

OCM/ENV/ 221 /2018

Date: 26.05.2018

To

Dr. Amit Kumar Gupta  
Joint Director  
Ministry of Environment & Forests,  
Govt. of India  
Eastern Regional Office  
A/3, Chandrasekharpur  
Bhubaneswar - 751 023

Sub: Six monthly compliance of conditions stipulated vide Environmental Clearance Letter No.J-11015/38/2006-IA.II (M), dtd. 06-12-2006 for Ostapal Chromite Mines of M/s. FACOR Ltd.

Dear Sir,

With reference to above stated Environmental Clearance letters, we are herewith submitting hard copies of six monthly compliance report of our Ostapal Chromite Mines of M/s.FACOR Ltd. for the period from October, 2017 to March, 2018 for your kind perusal. The soft copy of the same has already been sent by mail to your good Office.

Thanking you,

Yours faithfully,  
for FERRO ALLOYS CORPORATION LTD.

  
MINES MANAGER

Encl: As above

Copy to: The Director, MOEF, New Delhi – for favour of kind information.

Name of the Project : **OSTAPAL CHROMITE MINES, M/S. FACOR LTD.**  
Project Code : Mining (Non-Coal)  
Clearance Letter No. with date : No. J-11015/38/2006-IA.II (M), dtd. 06-12-2006  
Period of Compliance Report : October, 2017 to March, 2018

**Specific Condition:**

Sl. No.	Condition	Compliance Status
1.	All the conditions stipulated by the State Pollution control Board, in their Consent to establish should be effectively implemented.	All the stipulated conditions are being effectively implemented.
2.	Necessary forestry clearance under the Forest (Conservation) Act, 1980 for an area of 4.07 ha forest land shall be obtained before starting mining operation in that area. Till such time mining activities shall be restricted to an area of 64.354 ha for which in principle forestry clearance has been obtained from the Ministry on 03.10.2005	This area is left as Safety Zone area for greenbelt around periphery of forest land of M.L. area and mining operations in this area will not be done.
3.	Top soil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area.	No top soil has been generated during the period October, 2017 to March, 2018. All the top soil generated till Sept'2017 has been already used for plantation purpose, so there is no balance /stock available.
4.	Over burden shall be stacked at earmarked dump site(s) only and should not be kept active for long period. The total height of the dump(s) should not exceed 45m in three stages of 15 m each, keeping overall slope of the dumps below 28°. The proponent shall carry out slope stability study and submit report to the Ministry. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be taken for stabilization of the dump. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on six monthly basis.	The OB is being dumped at earmarked sites only. The OB dump is not kept active for longer periods. The present height of the dump is 41m with overall slope 25°. In future also the overall slope will be maintained below 28 degrees. The inactive benches are being vegetated by suitable native species and massive grass plantation to prevent erosion & surface runoff. The management of the rehabilitated areas of the dumps has been continuing until the vegetation becomes self sustaining.
5.	Trace Metals such as Ni, Co, As, and Hg should be analyzed in dust fall and soil samples for at least one year during summer, monsoon and winter seasons. If concentrations of these metals are found below the standards then with prior approval of MOEF this specific monitoring could be discontinued.	Collection and analysis of dust & soil samples is done and the results of the same are being submitted to MOEF regularly. The result is enclosed in <b>Annexure-1</b> . There is no standards for Ni, Co, As and Hg for dust fall and soil samples.
6.	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilized for watering the mine area, roads, plantation etc. The drains should be regularly de-silted and maintained properly.	Catch drains around OB dumps and mineral stockyard have already been constructed with siltation ponds at regular intervals to arrest silt and sediments. Whenever required the silts and sediments are being cleaned from catch drains and siltation ponds and maintained regularly.

