INDIAN BUREAU OF MINES
MINERALS DEVELOPMEMT AND REGULATION DIVISION

MCDR INSPECTION REPORT

Nagpur regional office

Mine file No : MAH/NAG/MN--79/NGP L-3 **Mine code : 40MSH14049**

(i) Name of the Inspecting Officer and ID No. : **M017) ASHISH MISHRA**

(ii) Designation : Sr. Asst. Contrl. Mines

(iii) Accompaning mine Official with Designation :

(iv) Date of Inspection : 03/03/2020

(v) Prev.inspection date :

PART-I : GENERAL INFORMATION

1. (a) **Mine Name** : **GUMGAON,KHAPAPETH (35.97 HA)**

(b) Registration NO. : **IBM/5711/2011**

(c) Category : A Mechanised

(d) Type of Working : Underground

(e) Postal address

State : MAHARASHTRA
District : NAGPUR
Village :
Taluka :
Post office :
Pin Code :
FAX No. :
E-mail :
Phone :

(f) Police Station : KHAPA

(g) First opening date : 01/07/2000

(h) Weekly day of rest : SUN

2. Address for correspondance : Gumgaon Mine, Khapa
Nagpur

3. (a) Lease Number :
(b) Lease area :
(c) Period of lease :
(d) Date of Expiry :

4. Mineral worked : MANGANESE ORE Main

5. Name and Address of the

Lessee	:	MOIL LIMITED MOIL BHAVAN, 1-A KATOL ROAD, NAGPUR NAGPUR NAGPUR MAHARASHTRA Phone: FAX :
Owner	:	DEEPANKAR SHOME 1-A, MOIL BHAVAN KATOL ROAD NAGPUR NAGPUR MAHARASHTRA Phone: FAX :
Agent	:	Shri R.U.Singh Mansar Manganese Mines, Village- Mansar, Tehsil - Ramtek, Nagpur Dis Mansar NAGPUR MAHARASHTRA Phone: FAX :
Mining Engineer		
Name	:	Vikrant Khedikar,Full Time
Qualification	:	B.E.Mining
Appointment/ Termination date	:	

6. Date of approval of Mining Plan/Scheme of Mining

:	Mining Scheme rule 12 MCDR1988	09/05/2006
	MP review under 17(1) MCR 2016	12/07/2017
	MP modif under 17(3) MCR 2016	03/08/2018

PART - II : OBSERVATION/COMMENTS OF INSPECTING OFFICERS

Exploration :

Sl.No.	Item	Proposals	Actual work	Remarks
1a	Backlog of previous year	There is no backlog till 2017-18. For the year 2018-19, 5 boreholes were proposed to be drilled at 50 m X 100 m grid having depth of 300-500 m each.	Exploration was carried out as per the proposals. 5 vertical boreholes at 50 m X 50 m grid interval have been drilled with a total meterage of 1741 m. details are as below: BH 101 431 m BH 102 100 m BH 103 430 m BH 104 400 m BH 105 380 m	
1b	Exploration over lease area for geological axis 1 or 2	G-1	Entire area has been covered under G-1 level. Being an underground mine, present exploration is being carried out to explore the ore zone at deeper levels through surface boreholes as well as exploratory mining.	
1c	Exploration Agencies and Expenditure in lakh rupees during the year	Exploration is proposed to be carried out by MOIL Ltd. (lessee itself) and proposed cost of exploration is around Rs 6500/- per m of drilling.	Exploration was carried out by MOIL Ltd. with an expanditure of around Rs 1.2 Crore.	
1d	Balance area to be explored to bring Geological axis in 1 or 2	Nil	Nil	Exploration program with close-spaced drilling (50 m X 50 m) is ongoing to facilitate underground workings at deeper levels and clear demarcation of orebody for better planning.

