

EXPLORATION PROPOSAL FOR CEMENT GRADE LIMESTONE IN GHUNCHIHAI AREA, RAMPUR BAGHELAN TEHSIL, DISTRICT-SATNA, MADHYA PRADESH

1.0.0. INTRODUCTION

- 1.1.1 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 Madhya Pradesh Government requested MECL to take up exploration work of Limestone in 3 Blocks in Satna Districts of Madhya Pradesh.
- 1.1.2. Representatives from Govt. Madhya Pradesh and Mineral Exploration Corporation Ltd visited the proposed area to find out the possibilities of taking up of the exploration work in the area. Accordingly, MECL prepared the proposal for G-3 Level exploration in the proposed areas (Ghunchihai Block Tehsil- Rampur Baghelan, Jamodi, Mahanna, Tehsil Raghurajnagar and Naubasta-Kolard & Vasudha Blocks, District Satna, Madhya Pradesh) and put up for approval of Technical Committee of NMET.

1.2.0 Location and Communication

- 1.2.1 The Cement grade limestone deposit located in the Ghunchihai area of Tehsil- Rampur Baghelan, District- Satna, Madhya Pradesh. The deposit falls within the Survey of India Toposheet No. 63 D/14 and 63 H/2. The block limits with Latitude and Longitude as under
- A : 80°59' – 24°38'
B : 81°00' – 24°38'
C : 81°00' – 24°37'
D : 80°58' – 24°35'
E : 80°58' – 24°37'
- 1.2.2. Most of the Infrastructure (Police Station, Bank facility, workshop facility, Bus Stand etc) are available at Rampur Baghelan Tehsil Town. The nearest Railway station is Satna Junction and Rewa Station which are about 25 km from the proposed Study area. Motorable /Metalled road is available in the area. The proposed block covers an area of 6.5 Sq. km. with the proposed work of G4 level.
- 1.2.3 The limestone exploration proposal of Ghunchihai Block Tehsil- Rampur Baghelan, District-Satna, Madhya Pradesh was submitted by MECL for G3 \ G2 level was discussed in 1st meeting of Technical Committee of NMET held on 01 & 02 April, 2016 at the GSI Central Region, Nagpur. The committee recommended Geological Mapping and five scout boreholes covering the entire block with an area of 6.5 Sq.km to generate analytical data at G4 level. After receiving the results of G4 level exploration, the exploration data will be reviewed by the Technical Committee of NMET during midterm review meeting.

1.3.0. Physiography & Drainage

Physiographically, Satna district forms a part of Vindhya range. The back slope of Vindhya leads to a broad plain with low ridges and valleys and rise gently to Bhandar Plateau in the south. The Bhandar Plateaus comprises isolated mesas and buttes and is succeeded further south by Kaimur ridge reaching maximum elevation of 704 m. The Satna district is mainly drained by Son and Tons or Tamasa Rivers and their tributaries.

The highest elevation in the proposed area is 382mtrs above msl. The average rainfall in the area is 800mm to 1100mm. Wildlife in the area is scanty.

2.0.0 GEOLOGY OF THE AREA

2.1.0 Regional Geology of the area

The rock types of the region, District- Satna range in age from Archaean to Cainozoic. The Archaean rocks comprise of granites & gneisses and are exposed only in northern part of the district. The rocks of Vindhyan Supergroup comprises Semri, Kaimur, Rewa & Bhandar groups. The Semri Group of rocks are represented by an alternating sequence of Sandstone and shale along with porcellanite and limestone. The Semri Group of rocks mainly exposed in the southern and northern part of the district. The Rohtas Limestone is light to grey in colour, fine grained compact and well bedded. The Kaimur Group comprising mainly sandstone which is fine grained, massive and thickly bedded is exposed in the northern and southern part. The Rewa Group of rocks comprises mainly of sandstone, shale and conglomerate. The Bhandar Group of rocks exposed as a broad band and comprises mainly shale, Nagod limestone and upper Bhandar sandstone and Nagod limestone is fine grained, hard, compact thinly bedded to massive with some stromatolitic bands. The upper Bhandar Sandstone forms the cliffs of the Bhandar plateau is composed of purple to reddish brown, fine to medium grained, flaggy to massive and well sorted sandstone interbedded and splintery shale and siltstone. Lameta Formation comprising sandstone and shale range in thickness from 15-80m and occurs in the form as clusters on the hillocks of upper Rewa Sandstone. Laterite occurs as capping on the Bhandar Group of rocks and on the upper Rewa Sandstone. It has a maximum thickness of 60m.

