REVIEW OF MINING PLAN

of

SITAPTORE MINE

At Village – Sitaptore Tahsil – Tirodi Distt. - Balaghat, Madhya Pradesh

Over an area of 43.353 Ha.

Submitted Under Rule 17(1) of Mineral (Other than Atomic and Hydrocarbon Mineral) Concession Rule, 2016 & PMCP 23 OF MCDR 2017

Category 'A' Opencast

Lease Period – 1.07.2002 to 30.06.2020

Proposal Period – 2020-21 to 2021-22

अनुमोदित/APPROVED

Registration No. of MOIL under Rule 45: IBM/5711/2011

MINE CODE: 40MPR01016

29th June 2020

क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
जबलपुर JABALPUR

MOIL LIMITED,

(A Government of India Enterprise)

MOIL Bhavan, 1-A, Katol Road, NAGPUR – 440 013

अनुमोदित/APPROVED

Type of lease area	Area (in Ha.)
FOREST	43.353
NON-FOREST	Nil
Total Lease area	**43.353 Ha**

PREPARED BY: Dr. G.G. Manekar ,
QP & General Manager (Mines planning)
MOIL Limited, Nagpur

खान का अनुमोदन
अनुमोदन पत्र संख्या MP/Balaghat/Manganese
RMP-45/19-20 दिनांक - 29/06/2020
में उल्लेखित शर्तों / प्रतिबन्धों के अधीन हुआ है

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

REVIEW OF MINING PLAN OF SITAPATORE MINE OVER AN AREA OF 43.35 HA. AT VILLAGE SITAPATORE, TAHSIL TIRODI, DIST. BALAGHAT, MADYA PRADESH STATE

Review of of Mining plan over an area of 43.35 Ha. of Sitapatore Mine of MOIL LTD in Village Sitapatore, Tah. Tirodi, Distt. Balaghat, Madhya Pradesh State is submitted for approval under Rule 17(1) of Mineral (other than Atomic and Hydrocarbon Mineral) Concession Rule, 2016 & PMCP 23 of MCDR 2017 to Regional Controller of Mines, Jabalpur Region, Indian Bureau of Mines, Jabalpur for kind approval.

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

MOIL LIMITED

SITAPATORE MINE -43.35 Ha

LIST OF PLAN AND SECTION

Sr. No.	Title	Plate No.	R.F
1.	Key Plan	I	1:50000
2.	Lease Plan	II	1:40000
3.	Surface Plan	III	1:2000
4	Plan showing GPS Co-ordinate	III-A	1:3960
5	Geological Plan	IV	1:2000
6	Geological X- section (pit no.6)	V	1:500
7	Geological X- section (pit no.8)	VI-A	1:500
8	Geological X- section (pit no.8)	VI-B	1:200
9	DTH drill holes cross section	VI-C	1:500
10	X section of proposed development plan (pit no.6)	VII	1:500
11	X section of proposed development plan (pit no.8)	VII-A	1:500
12	Year wise/Level wise O/C Development plan (pit no.6)	VIII A-E	1:500
13	Year wise/Level wise O/C Development plan (pit no.8)	IX -A-B	1:500
14	Plan Showing proposed black dump mining and proposed waste rock dumping	X	1:500
15	Section showing proposed Black Dump	XI	1:500
16	Section showing proposed waste rock dumping	XII	1:500
17	Reclamation Plan	XIII	1:1000
18	Environment Plan	XIV	1:5000
19	Conceptual plan	XV	1:2000
20	Financial Area assurance plan	XVI	1:2000

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

SITAPATORE MINE (43.35 Ha)

List of Annexure

Sr. No.	CONTENTS	ANNEXURE NO.
1	LEASE RENEWAL ORDER	I
2	COPY OF LEASE DEED	II
3	MoEF – ENVIRONMENTAL CLEARANCE	III
4	FOREST PERMISSION	IV
5	FEASIBILITY STUDY	V
6	DGMS PERMISSION	VI
7	PRODUCTION SCHEDULE	VII A-C
8	DEVELOPMENT SCHEDULE	VIII A-D
9	FLOW CHART OF ROM SORTING	IX A
10	DTH BOREHOLE REPORT	IX B
11	CASH FLOW	IX C
12	MACHINE DEVELOPMENT	X A-B
13	AIR,WATER AND NOICE ANALYSIS REPORT	XI
14	GRANT OF CONSENT TO OPERATE	XI-A
15	PMCP CALCULATION SHEET	XII
16	BANK GURANTEE	XIII
17	RQP CERTIFICATE	XIV
18	BOARD RESOLUTION FOR AUTHORISATION OF OWNER WITH PHOTO ID	XV
19	REGISTRATION CERTIFICATE OF MOIL	XVI
20	CHEMICAL ANALYSIS REPORT OF Mn. ORE	XVII
21	CHEMICAL ANALYSIS REPORT OF REJECT	XVIII
22	LIST OF MACHINERY	XIX
23	MINE PHOTOGRAPHS	XX A
24	DGPS APPROVED NOTE WITH UNDERTAKING	XXI
25	FORM K	XXII
26	ANNUAL RETURN H2	XXIII
27	COPY OF APPROVED MINING PLAN/अनुमोदित	XXIV

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Proposed Period for 43.35 Ha

The mining plan is being submitted for the year 2020-2021 to 2024-25

In this proposal period the proposed production and development is given bellow.

Proposed Production:

PROPOSED PRODUCTION (in Tonnes)		
Name	YEAR	
	2020-2021	2021-2022
Pit-6	5000	5000
Pit-8	4900	4900
Mineralised Dump- 1	0	0
Mineralised Dump- 2	4000	4000
Mineralised Dump- 3	3000	3000
Mineralised Dump- 4	0	0

Proposed Development:

PROPOSED DEVELOPMENT (in Cu. Mtr.)		
Name	YEAR	
	2020-2021	2021-2022
Mineralised Dump- 1	0	0
Mineralised Dump- 2	21920	21920
Mineralised Dump- 3	16121	16058
Mineralised Dump- 4	0	0

अनुमोदित / APPROVED

PROPOSED INSITU EXCAVATION OF PIT NO. 6						
YEAR	Total Tentative Excavation(in Cu. Mtr)	Top Soil (in Cu. Mtr)	OB (in Cu. Mtr)	ROM ore (in Cu. Mtr)	Mineral Rejects (in Cu. Mtr)	Mineral Rejects
2020-2021	74970	0	66640	2380	952	40%
2021-22	74970	0	66640	2380	952	40%
TOTAL	149940	0	133280	4760	1904	40%

PROPOSED INSITU EXCAVATION OF PIT NO. 8						
YEAR	Total Tentative Excavation(in Cu. Mtr)	Top Soil (in Cu. Mtr)	OB (in Cu. Mtr)	ROM ore (in Cu. Mtr)	Mineral Rejects (in Cu. Mtr)	Mineral Rejects
2020-2021	45750	0	37580	2334	933	40%
2021-22	45750	0	37580	2334	933	40%
TOTAL	91500	0	75160	4668	1866	40%

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

INTRODUCTORY NOTE

The leasehold area of 43.35 ha in village Sitapatore was granted in favour of MOIL on 01-07-1962 for a period of 20 years. This lease was renewed up to 30.06.2002 vide State Govt. order No.3-187/81/12 dated 15/2/1985. For further renewal of 20 years, an application has been submitted to Collector, Balaghat vide letter No. GM(Tech.) RML/SIT-I/2001/107-B dt.01-04-2001 and the lease has been granted vide lease renewal grant order no. F3-24/10/12/2 dated. 27.9.2010 from 1.7.2002 to 30.6.2022. Copy of the grant order is enclosed as Annexure – I and lease deed as Annexure -II.

Mining plan, prepared for 2005-06 to 2009-10 period, was approved vide letter No.BGT/Mn/MPLN-275/NGP dt.01-06-2005. The 2nd scheme of mining for a period 2010-11 to 2014-15 been approved under rule 12 of MCDR 1988 vide letter no. No.BGT/Mn/MPLN-275/NGP dt.21.1.2013 by IBM, Nagpur. 3rd Scheme of Mining for the year 2015-16 to 2019-20 was approved under rule 12 of MCDR 1988 vide letter no. No.BGT/Mn/SOM/275/NGP/2015 dt.11.01.202016.

The area has been explored with 8 No. boreholes, the account of boreholes B.H.1, B.H.2 & B.H.6 mentioned in approved mining plan are proved positive. In this 3rd scheme of mining a proposal for opencast and dump development is submitted. In past, the area has been exploited by developing few pits. Two of these pits namely pit No.6 and 8 are promising. No.6 pits is water logged and dewatering is in progress. It is proposed to develop these pits to a[illegible] Mtrs depth with 1:6 & 1:9 stripping ratio. Environment and Forest clearance are obtained; they are enclosed as Annexure - III and Annexure –IV.

The area fall on toposheet no. 55 O/10 having longitude 79° 40' 00" and latitude 21° 42' 00". It is approachable from Balaghat by State highway upto Borkatta, then to the right by all weathered road. The Sitapatore Mine is 12 Km away from Tirodi Manganese Mine of MOIL.

There are two leases. The main lease is 43.35 ha the other 4.73 ha area is adjacent to main lease. Both the leases use for mining and ancillary to mining activities.

अनुमोदित/APPROVED

29th June 2020

क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
जबलपुर/ JABALPUR

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning
MOIL Limited, Nagpur.

1. General:

Name of the mine and address:	Sitapatore Manganese Mine MOIL Limited, P.O. Sukli Tah. Tirodi, Dist.-Balaghat (M.P.) – 481 449 Tel: 07630 – 294399 Email ID: sureshpantawane@gmail.com
Name of applicant Rule 45 registration no.	IBM/5711/2011
Mine Code:	40MPR01016
Name and address of applicant	M/s MOIL Limited, MOIL Bhawan, 1A, Katol Road., Chhaoni, Nagpur – 440 013
Name and address of nominated owner:	Shri Dipankar Shome, Director (Prod. & Plng), (Nominated Owner)
Address :	MOIL Limited, MOIL Bhawan, 1A, Katol Road., Chhaoni, Nagpur – 440 013 Phone: 0712-2589746 Email: dshome61@gmail.com

Nomination certificate (Copy of Board Resolution is enclosed as Annexure – XV)

a) Status of the lessee:	A Government of India Enterprise Under the Ministry of Steel, Government of India, Udyog Bhawan, New Delhi

अनुमोदित/APPROVED

Registration certificate of MOIL is enclosed as Annexure –XVII

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Sr.No	LIST OF DIRECTORS	Nationality	Telephone No.	
			Office	Residence
1.	Shri M.P. Chaudhari Chairman cum Managing Director, MOIL Ltd, MOIL Bhawan, 1-A, Katol Road, Nagpur- 440 013	Indian	2592070 2592071	2570887
2	Shri. Dipankar Shome Director (production & planning) MOIL Ltd, MOIL Bhawan, 1-A, Katol Road, Nagpur- 440 013	Indian	2590775	2576909
3	Shri T.K. Pattnaik, Director (Commercial), MOIL Ltd., MOIL Bhawan, 1-A, Katol Road, Nagpur- 440 013	Indian	2592272	
4	Shri. Rakesh Tumane Director (Finance) MOIL Ltd., MOIL Bhawan, 1-A, Katol Road, Nagpur- 440 013			
5	Smt Usha Singh. Director (Human Resource) MOIL Ltd., MOIL Bhawan, 1-A, Katol Road, Nagpur- 440 013	Indian		
6	Shri. T. Shrinivas Nominnee Director (Govt. of India) Jt. Secretary to Govt. of India Ministry of Steel Udhyog Bhavan, New Delhi 110 011	Indian	011- 24675500	
7	Ms Sunanda Prasad Independent Director 12, Usman Enclave, Sector-O Aligang, Lucknow-226024 (U.P)	Indian		
8	Shri. Vijayaraghavn Madhavan Chairiar Independent Director 72 Vikramshila Apts, IIT campus, Hauz Khas, New Delhi-110016	Indian		
9	Shri Deepak singh Bhakar Independent Director 156-A, Adarsh Nagar, Ajmer, Rajastan-305001	Indian		
10	Shri. MangeshPandurang Kinare Independent Director , Rajlaxmi, 2 nd floor, General Vaidya marg, Panchpakhadi, Thane- Maharashtra-400602	Indian		