1e	Balance reserve as on 01/04/20	Balance reserves as on 01.04.2018 (as per the approved Mining Plan document) are given in actual work details:	111-2691221 T 221- 2720362 T	
1f	General remarks of inspecting officers on geology, exploration etc		Ore zone in the lease area is displayed in anticlinal form with a strike east west and dip due south with moderate to high angle. The limb of ore also plunges due west with low angle. The deposit is faulted with a vertical fault trending in north east - south west direction, dislocating the eastern block to south. This deposit has been explored to the depth of -900'L with 75 boreholes. The avg. thickness available for mining within the area ranges from 3 m to 50 m.	The area is one of the three leases of Gumgaon mine having total area 85.90 ha (L-1: 48.596 ha, L-2: 35.97 ha & L-3: 1.33 ha). As 1.33 ha area lease is PWD road, entire exploration is proposed in other 2 leases. Total 75 boreholes were drilled in the composite area to prove the mineral reserves/resources available in the potentially mineralized zone and further exploration is proposed in this lease with 20 boreholes from 2018-19 to 2021-22 period out of which, 5 boreholes have been completed.

Development :

Sl.No.	Item	Propasals	Actual work	Remarks

2a	Location of development w.r.t.lease area	For 2018-19, Horizontal development: 214 RMT -200'L: 160 RMT (in Rock-Haulage Road 123 RMT & Cross cuts 37 RMT) & -300'L: 54 RMT (in ore, Ore Drive) Vertical Development: 90 RMT -200'L: 90 RMT (Winzes) Overall, for 2018-19: 2070 cum	For 2018-19, Horizontal development: 605 RMT -200'L: 286 RMT (in Rock) & -300'L: 319 RMT (in ore, Ore Drive) Vertical Development: 60 RMT -200'L: 60 RMT (Winzes) Overall, for 2018-19: 6188 cum	The actual figures are for entire mine having 3 leases. Vertical development was lower due to more horizontal developments required & carried out. The developments were carried out as per the proposed location between Ch 50 to Ch 54.
2b	Separate benches in topsoil, overburden and minerals (Rule 15)	Not applicable as it is an underground mine	Not applicable	
2c	Stripping ratio or ore to OB ratio	Not applicable as it is an underground mine	Not applicable	
2d	Quantity of topsoil generation in m3	Not applicable as it is an underground mine	Not applicable	
2e	Quantity of overburden generation in m3	Not applicable as it is an underground mine	Not applicable as it is an underground mine	

2f	General remarks of inspecting officers on development of pit w.r.t. type of deposit etc	Ore zone in the lease area is displayed in anticlinal form with a strike east west and dip due south with moderate to high angle. thus, underground mining with overhand cut and fill method is adopted which is suitable as per the occurrence of mineral in the area. Present economic workable pit limit is -400'L however, the deposit has been explored upto -900'L. Developments are adequate in the area for systematic and scientific exploitation of orezone demarcated through extensive exploration.

Exploitation:

Sl.No.	Item	Propasals	Actual work	Remarks
3a	Number of pit proposed for production	Not applicable as it is an underground mine	Not applicable as it is an underground mine	
3b	Quantity of ROM mineral production proposed	2018-19: 60000 T from 35.97 ha, 48000 T from 48.596 ha & 7420 T from 1.33 ha area. Overall proposed production from the combined 3 lease areas was 115420 T (Underground ROM)	2018-19: Actual ROM (underground) from all 3 leases was 89956 T	

3c	Recovery of sailable/usable mineral from ROM production	Recovery of cleaned our proposed is around 76% of ROM (ROM: 60000 T, cleaned ore: 45650 T) in this lease however, the same is proposed as 80% from other two leases. Overall recovery from the entire mine is proposed as ~78%	Actual recovery of cleaned ore was 100%	Recovery was 100% due to saleability of LGHS (Low-grade High Silica) material and fines. Thus, after grade-wise sorting of ROM, entire material was saleable and no mineral rejects or sub-grade were reported for the year.
3d	Quantity of mineral reject generation	2018-19: 7175 T from this lease, overall 13445 T from entire mine having 3 leases	2018-19: Nil	Reasons elaborated under 3c.
3e	Grade of mineral rejects generation and threshold value declared.	Grade of mineral rejects reported are -10% of Mn, threshold value for Mn is +10% Mn	As per the proposals	
3f	Quantity of sub grade mineral generation.	2018-19: 7175 T from the lease, overall 11975 T from the mine having 3 leases	2018-19: Nil	Reasons elaborated under 3c
3g	Grade of sub grade mineral generation	+10-20% Mn containing material	As per the proposals, however, entire quantity was saleable.	
3h	Manual / Mechanised method adopted for segregating from ROM	Manual sorting of ROM after mechanical crushing and screening at pit head.	Manual sorting of ROM after mechanical crushing and screening at pit head.	

