

- To demarcate the Limestone occurrence in the study area by drilling boreholes at 800mx 800m grid interval in Phase-I under G-3 level of exploration.
- To find out the quality & grade of Limestone and estimate Limestone resources.
- To carry out the exploration as per Mineral (Evidence of Mineral Contents) Rule-2015, Mineral Auction Rule-2015 and MMDR Amendment Act-2015, in turn to facilitate the State Govt. of Chhattisgarh in Auctioning of Blocks.

5.0.0. Methodology of Exploration

5.1.0 Topographic Survey & Geological Mapping.

- 5.1.1 Triangulation network will be laid down in the proposed study area of 5 Sq. Km. Contouring will be done on 1:10000 scale at 5m contour intervals. Boreholes will be fixed on the ground. RL's and co-ordinates of survey and exploration points will be determined. Detailed Geological Mapping will be done in the proposed block on 1:10000 scale. All the geological features will be recorded. This map will be used as base map for future work. Locations of proposed boreholes are depicted in the part of Toposheet with overlying vectors of Geological formations (Lithological contacts) from district resource map of Bilaspur, Chhattisgarh of GSI (Plate-III). The block boundary will be surveyed by DGPS & Total Station in WGS-84 Datum.

5.2.0. Surface Sampling: The carbonate rich rock of west bank of river will be mapped in detail and surface /outcrop samples shall be collected and sent for Analysis of CaO content. If the results are encouraging (Cement grade & above) then seven boreholes in the area are to be drilled.

5.3.0 Drilling

In present exploration programme the boreholes are proposed at 400m interval and a total of 10 Boreholes in 7 section lines in an area of 5.00sq.km. The carbonate rich rock of west bank of river marked on map as dolomite area will be mapped and surface sample will be collected and subjected for analysis of CaO content and in case the results are encouraging (Cement grade & above) then drilling will be taken on 400m interval and a total of 7 boreholes shall be drilled in the area. Thus a total of 510 m in 17 vertical boreholes will be drilled in 5.00 sq.km area. The dip of the beds / formations indicated by DGM in the data provided to MECL and on the District Resource map is 2° to 4 ° towards south or south west hence vertical boreholes are proposed. The average depth of proposed boreholes is taken as 30m but for all practical purpose the boreholes will be closed after intersecting the Limestone bands and reaching to the Dolomite or Shale formation of Raipur group of rocks. Thus the total meterage in the block at 400mx400m grid will be around 510m in 17vertical Boreholes. The exploration work will be of G-3 level of exploration. In case the results of above exploration are encouraging then further exploration will be decided during Mid Term review of the work.

5.4.0 Drill Core Logging and Sampling

5.4.1. Detailed drill core logging will be done with consideration of creation in weathering, grain size, fossil contents, colour of various formations, intercalation / parting of shale, stylolite, structure and presence of sulphides. On the basis of these parameters, grade of limestone can be broadly presented and it also will be helpful in sampling.

Primary samples will be drawn at 2m interval subject to change in lithology and core recovery. The following parameters should be considered while sampling the drill cores.

- 1) Colour, grain size.
- 2) Fossil variation.
- 3) Thin intercalations of shale/siltstone.
- 4) Partially weathered zone.

For preparation of samples the borehole core will be split into two equal halves by using core splitter. One half will be powdered to 100 mesh size and the other half will be kept for future studies. The powdered material will be mixed thoroughly and about 100 gram of samples will be taken for chemical analysis by successive coning and quartering as primary samples and rest of the material (-100 mesh size) will be kept as duplicate half for future reference. This will generate about 250 No of primary Drill core samples and 30 NO of Check samples (10% of Primary samples). In addition 20 number of surface samples will be subjected to analysis of 6 radicals. Thus a total of

300No Primary (surface & Drill core) & check samples will be prepared and analysed for six radicals.

Composite samples will be prepared borehole wise based on primary sample data at every 6m interval (6m bench height). Composite samples shall be prepared from all the borehole in which limestone bands will be intersected. This will generate about 50 Nos of composite samples.

