# INDIAN BUREAU OF MINES MINERALS DEVELOPMENT AND REGULATION DIVISION

#### MCDR INSPECTION REPORT

#### Bhubaneshwar regional office

Mine file No : ORI/IRON-MN/SNG/MCDR-12/BBS Mine code : 300RI13012

(i) Name of the Inspecting: **U11** ) **DAYANAND UPADHYAY** 

Officer and ID No.

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

(iii) Accompaning mine : Shri N.R. Sathpathy, Mines Manager

Official with Designation

(iv) Date of Inspection : 13/04/2018
(v) Prev.inspection date : 14/07/2017

PART-I : GENERAL INFORMATION

1. (a) Mine Name : NADIDIH

(b) Registration NO. : IBM/4583?2011(WB)

(c) Category : A Fully Mechanised

(d) Type of Working : Opencast

(e) Postal address

State : ORISSA
District : SUNDARGARH

Village : NADIDIH
Taluka : BONAI
Post office : GUALI

Pin Code

FAX No. : 06596-262101

E-mail : bbl.geology@feegrade.com

Phone : 06596-276161

(f) Police Station : KOIRA

(g) First opening date : 10/10/1961

(h) Weekly day of rest : SAT

2. Address for : AT/PO NADIDIH

correspondance DIST. SUNDERGARH, ORISSA

PIN. 770048

3. (a) Lease Number : ORIO128 (b) Lease area : 121.4

(c) Period of lease

(d) Date of Expiry : 31/03/2020

4. Mineral worked : MANGANESE ORE Associated

IRON ORE Main

5. Name and Address of the

Lessee : FEEGRADE &CO.(P)LTD.

AT/PO BARBIL CABLE- RUNGTA

KEONJHAR ORISSA Phone:06767--30221

FAX :

Owner : M D RUSTAGI, NOMINATED OWNER

RUNGTA OFFICE, MAIN ROAD, BARBIL AT/PO- BARBIL, DIST-KEONJHAR SUNDARGARH ORISSA

Phone: FAX:

Agent : A.S.MAHAPATRA

Rungta Office, Main Road, Barbil Keonjhar, Orissa

KEONJHAR ORISSA Phone: 06767-276651 FAX : 06767-276651

Geologist

Name : R K SHARMA, Full Time

Qualification : MSC GEOLOGY Appointment/ : 12/07/2004

Termination date

Manager

Name : Santosh Kumar Choudhary

Qualification : BE(Mining)
Appointment/ : 24/12/2013

Termination date

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

: Mining Scheme rule 12 MCDR1988 06/06/2007 Modif.approved Mining Scheme 23/02/2010 Mining Scheme rule 12 MCDR1988 03/03/2011 Mining Scheme rule 12 MCDR1988 17/04/2013 FMCP under 23C(1) 17/04/2015 Modif.approved Mining Scheme 27/07/2015 MP modif under MCR 1960 28/03/2016 30/12/2016 MP modif under 17(3) MCR 2016

PART - II : OBSERVATION/COMMENTS OF INSPECTING OFFICERS

# Exploration :

Sl.No.	Item	Proposals	Actual work	Remarks
1a	Backlog of previous year	13 nos. of bore holes during 2017- 18.	During 2017-18 total 31 nos. of bore holes have been drileed by lessee.	There is no backlog.
1b	Exploration over lease area for geological axis 1 or 2	G1/G2 Level of exploration.	Total 114.221 ha area is explored under G1/G2 level through 299 no. of bore holes covering a total depth of 15536.1m	mineralised area
1c	Exploration Agencies and Expenditure in lakh rupees during the year	Not specified.	In 2017-18 total total cost incurred in drilling was Rs 3142775/	In 2017-18 total total cost incurred in drilling was Rs 5050455/ Exploration agency involved in drilling was M/s Geovision Pvt Ltd & V.K.S Mining services, Joda.
1d	Balance area to be explored to bring Geological axis in 1 or 2	Not Proposed.	Almost all the mineralised area has been explored by lessee covering 92.583 ha. under G1 level and 21.638 ha. under G2 level.	Almost all the mineralised area has been explored by lessee covering 92.583 ha. under G1 level and 21.638 ha. under G2 level.
1e	Balance reserve as on 01/04/20	Balance reserve as per Modified mining plan approved on 30.12.2016 was 28.02MT under proved (111) category and 2.328 MT was under feasibility resources (211) category.	Balance reserve as on 01/04/2018under 111 category was 23.98 MT of Iron ore and feasibility resources under (211) category was 2.328 MT.	