3i	Any analysis or beneficiation study proposed and carried out for sub grade mineral and rejects.	No such proposals	Nil	
3j	Provision of drilling and blasting in mineral benches	Not applicable as it is an underground mine	Not applicable as it is an underground mine	Drilling and blasting in underground is proposed and being carried out with 33 mm dia jackhammer drill machines. Blasting is proposed and carried out with 25 mm small dia explosives (Nitro based) with electric detonation.
3k	Provision of mining machineries in mineral benches	Not applicable as it is an underground mine	Not applicable as it is an underground mine	In underground, Locomotive, SDL, drills are being used in form of mechanization.
3l	Whether height of benches in overburden and mineral suitable for method of mining proposed in MP/SOM	Not applicable as it is an underground mine	Not applicable as it is an underground mine	Level interval is being kept at 100' (around 30 m) that is suitable as per the method of mining.
3m	Total area covered under excavation/pits	Not applicable as it is an underground mine	Not applicable as it is an underground mine	
3n	Ore to OB ratio for the pit/mine during the year.	Not applicable as it is an underground mine	Not applicable as it is an underground mine	
3o	Total area put in use under different heads at the end of year	Total area put to use as on 31.03.2019 is furnished in actual work details:	Area under: Excavation/Pits- Nil Area under Dumps-3.10 ha Roads- 0.62 ha Green belt- 3.5 ha Infrastructure: 1.0 ha	There was an additional requirement of 3.38 ha proposed under dumps & infrastructure for the 2nd shaft which was proposed at Ch 52 as per the approved mining plan document for the period 2018-19 to 2021-22.

3p	Production of ROM mineral during the last five year period as applicable	2017-18: 38000 T 2016-17: 45000 T 2015-16: 45000 T 2014-15: 35000 T 2013-14: 25000 T	2017-18: 28643 T 2016-17: 14899 T 2015-16: 7721 T 2014-15: 6323 T 2013-14: 6381 T	
3q	General remarks of inspecting officers on method of mining etc.			Method of mining is underground and method of stoping is cut and fill. The method selected is suitable as per the occurrence of orebody in the area, geology of the area and capital investments. Present mode of entry is through vertical shaft upto 169 m from the surface connecting -100'L, -200'L, -300'L & -400'L. As depth is increasing, one high speed shaft is proposed at Ch 52 with maximum operating depth of 450 m as per the future strategy for systematic developments at deeper levels.

Solid Waste Management - Dumping:

Sl.No.	Item	Propasals	Actual work	Remarks

4a	Separate dumping of topsoil, OB and mineral rejects (Rule 32,33)	No top soil or OB is present in the working area being an underground mine. Mineral rejects generated from the underground are proposed to be kept separately for future considerations.	No top soil or OB is present in the working area being an underground mine. No mineral rejects are generated from the underground for the year 2018-19, however, it is proposed to be kept separately for future considerations.
4b	Location of topsoil, OB and mineral reject dumps	Top soil dump: nil OB/Waste Dump: 1 Existing Dump at N1850 to N1950 & E1650 to E1700, 2 Dumps proposed at N1800 to N2000 & E1100 to E1500 for the sinking of 2nd shaft. Mineral rejects: Nil	Only one waste dump present at N1850 to N1950 & E1650 to E1700
4c	Number of dumps within lease area and outside of lease area	One existing dump and 2 additional dumps proposed during 2018-19 to 2021-22 (2nd shaft sinking), all within the lease area	One existing dump within the lease area
4d	Location of dumps w.r.t. ultimate pit limit (Rule 16)	Not applicable as it is an underground mine	Not applicable as it is an underground mine
4e	Number of active and alive dumps.	1 existing dump and 2 additional proposed dumps all are active	1 existing dump is active
4f	Number of dead dumps.	No such proposals	Nil
4g	Number of dumps established.	No such proposals	Nil

4h	Whether Retaining wall or garland drain all along dumps are there.	No such proposals for 2018-19 as garland drains and retaining walls were already constructed	Yes	
4i	Length of Retaining wall or garland drain all along dumps	Around 500 m long garland drains and retaining walls already constructed in the area along the toe of the dumps	Around 500 m long garland drains and retaining walls already constructed in the area along the toe of the dumps	
4j	Number of settling ponds	No such proposals	Nil	
4k	Specific comments of inspecting officer on waste dump management			One waste dump is active and two additional dumps are proposed for the development of 2nd shaft in the NW part of the lease area. Plantation is proposed to be carried out over these dumps after maturity. Garland drains and retaining walls are available at the toe of the dumps in form of protective measures. Being an underground mine, waste available for dumping is meagre and most of the generated waste is filled underground. Thus, waste dump management aspect is satisfactory at mine level.

