

Proposal for Detailed Exploration of Iron Ore in
Jumka-Pathariposhi Pahar Block
District: Sundargarh, Odisha

SYNOPSIS

- 1 Mineral : Iron**
- 2 Location :** The Jumka- Pathariposhi Pahar Block is situated 20 kms south of Koira town, the block head quarter in Sundargarh district of Odisha. The proposed investigation area falls in Survey of India Toposheet No 73G/1 and the area is bounded by coordinates North Lat 21° 47'32.594" – 21°48'54.71" and East Long. 85°12'13.855" – 85°13'25.484".
Koira town lies by the side of National Highway No. 215 connecting Panikoili- Rajamunda passing through Keonjhar & Joda towns. This Highway connects the N.H N0.5 (Kolkata- Chennai) at Panikoili. The State capital Bhubaneswar is at a distance of 360 kms by road from Koira.
The working area is connected by kachha hilly forest roads, which passes through steep slopes, & rugged terrain of iron ore range, often crosscut by perennial streams. The nearest railway station is Barsuan, mainly haulage raw materials (iron ore) and local passengers. It is connected with Rourkella by a 22kms long broad gauge railway link of south eastern railway.
- 3 Exploiting Agency : National / Private**
- 4 Background :** The Banded Iron formation (B.I.F.) and associated volcano-sedimentary sequence of Iron ore group of Bonai-Kendujhar belt, North Odisha, received attention of geoscientists and mining agencies as early as 1930's. Geological Survey of India has been carrying Iron ore exploration work in this belt since 1980's. In addition, several Iron ore bodies also occur within the synclinal valley, which are mostly associated with the upper shale formation of Koira group of rocks.
In view of MMDR Amendment Act 2015 & Mineral Auction Rule 2015 Government of Odisha requested MECL to carry out exploration for Iron & Limestone in the state for auctioning of Blocks. MECL submitted Cost estimates to DMG Odisha for exploration of Iron, Bauxite Limestone & Manganese for a total of 11 Blocks. On examination of exploration data DMG suggested three Blocks for which detailed exploration is to be taken up. Jhumka Pathirposi Block for detailed exploration for Iron is one of the Block for which exploration proposal is prepared and is put up for approval of Technical Sub-Committee of NMET.
Geological Survey of India started their exploration work in the area during field season 1997-2000. GSI, excavated nine trenches around Jumka – Pathiriposhi Pahar, both on the iron ore band and scree zone to examine the nature of ore body, grade as well as

depth of overburden.

Geological Survey of India drilled a total of twenty nine vertical boreholes in the Jumka-Pathiriposhi Pahar area for a total drilling meterage of 1395.50 meters.

In the first phase GSI planned boreholes at an interval of 400 m strike length, and subsequently the boreholes interval was brought down to 200m owing to thickness variation of the ore body at shorter interval. The drilling was carried out both by dry and wet methods to intersect both the iron ore zone and the bottom BHJ & BHQ units in this area.

GSI estimated Iron ore resources in the Jumka –Pathiriposhi Pahar block at 88,407,057.3 metric tonnes, **i. e 88.4 million tonnes**, with average Fe content of 62.35%. The resource has been placed under UNFC 333 category.

DGM Odisha handed over four reports to MECL to upgrade the resources to G-2 level to facilitate the State Government for Auction of Blocks as per the Mineral (Evidence of Mineral contents) Rule-2015 & Mineral Auction Rule -2015.

Accordingly MECL formulated exploration scheme for detailed exploration and put up for approval of Technical Committee of NMET. The proposal was put up for Technical Evaluation to Technical Committee of NMET during its 1st Meeting held on 01-04-2016 & 02-04-2016 at GSI, Central Region Nagpur. The Committee after detailed discussion & deliberations has approved a total of 4100m of drilling in 63 Boreholes with slight modifications in planning of boreholes and recommended for approval of Executive Committee of NMET.

- 5 Objectives :** The present exploration programme has been formulated to fulfil the following objectives:-
- i. The detailed drilling proposal has been made with the sole objective to upgrade the resources from G-3 estimated by GSI to G-2 category of United Nations Framework classification of Mineral Reserves / Resources. .
 - ii. To upgrade earlier estimates at higher confidence level as per UNFC norms and Minerals (Evidence of Mineral Contents) Rules 2015.