2.2.0 Geology of the area

2.2.1 The rock formation occurring in the area comprise sandstone, shale and limestone, all belonging to the Bhandar series of Upper Vindhyan. These rock formations are almost sub-horizontal having southerly dips varying from 5° to 10°.

The general stratigraphic sequence is as below:

Recent	-	Laterite
Upper Vindhyan	Bhander Series	Upper Bhander Sandstone Sirbu Shale
		Lower Bhander Sandstone
		Bhander (Nagod) Limestone

3.0.0 DESCRIPTION OF DIFFERENT FORMATIONS

3.1.0 BHANDER (NAGOD) LIMESTONE

General

Outcrops of this limestone in the area are far and few between, occurring in patches along the general trend which is almost E-W. The limestone deposits are sub horizontally bedded with dips varying from 5° to 10° towards south. At places where limestone deposits are not seen they are concealed below the soil and alluvium cover, varying in thickness from a fraction of a meter to as much as 3 to 5 meters. In many localities the workable limestone does not have any overburden but in few instances the overburden which comprises of soil and alluvium are highly siliceous limestone tending to be calcareous sandstone which is used only as building stone. The nature of the occurrence of this rock formation is such that in all probability is a key horizon in the stratigraphic occupies a set-up of this limestone area.

The Bhander limestone deposits in the region show fairly frequent variations in quality and thickness both laterally and vertically.

Furthermore, these Bhander limestones show considerable variations in quality, both laterally as well as vertically. Again, in several localities the rich quality limestone beds are overlain and also interlayered with limestones which are of interior grade. Another feature which is quite widespread in the stratigraphic sequence of this tract is the capping and interbedding of the rich quality of limestone strata with shales and arenaceous as well as argillaceous limestones.

The limestone are well bedded, fine to medium grained and grey to dark grey in colour. They are traversed by two sets of joints which are parallel to their strike and dip directions.

3.2.0 LOWER BHANDER SANDSTONE – (Impure Siliceous Limestone)

The rock occurs almost as a persistent capping rock over the Bhander Limestone deposits in the area east and also west of Satna, right upto Nagod in the West, with occasional breaks. The rock varies in colour from greyish white to pale greyish and pale

brownish, often cherty in nature and well bedded with thin argillaceous intercalations. The rock is hard, compact, and comes out in slabs.

This rock has perhaps been responsible for the preservation of a large tract of limestone strata underneath, protecting it from sub aerial erosion,

3.3.0. SIRBU SHALES.

Very prominent exposures of Sirbu Shales are seen around Nagod town, along the road cuttings and nala & river courses between Nagod and Satna. The shales are thinly bedded and vary in colour from light grey to pale grey and purple to purplish brown. These shales at places directly overlie the limestone horizon.

3.4.0. Upper Bhandar Sandstone

These sandstones makes the distinct hillocks, situated away from the limestone area were not examined in the investigation and accordingly not described.

3.5.0. Laterite

At places between Nagod and village Sitpura and also in patches around Satna, particularly on higher grounds laterite is seen strewn over the surface.

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

- i) To demarcate the Limestone occurrence in the study area by drilling five scout boreholes covering the entire block under G-4 level of exploration.
- ii) To find out the quality & grade of Limestone.
- iii) To take decision on future exploration programmes (G-3 \ G-2) level of exploration by the Technical Committee in case the results of present exploration results are encouraging.

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. Contouring will be done on 1:10000 scale at 5m contour intervals. Borehole 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 District Resource Map of Satna District of GSI (Plate-II & Geological cross sections Plate-III). The block boundary will be surveyed by DGPS & Total Station in WGS-84 Datum.