	<p>Garland drain (size, gradient and length) shall be constructed for both mine pit &amp; waste dump and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.</p> <p>Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall / super cyclone period. A separate storm water sump for this purpose should be created.</p>	<p>Mine pumped out water is sufficient for dust suppression and plantation purposes. Hence catch drain water is discharging outside ML area through upgraded ETP. Hence there is no need for collection of water from catch drains from mine area, roads, plantation etc.</p> <p>Garland drains of width 2m, depth 1.5m and length 4325 m with gradient have been constructed for maximum discharge of rainfall in the adjoining areas. There is no chance of flow of storm water into the effluent treatment plant during high rainfall/super cyclone period because the plant is at high reduced level (RL). Hence storm water return system is not required.</p>
7.	<p>Dimensions of retaining wall at the toe of OB dumps &amp; benches within the mine to check run-off and siltation should be based on the rainfall data.</p>	<p>Retaining wall of width 1.5m and height 1.2m has already been constructed all around the toe of dumps upto a length of 2870 m to check the run-off and siltation.</p>
8.	<p>Effluents containing of Cr<sup>+6</sup> shall be treated to meet the prescribed standards before reuse/discharge. Effluent Treatment plant should be provided for treatment of mine water discharge and wastewater generated from the workshop and mineral separation plant.</p> <p>Run off from OB dumps and other surface run off should be analyzed for Cr<sup>+6</sup> and in case its concentration is found higher than the permissible limit the water should be treated before reuse/discharge.</p>	<p>An Effluent Treatment Plant has been commissioned for treatment of Mines discharge water. The conc. of Cr<sup>+6</sup> in treated discharge water is &lt;0.005 mg/l. The tailing water (waste water of mineral separation plant) also is being treated by adding FeSO<sub>4</sub> before discharge into tailing pond. The treated tailing pond water is being collected in a intake pond and being re-used in beneficiation plant. Thus zero discharge from Beneficiation Plant is being maintained.</p> <p>Almost all mining machineries and transporting vehicles are being engaged on contract basis for transportation of OB and chrome ore. The company has few Nos. of vehicles. The major repairing of these vehicles is being done at outside workshop and minor repairing is being done in our garage. Hence, discharge of workshop effluent is nil.</p> <p>The total surface runoff water is being collected in two settling pits which are pumped to the ETP for treatment before final discharge.</p>
9.	<p>Separate impervious concrete pits for disposal of sludge shall be provided for the safe disposal of sludge generated from the mining operations.</p>	<p>The sludge generated from mining operations contains chrome ore. It is being fed in Beneficiation Plant to separate the Chrome.</p>
10.	<p>The Project proponent shall ensure that the quality of decanted effluents from the tailing pond conform to the prescribed standards before discharge.</p>	<p>The effluents from tailing pond are not discharged outside. The supernatant water of the tailing pond is being collected in a sump adjacent to the tailing pond and re-circulated in Beneficiation Plant.</p>
11.	<p>The Project proponent shall explore the possibility to reduce concentration of Cr<sup>+6</sup> in the tailing pond in consultation with an Expert Scientific Institution like NEERI.</p>	<p>The Conc. of Cr<sup>+6</sup> in tailings is being reduced by adding FeSO<sub>4</sub> solution and disposed in the tailing pond.</p>
12.	<p>Plantation shall be raised in an area of 33.02 Ha including green belt in an area of 6.56 Ha by planting native species around ML area, OB dumps, and roads around worked out area etc. in</p>	<p>Plantation has been done over inactive benches of OB dumps, Road side, around C.O.B Plant and inside the colony in an area of 32.996 Ha.</p>

	consultation with local DFO/ Agriculture Department. The density of the trees should be around 2000 plant species per hectare.	Plantation is being carried out in consultation with local Forest Department.
13.	Regular monitoring of ground water level & quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and Regional Director Central Ground Water Board.	Monitoring of ground water level & quality is being carried out in 6 Nos. of existing wells (2 Nos. bore wells in Core Zone & 2 Nos. open wells & 2 Nos. of tube well in Buffer Zone.) and 14 Nos. of piezometer holes have been constructed inside the Mine. Two bore well inside the Core Zone and 2 Nos. of tube wells (one is inside of the Shiva Temple of Gurujanga and other is outside of the Shiva Temple) are in Buffer Zone. Above four wells are in network system. The monitoring report for the period from October, 2017 to March, 2018 is enclosed as Annexure-2 & 2A.
14.	The project proponent shall carry out regular monitoring of ground water quality in all the 14 wells. The frequency of monitoring in 8 wells where concentration of Cr <sup>+6</sup> is within permissible limits, will be quarterly while in the remaining 6 wells it will be on monthly basis.	The monitored results of ground water quality in all existing Bore wells are enclosed as <b>Annexure-3</b> .
15.	Project Authorities should meet water requirement of the peripheral village(s), especially, if the village wells go dry due to mine de-watering.	Ground water level is being monitored regularly. The water level of the nearby village wells has not gone dry even during summer seasons. However, as a part of peripheral development the Project Authority has constructed Bore wells in nearby villages and also potable water is being provided to nearby villages by water tankers.
16.	Permission from the competent authority should be obtained for drawal of ground water for domestic use.	Permission obtained from Central Ground Water Authority, Ministry of Water Resources, New Delhi vide letter no.21-4(13)/SER/CGWA/2007-1460 dated 6.12.2007 and the same has been submitted to Eastern Regional Office of M.O.E.F., Bhubaneswar.
17.	Suitable rain water harvesting measures on long term basis shall be planned and implemented in consultation with Regional Director, CGWB.	Rain water has been collected in different pits for suitable rain water harvesting measures.
18.	Drills should be wet operated or operated with dust extractors.	Drilling operation is being carried out with dust extractors.
19.	Blasting operation should be carried out only during the day time. Controlled blasting should be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.	Blasting operation is being carried out in the day time only. Controlled blasting is being practiced by following Nonel & muffle blasting. Delay detonators are used for providing delay timings between rows and within rows of holes. Numbers of rows in a blast are restricted to less than three to get good fragmentation and to reduce fly rocks and ground vibration.
20.	The voids created at the end of mining shall be converted into water Body with shallow depths not exceeding 30m. The higher benches of the excavated void/mine pit shall be terraced and plantation done to stabilize the slopes. Peripheral fencing shall be done along the excavated area.	The same will be implemented at the end of mining operation.