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

b) Mineral which is included in the prospecting license: NA

c) Mineral which is mined: Manganese Ore

d) Mineral included in lease deed: Manganese Ore

e) Lease period from 1.7.2002 to 30.6.2022 (20 years)

f) Name, Address & Registration No: of recognized (key) person

Dr. G.G. Manekar,
General Manager (Mines- Plng)
MOIL Limited,
1A, Katol Road., Chhaoni, Nagpur
Tel.No.0712-25806243
Fax: 0712-2590774
Email ID: g.manekar@rediffmail.com

Reg No. RQP/NGP/206/98/B
Valid up to 14 July 2020
Under Rule 22 (c) of MCR 1960

Copy of the RQP certificate is enclosed as Annexure -XIV

The environment clearance obtained vide letter no. J-11015/747/2006-IA.II (M), MoEF dated 16th January, 2009 was pertaining to production capacity of 17000 TPA (7000 TPA from the dump and 10000 TPA from the bed mining). MOIL proposes to produce 16900 TPA, which includes 9900 T from bed and 7000T from dumps. The 3rd Scheme of Mining is submitted for approval.

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

2.0: LOCATION AND ACCESSIBILITY

The area fall on toposheet no. 55 0/10 having longitude 79° 40' 00" and latitude 21° 42' 00". It is approachable from Balaghat by State highway upto Bonkatta, then to the right by all weathered road. The Sitapatore Mine is 12 Km away from Tirodi Manganese Mine of MOIL.

a) Lease Details:

Name & address of the mine : - Sitapatore Manganese mine
MOIL Limited,
P.O. Sukli Tah.- Tirodi
District : Balaghat – 481 449
Madhya Pradesh
Phone: 07630-294399

iii) Location : - Longitude 79° 40'00"
Latitude 21° 42'00"
Toposheet No. – 55 0/10

अनुमोदित / APPROVED

iv) Type of lease area :

Protected forest land	-	43.35 ha.
Revenue forest land	-	-
Private land	-	NIL
Total lease	-	43.35 ha.

Forest		Non –Forest	
Forest	Area (ha)		Area (ha)
Protected forest land	43.35 ha	(i) Waste land	NIL
		(ii) Grazing land	NIL
		(iii)Agriculture land	NIL
		(iv)Others	NIL

v) Topo sheet No. 55 0/10 is enclosed as plate No. I (Key plan)

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

3. DETAILS OF APPROVED MINING PLAN AND SCHEME OF MINING:

3.1: Details of Mining plan and Scheme of Mining:

Name & Area in ha.	Status of lease	Status of mining plan/scheme	Remarks
Sitapatore-I 43.35 ha.	Lease renewal order no. F3-24/10/12/2 dt. 27.9.2010 Lease Period 1.7.2002 to 30.6.2022	1. Mining plan approved vide letter No.BGT/Mn/MPLN-275/NGP dt.08-06-07 2. 2nd SOM from the year 2010-11 to 2014-15 approved vide letter no. No.BGT/Mn/MPLN-275/NGP dt.21.1.2013 3. 3rd SOM from the year 2015-16 to 2019-20 approved vide letter no. BGT/MN/SOM-275/NGP/2015 dated 11.01.2016	Environment clearance obtained vide letter no. J-11015/474/2006-1A-II(M) dated 16.1.2009 Forest Clearance obtained vide letter no. F.No.8-81/2004-4C dated 23.10.2008

3.2: Details of last Modification: No modification has been done

3.3: Details of the production schedule given in the 3rd SOM and actual in the following tables:

Actual Yearly Production from Bed & Dump

Proposed and Actual Production from Bed & Dump on Clean ore basis अनुमोदित / APPROVED

Quantity in Tonnes

Year	Pit. No. 6		Pit. No.8		Total Bed		Dump		Total	
	Prop	Act.	Prop	Act.	Prop	Act.	Prop	Act.	Prop	Act.
2015-16	5000	3269	4900	366	9900	3635	7000	6950	16900	10585
2016-17	5000	4993	4900	2100	9900	7093	7000	5224	16900	12317
2017-18	5000	4488	4900	3000	9900	7488	7000	4627	16900	12115
2018-19	5000	4995	4900	4850	9900	9845	7000	1811	16900	16900
2019-20	5000	4500	4900	4890	9900	9390	7000	4232	16900	13622
Total	**25000**	**22245**	**24500**	**15206**	**49500**	**37451**	**35000**	**22844**	**84500**	**65539**

Note:Production for 2019-20 is given upto ending Dec. 2019

Due to lense deposit production from Pit No.8 was less. Recovery form the dumps is almost about 8-9%, therefore production from the dumps was less.

Production for 2019-20 is given up to ending Dec.2019

Proposed and Actual Development at Pit No.6

Sr. No.	Year	RL	Total DEVP.(M3)	
			Prop	Act.
1	2015-16	335 to 325	74970	94866
2	2016-17	325to 315	74970	81386
3	2017-18	315to 305	74970	77014
4	2018-19	305 to 295	74970	38312
5	2019-20	295to 285	74970	58000
	Total		**374850**	**349578**

Dev.2019-20 is given upto ending Dec.2019

Proposed and Actual Development at Pit No.8

Sr. No.	Year	RL	Total DEVP.(M3)	
			Prop	Act.
1	2015-16	335 to 325	45750	10645
2	2016-17	325to 315	45750	34285
3	2017-18	315to 305	45750	51525
4	2018-19	305 to 295	45750	37281
5	2019-20	295to 285	45750	58838
	Total		**228750**	**192574**

Dev.2019-20 is given upto ending Dec.2019

अनुमोदित / APPROVED

Year Wise Dump Development - Quantity in Cum

Sr. No.	Year	Dump 1		Dump2		Dump 3		Dump 4		Total	
		Prop.	Act.	Prop	Act.	Prop	Act	Prop	Act.	Prop	Act.
1	2015-16	0	0	21920	18750	16121	16000	0	0	38041	34750
2	2016-17	0	0	21920	14120	16058	12000	0	0	37978	26120
3	2017-18	15873	8211	15430	8212	0	0	12698	6712	44001	23135
4	2018-19	19048	3500	0	0	0	0	22222	5555	41270	9055
5	2019-20	31746	16000	0	0	26996	14000	0	0	58742	30000
	Total	66667	27711	59270	41082	59175	42000	34920	12267	220032	123060

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

3.4: No violation has been pointed out by IBM.

3.5: There is no suspension/closure/prohibitory order issued by any Government agency under any rule or court of law during the 4th SOM period.

3.6: No modification has been done in 4th SOM.

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning
MOIL Limited, Nagpur.

PART – A

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

1. GEOLOGY AND EXPLORATION:

a) Physiography: -

The lease area of 43.35 ha located in village Sitapatore which consists of undulating topography with alluvium. Small ridges trending N25°E is located around the sitapatore village. The maximum elevation of this lease area is 345 MRL and minimum elevation is 325 MRL. The area is drained by a number of small streams and tributaries joining the main water course of Bavanthadi river.

The area enjoys the dry tropical climate with temperatures rising upto 43^0c during the summer and descending 8^0c during the cold season. The average rainfall is about 1056 mm per annum. There lease area is surrounded by forest land. The total vegetation land in this lease area is covered with alluvium soil. The major crops cultivated are wheat, Cotton, Pluses and orange. Other speices like neem, babul, subabul, kesia and teak are also found in this area.

b) Regional Geology of Sausar Group

The Precambrian (Mesoproterozoic to Neoproterozoic) meta-sedimentary sequence of Sausar Group is well known for some of the largest manganese ore deposits in Central India. The Sausar Fold Belt (SFB) is an important constituent of the Central Indian Tectonic Zone (CITZ) - a crustal-scale Precambrian mobile belt running E-W through the Indian Peninsular Shield. It constitutes the southern boundary of CITZ and is bounded by Central Indian Suture zone (CIS) on its south. It is 300 km long and 70 km wide, curvilinear (convex towards south) in shape, ESE-WNW to E-W to ENE-WSW trending orogenic belt bounded by two cratonic blocks, the Bundelkhand Craton (BKC) in the north and Bastar Craton (BC) in the south (Roy *et al.,* 2006). The central portion comprises of a stable platform sequence of manganese bearing pelite-arenite-carbonate rocks along with Tirodi Biotite Gneiss (TBG) and intrusive granitoids. The Sausar supracrustal rocks have undergone polyphase deformation (Bhowmik *et al., 1999)* and the dominant E-W structural trend in SFB is a result of the combined effect of multiple phases of deformations (Chattopadhyay *et al.,* 2003). Deformation produced low angle thrusting, tight-to-isoclinal, recumbent-to-reclined folds which led to the tectonic interleaving of basement and

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

supracrustal rocks which resulted in co-folding of the basement gneisses with the supracrustal rocks at many places. The metamorphic grade in the Sausar supracrustal rocks vary from green schist to upper amphibolite facies with gradual increase in the grade of metamorphism from east-southeast to northwest (Bhowmik *et* al., 1999). However, the gneissic rocks adjacent to the Sausar Group in the north and south contain enclaves of pelitic and basic granulites, overprinted by a retrograde amphibolites facies fabric (Bhowmik *et al.,* 1999). The Bhandara-Balaghat Granulite (BBG) domain to the south includes mafic granulite, charnokite, enderbite, meta-ultrabasites, cordierite granulite and kyanite quartzite. Whereas Ramakona-Katangi Granulite belt (RKG) to the north consists mainly of cordierite gneiss, mafic granulite, felsic migmatitic gneiss and foliated gneisses.

Recent geo-chronological study has indicated that the SFB experienced a major tectonothermal event around 850-950 Ma (Roy *et al.,* 2006). The above tectonothermal event imprinted an amphibolite facies fabric over 1100 Ma granulite grade foliations in the high grade quartzo feldspathic gneisses of the TBG suite. It is suggested that these tectonic domains in the Sausar fold belt are the result of early subduction in the southern part of CITZ followed by continent-continent collision from south to north around Grenvillian time (Roy and Prasad, 2003; Bhowmik, 2006; Bhowmik, *et al.* 2012).

The stratigraphic succession of the Sausar Group is shown in table-1 (Chattopadhyay, *et al.,* 2003). The Mansar formation which contains significant amount of manganese ore horizon associated with gondite rocks is rich in mica schist and muscovite-biotite-schist. The underlying Lohangi formation is composed of Dolomite marble with lenses of manganese ore and gondite rocks and rests over the Archean TBG basement. The overlying Chorbaoli formation consists of quartzite, quartz-schist, quartz muscovite schist and Bichua formation occur as dolomitic marbles with calc-silicate and schistose bands and sillimanite bearing quartz biotite-granulite. All the above formations are intruded by pegmatite, quartz vein and intrusive granitoids. One of the most characteristic features of this metamorphic belt is the absence of mafic rocks. Presence of a large granite body intruding the schistose rocks immediately underlying the quartzite-pelite sequence in the Mansar area indicates that the granite emplacement was syntectonic (Chattopadhyay, *et al.,* 2003).