5.2.0 Surface Sampling: - Surface / outcrop samples will be collected during Geological Mapping from out crops / exposures of Limestone formations in an area of 6.50 sq.km. In case outcrops are not available on systematic grid then random samples will be collected from the available outcrops / exposures. In the total exploration block approximately 20 number samples will be generated/ collected. These samples will be subjected for 6 radicals i.e. CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃ and LOI.

5.3.0 Surface Drilling

Keeping in view the paucity of the data for G-3\G-2 exploration, the Technical Committee of NMET recommended 5 scout boreholes covering the entire area of the block. The boreholes are to be drilled upto a maximum depth of 50m or upto intersection of Nagod shale, whichever is shallower. Thus the total meterage in present G-4 level exploration drilling will be 250m approximately.

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 will also 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 splitted 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. In addition to drill core samples 20 number of surface out crop samples will also be generated. Thus a total of 120 Nos primary drill core & surface samples and 10 Nos Check samples (around 10% of Primary samples). Thus a total of 120 No Primary and 10 NO 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 15 Nos of composite samples.

5.5.0. Laboratory Studies

5.5.1. Chemical Analysis: All the primary (100 Nos) and check samples (10 Nos) will be analysed for 6 radicals. CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃ and LOI. 5% of primary samples (5 Nos) will be sent to NABL external labs as check samples for analysis of 6 radicals CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃ and LOI. Spectroscopic studies will be done on 10 Nos of composite samples to know the presence of trace elements and 10 Nos of composite samples for 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 20 drill core specimen.

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

Table No.5 - Quantum of Work Proposed

Sl. No.	Item of Work	Unit	Quantum of work proposed
1	Topographic Survey (on 1:10000 scale).	Sq. Km.	6.50 sq. km
2	Geological Mapping (on 1:10000 scale).	Sq. Km.	6.50 sq. km
3	Surface / Out crop sampling	Nos.	20 numbers in an area of 6.50 Sq. Km
4	Drilling	m.	250m (5 Scout Bhs)
5	Laboratory Studies		
	i) Chemical Analysis; Primary + Check for 6 radicals i.e. CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ and LOI	Nos.	120 Primary + 10 Check = 130
	ii) 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.	5
	iii) Composite Samples a) 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.	15
6	Physical Studies		
	a) Spectroscopic Studies (10 elements)	Nos.	10
	b) XRD studies	Nos	10
7	Petrological Studies (Petrographic Studies)	Nos	10
8	Specific Gravity Determinations	Nos	20
9	Report Preparation (Digital format)	Nos.	1 No.

5.6.0 Exploration Report: Data generated from proposed exploration will be utilised in Report preparation.

6.0.0 Time Schedule and Cost Estimates:

6.1.0 Time Schedule: The proposed exploration programme work activities like, camp setting, topographic survey, geological mapping, collection of surface samples, and associated geological work, drilling, camp winding and laboratory work will be completed within 4 month's time, report writing will be completed in a period of 2 months including overlapping of one month of laboratory studies. Thus the total duration of the project for present exploration will 5 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. 57.75 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	36,76,886 /-
2	Geology	13,00,770/-
3	Laboratory	5,56,800/-
4	Exploration Report	55,619/-
5	Core Preservation charges	1,57,200/-
	Total	57,74,695/-

Say Rs. 57.75 Lakhs

7.0.0 Justification

- In view of MMDR Amendment Act and Mineral Auction Rule 2015 DMG Madhya Pradesh Government has requested MECL to take up the exploration in this block. MECL decided to take up the work under NMET funding.
- The exploration work has to be carried out systematically i.e. Geological Mapping, Survey scout drilling covering the entire area (G-4 level) and in case the results are encouraging then Technical Committee will Review the exploration data during Mid-Term Review for taking up G-3\G-2 Level work.
- The exploration will be helpful in generation of data at G-4 level. This exploration will help in planning of G-3 \ G-2 Level exploration programme which in turn will facilitate the Madhya Pradesh State Government for Auctioning of Block.