Table No.-III- Details of Proposed Boreholes in Ranigaon-Gondaiya Block, District- Bilaspur, Chhattisgarh

Sl. NO.	Section line No.	Borehole No.	Angle / Azimuth	Depth to be drilled (m)
1.	S-1	PBH-1	Vertical	30.00
		PBH-2	do	30.00
2.	S-2	PBH-3	do	30.00
		PBH-4	do	30.00
3	S-3	PBH-5	do	30.00
		PBH-6	do	30.00
4	S-4	PBH-7	do	30.00
5	S-5	PBH-8	do	30.00
6	S-6	PBH-9	do	50.00
7	S-7	PBH-10	do	30.00
			Total	300.00
Note	In addition to above in case the results of surface sample from the carbonate rich rock of west bank of river marked on map as dolomite are encouraging (cement grade & above) 7 boreholes with a total of 210m of drilling shall be drilled at 400m grid. Thus a total of 510m of drilling in 17 boreholes is proposed.			

5.5.0. Laboratory Studies

5.5.1. Chemical Analysis: All the primary (270 Nos Surface & Drill core) and check samples (30 Nos) will be analysed for 6 radicals CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃ and LOI. Around 50 Nos of primary samples will be analysed for additional two radicals i.e. SO₃ & P₂O₅. 10% of primary samples (20 No) will be sent to NABL external labs as check samples for analysis of 6 radicals CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃ and LOI. Around 50 Nos of composite Samples will be subjected for analysis of 12 radicals i.e. CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, SO₃, P₂O₅, LOI, MnO₂, K₂O, Na₂O and Cl. Spectroscopic studies will be done on 10 Nos of composite samples for presence of trace elements and 10 Nos of composite samples for XRD (mineral phase) studies respectively.

5.5.2. Petrological Studies: Petrological studies will be done on around 10 Nos. of drill core specimen.

5.5.3 Specific Gravity Determination: Specific Gravity will be determined on 15 Nos drill core specimen.

5.6.0. The Quantum of work proposed is given in Table No.5.

Table No. 5 - PROPOSED QUANTUM OF WORK			
Sl. No.	Item of Work	Unit	Quantum
1	Topographic Survey on 1:10000 scale.	Sq. Km.	5.00
2	Geological Mapping on 1:10000 scale.	Sq. Km.	5.00
3	Drilling	m.	510m (17 Bhs)
4	Laboratory Studies		
	i) Surface sample for 6 radicals i.e. CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ and LOI	Nos	20
	ii) Chemical Analysis; Drill core Primary + Check for 6 radicals i.e. CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ and LOI	Nos.	250 Primary + 30 Check = 280
	iii) For 2 radicals SO ₃ & P ₂ O ₅	Nos.	50
	iv) External Check sample for analysis of 6 radicals i.e. CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ and LOI	Nos.	20
	v) Composite Samples For 12 radicals (CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ , SO ₃ , P ₂ O ₅ , LOI, MnO ₂ , K ₂ O, Na ₂ O and Cl.)	Nos.	50
5	Physical Studies.		
	a) Spectroscopic Studies (10 elements)	Nos.	10
	b) XRD studies	Nos	10
6	Petrological Studies (Petrographic Studies)	Nos	10
7	Specific Gravity Determinations	Nos	15
8	Report Preparation (Digital format)	Nos.	1

5.7.0 Exploration Report: Data generated from proposed exploration along with integration of earlier data of GSI will be utilized in Report preparation.

6.0.0 Time Schedule and Cost Estimates:

6.1.0 Time Schedule: The proposed exploration programme is planned for activities like, camp setting, survey and associated geological work, drilling, winding and laboratory work will be completed within 7 month's time. Report writing will take another 3 months time with overlapping of one month laboratory studies. Thus the total duration of project shall be completed in 9 months from the date of commencement of the project.