अनुमोदित / APPROVED

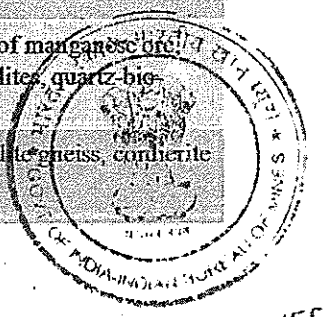
The ore bodies invariably occupy the Mansar formation (in the middle part , at the top and bottom of the Mansar formation in contact with overlying and underlying rocks) (Straczek et *al.,*

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

1956). In all cases, the manganese silicate rocks (gondites) are uniformly interbanded with manganese oxide ore bodies (braunite, bixbyite, hollandite, hausmannite, jacobsite, manganite, pyrolusite, eryptomelane), and are often co-folded in different scales. Gondite is a metamorphosed manganiferous sedimentary rock consisting of quartz and spessartite as essential minerals. However, braunite, rhodonite and other manganese silicates are also very common (Straczek et *al.,* 1956). The individual manganese silicate bands vary in thickness from a few cm to several meters. The mineral assemblages in gondites of different metamorphic zones suggest that they are formed due to regional metamorphism of mixed manganiferous sediments that were originally laid down in the oxidizing condition (Roy and Mitra, 1964). After the careful assessment of mineralogy, texture and paragenesis of the manganese ore of the study area, Jawed and Siddiquie (2014) have concluded that the manganese ores of the Nagpur area are formed by the multiple processes *i.e.* metamorphism and supergene enrichment.

Table 1. *Generalized Stratigraphy of the study area after Chattopadhyay, et al. (2003).*

Formations		Litho Units
Recent		Alluvium. Unconformity
Proterozoic — Sausar Group	Intrusive	Pegmatite, granitites and vein quartz
	Bichua formation	Dolomite marble, calc silicate rocks, sillimanite bearing quartz-bio-granulites, biotite-muscovite-schist.
	Chorbaoli formation	Garnet-staurolite-quartz-muscovite schist
	Mansar formation	Manganese ore I and gondite muscovite schist. Manganese ore II and schist. Manganese ore III with gondite
	Lohangi formation	Dolomite marbles with lenses of manganese ore, calc-silicate rocks, calc-granulites, quartz-bio-granulites and gneisses
Archaean	Tirodi biotite gneiss	Biotite gneiss, migmatite, tonalite gneiss, cordierite gneiss, amphibolites etc.



अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

c) Detailed description of Local Geology:

The strike direction of the deposit is N 25° E and dips towards south east direction. The average dip of the ore body in this lease area is 75°. The ore body occurs in the form of lenses The manganese ore horizon in the lease area belongs to Munsar Formation of Sausar Group. The major mineral of manganese ore is Braunite and minor minerals are Hausmanite, jacobsite etc. The major litho units found by exploration in this lease area are Topsoil, felspathic mica schist, Mica-sillimenite schist, Mn ore, biotite gneiss. This deposit has been explored up to a depth 290 MRL with dth boreholes. The avg. thickness of ore available for mining is 5 m.

The manganese ore horizon extends from a SW (pit6) to NE (pit 8) in general strike direction, with a obliterative attitude at pit No.3. The country rock to the East of ore is biotite gneiss whereas on the other side it is felspathic mica schist & mica silliminite schist.

Structurally it is an overturned asymmetrical anticline, super-imposed by synclines. The folds which are formed subsequently due to tectonic movements are represented by manganese ore & biotite gneiss. The dispersed / scattered ore bodies with obliterative attitude is a result of many cycles of tectonism, to which the rock types in area were subjected.

Manganese and other rock types have shown movements along the fold axis. One of the folds occupies the entire length of area including both the hills (Pit 6& 8). The axis is undulating, the depressions arising out of folding are occupied by manganese bodies in linear, tightly folded, doubly plunging synclines with in mica schist. There is a small fault in pit no.2 trending in NNW-SSE direction, which is traversed by pegmatite of later age.

Manganiferrous zone consist of quartzite, ore mineral, garnets & other manganese silicates. Braunite is the principal mineral associated with hausmunanite, Rhidenburgite with less proportion of Jecobsite. The ore zone is discontinuous, lenticular in shape of variable thickness. The zone has been worked with number of small dimension pits. The other pits, except No.8 and 6 are closed due to depletion of mineral. In general exploration indicates the upliftment of basal strata, owing to which, the deposit shows shallow depth persistency.

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

d) Name of the prospecting/ exploration agency

i) Name of the prospecting/ exploration agency	: M/s MOIL LTD
ii) Address of exploration agency	: M/s MOIL Limited. (A Government of India Enterprise) 1-A, MOIL BHAVAN, Katol Road, Chaoni, Nagpur-440 013
iii) E mail address and phone	Telephone: 0712-2590775 Fax: 0712-2592073 ggmanekar61@gmail.com

e) Details of prospecting/ exploration carried out

i) No. of pits/trenches with dimension along strike of deposit

No pitting and tenching is proposed in this lease area as a part of exploration.

ii) No. of boreholes indicating type, diameter, spacing, Inclination, collar, depth etc with standard borehole logs.

Lease hold of Sitapatore was acquired by the then British Company CPMO. Mining was commenced with exploitation of Boulder ore. With passage of time outcrops were opened by opencast pits marked as P-1,P-2,P-3,P-4,P-5,P-6,P-7 & P-8. Owing to the development of inferior ore quality with depth, except pit No.6 & 8, the other pits were closed by the then British company. As reported, ore of +44% Mn was recovered from these pits. All these activities have created sizable quantity of black mineral dump.

Geology of the area is disturbed. This part falls on central zone of Saucer belt. It has been subjected by cycles of deformations, resulting in development of pockets/lenses of variable size having shallow depth. The central fold system shows depth persistency on NE & SW part of the area, where as the central part is uplifted due to vertical strata movements.

a) At pit no. 8, Bore hole no. 1 of depth 78 mtrs has been drilled 65° from surface RL 344 and Bore hole no. 2 of depth 60.96 m from surface RL 343 with inclination of 55°. Details are enclosed as Plate No. 6 A and 6 B

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

b) At pit no. 6, Bore hole no. 6 of depth 87 mtrs has been drilled 75° from surface RL 343 and Bore hole no. 6 A of depth 96 m from surface RL 343 with inclination of 55°. Details are enclosed as Plate No. 5

As the ore occurs in the form of lenses and is scattered, the deposit is proved with 20 DTH boreholes of depth 15 m length. Based on the core and dth boreholes and the surface exposure of manganese by development the reserves are estimated.

f) The surface plan of the lease area may be prepared on a scale of 1: 1000 or 1: 2000 with contour interval of maximum of 10 m depending upon the topography and size of the area duly marked by grid lines showing all features indicated under Rule 31 of MCDR 2017.

Surface plan in 1:1000 scale is enclosed as Plate III

g) For preparation of geological plan, surface plan prepared on a scale of 1: 1000 or 1: 2000 scale specified under para 1.0 (f) of Part A of the format may be taken as the base plan. The details of exploration already carried out along with supporting data for existence of mineral, locations proposed exploration, various lithounits along with structural features, mineralized/orezone with grade variation if any may be marked on the geological plan along with other features indicated under Rule 31 of MCDR 2017.

Surface Geological plan in 1: 2000 scale is enclosed as Plate IV

h) Geological sections may be prepared on natural scale of geological plan at suitable interval cross the lease area from boundary to boundary.

Geological cross sections is enclosed as Plate V

अनुमोदित/APPROVED

i) Broadly indicate the future programme of exploration with due justification (duly marking on Geological plan year wise location in different colours) taking into consideration the future tentative excavation programme planned in next five years as in table below: -

As per the MEMC Rule, 2015 the entire mineralized area in the lease has to be explored at G1 level of UNFC. hence the boreholes are proposed in grid pattern, the year wise proposed

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

boreholes are marked on surface Geological plan. The exploration will be done in 100 m x 50 m grid to explore the deposit in G1 level, the year wise boreholes proposed are listed below and also marked on surface Geological plan.

Year	No. of BH (core drill)	PROP.BH NO.	Grid interval In meter	Total meterage	No. of pits	No. of trenches
2020-21	05	P1 to P5	100 x 50	250	Nil	Nil
2021-22	15	P06 to P20	100 x 50	1000	Nil	Nil
Total	20			1250		

J) Reserves and Resources as per UNFC with respect to the threshold value notified by IBM

Estimation of Resources: -

The ore reserves and resources are calculated on the basis of boreholes drilled in the past. The calculation sheet of reserve and resources submitted in the previous review of mining plan is given below

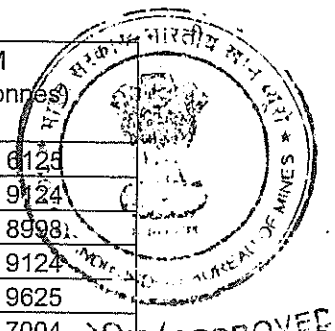
FOR PIT No. 6

SECTION	AREA (In M^2)	LENTH OF INFULANCE (In M)	VOLUME (In M^3)	SP. GR.	ROM (In Tonnes)
0-BB'	262.50	20	5250	3.5	18375
BB'-CC'	587.50	30	17625	3.5	61687
CC'-DD'	512.50	30	15375	3.5	53812
DD'-0	187.50	10	4276	3.5	14966
TOTAL					148841.50
					Say 148842 Tonnes

FOR PIT No. 8

FOR PIT NO.8

SECTION	AREA (Sq.M) (Sq.M)	LENGTH OF INFLUENCE IN (M)	VOLUME (In Cu.M)	SP.GR	ROM In Tonnes)
0N -AA'	87.5	20	1750	3.5	6125
AA' - BB'	130.35	20	2607	3.5	9124
BB' - CC'	128.55	20	2571	3.5	8998
CC' - DD'	130.35	20	2607	3.5	9124
DD' - EE'	137.5	20	2750	3.5	9625
EE' - OS'	100.05	20	2001	3.5	7004
Total					50000
				Say	50000 Tonnes



Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Total Reserve/Resources as on 01.04.2015 148842 + 50000 = 198842 T

ROM Production during the year 2015-16 : 3635 T

ROM Production during the year 2016-17 : 7093 T

ROM Production during the year 2017-18 : 7488 T

ROM Production during the year 2018-19 : 9845 T

ROM Production during the year 2019-20 (upto dec 2020) : 9390 T

Total production from 2015-16 to 2019-20 : 37451 T

Balance reserve/Resources :198842-37451=161391 T

k) Mineral Reserves/Resources:

Level of Exploration	Resources in tons	Grade	Threshold value of IBM	Area in ha.
G1 - Detailed exploration	111391	10 % to 48 %	10 %	1.346
G2 - General Exploration	50000	10 % to 48 %	10 %	0.60
G3 – Prospecting	0	10 % to 48 %	10 %	1.29
G4- Reconnassance	**161391**			**3.236**

Resources and Reserves within the lease may be arrived after applying results feasibility/prefeasibility study and economic evaluation of deposit based on various factors such as:

a) As the ore is proved at 290 MRL the deposit will be mined by Opencast mining method. The recovery in the opencast is around 70 %. No processing of ore will be done in this lease area hence there will not be any loss of ore due to processing.

b) The proposed mining method is opencast method, as on date the cut-off grade of the mine is 20% Mn, whereas the threshold value decided by IBM is 10%.

c) As this is a opencast mine, the mining operation is on surface there is no blockage of ore due to roads, railway line, electricity poles, river, reservoir and nala within the lease area. Total 8 boreholes are drilled to prove the deposit, based on the borehole data and cross sections the reserves and resources are calculated.