Solid Waste Management - Backfilling:

Sl.No.	Item	Propasals	Actual work	Remarks

5a	Status of part or full extraction of mineral from mined out area before starting backfilling.	No such proposals as it is an underground mine	Nil	
5b	Area under backfilling of mined out area	No such proposals as it is an underground mine	Nil	
5c	Concurrent use of topsoil for restoration or rehabilitation of mineral out area (Rule 32)	No such proposals as it is an underground mine	Nil	
5d	Total area fully reclaimed and rehabilitated	No such proposals as it is an underground mine	Nil	
5e	General remarks of inspecting officers on backfilling and reclamation etc.			At conceptual stage, existing old pit is proposed to be converted into water reservoir and no backfilling is proposed. Generated waste is used for filling of underground voids, thus, available waste is quite less for backfilling of the old pit.

Progressive Mine Clousre Plan:

Sl.No.	Item	Propasals	Actual work	Remarks
6a	Whether Annual report on PMCP submitted on time and correctly. Rule 23 E(2).	To be submitted on or before 30th June every year depicting work done under PMCP in the preceeding year	Yes	

6b	Area available for rehabilitation (ha) .	No such proposals	As the area is under active mining, there is no clear proposals for availability of area for rehabilitation. Further, there is extensive ongoing exploration program to delineate the orezone at deeper levels and also, there are proposals for 2nd shaft alongwith additional land requirements for dumping of waste generated out of this development. However, 3.5 ha area in the Northern part of the lease area has been converted into green belt.	Grant of one additional lease (area reserved for MOIL Ltd.) having an area of 126.84 ha is under process and after joining all leases, area to be rahabilitated is advised to be planned.
6c	afforestation done (ha).	No such proposals for the year 2018-19	Nil for the year 2018-19. Earlier, 3.5 ha of area in the Northern part of the lease has been converted into green belt.	
6d	No. of saplings planted during the year	2018-19: No such proposals	2018-19: Nil	
6e	Cumulative no .of plants	Proposals for cumulative number of plants is not available as the mine is quite old and at earlier stages, there were no specific proposals	Cumulative number of plantes in Gumgaon Mine comprising of 3 leases is around 137680 out of which 97654 plants are surviving at 71%.	
6f	Any other method of rehabilitation	No such proposals	Nil	At earlier stages, green belt plantation was proposed and carried out.

6g	Cost incurred on watch and care during the year	Cost proposed to be incurred is only over environment monitoring i.e. around Rs 100000/- (Rs 25000/- expanditure for quarterly analysis of environment parameters)	Actual cost incurred is around Rs 12 Lakh for the entire mine having 3 lease areas (including SDF expanditures)
6h	Compliance on reclamation and rehabilitation by backfilling (i) Voids available for backfilling (Lx B x D	No such proposals as it is an underground mine	Nil
6i	Compliance on reclamation and rehabilitation by backfilling (ii) Voids filled by waste / tailings	No such proposals as it is an underground mine	Nil
6j	Compliance on reclamation and rehabilitation by backfilling (iii)Afforestation on backfilled area	No such proposals as it is an underground mine	Nil
6k	Compliance on reclamation and rehabilitation by backfilling (iv) Rehabilitation by making water reservoir	No such proposals as it is an underground mine	Nil
6l	Compliance on reclamation and rehabilitation by backfilling (v)any other specific means.	No such proposals as it is an underground mine	Nil