21.	Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be over loaded.	Vehicular emission of all machinery used in mining operations are being monitored regularly and kept under control of rigorous maintenance of all engines and changing of lubricants as per the recommendation of the manufacturer. Which HEMMs have valid PUC Certificate is only allowed for operation inside the Mines. All the transporting vehicles are being covered with tarpaulin and over loading are strictly avoided.
22.	Consent to operate should be obtained from SPCB before enhancing Production capacity of the mine.	Consent to operate has been obtained from SPCB, Bhubaneswar before enhancing production capacity of the mine.
23.	Sewage treatment Plant should be installed for the colony. ETP should also be provided for workshop and waste water generated from Mining operations.	There is no colony inside the ML area. Almost all mining machineries and transporting vehicles are being engaged on contract basis for transportation of OB and chrome ore. The company has few Nos. of vehicles. The major repairing of these vehicles is being done at outside workshop and minor repairing is being done in our garage. Hence, discharge of workshop effluent is nil. An ETP has already established for treatment of mines water.
24.	A final mines closure plan along with details of corpus fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.	The same will be submitted in due time to MOEF for approval.

#### GENERAL CONDITIONS:

Sl. No.	Condition	Compliance Status
1	No change in mining technology & scope of working should be made without prior approval of the Ministry of Environment & Forests.	The Mining technology & scope of working has not been changed.
2	No change in the calendar plan including excavation, quantum of mineral Chromite and waste should be made.	The calendar plan including excavation, quantum of mineral Chromite and waste overburden has not been changed. The calendar plan including excavation, quantum of mineral chromite and waste overburden has been generated during the period (April, 2017 to March, 2018) is given in <b>Annexure-8</b> .
3	Conservation measures for protection of flora & fauna in the Core & Buffer Zone should be drawn up in consultation with local forest & wild life department.	As per the advice of Forest Department, we are maintaining vehicles, watchman and infrastructural facilities as measures to protect the Flora & Fauna in core & buffer zone.
4	Four ambient air quality-monitoring stations should be established in the Core zone as well as in the Buffer zone for RPM, SPM, SO <sub>2</sub> & NO <sub>x</sub> monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control	Ambient Air quality monitoring stations has already been established in consultation with SPCB.

	Board.	
5	Data on ambient Air Quality (RPM, SPM, SO <sub>2</sub> & NO <sub>x</sub> ) should be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six months.	Data on Ambient Air Quality monitoring with respect PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>x</sub> & CO for the period October, 2017 to March, 2018 is enclosed as <b>Annexure 4</b> . The copy of the same has been submitted to the Ministry and SPCB, Bhubaneswar. In future also the same will be continued.
6	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading & unloading and at transfer points should be provided and properly maintained.	Control of fugitive dust emissions is being carried out by water spraying on haul roads, loading and unloading points and Ore handling yard regularly. The monitored results of the same are enclosed as <b>Annexure 5</b> .
7	Measures should be taken for control of noise levels below 85 dB(A) in work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.	Control measures such as maintenance of all machines including checking of silencers regularly, controlled blasting using delay detonators, installing immovable machinery on foundations with suitable rubber pad and closed rooms is being followed-up. The workers engaged at noise generating areas are allowed to work on rotation basis with providing ear plugs/muffs. The present noise level of work environment is below 68 dB (A). Location wise noise level at work environment is enclosed as <b>Annexure – 6</b> .
8	Industrial waste water (workshop & waste water from the Mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19 <sup>th</sup> May, 1993 and 31 <sup>st</sup> December, 1993 or as amended from time to time. Oil & grease trap should be installed before discharge of workshop effluents.	The Mines waste water is being pumped out directly into the intake tank of the ETP for treatment of Cr <sup>+6</sup> and part of the treated water is being used in our COB Plant, Plantation, dust suppression and surplus treated water is finally discharged to outside ML area. The analysis of this water shows that all parameters are well within the prescribed limit. The analysis report of Mines final discharge water after treatment in E.T.P., for the period from October, 2017 to March, 2018 is enclosed as <b>Annexure -7</b> . Almost all mining machineries and transporting vehicles are being engaged on contract basis for transportation of OB and chrome ore. The company has few Nos. of vehicles. The major repairing of these vehicles is being done at outside workshop and minor repairing is being done in our garage. Hence, discharge of workshop effluent is not envisaged.
9	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	In addition to water spraying to suppress dust generation, workers engaged in dusty areas such as drillers, dumper drivers, HEMM Operators are being provided with nose masks as a precautionary measure. Training & information on safety, health hazards are being given to all categories of deserved workers. Occupational health surveillance programme of all categories of workers and employees are being conducted periodically by lung function test,