Reserve

Proved Mineral Reserves (111):- 111391 Tonnes

Resources:-

Inferred Mineral Resource (333):- 50,000 Tonnes.

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

The ore zone at Pit No. 6 is consider under indicated mineral Resource (333), as the ore body is yet to be proved at G1 Level. Hence the quantum computed is placed as Inferred Mineral Resource (333) of UNFC.

Mineral Reserves/Resources: As per UNFC Reserves and Resources are given below;

Classification	Code	Quantity in Tonnes	Grade
	A+B		Mn%
Mineral Reserves			
(1) Proved Mineral Reserves	111	111391	
(2)Probable Mineral Reserves	121	0	10-47%
(3)Probable Mineral Reserves	122	0	
TOTAL-A		111391	
Remaining Resources			
(1)Feasibility Mineral resource	211	0	
(2)Prefeasibility Mineral Resource	221	0	
(3)Prefeasibility Mineral Resource	222	0	
(4)Measured Mineral Resource	331	0	
(5)Indicated Mineral Resource	332	0	10-47%
(6)Inferred Mineral Resource	333	50000	
(7)Reconnaissance Mineral Resource	334	0	
TOTAL-B		50000	
GRAND TOTAL A+B		161391	

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

2.0 MINING

A. OPEN CAST MINING :

Salient description of present mining method:

In past, the mineral was exploited by open pit mining and retrieval of black dump. The bed mining will be continuing in pit no. 6 and pit no. 8 with approved norms of DGMS. The approval letter is enclosed as Annexure VII. Accordingly, the bed mining will be undertaken by observing following parameters-

1) Formation of benches shall be done from top downward.
2) Height of the bench in hard strata shall not be more than 7.5 mtrs.
3) Height of the bench in soft strata shall not be more than 3 m
4) Width = height + 2 m
5) No roads shall have a gradient steeper than 1in 16 at any place
6) Ground vibrations will be monitored continuously.

Bed Mining:

The bed mining will be commenced from 2020-21. A time gap is required to establish the area and pits. Both the pits require proper benching & ramp for transportation of waste. The required development will be commenced in the year 2020-21

It is propose to commence the drilling and blasting in ore zone at both the pits from 2020-21 to 2021-22. Manganese ore, ROM of 16660 T & 16340 T will be exploited through pit no. 6 & pit no.8 during scheme period against the development of 149940 m3 from pit no.6 & 91500 m3 from pit no. 8. The total development & ROM production in respect of both the pits, is distributed over 5 years period, which is shown in table below and enclosed as Annexure VIII A-D

Both the pits will be brought under development from 1st year of SOM. This will provide proper bench configuration & a ramp for transportation of waste/ ore.

As regards, the present status of pits:

अनुमोदित / APPROVED

Pit no. 6:

Past exploitation activities over pit no. 6, resulted in development of pit from 315 MRL. After developing proper bench configuration, the pit bottom will be lowered to 280 MRL with

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

average rate of 10 mtr per year. It is proposed to recover 10000 tonnes of clean ore against the development of 149940 m³ with 1:9 ratio. The overburden will be used for reclamation of pit no.7 which adjacent to pit no. 6.

Proposed insitu excavation of Pit No.6

Year	Total Tentative Excavation in Cum	Top Soil Cu.M.	OB Cu.M.	ROM Ore Cu.M	Mineral Rejects Cu.M	Mineral Rejects
2020-21	74970	0	66640	2380	952	40%
2021-22	74970	0	66640	2380	952	40%
Total	149940	0	133280	4760	1904	40%

Year	Total Tentative Excavation in Cum	Top Soil Cu.M.	OB Cu.M.	ROM Ore in T	Mineral Rejects in T	Mineral Rejects
2020-21	74970	0	66640	8330	3330	40%
2021-22	74970	0	66640	8330	3330	40%
Total	149940	0	133280	16660	6660.	40%

Pit no. 8:

It is developed from 325 MRL, with proper benches. It is propose to develop this pit to 270 MRL, as the ore zone has been established to this MRL. To begin with, bench configuration will be developed from the year 2015-16, followed by exploitation of ore in consecutive years by lowering the MRL by 10 mtrs per year. As the table reads, 24500 Tonnes of clean ore will be recovered against the development of 91500 m³ with 1:5.6 ratio. The overburden material will be dump in the dumps as given on surface plan.

Insitu Proposed Excavation of Pit no.8

Year	Total Tentative Excavation in Cum	Top Soil Cu.M.	OB Cu.M.	ROM Ore in Cum	Mineral Rejects in cum	Mineral Rejects
2020-21	45750	0	37580	2334	933	40%
2021-22	45750	0	37580	2334	933	40%
Total	91500	0	75160	4668	1866	40%

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

In-situ Proposed Excavation

PIT No. 8

Year	Total Tentative Excavation in Cum	Top Soil Cu.M.	OB Cu.M.	ROM Ore in T	Mineral Rejects in T	Mineral Rejects	ROM/ Waste Ratio T/cum
2020-21	45750	0	37580	8170	3270	40%	1:5.6
2021-22	45750	0	37580	8170	3270	40%	1:5.6
Total	91500	0	75160	16340	6540	40%	1:5.6

PROPOSED CLEAN ORE PRODUCTION IN TONNES			
YEAR	Pit No.6	Pit No.8	Quantity in Tonnes
2020-21	5000	4900	9900
2021-22	5000	4900	9900
Total	**10000**	**9800**	**19800**

GRADE WISE PROPOSED PRODUCTION IN TONNES					
Year	Prod	II Gr Ferro	III Gr Ferro	LGHS	Low Grade
2020-21	9900	990	1485	4950	2475
2021-22	9900	990	1485	2475	2475
Total	**19800**	**1980**	**2970**	**9900**	**4950**

भारत सरकार-भारतीय खान ब्यूरो * GOVT. OF INDIA-INDIAN BUREAU OF MINES *

अनुमोदित/APPROVED

29th Jan 2020

क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरों
INDIAN BUREAU OF MINES
जबलपुर/ JABALPUR

भारत सरकार-भारतीय खान ब्यूरो * GOVT. OF INDIA-INDIAN BUREAU OF MINES *

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

II. DUMP MINING:

Dump mining will be carried out by óff the pit mining'. The mangane-ferrous rock generated by the development will be taken from the dump working area and will be staked for secondary recovery of manganese ore on the flat surface area for breaking and sorting in OCF. There it will be sorted and keep ready for dispatch after checking of grade of mineral.

Rejects will be stacked separately on mineral reject dump site.

Recovery of manganese ore from the dumps is about 8-9%.

LOCATION AND DIMENSION OF MINERALLIZED DUMP				
Year	LAT.	DEP.	DIMENSION (AREA X HEIGHT)	QUANTITY IN M3
Dump-1	1100 TO 1180	330 TO 470	10428 X9.5	99066
Dump-2	1100 TO 1200	140 TO 300	11567 X 10	115670
Dump-3	1000 TO 1070	120 TO 220	23408 X 13	304304
Dump-4	700 TO 900	220 TO 450	5734.4 X 17	97484.80

c- Development plan of pit no. 6 and pit no. 8 along with dump development plan and sections are enclosed as plate VII, VII-A, VII A-E and IX-A-E and L –section enclosed as plate - X.

Year wise Dump Development - Quantity in Cum					
Year	Dump-1	Dump-2	Dump-3	Dump-4	Total
2020-21	0	21920	16121	0	38041
2021-22	0	21920	16058	0	37978
Total	0	43840	32242	0	76019

Dump No. 1	Year wise handling in Cum	Production in T
2020-21	0	
2021-22	0	
Total	0	0

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Dump No. 2	Year wise handling in Cum	Production T
2020-21	21920	4000
2021-22	21920	4000
Total	43840	8000

Dump No. 3	Year wise handling in Cum	Production T
2020-21	16121	3000
2021-22	16058	3000
Total	32179	6000

Dump No. 4	Year wise handling in Cum	Production T
2020-21	0	0
2021-22	0	0
Total	0	0

Production Schedule

Production Schedule from Dumps

Quantity in Tonnes

Year-wise production From Dumps					
Year	Dump-1	Dump-2	Dump-3	Dump-4	Total
2020-21	0	4000	3000	0	7000
2021-22	0	4000	3000	0	7000
Total	0	8000	6000	0	14000

Grade-Wise Production From Dump

Grade-Wise Production from Dumps

In Tonnes

Year	LGHS	Low Grade	Total
2020-21	5250	1750	7000
2021-22	5250	1750	7000
Total	10500	3500	14000

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Production Schedule

Yearly Production From Bed & Dump

Production Schedule From Bed & Dump on Clean Ore basis

Quantity in Tonnes

Year	Pit no.6	Pit no.8	Total-Bed	Dump	Total
2020-21	5000	4900	9900	7000	16900
2021-22	5000	4900	9900	7000	16900
Total	**10000**	**24500**	**19800**	**14000**	**33800**

a) Salient feature of proposed method of mining;

Opencast working:

Exploration of both the pits, indicates that the no persistence of ore zone approximately below 270 MRL at pit no.8, where as the ore zone does show depth persistency at central part of pit 6. owing to the nature & behavior of ore zone, exploitation activities in pit 8 will be suspended at 270 MRL, for further exploration from pit bottom by non-core drill.

Mining will be done by deploying tippers of carrying capacity 10-12 tonnes in combination with hydraulic excavators of 0.9 cum capacity. Drilling will be done by DTH hammers of 110 mm by wagon drills. Detail calculation of the machines deployed for development is appended in Annexure – X A-B for pit no.6 & pit no.8. Overburden will be dumped at the dumping sites. Manganese ore will be transported to OCF for cleaning & sorting purpose. Rejects (below 20% Mn) will be stacked in area demarcated for mineral reject dump. Controlled blasting will be carried out by using non-electric detonating system (NONEL), moreover ground vibrations will be measured for every blast by seismograph recorder. This will reduce the ground vibration in the area. Water spraying will be done continuously on the benches to reduce the splash of dust in air.

At Sitapatore Mine the extraction of manganese ore is being carried out by mechanised opencast method with the use of Heavy Earth Moving machinery and with deep holes blasting as per the permission obtained from the office of Director of Mine Safety, Nagpur Region -1 with the vide letter no. NR-1/1585, dated 21-08-2009. All the operations are carried out with the strict compliance of the all the conditions are given in the permission. The permission was granted with the exemption

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

from the provision of Regulation 106 (2) (b) of the metaliferrous mines Regulation 1961. Copy of the blasting permission is enclosed.