6m	Compliance of rehabilitation of waste land within lease (i)afforestation	No such proposals	As the area is under active mining, there is no clear proposals for availability of area for rehabilitation. Further, there is extensive ongoing exploration program to delineate the orezone at deeper levels and also, there are proposals for 2nd shaft alongwith additional land requirements for dumping of waste generated out of this development. However, 3.5 ha area in the Northern part of the lease area has been converted into green belt.
6n	Compliance of rehabilitation of waste land within lease (ii)Area rehabilitation (ha)	No such proposals	As the area is under active mining, there is no clear proposals for availability of area for rehabilitation. Further, there is extensive ongoing exploration program to delineate the orezone at deeper levels and also, there are proposals for 2nd shaft alongwith additional land requirements for dumping of waste generated out of this development. However, 3.5 ha area in the Northern part of the lease area has been converted into green belt.
6o	Compliance of rehabilitation of waste land within lease (iii)Method of rehabilitation	No such proposals	Green belt over 3.5 ha area in the northern part of the lease

6p	Compliance of environmental monitoring (core zone and buffer zone)	Environment monitoring is proposed to be carried out as per the guidelines of MOEFCC in this regard.	Environment monitoring was done for air, water, noise and ground vibrations in the core and buffer zone. Reports were seen during site inspection and all the parameters were withing the permissible limits. Surface subsidence is also being monitored regularly.	
6q	General remarks of inspecting officers on PMCP compliance and progressive closure operations etc.			Under PMCP operations, overall around 4750 saplings have been planted in the composite mine having 3 leases, however, due to development proposals for 2nd shaft and requirement of land for mining and allied activities, no specific proposals were made for the instant lease. Environment monitoring has been carried out in the area as per the norms.

Mineral Conservation:

Sl.No.	Item	Propasals	Actual work	Remarks
7a	ROM Mineral dispatch or grade-wise sorting within lease area	Dispatch of graded mineral after mechanical crushing, screening and manual sorting of ROM	Dispatch of graded mineral after mechanical crushing, screening and manual sorting of ROM	
7b	Method of grade-wise mineral sorting i.e. manual or mechanical.	Mechanical crushing, screening at pit head and then manual sorting	Mechanical crushing, screening at pit head and then manual sorting	

7c	Different grade of mineral sorted out at mines.	(a) 25% to below 35% Mn (b) 35% to below 46% Mn (c) 46% Mn and above (d) Sub-grade: +10-20% Mn (e) Mineral rejects: -10% Mn	(a) 25% to below 35% Mn (b) 35% to below 46% Mn 46% and above grade not generated during the year 2018-19. No sub-grade or mineral rejects were generated due to 100% saleability of ROM as elaborated under item 3c	
7d	Any beneficiation process at mines.	No such proposals	Nil	
7e	General remarks of inspecting officer on Mineral conservation and beneficiation issues			Mineral conservation aspect has been covered satisfactorily for the mine. ROM is proposed to be graded into saleable ore, mineral rejects & sub-grade. Sub-grade is proposed to be utilized in future as per the requirements. In the year 2018-19, entire fines and low grade minerals were also saleable. No sub-grade is left underground and all such material is proposed to be brought to surface.

Environment:

Sl.No.	Item	Propasals	Actual work	Remarks
8a	Separate removal and utilization of topsoil (Rule 32)	No such proposals as it is an underground mine	Nil	
8b	Concurrent use or storage of topsoil	No such proposals as it is an underground mine	Nil	

8c	Separate dumps for overburden, waste rock, rejects and fines (Rule 33)	No top soil or OB is present in the working area being an underground mine. Mineral rejects generated from the underground are proposed to be kept separately for future considerations.	No top soil or OB is present in the working area being an underground mine. No mineral rejects are generated from the underground for the year 2018-19, however, it is proposed to be kept separately for future considerations.	
8d	Use of overburden, waste rock, rejects and fines dumps for restoring the land to its original use	No such proposals	Nil	In the underground, voids are being backfilled with generated waste and minimum quantity of waste is being transported to surface.
8e	Phased restoration, reclamation and rehabilitation of lands affected by mining operations (Pits, dumps etc)	No such proposals	Nil	
8f	Baseline information on existence of plantation and additional plantation done (Rule 41)	Baseline information given in the mining plan. No additional plantation is proposed till the maturity of dumps.	Baseline information has been given in the mining plan for the area. Further, additional plantation has been carried out over 3.5 ha in the northern part of the lease area.	
8g	Survival rate	~75% (overall mine)	~71% (overall mine)	As survival rate is low, it was overcome by planting more number of saplings.