1f General remarks of inspecting officers on geology, exploration etc

13 nos. of bore holes during 2017-18.

During 2017-18 total 31 nos. of bore holes have been drileed by lessee. Almost all the mineralised area has been explored by lessee G1 level and covering 92.583 ha. under G1 level and 21.638 ha. under G2 level.

Almost all the mineralised area has been explored by lessee covering 92.583 ha. under 21.638 ha. under G2 level.

#### Development :

Sl.No.	Item	Propasals	Actual work	Remarks
2a	Location of development w.r.t.lease area	1013), N-pit (S-1110 to S-	(S-531 to S-1098 and W-	The development is concentrated in D-pit and N-pit.
2b	Separate benches in topsoil, overburden and minerals (Rule 15)		D-pit: OB- 8 benches, ore- 4 benches N-pit: OB- 2 benches, ore- 5 benches	Separate benches in OB and ore have been maintained.
2c	Stripping ratio or ore to OB ratio	1:0.08	1:0.07	Average stripping ratio varries due to irregular nature of ore deposit .
2d	Quantity of topsoil generation in m3	Not proposed.	Not applicable.	The top soil wherever found is of negligible thickness and it is not extracted separately.
2e	Quantity of overburden generation in m3	416666 cu.m	104843 cu.m	Less OB excavated due less ROM production.

2f General remarks The of inspecting officers on development of pit w.r.t. type Mn pit. of deposit etc

The whole mineralised development is area is fully exlpored proposed in D- and development is pit, N-pit and concentrated in two pits i.e D-pit and N-pit only.

The whole mineralised area is fully exlpored and development is concentrated in two pits i.e D-pit and N-pit only.

#### Exploitation:

Sl.No.	Item	Propasals	Actual work	Remarks
3a	Number of pit proposed for production	03 numer of pits i.e D-pit , N-pit and Mn pit.	Working is concentrated in mainly 02 pits, D-pit and N-pit.	Due to constraint of market demand of low grade Mn ore, manganese pit has not been developed.
3b	Quantity of ROM mineral production proposed	5.0 million tonnes Iron ore and 3600T Mn ore.	In 2017-18, 2.878 million tonnes Iron ore has been produced.	Less production of iron ore carried out due to want of environmental clearance. No production of manganese ore has been reported due to market constraint of low grade Mn ore.
3с	Recovery of sailable/usable mineral from ROM production	Saleable 90% w.r.t total ROM.	Total ROM has been utilised by lessee for the year 2017-18.	Total ROM has been utilised by lessee for the year 2017-18.
3d	Quantity of mineral reject generation	1666666T	No sub grade/mineral reject generation has been reported for the peroid 2017-18. About 10% sub grade/mineral reject of ROM production as proposed in modified mining plan has been blended with high garde.	Sub grade/mineral reject generated during mining has been blended with high garde ROM.
3e	Grade of mineral rejects generation and threshold value declared.	-55% to +45% Fe.	No sub grade/mineral reject generation has been reported for the peroid 2017-18.	No sub grade/mineral reject generation has been reported for the peroid 2017-18.