Salient features of the blasting operations:

[1] Hole Dia. – 100 mm
[2] Drilling pattern – staggered
[3] Hole Direction – Vertical
[4] Initiation Safety front – Away from structure & hutments
[5] Explosive type – Cartridge slurry
[6] Maximum Holes per round -17 No.
[7] Nos of rows – 02
[8] Hole depth – 8.5 Mtrs.
[9] Spacing – 2.00 to 2.50 Mtrs.
[10] Burden – 2.00 to 2.50 Mtrs.
[11] Nos . & type of deck – one middle deck
[12] Average deck length – 2.5 Mtrs. to 0.75 Mtre.
[13] Maximum charge per delay in kg- 114
[14] Maximum charge per round – 425 kg.
[15] Specific charge in kg./M3- 0.6 – 0.75
[16] Stemming material – sand
[17] Short delay detonators 25 millisecond for each row.
[18] Bottom initiation system with shock tube / non-electric / Nonel detonators shall only be used for all the blasts.
[19] Controlled blasting in conjunction & with effective muffling with Nonel detonators.

b) UPL of pit no. 6 and 8 – 45 mtrs

अनुमोदित / APPROVED

c) Conceptual Mining Plan:

Lease hold area of Sitapatore is under mining operation since 1906. To begin with, it was broker for boulder ore mining, however with passage of time, exploitation of mineral was

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

executed by developing open cast workings. Central Province prospecting syndicate & Central Province Manganese Ore exploited high quality ore & inferior quality as they deem considered, was stacked as black mineral dumps within lease hole area. MOIL prior to enforcement of forest act, retrieve these black dumps, as the demand for lower grade was gaining momentum.

Implementation of forest act 1980, adversely affected the exploitation activities since 1981-82. Over a period of app. 30 years, many wild trees & shrubs are grown, pits are water logged. The area looks like a dense forest.

With clearance from MOEF, it is proposed to re-establish the area for exploitation of black dump & bed ore. MOIL a pioneer company insisted upon the implementation of sustainable development & eco-friendly mining. All the measures to protect flora-fauna & environment will be followed meticulously.

Area of mining needs proper housekeeping. Though maintenance of road, periodic dewatering of pits & other related activities were in process but for proper & scientific mining of bed ore, proper maintenance of road, benches, clean area for OCF etc. are essential.

Exploitation of mineral from black dump marked as, Dump no.1,2,3 & 4 have commenced from 1.4.2015. The dump exploitation will continue till saleable mineral exhaust & the rejects that will be left will be stacked separately.

It is proposed to commence bed mining from 2015-16 from pit No.6 & 8. Boreholes have indicated the depth persistency of ore zone. In past, as the history spells, these two pits were worked to present depth for ferro-grade production. As indicated by boreholes & the general behaviour of the strata, the deposit has shallow depth persistency. As a strategy, prior to depletion of pit 6 & 8, few additional bore holes will be drilled in area, where possibilities of presence of sub-surface mineralization are there.

As a social responsibility & commitment towards society, the area will be stabilized by plantation with & suitable species. Proper drain, toe dams will be constructed before completion of mining operation. Considering the water scarcity of area, large dimensioned pits will be kept open as water reservoir, whereas other small pits will be reclaimed with waste of mining.

अनुमोदित / APPROVED

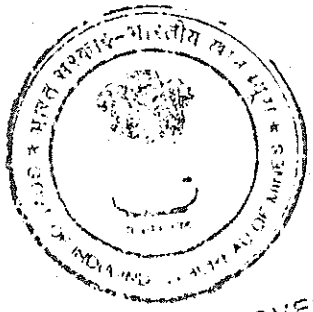
Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Land use pattern of the mine is given below;

LAND USE PATTERN

Sr. No.	Description	Area in Ha
1	Opencast Excavation	6.608
2	Overburden Dumps	5.739
3	OCF &Mineral Storage	6.772
4	Roads	0.085
5	Township Area	0.491
6	Green Belt Area	0.120
Total		19.815

B. UNDERGROUND MINING : NOT APPLICABLE



Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

3. MINE DRAINAGE :

a) Max and minimum water table – 0.5 m to 2 m below ground level in dug well

b) Maximum and minimum depth of working – 35 to 45 m

c) Quantity of the water – 150 cm/year

d) Regional and local drainage pattern ;

There is no problem of waste water, as the mine has only small bed mining & dump working. However the rain water will be drained out through the natural course of drainage. During Monsoon, drain off water joins the Dhuria nallah and Baillphate stream joining ultimately to Bawanthadi river which is about 8 kms away from the mine.

Open dug well water is the principal source of water for Sitapatore village. The open dug wells in the area are 9 to 12 meter deep & yield good amount of water. The water level in these wells in monsoon period ranges between 0.5 meters to 2 meters below ground level.

Present pit bottom down-most level of pit no.6 is about 315 mRL. Likely depth of water table based on observations from nearby wells is about 313 mRL.& during monsoon it reaches up to 323 mRL.

The expected pit bottom level will be 280 mRL, and from pit no. 6 and 8 during 5 years of development as proposed in this Scheme of Mining.

The average annual rainfall is this area is about 150 Cm./year. During dry season minor seepage is encountered, from the strata, whereas during monsoon water of whole catchment area gets accumulated in pit no 6 . At pit no. 6, 10HP capacity pump will be sufficient to discharge the water from the pit. If it is required more capacity pump may be installed to encounter the accumulated water. The water collection of sumps is pumped to surface.

In normal course, the water pumped out of opencast pit will be fully utilised for various industrial (Jigging, dust suppression etc) purpose. During rainy season a part of total make of water will be discharged through a seasonal water drain in the adjoining agricultural paddy field outside SW side of lease hold while in dry season hardly any water escaped.

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

DURING DRY SEASON:

The capacity of pumping is more than sufficient to pump out accumulated water in opencast pit No.6 during dry season. Average analysis result of discharge water from these pumps is given below:-

1)	Physical appearance	-- Hazy, Colorless, Odorless
2)	pH	-- 7.1
3)	Dissolved Oxygen	-- 5.2
4)	C.O.D.	-- 62.08
5)	B.O.D. 5 days at 20	-- 13.00
6)	Suspended Solids	-- 48.00
7)	Oil & Grease	-- Nil

Detailed report of water analysis are given in Annexure- XI A-D

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

4. STACKING OF MINERAL REJECT/SUB GRADE MATERIAL AND DISPOSAL OF WASTE

Disposal of Waste & Top soil:

There is no generation of top soil in this lease area as pits proposed for mining are already under development.

While working the old dump rejects generated after recovery of saleable grades of ore are dumped adjoining to the present dumps working side leaving about 10 to 15 mts. distance from the dumps and levelled thereby utilizing the same area of old dumps without disturbing the present environment. the location of the dumps has been shown on Surface Plan Plate No. III. The waste disposal of pit no. 6 and 8 will be done at barren land on waste dumps I & II as shown in the plate No.III.

LOCATION OF WASTE DUMP		
Year	LAT.	DEP.
Waste Dump-1	1264 to 1334	480 to 510
Waste Dump-2	710 to 888	500 to 464

Nature of Waste:

a) Manganeferous waste : The black rock consisting upto 20% of Manganese, locally known reject from O.C.F. & Off Pit Sections will be dumped separately. This include lumpy reject, hutch product & jig reject.

b) Non Manganiferous Rock Waste: The waste rock consists of mica schist, muscovite schist & Biotite gneiss product from overburden development will be stacked separately.

Selection of Dumping Site

O/C Development Waste :

In future F/W development rock and H/W development rock will be disposed off at waste dump I & II. This distance is of 0 .5 Kms. & is conveniently located with respect to the main 6 No. pit activities. The lower level areas around the dumps shall be covered by erecting stone

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

pitching 1.2 Mtrs high to protect the spread of dumps. The location of waste rock dump is given in Surface plan No III.

Dump Development & Mining Waste :

The waste containing schist, quartzites and non manganiferous rock generated from the dumps after recovery of manganiferous ore :

Waste produced from dump working faces is carried out manually and dumped 4 to 5 mts. before the dump which is under operation and as the dump face advances dumping of waste or rejects will also proceed accordingly towards dumps.

Maximum height and spread of dumps :

Maximum height of these dumps will not be more than 10 mtrs, with angle of repose of 37°in the terracing fashion and its spread will be as much as 40 Mtrs. depending upon the space available. Presently dump is being worked & the mining of this dump in course of time will create void space. the void space would be backfield with white schist rock of development material. The space so leveled will be suitable for afforestation.

As far as the void spaces in working opencast pits are concerned, the mining would not be completed by another 19 years time. Hence back filling of the opencast working pits would only commence after 10 years followed by afforestation scheme in the area to rehabilitate the entire opencast section.

Rate of yearly generation of waste & proposal for it's disposal:-

This scheme proposes opencast development at pit 6 & pit 8. The waste rock, i.e. mica silleminite schist & Biotite -Gneiss will be generated in the process of development. Total generation of waste during this SOM period will be approx. 823332 m^3. The year wise generation of waste is given in Annexure VIII. This waste will be stacked in area earmarked for the same. The total area required for stacking of waste is 65000 m^2.

अनुमोदित / APPROVED

Rate of yearly generation of sub-grade & proposal of its stacking:

As such MOIL do not produce sub-grade mineral. The ROM is divided in two fractions, namely saleable grade & reject. These rejects are as & when retrieve to cope up the demand of required low grade. With induction of Silico grade (25-30%) & 20% Mn as cut off, the rejects volume is

considerably reduced. Thus the rejects that would be generated in the cleaning & sorting process, may analyze on and average 15%Mn which is a non-saleable fraction. They will be stacked separately and will not be allow to mix with waste so that if required, easily be approached for their retrieval.

Quantity & grade of sub-grade/rejects:

Year	Rejects -in T
2020-21	6600
2021-22	6600
Total	13200

Threshold value of the manganèse ore is 10%, whereas with prevailing condition of the market cut off grade is about Mn% 20. These mineral rejects will be stacked separetly in black dump mineral rejects. When market favours the same will be processed and will be marketed.

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

5. USE OF MINERAL AND MINERAL REJECT:

Use of Mineral:-

As described in mining plan ROM will be sorted to obtain Ferro-grade(>38% Mn) fines (36-38% Mn), LGHS (30-35% Mn) & Silico grade (25-30% Mn). They will be sold to Ferro industries, Bhilai Steel Plant & Steel Industries etc.

PRODUCTS MARKETED BY MOIL

Manganese Ore (India) Limited, the leading producer of high grade Manganese ore and manufacturer of Electrolytic Manganese Dioxide and manganese alloys in India, markets various grades and blends of ores to suits individual requirements of consumers, particularly for Steel, Ferro Manganese, Dry Battery, and Chemical Industries. Currently the grades of ore and value added products available for sale comprise of -

METALLURIGICAL ORE – SPECIFICATIONS					
Grade	Mn %	Phos %	SiO2 %	Fe %	Size
49% Grade	49.50	0.100	8.00	4.80	(-) 75mm to (+) 6mm- 90%
43% Grade	43.00	0.240	16.00	7.50	(-) 75mm to (+) 6mm- 90%
37% Grade	37.50	0.250	24.00	7.50	(-) 75mm to (+) 6mm- 95%
Chemical Grade	43.00	0.260	13.00	8.50	(+) 6mm : 25%; (-) 6mm : 75%
SM Grade – I	30.00	0.300	30.00	8.00	(-) 75mm to (+) 6mm- 95%
SM Grade - II	24.00	0.310	35.00	9.00	(+) 10mm : 90%
Mn. Ore Fines	34.00	0.135	27.00	5.20	(+) 3mm : 40%; (-) 3mm : 60%
Mn.Ore Fines	32.00	0.150	27.00	6.00	(+) 3mm : 20%; (-) 3mm : 80%
Mn. Ore Fines	36.00	0.220	14.40	10.50	(-) 3mm : 100%

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

MANGANESE DIOXIDE		
Grade of Ore	Fe	SiO2
72-74% MnO2	6.00	5.00
74-76% MnO2	6.00	5.00
76-78% MnO2	6.00	5.00
78-80% MnO2	6.00	4.50
80-82% MnO2	5.00	5.00
82-84% MnO2	4.00	3.00
85-87% MnO2	3.00	3.00
> 88% MnO2	2.00	2.00

FERRO MANGANESE		
Mn	78 %	77 %
P	0.33 %	0.33 %
C	7.50 %	7.50 %
Si	1.00 %	1.50 %
Size (mm)	40-100 mm	25-40 mm
ELECTROLYTIC MANGANESE DIOXIDE		
Quality better than IS : 11153-84 MnO2		

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

6.0. PROCESSING OF ROM AND MINERAL REJECT:

No beneficiation tests were conducted. As such the ROM after segregation in various fractions (physical & grade wise) is directly saleable in market. No beneficiation is required at this stage. To enrich the grade of ore, sorting operation will be carried out manually. Flow sheet is enclosed as Annexure IX-A.