8h	Water sprinkling on roads to control airborne dust	Yes, for surface operations in form of transportation of ore and manpower, sorting yard etc., water sprinkling is proposed. Not applicable for underground workings.	Over surface operations, water sprinkling was done through 6000 L capacity water tanker deployed in the mine.	
8i	General remarks of inspecting officer on aesthetic beauty in and around mines area			Mainly, working is through underground means in the area (apart from dump workings in adjacent lease). Hence, apart from normal degradation due to mining, aesthetic beauty is satisfactory in the area. Lessee has done extensive plantation over the dumps in the adjacent lease area and in the nearby villages/purchased land in collaboration with NEERI which is quite good.

Compliance of Rule 45:

Sl.No.	Item	Propasals	Actual work	Remarks

9a	Status of submission of Monthly and Annual returns	Annual Returns are required to be submitted online before 1st July of every year for preceding year Monthly returns are required to be submitted online before 10th of every month for preceding month	AR submitted online upto 2018-19 For entire mine having 3 leases MR submitted online upto Jan'20 for entire mine having 3 leases	It was advised to file separate returns for separate leases to evaluate individual proposals.
9b	Scrutiny of Annual return for information on Mining Engineer, Geologist and Manager	Mining Engineer: Shri V. M. Khedikar Geologist: Shri Anil Singh Rajput Manager: Shri V. M. Khedikar	Complete and correct information provided	
9c	Scrutiny of Annual return on land use pattern for area under pits, reclaimed area, dumps etc.	As per the AR for the year 2018-19 (combined 3 leases): Area used for waste disposal: 18.46 ha Area occupied by plant, buildings, residential, welfare buildings & roads: 11.847 ha Other Purpose (MINERAL STORAGE): 1.28 ha Reclaimed and rehabilitated: 11.23 ha	Complete and correct information provided. As pit area has not been covered under current O/C workings, the same has been furnished as Nil. However, for the lease area of 35.97 ha, land use as on 01.04.2019 is as below: Area under: Excavation/Pits- Nil Area under Dumps-3.10 ha Roads- 0.62 ha Green belt- 3.5 ha Infrastructure: 1.0 ha	

9d	Scrutiny of Annual return on afforestation	Within lease: No. of saplings- 4750, Survival- 70% Outside Lease: No. of saplings- 5000, Survival- 73%	Correct information for within lease plantations. Outside lease plantation work could not be verified. This information pertains to adjacent lease area as no plantation was proposed or carried out in the lease area of 35.97 ha.
9e	Scrutiny of Annual return on mineral reject generation (Grade and quantity)	Mineral rejects: Nil	Complete and correct information provided as per the reasons elaborated under item 3c
9f	Scrutiny of Annual return on ROM stock and/or graded ore	ROM: Opening Stock and Closing Stocks- Nil, Prodcution- 83662 T Graded Ore: (a) 25% to below 35% Mn- Opening Stock- 1582 T, Production- 20170 T, Dispatch- 20406 T, Closing Stock- 1346 T (b) 35% to below 46% Mn- Opening Stock- 6691 T, Production- 69786 T, Dispatch- 75364 T, Closing Stock- 1113 T (c) 46% Mn and above- Opening Stock- 3 T, Production- Nil, Dispatch- Nil, Closing Stock- 3 T	Complete and correct information provided for the entire mine

9g	Scrutiny of Annual return on sale value, Ex. Mine price and production cost	Sale value: (a) 25% to below 35% Mn- Rs 185735713/- (b) 35% to below 46% Mn- Rs 1050517878/- (c) 46% Mn and above: Nil Ex-mine Price: (a) 25% to below 35% Mn- Rs 9102/- per T (b) 35% to below 46% Mn- Rs 13939/- per T (c) 46% Mn and above: ASP Cost of production: Rs 5440.67 per T	Complete and correct information provided for the entire mine
9h	Scrutiny of Annual return on fixed assets	Value of Fixed Assets (in Rs): 675472296/- Apart from this, depreciation for plant, buildings, machineries etc. has been furnished under Part-II A.	Complete and correct information provided for the entire mine
9k	Scrutiny of Annual return on mining machineries	Complete information given for mining machineries deployed at the mine.	Complete and correct information furnished as per the extent of mechanization given in the mining plan document

Details of violations observed during current inspection and compliance position of violation pointed out

Violation observed			Show couse position		
Rule NO.	Issued on	Compliance on	Rule NO.	Issued on	Compliance on

Date :

(**ASHISH MISHRA**)

Indian Bureau of Mines