SL. NO.	Table:6.2 COST ESTIMATE FOR EXPLORATION OF LIMESTONE IN GHUNCHIHAI BLOCK, TEHSIL - RAMPUR BAGHELAN, DISTRICT- SATNA, MADHYA PRADESH					
	Item of Work	Unit	Base	Escalated rates (2016-17)		
			Rate 01. 04. 1990	Esc. Rate (Rs)	Qty.	Amount (Rs)
A	DRILLING					
1	Surface Drilling (1 Rig)	m.	1714	7891	250	1972750
2	Transportation	Km.	8.8	34	1000	34000
3	Accomodation	One time/ Drill	185925	709899	1	709899
4	Camp Setting / Winding	Drill / month	68606	261951	2	523902
5	Road Making (Hilly Terrain)	Km	7800	29089	15	436335
	Sub Total A					3676886
B	GEOLOGICAL WORK					
1	Survey Party Days (1 party)	day	1180	6231	60	373860
2	Geologist Party days (1 party)	day	1541	8311	90	747990
3	Core Sampling Party days (2 party)	day	525	2982	60	178920
	Sub-Total B					1300770
C	LABORATORY STUDIES					
a	Chemical Analysis					
1	Primary + Check Samples					
	i) for 6 radicals (CaO,MgO,Al ₂ O ₃ ,SiO ₂ ,Fe ₂ O ₃ & LOI)	Nos	490 76x5+110)	2742	120	329040
	ii) External Check Samples for 6 radicals (CaO,MgO,Al ₂ O ₃ ,SiO ₂ ,Fe ₂ O ₃ & LOI)	Nos	490 76x5+110)	2742	10	27420
2	Composite Samples					
	i) For 12 radicals (CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ , SO ₃ , P ₂ O ₅ , Mn ₂ O ₃ , TiO ₂ , K ₂ O, Na ₂ O & LOI,)	Nos	946 (76x11+110)	5304	15	79560
b	Physical Analysis					
1	X-RD Studies on composite	Nos	1137	5980	10	59800
2	Spectroscopic Studies	Nos	1173	6358	10	63580
3	Preparation of thin section	Nos	100	570	10	5700
4	Petrographic Studies	Nos	228	1512	10	15120
5	Specific Gravity determination	Nos	32	200	20	4000
	Sub-Total C					584220
	Total A+B+C					5561876
D	EXPLORATION REPORT - Lumpsum					55619
E	a) Core Preservation Charges in GI Sheets Core Boxes (@ RS 2000 Core Box GI 22 gauge)	Nos	2000	2000	65	130000
	b) Transportation Charges of Core Boxes	Km	8.8	34	800	27200
	Total E					157200
	GRAND TOTAL A to E					5774695
Note:					Says RS 57.75 Lakhs	
1	Rates of Goel Commiitte based on actual escalation as per RBI index as on 31/3/15 and @ 20% provisional escalation for drilling and @ 25% for Geology + Lab.for subsequenet year.					
2	Phoshphorite rates have been considered as there is no rates for Limestone in Goel Committee report of MoM Schedule of Rates.					
		9				

**Table:6.2 COST ESTIMATE FOR EXPLORATION OF LIMESTONE IN GHUNCHIHAI BLOCK,
TEHSIL - RAMPUR BAGHELAN, DISTRICT- SATNA, MADHYA PRADESH**

Sl. NO.	Activities	Unit	MONTHS					Total
			Financial Year 2016-17					
			1	2	3	4	5	
			05 /16	06 /16	07 /16	08 /16	09 /16	
1	Camp Setting	Month	↔					1 month
2	Surface Drilling (1 rig)	m.		↔				250 m (in 5 Scout BHs)
3	Survey Party days (1 Party)	day		↔				60
4	Geologist Party days (1 Party)	day		↔				90
5	Sampling Party days, Core Sampling (1party)	day			↔			60
6	Laboratory Studies	Nos.			↔			180
7	Camp Winding	Months				↔		1 month
9	Report Writing	Months				↔		2 months
			8					

Government of India
Ministry of Mines
National Mineral Exploration Trust

F.No. 6/1/NMET-2015

New Delhi, 16th August, 2016

OFFICE MEMORANDUM

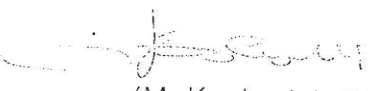
Sub: - Approval of mineral exploration projects in 13 blocks

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.


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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