Physical characteristic of the ore is listed below:

1. +25 mm to -75 mm Lumpy ore
2. +6 mm to -25 mm Small ore
3. -6 mm to +3 mm Fines

No sub-grade mineral is generated, MOIL produces rejects, which is not saleable in present market. The beneficiation tests are not essential at this stage.

No chemical processing is being carried out in the mine.

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

7.0 **OTHER**

Site Services:

a) Workshop: The Mine uses the Tirodi Mine Workshop. However, there is one smithy shop here.

b) Mine Office : There is a mine office.

c) Mine Store and Fuel Store: The Tirodi Mine stores provide materials to this mine when required.

d) Medical facility: The Mine employees take the treatment from Tirodi Mine Hospital. However, a First Aid room and a nurse is available for primary medical treatment.

e) Canteen: A small canteen serves tea and snacks etc. to the employees.

f) Rest Shelters/ Urinals and Latrines: There are 3 rest shelters, 2 Urinals-cum-Latrines.

Employment potential:

Highly skilled: NIL - nil

Skilled: nil

Semi-Skilled: 56

Un-skilled: 41

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

8.0 PROGRESSIVE MINE CLOSURE PLAN of SITAPATORE MINE FOR 43.35 Ha . LEASE AREA UNDER RULE 23 OF MINERAL CONSERVATION AND DEVELOPMENT RULE - 1988

8.1: Base Line Information:

i) Name of lessee : - MOIL Limited,
MOIL Bhawan, 1A, Katol Road,
Chhaoni, Nagpur – 440413
Tel: 0712-2590775
Fax: 0712-2592073
Gram: ORMIX

ii) Name & address of the mine : - Sitapatore Manganese mine
Manganese Ore (I) Ltd.,
P.O. Sukli Tah.- Katangi
District : Balaghat – 481 449
Madhya Pradesh
Phone: 07630-294399

iii) Location : - Longitude 79° 40'00"
Latitude 21° 42'00"
Toposheet No. – 55 0/10

iv) Type of lease area : Protected forest land 43.35 ha.
Revenue forest land
Private land NIL
Total lease 43.35 ha.

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Mining operations and ancillary activities are continued in area. A set up of residential including Manager, Foreman & other staff were residing in area. Dewatering, repairing of roads, drains etc. were the activities conducted in area. With clearance from MoEF, the propose mining activities now will be implemented.

No statutory obligations are issued from Govt. or inspecting authorities. The special conditions reflected in MOEF clearance will be meticulously followed & implemented before the closure of mine. Some of the conditions, such as payment of NPV, payment for degraded forest land, safety zone etc. have been fulfilled. The construction of toe dam, plantation in safety zone, day time blasting, regular monitoring of air-water etc. are the proposed activities of present scheme.

Existing Land Use pattern:

LAND USE PATTERN

Sr. No.	Description	Area in Ha
1	Opencast Excavation	6.608
2	Overburden Dumps	5.739
3	OCF &Mineral Storage	6.772
4	Roads	0.085
5	Township Area	0.491
6	Green Belt Area	0.120
Total		19.815

The overall land use pattern in Sitapatore manganese mine is as follows.

i) Agricultural Land : Nil

ii) Natural Vegetation i.e. forest 52%

iii) Active Mining area : 20%

iv) Human Settlements : 2%

v) Rehabilitated Dump : 26%

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

The present land use pattern of buffer zone of 10 km around consists of :-

i)	Agricultural Land :	50%
ii)	Natural Vegetation i.e. forest	45%
iii)	Active Mining area :	2.5%
iv)	Human Settlements :	0.5%
v)	Rehabilitated Dump :	2%

Water regime, quantity of air, ambient noise level, flora and climatic condition:

Water Regime

Sitapatore Mines campus needs about 2000 liters / day water for drinking & for sanitary purposes , about 5000 liters/day for Ore washing and about 10000 lts./day for dust suppression. Water supply in this area is through wells sunk at favorable places, which are staple source of water supply. Dhoria nallah belt can be potential source. There are three major regimes in Sitapatore Mines area.

Ground water which is typically represented by well water samples near mine office and Gopikisan Camp. There is a water impoundment which is about 3 km away from Sitapatore. This area gets water logged in Monsoon. Third source is hand pump water. The dependability of ground water is related to consumption and recharge rates. The consumption of water in the mine area itself is not high, the requirement mainly being for watering the roads. In fact there is lot of excess water during rains which get discharged into the open nallah.

From last so many years open cast mining is not carried in this lease area. Details about the water balance at site, lean season water availability, changes in quality & quantity of ground water, the records will be maintained after workings gets started.

Flora and Fauna

Flora :

The whole mine area is situated inside the protected forest of South Balaghat Division about 2-3 km in the south from the village Sitapatore. The forest is of southern dry mixed deciduous types. During the early period of mining the dumps have been formed in the form of hillocks and changed the topography in the area the dumps were devoid of any vegetation of

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

forest cover. The peculiarity of this mine area is that even though it was worked in the past, since last 100 years or so, it was closed between 1967 to 1982. During this period a MOIL chowkidar used to patrol the area. At the same time the area being surrounded by dense forest is well protected by forest department staff. It came under the management of the forest department in 1957 after the abolition of ex-proprietary forests. Gradually the vegetation cover of the forest species have come up well and covered the whole area and mixed up with surrounding environment, Mostly miscellaneous species. Saj, Lendia, Palas, Mokha, Tiwas and others have covered the dump hillocks with shrubby growth underneath. The density also varies between 0.6 to 0.8. except at places where deep water ponds have been formed in old mined places and on slopes where soil is washed down and new excavation are being carried out on old dumps to recover saleable quality of ore.

Fauna

The area is also rich in wild life Tiger, Panthers, Spotted Deer, and Wild Boars are noticed in the area. With the little disturbance of environment no need is felt for any afforestation works in the mine area and then surrounding malguzari forests, which have constituted as protected forest after the abolition of malguzari rights.

Climatic Condition

Sr.no.	Description	Summer	Monsoon	Post Monsoon	Winter
1	Predominant wind	NW	SW	SW	NE
2	Predominant wind	1-5	6-11	1-5	1-5(Km/hr)
3	Max Temp deg.cent	46.	38	31	30
4	Min Temp deg.cent	21	23	18	8
5	Max R.H. %	70	96	90	80
6	Min R.H. %	10	80	75	15

अनुमोदित / APPROVED

Human Settlement

Sitapatore mine has remarkable influence on socio-economics of the surrounding area for the last 50 years. The mine is near Sukli Village in Balaghat district, which is predominantly rural in characteristics. The mine is surrounded by 29 villages within a buffer zone of 10 kms. The village wise details of human settlements are given below;

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

LAND USE, POPULATION AND AMENITIES AVAILABLE IN 10 KM RADIUS

				Amenities Available					
Sr. No.	Name of Village	Total area of the village (in Ha)	Total population and number of house hold	Educ-	Medical	Drinking water (Potable)	Post & Telegraph	Day or Days Of the market/ Hat If any	Bus Stop, Rly. Stati-on, water ways
1	2	3	4	5	6	7	8	9	10
1	Dulhapur	788.11	180(35)	-(-5)	+(10+)	W	-(10+)	-(10+)	-(10+)
2	Koilari	1204.39	803(166)	P(1)	-(10+)	W	-(10+)	-(10+)	-(10+)
3	Bandareva	746.5	502(94)	P(1)	-(10+)	W	-(10+)	-(10+)	-(10+)
4	Pathrapet	38.99	37(10)	-(-5)	-(10+)	W	-(10+)	-(10+)	-(10+)
5	Govindpur (Hamesha)	22.45	-	-	-	-	-	-	-
6	Kanhargaon	295.72	789(150)	P(1)	-(-5)	W	-(-5)	-(10+)	-(-5)
7	Kisanpur (Hamesha)	215.72	240(60)	P(1)	-(-5)	W	-(-5)	-(10+)	-(-5)
8	Navegaon Antara (Hamesha)	104.18	-	-	-	-	-	-	-
9	Kosamtola	201.51	275(61)	P(1)	-(-5)	WN	-(-5)	-(10+)	-(-5)
10	Mehkepar	1217.94	3976(760)	P(1)	-(-5)	W	PTO	WED	RS
11	Laxmipur Hamesha	199.93	105(25)	-(-5)	-(-5)	W	-(-5)	-(-5)	-(-5)
12	Pandhari	456.17	12(4)	-(-5)	-(-5)	W	-(-5)	-(-5)	-(-5)

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

LAND USE, POPULATION AND AMENITIES AVAILABLE IN 10 KM RADIUS

						Land use(in Ha)					
Sr. No.	Name of Village	Approach to Village	Dist. from cement plant in Km.	Power supply	Staple Food		Irrigated By Sources	Un Irrigated	Cultrable Waste Including gaucliar & groves	Area not available for cultivation	Remarks including any place of Religious Historical or Entoreological interest
1	2	11	12	13	14	15	16	17	18	19	20
1	Dulhapur	-	5	-	Rice	696.86	10.14	26.24	41.93	12.94	-
2	Koilari	PR	5	-	Rice	906.09	61.21 Tk	77.96	116.21	42.92	-
3	Bandareva	KR	9	-	Rice	502.19	6.77	164.61	47.14	25.89	-
4	Pathrapet	KR	10	-	Rice	-	-	21.28	15.12	1.89	-
5	Govindpur (Hamesha)	-	9	-	-	-	Uninhabited	-	-	-	-
6	Kanhargaon	KR	10	-	Rice	47.12	66.42 Tk	103.83	55.12	23.23	-
7	Kisanpur (Hamesha)	KR	9	-	Rice	19.37	2944 Tk	40.87	17.20	18.12	-
8	Navegaon Antara (Hamesha)	-	9	-	-	-	Uninhabited	-	-	-	-
9	Kosamtola	KR	9	-	Rice	94.66	37.81 Tk	23.31	18.51	27.22	-
10	Mehkepar	PR	10	ED,Eg	Rice	477.09	328.02 Tk	140.09	119.02	153.08	-
11	Laxmipur Hamesha	KR	10	-	Rice	42.00	14.39 Tk	54.59	49.55	39.40	-
12	Pandhari	PR	9	-	Rice	352.99	10.41 Tk	51.99	18.91	21.87	-