3f	Quantity of sub grade mineral generation.	1666666T	No sub grade/mineral reject generation has been reported for the peroid 2017-18. About 10% sub grade/mineral reject of ROM production as proposed in modified mining plan has been blended with high garde.	Sub grade/mineral reject generated during mining has been blended with high garde ROM.
3g	Grade of sub grade mineral generation	-55% to +45% Fe.	No sub grade/mineral reject generation has been reported for the peroid 2017-18.	No sub grade/mineral reject generation has been reported for the peroid 2017-18.
3h	Manual / Mechanised method adopted for segregating from ROM	Mechanised.	Mechanised.	Mechanised method is being practiced.
3i	Any analysis or beneficiation study proposed and carried out for sub grade mineral and rejects.	Not proposed.	Not applicable.	
3j	Provision of drilling and blasting in mineral benches	y exlposive as	DTH drilling of 110mm dia. Blast hole with emulsion/slurry exlposive as coloumn charge and booster as base charge alongwith delay detonator is being practiced for drilling and blasting.	Depth of blasting- 9.5m Burden- 3.2m spacing- 4.2m.
3k	Provision of mining machineries in mineral benches	Drilling machine- 110 mm dia1, Excavator- 1.16/2.3 cu.m- 18, Dumper 30T-40, Dozer- 2 etc.	DTH of 110mm dia. is used for drilling blast hole. Ore & OB are handled by excavator of 2.3 cu.m capacity with dumper of 30 T capacity. The machinaries available on the site were Drilling machine-110 mm dia1, Excavator- 1.16/2.3	Dozer is also used for road grading and two water sprinkler of 20 KL and 12 KL capacity are used for water spraying.

cu.m-18, Dumper 30T-40,

Dozer-2 etc.

31	Whether height of benches in overburden and mineral suitable for method of mining proposed in MP/SOM	Bench height 9m.	Bench height is suitably matched with the loading excavator.	Bench height is suitably matched with the loading excavator.
3m	Total area covered under excavation/pits	50.105 ha during approved plan period.	About 42.90 ha. has been covered under excavation pits.	About 42.90 ha. has been covered under excavation pits.
3n	Ore to OB ratio for the pit/mine during the year.	1:0.08	1:0.07	Average stripping ratio varries due to irregular nature of ore deposit .
30	Total area put in use under different heads at the end of year	Total 107.61 ha. area put in use under different heads during aapproved plan period.	Area covered under different heads are Pit-42.90 ha, waste dump-20.45 ha, Plant, residential & building, roads-12.301ha & Mineral storage, plantation & others -14.961 ha.	Area covered under different heads are Pit-42.90 ha, waste dump-20.45 ha, Plant, residential & building, roads-12.301ha & Mineral storage, plantation & others -14.961 ha.
3p	Production of ROM mineral during the last five year period as applicable	2014-15: 4.5MT	Iron ore 2013-14: 2160060T 2014-15: 312384T 2015-16: 1665517T 2016-17: 2543361T 2017-18: 2878463.6801T	Less production of iron ore carried out due to want of environmental clearance. No production of manganese ore has been reported due to market constraint of low grade Mn ore.

General remarks DTH drilling of inspecting officers on method of mining with etc.

of 110mm dia. Blast hole and booster alongwith delay detonator.

The ROM production has been carried out from D- pit and N-pit. DTH drilling of 110mm dia. emulsion/slurr Blast hole with y exlposive as emulsion/ slurry coloumn charge exlposive alongwith delay detonator is being practiced for drilling and blasting. No production has been reported for manganese ore.

The ROM production has been carried out from D- pit and N-pit. DTH drilling of 110mm dia. Blast hole with emulsion/ slurry exlposive alongwith delay detonator is being practiced for drilling and blasting. No production has been reported for manganese ore.

#### Solid Waste Management - Dumping:

Sl.No.	Item	Propasals	Actual work	Remarks
4a	Separate dumping of topsoil, OB and mineral rejects (Rule 32,33)	Separate dumping for overburden on the northern extension of active dump-C.	Overburden is dumped on active dump-C on the northern extension.	There is no top soil generation.
4b	Location of topsoil, OB and mineral reject dumps	grid S290-S360	Overburden is dumped on active dump-C on the northern extension. The location of active dump-C is between grid S290-S360 to W300-W650.	There is no top soil generation. Mineral reject generated during 2017-18 is no separately dumped and it has been blended with high grade ore.
4c	Number of dumps within lease area and outside of lease area	Two dumps, B and dump-C within lease area.	There is two main dump i,e dump AB and dump-C lies within the lease area. The location of active dump-C is between grid S290-S360 to W300-W650.	There is no dump in outside lease area.
4d	Location of dumps w.r.t. ultimate pit limit (Rule 16)	OB Dump-C on northern and western extension.	The location of dump-C is between grid S270-S754 to W234-W710.	Dump not falls under ultimate pit limit.