6 PROPOSED QUANTUM OF EXPLORATORY WORK				
Sl. No.	Item of work	Unit (m)	Proposed Quantum of work	Remarks
1	<u>Survey (1:2000)</u>			
	a) B.H. fixation (Hilly Terrain)	Nos.	63	
	b) R.L. & coordinate determination	Nos.	63 + GSI Bhs	
	c) Contouring (2m Contour Interval)	Sq. Km	1.71	
	d) DGPS Survey (Demarcation of Block Boundary points)	Sq. Km	1.71	
2	Drilling (coring)	m	4100m (63 Bhs) 100mx100m grid	
3	<u>Geological work</u>			
	a) Geological Core Logging	m	4100m (63 Bhs)	
	b) Sampling (Primary + Check) for 3 radicals (Fe%, SiO ₂ % & Al ₂ O ₃ %,)	Nos.	5400	
	c) Composite sample for 7 radicals (Fe%, SiO ₂ %, Al ₂ O ₃ %, P%, Mn%, S% & V ₂ O ₅ %)	Nos.	500	
4	<u>Chemical Analysis</u>			
	a) Primary+ Check samples for 3 radicals (Fe%, SiO ₂ % & Al ₂ O ₃ %)	Nos.	5200	
	b) Composite sample for 7 radicals (Fe%, SiO ₂ %, Al ₂ O ₃ %, P%, Mn%, S% & V ₂ O ₅ %)	Nos.	500	
	c) External Check Samples for 3 radicals (Fe%, SiO ₂ % & Al ₂ O ₃ %)	Nos.	200	
5	XRD – Studies	Nos.	20	
	Spectroscopic Studies	Nos.	30	
6	Petrological Samples	N0s	25	
7	Mineragraphic Studies	N0s	25	
8	Specific gravity Determination	Nos.	50	
9	Bulk Density Determinations	Nos	10	
10	Lumps Fine Ratio Determinations	Nos		
10	Report Preparation [As per Mineral (Evidence of Mineral Contents) Rule-2015]	N0s	1	

7 Time Schedule & Cost Estimate : 14 Months; Rs 772.68 lakhs

8	Justification	i	In view of MMDR Amendment Act and Mineral Auction Rule 2015 DMG Odisha requested MECL to take up the detailed exploration in this block .MECL decided to take up the work under NMET funding.
		ii	The mineralized zones intersected in GSI boreholes are open in strike direction hence the continuity of the zones requires further proving.
		iii	Enhancement of level of confidence of resources estimated by GSI by drilling few boreholes in the data gap areas.
		iv	Augmentation of resources by drilling in the strike continuity area.

Table-7.2 Cost Estimate for Iron Ore Mineralisation in Jhumka - Pathirposhi Block, District- Sundargarh, Odisha