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

LAND USE, POPULATION AND AMENITIES AVAILABLE IN 10 KM RADIUS

				Amenities Available					
Sr. No.	Name of Village	Total area of the village (in Ha)	Total population and number of house hold	Educ-	Medical	Drinking water (Potable)	Post & Tele Graph	Day or Days of the market/ Hat if any	Bus Stop, Rly. Station, water ways
1	2	3	4	5	6	7	8	9	10
13	Digana	521.46	1600(334)	P(1)	-(-5)	W	-(-5)	-(-5)	-(-5)
14	Bichua Ryt	350.67	499(940)	P(1)	-(5-10)	W	-(5-10)	-(5-10)	-(5-10)
15	Chanda Doh	430.39	520(110)	P(1)	-(5-10)	W	-(5-10)	-(5-10)	-(5-10)
16	Kharpadia	438.25	606(107)	-(-5)	-(-5)	W	-(-5)	-(-5)	-(-5)
17	Sivanheti Ryt	452.76	195(28)	-(5-10)	-(5-10)	W	-(5-10)	-(5-10)	-(5-10)
18	Sukli	1031.24	850(165)	P(1)	-(10+)	W	PO	-(10+)	-(10+)
19	Paunia	765.82	2282(410)	P(1), M(1)	-(-5)	W,TK	PO	Tue	-(-5)
20	Dongargaon	114.5	361(74)	-(-5)	-(-5)	W	-(-5)	-(-5)	-(-5)
21	Hirapur	301.68	370(88)	P(1)	-(5-10)	W	-(5-10)	-(5-10)	-(5-10)
22	Boldongri	237.17	720(135)	P(1)	-(-5)	W,TK	-(-5)	-(-5)	-(-5)
23	Jamrapani	262.19	530(125)	P(1)	-(-5)	W	-(-5)	-(-5)	-(-5)
24	Borikheda	207.82	196(46)	P(1)	-(-5)	W	-(5-10)	-(-5)	-(5-10)
25	Linga Pounar	337.07	857(165)	P(1)	-(5-10)	W	-(5-10)	Fri	-(5-10)
26	Borikheda Ryt	205.64	750(151)	P(1)	-(-5)	W	-(5-10)	-(-5)	-(5-10)
27	Besi	650.34	1240(241)	P(1)	-(5-10)	W	-(-5)	-(5-10)	-(5-10)
28	Maheduli	749.71	1673(356)	P(1)	-(5-10)	W	-(-5)	-(5-10)	-(5-10)

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur

LAND USE, POPULATION AND AMENITIES AVAILABLE IN 10 KM RADIUS

						Land use(in Ha)					
Sr. No	Name of Village	Approach to Village	Dist. from cement plant in Km.	Power Supply	Staple Food		Irrigated By Sources	Un Irrigated	Cultura-ble Waste Including gauchar & groves	Area not available for cultivation	Remarks including any place of Religious Historical or Entoreologic al Interest
1	2	11	12	13	14	15	16	17	18	19	20
13	Dighdha	PR	10	ED	Rice	62.53	202.06	164.09	37.98	54.81	-
14	Bichua Ryt	PR	4	-	Rice	82.40	103.00	77.96	24.05	63.23	-
15	Chandadoh	KR	2	-	Rice Wheat	205.77	123.15	35.35	35.55	24.53	-
16	Kharpadia	PR	5	-	Rice Wheat	236.53	66.20TK, 0.41 W,40220	40.37	44.20	46.32	-
17	Sivanheti Ryt	KR	4	-	Rice Wheat	411.82	0.03 W	7.96	5.32	27.83	-
18	Sukli	PR	4	-	Rice Wheat	667.49	112.57Tk 0.20W, 3.140	61.32	86.54	99.98	-
19	Pauniya	PR	10	ED	Rice Wheat	97.91	144.61Tk 2.11W, 55.320	235.48	188.90	41.49	-
20	Dongargaon	PR	8	ED	Rice Wheat	22.90	25.14 TK 0.32W,	43.93	14.87	7.34-	-
21	Hirapur	KR	7	-	Rice Wheat	115.75	57.81Tk 0.57W	70.61	30.41	26.53	-
22	Boldongri	KR	10	-	Rice Wheat	31.05	9.32R 39.58Tk 0.52W	80.47	56.41	19.82	-
23	Jamrapani	KR	7	ED	Rice Wheat	-	4.02 Tk 0.12W	1.82	7.43	248.80	-
24	Borikheda	KR	7	-	Rice Wheat	-	101.20R 16.72Tk	54.4	19.52	15.88	-
25	Linga Paunar	KR	6	-	Rice	8.83	92.38R	112.29	58.41	33.03	-
26	Borikheda Ryt	KR	6	-	Rice	-	99.16R	51.68	34.77	11.43	-
27	Basi	KR	10	-	Rice	258.90	112.32R	154.72	33.65	26.82	-
28	Maheduli	KR	10	EA G	Rice Wheat	218.00	127.43R 64.53W	224.23	54.87	60.65	-

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Public Building, Places and Monuments

There are no public building and monuments of historical, religious or archaeological importance within lease area and within buffer zone of 10 km.

8.2: Impact Assessment;

i) Land area likely to be degraded: 19.815 Ha area
ii) Air quality: Reports are enclosed as Annexure – XI- A-D
iii) Water Quality: Reports are enclosed as Annexure- X-A-D
iv) Noise Level – Report are enclosed as Annexure – XI- A-D
v) Vibration Levels –Continuous vibration has been observed in each blast at the mine
vi) Water regime: no polluted water has been allowed to flow in the nearby villages.
vii) Acid Mine drainage: no acid mine drainage at the mine
viii) Surface subsidence: Not happened since the opening of the mine
ix) Socio – economic: Contract labors has been engaged from the local area. Moreover, employment has been provided in the company.

8.3: Progressive reclamation plan:

Two pits, namely pit no. 6 and pit no. 8 will be developed as per the proposed development scheduled given in mining chapter. Pit No. 8 and Pit No. 6 will be reclaimed yearly as given in following paragraphs;

8.3.1: Mined out land

The Sitapatore mine was started during the year 1906. This mine was worked by opencast method of mining till 1960 by earlier owner. and then it was discontinued till 1981, due to gradual decrease in ore quality. The area of broken land is about 5.048 Ha. Reclamation work has been carried out for pit no. 7 and pit no. 8 in the year 2014-15.

While carrying out the above mentioned O/C mining, the waste generated was stacked on about 4.313 Ha. land & mineralised waste generated was stacked on about 5.114 Ha. Land. Additional requirement of land for waste rock dumping will be about 1.350 Ha during this Scheme of Mining.

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Reclamation of Pit No. 6

Pit has been water logged. De-watering is going on southern side of pit. Pit no. 7, which is already exhausted and hence the overburden quantity of 10000 cum will be used to fill up the pit no. 7. Part of the pit has already been filled with by 5600m^3 of overburden material in the year 2014-15. Photograph is enclosed. During the 3rd SOM, the remaining part of pit no. 7 will be filled and other overburden quantity will be dumped on the area marked on the plan. Year wise proposed quantity for back filling of pit no.7 is given below;

Details are as below;

Year	Quantity in Cum
2020-21	10000
2021-22	10000

Reclamation of Pit No.8

At pit no. 8, the mining will be continued in the southern side. Northern side of pit no. 8 up to the distance of 30 m has been filled and retaining wall has already been constructed. The remaining part will be filled in the SOM period. The year wise back filling of pit no.8 is given below;

Year	Quantity in Cum
2020-21	10000
2021-22	10000

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
M Limited, Nagpur.

8.3.2: Top soil Management:

As presently there is no O/C working at this mine, no destruction is made to topsoil. The topsoil generated and collected in the past has been completely used for making beds for plantation on the dumps.

8.3.3: Tailing Dam Management:

An adequate sized tailing dam has been provided and all wastewater from the beneficiation of ore is being diverted to tailing pond. There is tailing Pond to the SE side of the lease area, which is in operation. Dimensions are given below:

Length - 20 mtrs,

Width - 5 mtrs. ,

Depth - 3 mtrs. ,

Capacity - 3000 Cu. mtrs.

Quality of water before final discharge:

About 4,000 to 5,000 liters / day of water is required for jigging and after Jigging the water which is contaminated with soil, murrum and ferruginous material will pass through a settling tank, Shown on plan, where silt will be deposited. Most of the get evaporated & if tank gets full, the overflow water will drain through a natural drainage course. The quantity of water is very less, this may be happen rarely.

8.3.4: Acid Mine Drainage: No acid mine drainage in the mine.

8.3.5: No surface subsidence has been observed since opening of the mine.

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur

SUMMARY OF YEAR WISE PROPOSAL FOR ITEM NO. 8.3.1

Items	Details	Proposed	Actual	Remark
Dump Management	Area afforested (ha)	Nil	Nil	
	No. of sapling planted	Nil	Nil	
	Cumulative nos of plants	Nil	Nil	
	Cost including watch and care during the year			
Management of worked out benches	Area available for rehabilitation (ha)			
	Afforestation done (ha)	Nil	Nil	
	No of sapling planted in the year	Nil	Nil	
	Cumulative nos of plants	Nil	Nil	
	Any other method of rehabilitation - back filling			
	Cost including watch and care during the year			
Reclamation and Rehabilitation by back filling	Void available for Backfilling			
	(LxBxD) of Pit No. 8 for Pit Pit No. 7	10000m^3		
	Void filled by overburden	10 mtrs		
	Afforestation on the back filled area	Nil	Nil	Nil
	Rehabilitation by making water reservoir	Nil	Nil	
	Any other means (specify)	Nil	Nil	
Rehabilitation of waste land within lease	Area available (ha)			
	Area rehabilitated			
	Method of rehabilitation	Back filling		
Others Specify	Construction of retaining wall	Nil	Nil	

8.4: Disaster Management and Risk Assessment:

The company is operating 10 manganese mines, which includes 3 opencast and 7 underground mines. Sitapatore mine is a opencast mine and from the beginning of the mine, occurrence of hazards due to fire or inflammable gasses are not noticed. To deal with the hazard due to inundation, a special team is prepared every year, before onset of monsoon who keep meticulous watch on the pumping operation and electric supply.

8.5: Care and maintenance during temporally discontinuance:

There is no planning of temporary disclosure of this mine during the mine lease period i.e. upto 2022.

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

Calculation of PMCP

Sr. No.	PERTICULARS	LENGTH (IN M)	WIDTH (IN M)	AREA (IN M^2)
1	Pit No.8 (Pit Area)	250	30	7500
2	Pit No.8 Additional Area	210	50	10500
3	Pit No.6 (Pit Area)	174	49.4	8595.6
4	Pit No.6 Additional Area	134	131.4	17607.6
5	O.C.F.	250	70	17500
6	Pit No.1	82	19.6	1607.2
7	Pit No.2	31	9.5	294.5
8	Pit No.3	57	128.85	7344.45
9	Pit No.4	18	18	324
10	Pit No.5	34	33	1122
11	Pit No.7	85	77.5	6587.5
12	Trial Pit No.1	12.5	10	125
13	Trial Pit No.2	56	12	672
14	Trial Pit No.3	15	5	75
15	Trial Pit No.4	13	4	2
16	Trial Pit No.5	21	8	168
17	Trial Pit No.6	17	15	255
18	Road in Lease 43.37 Ha.	101.5	5	507.5
19	Road in Lease 4.73 Ha.	62	5.5	341
20	Building 1	16	8.5	136
21	Building 2	25	12	300
22	Building 3	34	26	884
23	Building 4	28	16	448
24	Building 5	16	8	128
25	Building 6	51	59	3009
26	Mineralized Dump No. 1	132	79	10428
27	Mineralized Dump No.2	140	82.625	11567
28	Mineralized Dump No.3	190	123.2	23408
29	Mineralized Dump No.4	128	44.8	5734.4
30	Waste Dump No.1	38	15.25	579.5
31	Waste Dump No.2	48	34.25	1644
32	Waste Dump No.3	76	28.3	2150.8
33	Proposed waste Dumping No.1	178	160	28480
34	Proposed waste Dumping No.2	82	40	3280
35	Proposed waste Dumping No.3	280	80	22400

अनुमोदित / APPROVED

50

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

FINANCIAL ASSURANCE

Sr. No.	Head	Area put on use at start of SOM In Ha.	Additional requirement during SOM period In Ha.	Total In Ha.	Area considered as fully reclaimed & rehabilitated In Ha.	Net area considered for calculation In Ha.
a	b	c	d	e e=(c+d)	f	g g=(e-f)
1	Area to be excavated	5.848	0.70	6.548	Nil	6.548
2.	Storage for top soil	Nil	Nil	Nil	Nil	Nil
3.	Overburden dumps	4.80	0.863	5.663	Nil	5.663
4.	Mineral storage (Dump)	5.114	NIL	5.114	Nil	5.114
5.	Infrastructure	0.491	Nil	0.491	Nil	0.491
6	Roads	0.085	Nil	0.085	Nil	0.085
7	Railways	Nil	Nil	Nil	Nil	Nil
8.	Green Belt	Nil	0.16	0.16	NIL	0.16
9.	Tailing pond	Nil	Nil	Nil	Nil	Nil
10	Effluent treatment plant	Nil	Nil	Nil	Nil	Nil
11	Mineral separation plant	Nil	Nil	Nil	Nil	Nil
12	Township area	Nil	Nil	Nil	Nil	Nil
13	Other to specify Mineral storage OCF	1.750	Nil	1.750	NIL	1.750
		18.088	1.723	19.811	Total area	19.811

Financial Assurance: 19.811 ha x 3,00,000 = 59,43,300/- lakh (Fifty nine lakh forty three thousand three hundred only). Bank guarantee of Rs.59,43,300/-Lakh has already submitted & valid up to 31.3.2020, this will be extended up to 31.3.2025 and will be submitted with in 15 days.