6.2.0 Cost Estimate: Cost has been estimated based on actual and provisional escalation as per RBI indices as on 31-03-15 and provisional escalation of @ 20% points for drilling work and 25% points for Geological and Laboratory Studies for the subsequent years. The total estimated cost is **Rs 100.52 Lakhs**. The details of cost estimates are given in Table 6.2 and summary is given below;

Summary of Cost Estimates

Sl. No.	Item	Total Estimated Cost (Rs.)
1	Drilling	54,37,656 /-
2	Geology	28,88,970/-
3	Laboratory	13,48,590/-
4	Exploration Report	96,752/-
5	Core Preservation Charges in GI Core Boxes	2,80,400/-
	Total	1,00, 52, 368/-

Say Rs 100.52 Lakhs

7.0.0 Justification

- i. In view of MMDR Amendment Act and Mineral Auction Rule 2015 DMG Government of Chhattisgarh has requested MECL to take up the exploration in this block. MECL decided to take up the work under NMET funding.
- ii The exploration work has to be carried out systematically i.e. Geological Mapping, Survey and drilling at 400mX400m grid (G-2 level) initially
- iii. The exploration will be helpful in estimation of Resources. The exploration will help in estimation of Limestone resources at G-2 Level of exploration which in turn will facilitate the State Government of Chhattisgarh for Auctioning of Block.

1.	Objective	To explore the limestone blocks through outsourcing for Auction.
2.	Title	Exploration of limestone in Ranigaon & Gondaiya area
3.	Area	1. Exploration of limestone in Ranigaon & Gondaiya village. 2. Toposheet No. 64 J/3 & J/4 3. Co-ordinates A : 22°16'00" – 82°05'00" B : 22°16'00" – 81°09'00" C : 22°13'00" – 82°09'00" D : 22°13'00" – 82°05'00" 4. Name of village : Ranigaon & Gondaiya 5. Tehsil : Kota 6. District : Bilaspur
4.	Background Information	Proposed area, as mentioned in the above coordinate lies between Ranigaon & Gondaiya village. On the basis of surface sampling the area having cement grade limestone with CaO% varies from 39.25% to 52.26%. MgO and SiO ₂ percentage are under permissible limit. The proposed area comes under village Kalmitar, Lachhanpur, Sajanpara etc. On such ground this area seems to be promising for further exploration work.
5.	Geology of the area	As per the available literature of the rocks formation of the proposed area comprises Limestone, Dolomite of Raipur group. The unclassified shale also exposed at some places in the area. Limestone is hard, compact grey to pink in colour and sometime stromatolitic rings are seen on the body of

		limestone. The general strike of the formation is NE-SW and beds 2° to 4° dipping. The exposure of limestone is seen in Bhadriadih, Kalmitar, Gondaiya, Ranigaon Lachhanpur and Sajanpara villages.
6.	Proposed Quantum of work	<u>Phase-I</u> 1. Reconnaissance Geological Survey - 200km² 2. Systematic Sampling – 5 km² 3. Drilling - 1000mts x 1000mts spacing 4. No. of Borehole - 6 5. Depth of Borehole - 70mts 6. Total drilling at 1 km x 1 km - 420mts 7. Sampling - as required <u>Phase-II</u> 1. Detailed Geological Mapping(1:4000)- 4.750km² 2. Topo survey & contouring (1m interval) - 4.750km² 3. Drilling - 200mts x 200mts spacing 4. No. of Borehole - 118 5. Total depth of Borehole - 30mts 6. Total proposed drilling - 3540mts 7. Sampling - 4000 nos.(approx.)
7.	Approximate Expenditure in Drilling	Phase-I : 240mts @1750 Rs. per mt. – 7,35,000 Phase-II : 3540mts @1750 Rs. per mt. – 61,95,000 Total : 69,30,000 (Sixty nine lakhs Thirty thousand only)
8.	Recommendations	The proposed area seems to be promising on the basis of surface sampling. The analysis report shows limestone exposed in the area is cement grade.

It is requested to do the needful to outsource the said job at the earliest.