SL. NO.	Item of Work	Unit	Base Rate	Escalated rates (2016-17)			Escalated rates (2017-18)			Grand Total	
				Esc. Rate	Qty.	Amount	Esc. Rate	Qty.	Amount	Qty.	Amount
			1.4.90	(Rs)		(Rs)					(Rs)
A	DRILLING										
1	Surface Drilling (3 rigs)	m									
	a) Core Drilling	m	19716	19716	1435	28292460	19716	0	0	1435	28292460
	b) RC Drilling	m	8130	8130	2665	21666450	8130	0	0	2665	21666450
2	Transportation	Km	8.8	34.0	3000	102000	34	3000	102000	6000	204000
3	Accomodation (One time/ Drill)		185925	709899	3	2129697	0	0	0	3	2129697
4	Camp Setting / Winding	- do-	68606	261951	3	785853	261951	3	785853	6	1571706
5	Road Making (Flat Terrain)	Km	5200	19855	15	297825	19855	10	198550	25	496375
	Sub Total A					53274285			1086403		54360688
B	GEOLOGICAL WORK										
1	Survey Party days (2 party)	day	1180	6197	360	2238657	6472	0	0	360	2238657
2	Geologist Party days (1 party)	day	1541	8267	480	3968160	8652	0	0	480	3968160
3	Core Sampling Party days (1 party)	day	525	2967	420	1246140	3098	0	0	420	1246140
4	Bulk Sample Party Days	day	2566	14727	30	441810	14727	0	0	30	441810
	Sub-Total C					7894767					7894767
C	LABORATORY STUDIES										
1	Chemical Analysis										
	i) Primary & Check samples										
	a. For3 radical (Fe%, SiO2% & Al2O3%,)	Nos	262(110 +76x2)	1454	4700	6833800	1519	0	0	4700	6833800
	b) Check Samples for 3radical (Fe%, SiO2% & Al2O3%)	Nos	262(110 +76x2)	1454	500	727000	1519	0	0	500	727000
	c) External Check Samples from NABL Labs for 3radical (Fe%, SiO2% & Al2O3%)	Nos	414(110 +76x4)	1454	200	290800	1519	0	0	200	290800
	ii) Composite Samples										
	a) Composite Samples for 7 Radicals (Fe%, SiO2%, Al2O3%, P%, Mn%, S% & V2O5%).	Nos	268	3154	500	1577000	3295	0	0	500	1577000
2	Physical Analysis										
	i) a) X-RD Studies on composite	Nos	1137	5948	20	118960	6232	0	0	20	118960
	ii) b) Spectroscopic studies (15 elements- Cd,Sn,W,Sb,Mi,Ce,Nb,Ba,La,Bi,Co & Ni	Nos	1173	6324	30	189720	6618	0	0	30	189720
	iii) Preparation of thin section	Nos	100	568	25	14200	593	0	0	25	14200
	iv) Petrographic Studies	Nos	228	1505	25	37625	1562	0	0	25	37625
	v) Preparation of polished section	Nos	100	568	25	14200	593	0	0	25	14200
	vi) Mineragraphic Studies	Nos	364	2134	25	53350	2225	0	0	25	53350
	vii) Specific Gravity determination	Nos	32	199	50	9950	207	0	0	50	9950
	viii) Transportation of Beneficiation Samples	Km	8.8	33	0	0	33	500	66000	500	66000
	ix) Beneficiation Study	Rs	280900*	280900	0	0	280900	1	280900	1	280900
	x) Bulk Sample Studies	Nos	24	141	0	0	147	10	1470	10	1470
	Sub-Total C					9866605			348370		10214975
	Total A+B+C					71035657			1434773		72470430
D	EXPLORATION REPORT - 1% of (A+B+C)							1	721143	1	724704
E	Environmental Studies										
1	Satellite Imagery Study	Scene	99697				508006	1	508006	1	508006
2	Baseline data collection(10km radius area)		151273				770812	1	770812	1	770812
3	Chemical Analysis	Nos	257400**				659974	1	659974	1	659974
4	Report writing	Nos	50000				50000	1	50000	1	50000
	Sub-Total E								1988792		1988792
F	a) Core Preservation Charges in GI Sheets Core Boxes (@ RS 2000 Core Box GI 22 gauge)	Nos	2000			0	2000	1025	2050000	1025	2050000
	b) Transportation Charges of Core Boxes	Km	8.8			0	34	1000	34000	1000	34000
	Total F					0					2084000
	Grand Total : A to F					71035657			4144708		77267926
									Say Rs772.68 Lakhs		
Note:											
1	Goel Committee rates for Iron ore are not available , hence Copper rates are taken on actual escalation as per RBI Indices as on 31-03-2015 and provisional escalation of@ 20% points for drilling and 25% points for Geological & Laboratory Studies for subsequenet years.										
2	** Nityanand Committee Rates with actual escalation as per RBI Index as on 31.3.2015 and provisional escalation @10% for subsequent year .										
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COST ESTIMATE FOR JHUMKA - PATHARIPOSHI BLOCK, DISTT: SUNDARGARH, ODISHA					
SL. NO	ITEM	UNITS	UNIT COST	PROPOSED QUANTUM of Work	TOTAL COST (IN Rs.)
1	Topographical Survey & Geological Mapping (on 1:2000 SCALE)				
	a) BH fixation, RL & Co-ordinate Determnination	BH	45208	63	2848104
	b) Topogrphical Survey (2 m contour Interval)	Hect.	18907	171	3233097
	Total 1				6081201
2	DRILLING				
	a) Coring	Mtr.	19716	1435	28292460
	b) RC (Non Coring)	Mtr.	8130	2665	21666450
	c) Mobilisation & Demobilisation of Machinery & Tools	Rig	712610	3	2137830
	d) Accomodation Charges for office & MECL perssonnels			Lump sum	10000000
	Total Drilling Activity				62096740
3	GEOLOGICAL WORK				
	a) Core Logging, Sampling , Analysis instruction & follow up ,sample Transportation	Mtr.	2560	4100	10496000
	b) Sample Crushing Charges (Coring at 1m length & RC 0.50m length)	Nos	414	5400	2235600
	c) Geological Mapping (on 1:2000 Scale)	Hect.	24865	171	4251915
	Total Geological Work (3)				16983515
4	CHEMICAL ANALYSIS				
	a) Primary+Check+external Chemical For 3 Radicals (Fe%,SiO ₂ % & Al ₂ O ₃ %)	Nos.	2981	5400	16097400
	b) Composite Samples of 7 Radicals (3 radicals+additional 4 radicals)	Nos.	6917	500	3458500
	c) Specific gravity Determination	Nos.	205	50	10250
	d) X- Ray Diffraction Studies (XRD)	Nos.	5948	20	118960
	e) Spectroscopic Studies	Nos.	6324	30	189720
	f) Petrological Samples (preparation of ThinSection)	Nos.	568	25	14200
	g) Petrological Samples	Nos.	1505	25	37625
	h) Preparation of Polished Section	Nos.	568	25	14200
	i) Mineragraphic Studies	Nos.	2124	25	53100
	j) Bulk Density Detrminations	Nos	139	10	1390
	Total Analytical Work (4)				19995345
5	Report Prepation>3000m	Nos.	1271	4100	5211100
	TOTAL (1+2+3+4+5)				110367901
				Say Rs 1103.68 Lakhs	
Note	There is no provision of Rate for Iron in the MoM schedule of Rates hence the matter was discussed in the Meeting of Technical Committee of NMET and the committee agreed for Karnataka DMG rates on Adhoc basis.				
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**Table- 7.1 Time Schedule / Action Plan for Detailed Exploration Proposal for Iron Ore in JHUMKA - PATHARIPOSHI BLock,
District- SUNDARGARH, ODISHA**

[illegible]

Government of India
Ministry of Mines
National Mineral Exploration Trust

F.No. 6/1/NMET-2015

New Delhi, 16th August, 2016

OFFICE MEMORANDUM

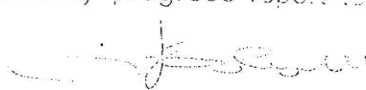
Sub: - Approval of mineral exploration projects in 13 blocks

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