29th June 2020

क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIAN BUREAU OF MINES
जबलपुर/ JABALPUR

अनुमोदित/APPROVED

Dr. C. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

PART – B

Consent letter of owner
Certificate of owner
Undertaking of owner
Certificate of RQP

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

CONSENT LETTER OF OWNER

The Review of Mining plan (SOM) and PMCP in respect of Manganese Ore Deposit over an area of 43.35 ha in Village – Sitapatore P.O. Tirodi, Tah: Tirodi, Dist: Balaghat under Rule 17(1) of MCR 2016 has been prepared by Dr. G.G. Manekar, General Manager (Mines-Planning) and QP of MOIL.

This is to request the Regional Controller of Mines, Indian Bureau of Mines, Jabalpur Region, Jabalpur, to make any further correspondence regarding any correction of the Scheme of Mining with the said qualified person at his address below

Name of QP: Dr. G.G. Manekar,
General Manager (Mines planing)
MOIL Limited,
1-A, MOIL Bhawan,
Katol Road, Nagpur – 440 013
Phone: 712- 25806243
Email: g.manekar@rediffmail.com

We hereby undertake that all modifications/ updating as made in the said Scheme of Mining by the said recognized person be deemed to have been made with our knowledge and consent and shall be acceptable on us and binding in all respects.

Place: Nagpur
Date: 16.03.2020

अनुमोदित / APPROVED

Dipankar Shome
Nominated owner and
Director (Production and Planning)
MOIL Limited,
1-A, MOIL Bhawan
Katol Road, Nagpur – 440 013
Phone: 712-2589746
Email: dshome61@gmail.com

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

CERTIFICATE OF OWNER

It is certified that the CCOM Circular No.2/2010 will be implemented and complied with when an authorized agency is approved by the State Government.

It is certified that the Progressive Mine Closure Plan of Manganese Ore Deposit at Village Sitapatore P.O. Tirodi, Tah: Tirodi, Dist: Balaghat of M/s MOIL Limited over an area of 43.35 ha. complies with all Statutory Rules, Regulations, Orders made by the Central or State Government, Statutory organization, Court etc which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.

The information furnished in the Progressive Mine Closure Plan is true and correct to the best of our knowledge and records.

Place: Nagpur
Date : 16.03.2020

Dipankar Shome
Nominated owner and
Director (Production and Planning)
MOIL Limited,
1-A, MOIL Bhawan
Katol Road, Nagpur – 440 013
Phone: 712-2589746
Email: dshome61@gmail.com

अनुमोदित/APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

UNDERTAKING OF OWNER

"The provisions of Mines Act, Rules and Regulations made there under have been observed in the Review of Mining plan (SOM) over an area of 43.35 ha in Balaghat District in Madhya Pradesh State belonging to Sitapatore Mine of M/s MOIL Limited and where specific permissions are required, the applicant will approach the D.G.M.S. Further, standards prescribe by D.G.M.S. in respect of Miners Health will be strictly implemented".

Place: Nagpur
Date: 16.03.2020

Dipankar Shome
Nominated owner and
Director (Production and Planning)
MOIL Limited,
1-A, MOIL Bhawan
Katol Road, Nagpur – 440 013
Phone: 712-2589746
Email: dshome61@gmail.com

अनुमोदित / APPROVED
Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

CERTIFICATE OF QP

The provisions of the Mineral Conservation and development Rules 2017 has been observed in the preparation of Scheme of Mining for Sitapatore Manganese Mine of M/s MOIL Limited located near Sitapatore village, tehsil Tirodi, District Balaghat, Madhya Pradesh state and whenever specific permissions are required, the applicant will approach the concern authorities of Indian Bureau of Mines.

The information furnished in the Review of Mining plan (SOM) & PMCP is true and correct to the best of our knowledge.

Place: Nagpur
Date: 16.03.2020

Dr. G.G. Manekar,
General Manager (Mines- Plng) & QP
MOIL Limited,
1-A, MOIL Bhawan,
Katol Road, Nagpur – 440 013
Phone: 0712- 2806243
Email: g.manekar@rediffmail.com

अनुमोदित / APPROVED

Dr. G. G. Manekar
Qualified Person
General Manager (Mines-Planning)
MOIL Limited, Nagpur.

SITAPATORE MINE (43.35 Ha)

List of Annexure

Sr. No.	CONTENTS	ANNEXURE NO.
1	LEASE RENEWAL ORDER	I
2	COPY OF LEASE DEED	II
3	MoEF – ENVIRONMENTAL CLEARANCE	III
4	FOREST PERMISSION	IV
5	FEASIBILITY STUDY	V
6	DGMS PERMISSION	VI
7	PRODUCTION SCHEDULE	VII A-C
8	DEVELOPMENT SCHEDULE	VIII A-D
9	FLOW CHART OF ROM SORTING	IX A
10	DTH BOREHOLE REPORT	IX B
11	CASH FLOW	IX C
12	MACHINE DEVELOPMENT	X A-B
13	AIR,WATER AND NOICE ANALYSIS REPORT	XI
14	GRANT OF CONSENT TO OPERATE	XI-A
15	PMCP CALCULATION SHEET	XII
16	BANK GURANTEE	XIII
17	RQP CERTIFICATE	XIV
18	BOARD RESOLUTION FOR AUTHORISATION OF OWNER WITH PHOTO ID	XV
19	REGISTRATION CERTIFICATE OF MOIL	XVI
20	CHEMICAL ANALYSIS REPORT OF Mn. ORE	XVII
21	CHEMICAL ANALYSIS REPORT OF REJECT	XVIII
22	LIST OF MACHINERY	XIX
23	MINE PHOTOGRAPHS	XX A
24	DGPS APPROVED NOTE WITH UNDERTAKING	XXI
25	FORM K	XXII
26	ANNUAL RETURN H2	XXIII
27	COPY OF APPROVED MINING PLAN	~~XXIV~~ अनुमोदित / APPROVED

Dr. G. G. MANEKAR
Qualified Person
General Manager (Mines)
MOIL Limited, Nagpur

ANNEXTURE – 1

मध्यप्रदेश शासन
खनिज साधन विभाग
मंत्रालय

अनुमोदित
APPROVED

–: आदेश :–

भोपाल, दिनाँक –27–9–10

क्रमांक – एफ 3–24/10/12/2 – आवेदक मैंगनीज ओर (इंडिया) लिमिटेड, नागपुर के पक्ष में जिला बालाघाट, तहसील कटंगी के ग्राम सीतापठोर के रकबा 107.13 एकड़ (43.353 हेक्टेयर) क्षेत्र पर मैंगनीज अयस्क खनिज का खनिपट्टा दिनाँक 01.07.62 से 30.06.82 तक के लिए स्वीकृत था। तदुपरांत प्रथम नवकरण पर दिनाँक 01.07.82 से 30.06.2002, तक के लिए स्वीकृत था। आवेदक द्वारा उक्त खनिपट्टे के द्वितीय नवकरण हेतु दिनाँक 10.04.01 को नवकरण आवेदन पत्र प्रस्तुत किया गया है जिसमें आगामी बीस वर्ष की अवधि हेतु नवकरण आवेदित किया गया है।

02. चूँकि आवेदित की गई भूमि वन संरक्षण अधिनियम 1980 के प्रावधानों से प्रभावित होती है, अतः भारत सरकार, वन एवं पर्यावरण मंत्रालय, नई दिल्ली द्वारा अपने पत्र क्रमाँक 8–81/04/एफ.सी. दिनाँक 23.10.08 व समसंख्यक पत्र दिनाँक 27.11.08 से उक्त क्षेत्र के संबंध में वन संरक्षण अधिनियम 1980 के प्रावधानों के तहत सशर्त अनुमति प्रदान की गई है। जिसके तारतम्य में म.प्र. शासन, वन विभाग, मंत्रालय वल्लभ भवन, भोपाल द्वारा पत्र क्रमाँक डी–2322/2333/10–3/2010 दिनाँक 27.09.10 से उक्त 43.353 हेक्टेयर क्षेत्र पर वन (संरक्षण) अधिनियम 1980 की धारा–2 के तहत भारत सरकार से प्राप्त स्वीकृति के आधार पर सशर्त औपचारिक स्वीकृति प्रदान की गई है। भारतीय खान ब्यूरो द्वारा भी अपने पत्र क्रमाँक एन–11011/17/आर. एम.एल./93 – सी.सी.ओ.एम.–1852, नागपुर, दिनाँक 27.09.10 से द्वितीय नवकरण किये जाने हेतु सशर्त अनुमोदन प्रदान किया गया है। उक्त क्षेत्र के संबंध में भारत सरकार, पर्यावरण एवं वन मंत्रालय के पत्र क्रमाँक जे–11015/474/ 2006–आई.ए.–2 (एम) दिनाँक 16.01.2009 द्वारा Environmental Clearance भी प्रदान किया गया है। भारतीय खान ब्यूरो, नागपुर द्वारा अपने पत्र क्रमाँक बी.जी.टी./एम.एन./एम.पी.एल.एन.–275/एन.जी. पी. नागपुर, दिनाँक 01.06.05 से माइनिंग का अनुमोदन प्रदान किया गया है।

03. यह कि आवेदित क्षेत्र वन कक्ष क्रमाँक 786 रकबा 43.353 हेक्टेयर का परीक्षण करने पर आवेदक के पक्ष में आवेदित किया गया क्षेत्र वन संरक्षण अधिनियम 1980 के तहत उपरोक्तानुसार विधिवत अनुमति प्राप्त हो जाने के कारण द्वितीय नवकरण में स्वीकृत किये जाने हेतु उपलब्ध पाया गया। यह उपलब्ध क्षेत्र दो खण्डों में है।

Dr. G. G. MANEKAR
Qualified Per
General Manager
MOIL Limited, Nagpur

अनुमोदित / APPROVED
MOIL LIMITED
RQP/NGP/206/98/B
Valid up to 14/7/2020