TABLE NO. 6.1 TIME SCHEDULE / ACTION PLAN, FOR EXPLORATION WORK OF LIMESTONE IN RANIGAON-GONDAIYA BLOCK, TEHSIL- KOTA, DISTRICT-BILASPUR, CHHATTISGARH													
Sl. NO.	Activities	Unit	MONTHS									Total	
				Financial Year 2016-17									
			1	2	3	4	5	6	7	8	9		
			05 /16	06 /16	07 /16	08 /16	09 /16	10 /16	11 /16	12 /16	01 /17		
1	Camp Setting	Month	↔									1 month	
2	Surface Drilling (1 rig)	m.		←		→						510 m (in 17BHs)	
3	Survey Party days (1 Party)	day		←			→					120	
4	Geologist Party days (1Party)	day		←				→				150	
5	Sampling Party days, Core Sampling (2 party)	day		←				→				300	
6	Laboratory Studies	Nos.			←				→			590	
7	Camp Winding	Months							↔			1 month	
9	Report Writing	Months							←		→	3 months	
							9						

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Government of India
Ministry of Mines
National Mineral Exploration Trust

F.No. 6/1/NMET-2015

New Delhi, 16th August, 2016

OFFICE MEMORANDUM

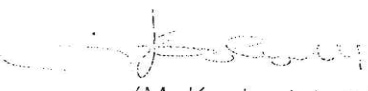
Sub: - Approval of mineral exploration projects in 13 blocks

On the recommendations of the Technical Committee of NMET, the Executive Committee in its second meeting held on 9.5.2016 has approved thirteen (13) mineral exploration projects in six states at a cost of Rs. 2292.16 lakhs.

2. Consequent to dropping of one project of bauxite in Jharkhand on the request of State Government, the number of approved projects under NMET now stands at twelve (12) in five states, at a cumulative cost of Rs. 21,61,29,777.00 (Rupees twenty one crore, sixty one lakhs, twenty nine thousand, seven hundred seventy seven paise).

3. The above exploration projects will be funded by NMET as per the plan recommended by the Technical Committee and approved by the Executive Committee. MECL will undertake exploration in these twelve blocks under Tripartite Agreement among (Ministry of Mines (NMET), MECL and the respective State Governments) and complete the same as per the approved work plan and time schedule.

5. The execution of work will be continuously monitored and periodically reviewed by the NMET Technical Committee and MECL will submit monthly progress report to NMET Secretariat.


(M. Koshy John)
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To

The Chairman-cum-Managing Director, MECL, 10, Dr. B.R. Ambedkar Bhawan,
Seminary Hills, Nagpur - 440 006

List of Mineral Exploration Projects approved in the 2nd meeting of the Executive Committee held on 09.05.2016

Sl. No.	Name of the Block	Mineral	Area of the Block	Work already done in the block	Work proposed in the block	Estimated cost of the project in Rs. lakh
1.	Jumka-Pathriposhi Block, Distt. Sundargarh, Odisha	Iron	1.71 Sq. Km.	G-3	G-2	772.68
2.	Purheibahal-Chandiposhi Block, Distt. Sundargarh, Odisha	Iron	1.35 Sq. Km.	G-3	G-2	265.33
3.	Mandri-Panchala Block, Distt. Nagpur, Maharashtra	Manganese	2.50 Sq. Km.	Virgin Area	G-4	130.31
4.	Lanjera-Futala Block, Distt. Nagpur, Maharashtra	Manganese	8.00 Sq. Km.	Virgin Area	G-4	148.98
5.	Ranigaon-Gondaiya Block, Distt. Bilaspur, Chhattisgarh	Limestone	5.00 Sq. Km.	G-4	G-3	100.52
6.	Nahardih-Madhaipur Block, Distt. Raipur, Chhattisgarh	Limestone	5.45 Sq. Km.	Virgin Area	G-4	27.89
7.	Sendurkhar Block, Distt. Kabirdham (Kawardha), Chhattisgarh	Bauxite	2.90 Sq. Km.	Virgin Area	G-4	45.13
8.	Saraipani-Dadar Block, Distt. Kabirdham (Kawardha), Chhattisgarh	Bauxite	0.80 Sq. Km.	Virgin Area	G-4	44.66
9.	Ghumchihi Block, Distt. – Satna, Madhya Pradesh	Limestone	5.00 Sq. Km.	Virgin Area	G-4	57.75
10.	Naubasta-Kolard Block, Distt. Satna, Madhya Pradesh	Limestone	15.00 Sq. Km.	Virgin Area	G-4	59.49
11.	Jamodi-Mahanna Block, Distt. Satna, Madhya Pradesh	Limestone	30.00 Sq. Km.	Virgin Area	G-4	65.36
	Total cost					1718.10