4e	Number of active and alive dumps.	-	There is avtive OB Dump-C on northern and western extension.	There is avtive OB Dump-C on northern and western extension.
4f	Number of dead dumps.	Not Proposed.	There is one dead dump A-B.	The slope of the dead dump is stabilized by coir mating with plantation.
4g	Number of dumps established.	Not proposed.	The slope of the dead dump is stabilized by coir mating with plantation.	The slope of the dead dump is stabilized by coir mating with plantation.
4h	Whether Retaining wall or garland drain all along dumps are there.	Not proposed.	Retaining wall and garland drain around dump as proposed earlier has been made.	Retaining wall and garland drain around dump as proposed earlier has been made.
4i	Length of Retaining wall or garland drain all along dumps	Not proposed.	About 450mX1.5mX1.0m Retaining wall and garland drain as proposed around dump-C in north west extension has been made.	About 450mX1.5mX1.0m Retaining wall and garland drain as proposed around dump-C in north west extension has been made.
4j	Number of settling ponds	Not proposed.	Not applicable.	
4k	Specific comments of inspecting officer on waste dump management	Separate dumping for overburden on the northern extension of active dump-C.	Overburden is dumped on active dump-C on the northern extension as proposed. To avoid the erosion and rain slides application of natural geotextiles such as coir matting has been undertaken. Slope of the dead dump has been stabilised by plantation.	To avoid the erosion and rain slides application of natural geotextiles such as coir matting has been undertaken. Slope of the dead dump has been stabilised by plantation.

# Solid Waste Management - Backfilling:

Sl.No. Item	Propasals	Actual work	Remarks	
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5a	Status of part or full extraction of mineral from mined out area before starting backfilling.	Not proposed.	Pit is not matured for reclaimation.	Mineralisation is continue and pit is not matured for reclaimation.
5b	Area under backfilling of mined out area	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for backfilling.
5c	Concurrent use of topsoil for restoration or rehabilitation of mineral out area (Rule 32)	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for backfilling.
5d	Total area fully reclaimed and rehabilitated	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for reclaimation.
5e	General remarks of inspecting officers on backfilling and reclamation etc.	Backfilling not proposed.	Mineralisation is continue and pit is not matured for reclaimation.	Mineralisation is continue and pit is not matured for reclaimation.

# 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).	Not spcefied.	Annual return on PMCP has been submitted.	Annual return on PMCP has been submitted.
6b	Area available for rehabilitation (ha) .	Not proposed.	Not applicable.	Area not matured for reclamation & rehabilitation.
6c	afforestation done (ha).	1.5 ha.	In 2017-18, total 1.5 ha area has been covered under afforestation.	In 2017-18, total 1.5 ha area has been covered under afforestation.
6d	No. of saplings planted during the year	8000 saplings.	In 2017-18, total 18100nos. of saplings have been planted by lessee.	In 2017-18, total 18100nos. of saplings have been planted by lessee.

6e	Cumulative no .of plants		Cumulative nos. of saplings planted in the lease area is about 193148 nos.	Cumulative nos. of saplings planted in the lease area is about 193148 nos.
6f	Any other method of rehabilitation	Not proposed.	Dump plantation, coir mating and spreading of grass seeds is being practiced.	Dump plantation, coir mating and spreading of grass seeds is being practiced.
6g	Cost incurred on watch and care during the year	Not specified.	Around Rs 94.80 lakh cost incurred on watch and care of green belt in 2017-18.	Around Rs 94.80 lakh cost incurred on watch and care of green belt in 2017-18.
6h	Compliance on reclamation and rehabilitation by backfilling (i) Voids available for backfilling ( Lx B x D	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for reclaimation.
6i	Compliance on reclamation and rehabilitation by backfilling (ii) Voids filled by waste / tailings	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for reclaimation.
6j	Compliance on reclamation and rehabilitation by backfilling (iii)Afforestati on on backfilled area	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for reclaimation.
6k	Compliance on reclamation and rehabilitation by backfilling (iv) Rehabilitation by making water reservoir	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for reclaimation.

61	Compliance on reclamation and rehabilitation by backfilling (v)any other specific means.	Not proposed.	Not applicable.	Mineralisation is continue and pit is not matured for reclaimation.
6m	Compliance of rehabilitation of waste land within lease (i)afforestation	Not proposed.	In 2017-18, afforestation in about 1.5 ha has been carried out.	In 2017-18, afforestation in about 1.5 ha has been carried out.
6n	Compliance of rehabilitation of waste land within lease (ii)Area rehabilitation (ha)	Not proposed.	In 2017-18, afforestation in about 1.5 ha has been carried out.	In 2017-18, afforestation in about 1.5 ha has been carried out.
60	Compliance of rehabilitation of waste land within lease (iii)Method of rehabilitation	Not proposed.	In 2017-18, afforestation in about 1.5 ha has been carried out.	In 2017-18, afforestation in about 1.5 ha has been carried out.
6p	Compliance of environmental monitoring (core zone and buffer zone)	Quarterly monitoring	Quarterly monitoring of air, water and noise level are being carried out.	Quarterly monitoring of air, water and noise level are being carried out.
6q	General remarks of inspecting officers on PMCP compliance and progressive closure operations etc.	In 2017-18, total 8000nos. of saplings have been proposed.	In 2017-18, total 18100nos. of saplings have been planted by lessee. Area has not been matured for reclamation & rehabilitation and afforestation has been carried out along slope of waste dump & safety zone. Regular data of quarterly monitoring of air, water and noise level has been submitted to this office.	Area has not been matured for reclamation & rehabilitation and afforestation has been carried out along slope of waste dump & safety zone. Regular data of quarterly monitoring of air, water and noise level has been submitted to this office .

### Mineral Conservation:

Sl.No.	Item	Propasals	Actual work	Remarks

7a	ROM Mineral dispatch or grade-wise sorting within lease area	Gradewise sorting.	Gradewise sorting.	ROM produced from the mine sorted out gradewise of +55% Fe.
7b	Method of grade- wise mineral sorting i.e. manual or mechanical.	Mechanised for iron ore and manual for manganese ore.	Mechanised method is adpoted for gradewise sorting of iron ore.	Mechanised method is adpoted for gradewise sorting of iron ore.
7c	Different grade of mineral sorted out at mines.	45% to 55% Fe and +55% Fe.	Different grades of minerals sorted out at mines are 45% to 55% Fe and +55% Fe.	Different grades of minerals sorted out at mines are 45% to 55% Fe and +55% Fe.
7d	Any beneficiation process at mines .	Not proposed.	Not applicable.	
7e	General remarks of inspecting officer on Mineral conservation and beneficiation issues	Grades of minerals proposed to sort out at mines is 45% to 55% Fe and +55% Fe.	Cut off grade of iron ore for the mine is +55%. Different grades of minerals sorted out at mines are -65% Fe, 62 to 58% fe and 58 to 55% Fe. In 2017-18, no sub grade has been reported by lessee. The sub grade generated during mining has blended with high grade.	Cut off grade of iron ore for the mine is +55%. Different grades of minerals sorted out at mines are -65% Fe, 62 to 58% fe and 58 to 55% Fe. In 2017-18, no sub grade has been reported by lessee. The sub grade generated during mining has blended with high grade.

#### Environment:

Sl.No.	Item	Propasals	Actual work	Remarks
8a	Separate removal and utilization of topsoil (Rule 32)	Not proposed.	Not applicable.	The top soil wherever found is of negligible thickness and it is not extracted separately.

8b	Concurrent use or storage of topsoil	Not proposed.	Not applicable.	The top soil wherever found is of negligible thickness and it is not extracted separately.
8c	Separate dumps for overburden, waste rock, rejects and fines (Rule 33)	on the northern	There is Separate dump for overburden and mineral rejects.  Overburden is dumped on active dump-C on the northern extension. The location of active dump-C is between grid S290-S360 to W300-W650.	There is Separate dump for overburden and mineral rejects.
8d	Use of overburden, waste rock, rejects and fines dumps for restoring the land to its original use	Not proposed.	Not applicable.	
8e	Phased restoration, reclamation and rehabilitation of lands affected by mining operations (Pits, dumps etc)	Not proposed.	Not applicable.	Area is not matured for reclamation and rehabilitation.
8f	Baseline information on existence of plantation and additional plantation done (Rule 41)	Plantation proposed along the slope of waste dump & safety zone.	Total 18100 nos. saplings have been planted in 2017-18.	Total 18100 nos. saplings have been planted in 2017-18.
8g	Survival rate	Not specified.	As reported survival rate is 90%.	As reported survival rate is 90%.
8h	Water sprinkling on roads to control airborne dust	Two water sprinkler	Two water sprinkler are used to control air borne dust.	Water sprinklers of 20 & 12 KL capacityare utilised to control air borne dust.

8i General remarks Total 8000 of inspecting officer on aesthetic beauty proposed in in and around mines area

have been 2017-18.

Aesthic beauty in and nos. saplings aroun mined area is maintained. In 2017-18, total 18100 nos of saplings have been planted by lessee. As reported cumulative no. of trees planted by lessee is about 193148 nos.

Aesthic beauty in and aroun mined area is maintained. In 2017-18, total 18100 nos of saplings have been planted by lessee. As reported cumulative no. of trees planted by lessee is about 193148 nos.

#### Compliance of Rule 45:

Sl.No.	Item	Propasals	Actual work	Remarks
9a	Status of submission of Monthly and Annual returns	Monthly & Annual returns are being regularly submitted by lessee.	Monthly & Annual returns are being regularly submitted by lessee.	Monthly & Annual returns are being regularly submitted by lessee.
9b	Scrutiny of Annual return for information on Mining Engineer, Geologist and Manager	Graduate Mining Engineer-2, Diploma mining Engineer-2, Geologist-1, Others-12.	Graduate Mining Engineer-2, Diploma mining Engineer-2, Geologist-1, Others-12.	Graduate Mining Engineer-2, Diploma mining Engineer-2, Geologist-1, Others-12.
9c	Scrutiny of Annual return on land use pattern for area under pits, reclaimed area, dumps etc.	different heads are Pit-42.90 ha,	Area covered under different heads are Pit-42.90 ha, waste dump-20.45 ha, Plant, residential & building, roads-12.301ha & Mineral storage, plantation & others -14.961 ha.	Area covered under different heads are Pit-42.90 ha, waste dump-20.45 ha, Plant, residential & building, roads-12.301ha & Mineral storage, plantation & others -14.961 ha.
9d	Scrutiny of Annual return on afforestation	18100 nos. saplings	Total 18100 nos. saplings have been planted in 2017-18.	Total 18100 nos. saplings have been planted in 2017-18.

9e	Scrutiny of Annual return on mineral reject generation (Grade and quantity)	Mineral reject- Nil	Mineral reject- Nil	Mineral reject- Nil
9f	Scrutiny of Annual return on ROM stock and/or graded ore	of 55% Fe: 55% to 58% Fe:		Grdewise stock of 55% Fe: 55% to 58% Fe: 58% to 60% Fe: 60% to 62% Fe: 62% to 65% Fe: 65% & above have been furnished.
9g	Scrutiny of Annual return on sale value, Ex. Mine price and production cost	Cost of production is Rs 659.90/-	Cost of production is Rs 659.90/-	Cost of production is Rs 659.90/-
9h	Scrutiny of Annual return on fixed assets	Net closing balance is Rs 147794830/-	Net closing balance is Rs 147794830/-	Net closing balance is Rs 147794830/-
9k	Scrutiny of Annual return on mining machineries	CUM-10,SHOVEL (HYDRAULIC)-	FRONT END LOADER, 1.800 CUM-10,SHOVEL (HYDRAULIC)-09, EXPLOSIVE VAN-1, TIPPER, 12/16 cu.m-32, WATER TANKER-4.	FRONT END LOADER, 1.800 CUM- 10,SHOVEL (HYDRAULIC)-09, EXPLOSIVE VAN-1, TIPPER, 12/16 cu.m-32, WATER TANKER-4.

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Details of violations observed during current inspection and compliance position of violation pointed out					
Violat	cion observed	Show couse position			
Rule NO.	Issued on Compliance on	Rule NO.	Issued on Compliance on		

Date : (DAYANAND UPADHYAY)

Indian Bureau of Mines