		audiometry test, vision tests and other tests. The defects workers/employees are advised for suitable treatment or engaged on suitable rotation duty.
10	A separate Environment Management Cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.	A separate Environment Management Cell with qualified personnel and well equipped Environment Engineering Laboratory are functioning since 1989 under the control of Senior Executive. Besides we are carrying out all Environmental monitoring & analysis through a MOEF & NABL accredited laboratory M/S Kalyani Laboratory Pvt. Ltd., Bhubaneswar & the monitoring reports are enclosed in Annexures.
11	The Project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the Project by the concerned authorities and the date of start of land development work.	The final approval of the Project is 06.12.2006. It is a mining industry. Hence, land development work is a continuous process.
12	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.	Separate funds provision is made to carry out environmental protection measures. Details of expenses during the year 2017-18 and proposed budgeted amount for the year 2018-19 are given in <b>Annexure -9</b> .

**SOIL AND DUSTFALL SAMPLE ANALYSIS REPORT**

PROJECT : OSTAPAL CHROMITE MINES  
 PERIOD : OCTOBER, 2017 TO MARCH, 2018

**1-SOIL SAMPLE**

Units: %

Sl. No.	LOCATION	SEASON	PARAMETERS			
			Ni	Co	As	Hg
1.	30 metre distance from tailing pond	Oct'17 to Dec'17	0.0319	Not Detected	Not Detected	Not Detected
		Jan'18 to Mar'18	0.0415	Not Detected	Not Detected	Not Detected
2.	20 metre distance from tailing pond	Oct'17 to Dec'17	0.0432	Not Detected	Not Detected	Not Detected
		Jan'18 to Mar'18	0.0485	Not Detected	Not Detected	Not Detected
3.	10 metre distance from tailing pond	Oct'17 to Dec'17	0.0382	Not Detected	Not Detected	Not Detected
		Jan'18 to Mar'18	0.0522	Not Detected	Not Detected	Not Detected
4.	Soil sample from Northern side of the lease hold area	Oct'17 to Dec'17	0.1140	Not Detected	Not Detected	Not Detected
		Jan'18 to Mar'18	0.1260	Not Detected	Not Detected	Not Detected

**2- DUST FALL SAMPLE:**

Sl. No.	LOCATION	SEASON	PARAMETERS			
			Ni	Co	As	Hg
1.	Dust fall sample from Roof top of the Type –II Building	Oct'17 to Dec'17	16.2	<1.0	<1.0	<1.0
2.		Jan'18 to Mar'18	16.4	<1.0	<1.0	<1.0

**ANNEXURE -2****MONITORING DETAILS OF GROUND WATER LEVEL FROM SURFACE**

PROJECT : OSTAPAL CHROMITE MINES

PERIOD : OCTOBER, 2017 TO MARCH, 2018

SURVEY CONDUCTED BY: ENVIRONMENTAL ENGINEERING LABORATORY, FACOR

Sl. No.	LOCATION	Unit:In metres		
		Collar RL	NOV,2017	FEB,2018
1.	Near Ostia Village (Open Well)	135	3.9	3.8
<b>PIEZOMETER HOLES</b>				
1.	Eastern side of the quarry, (PZ-1)	126	75.00	73.71
2.	Southern side of the quarry, (PZ-2)	112	60	60
3.	Western side of the quarry, (PZ-3)	117	39.84	39.34
4.	Eastern side of the quarry, (PZ-7)	110	13.59	13.50
5.	Eastern side of the quarry, (PZ-8)	109	14.43	13.53
6.	Eastern side of the quarry, (PZ-9)	109	11.71	11.47
7.	Eastern side of the quarry, (PZ-23)	126	14.01	11.11
8.	Eastern side of the quarry, (PZ-24)	126	14.15	Silt
9.	Eastern side of the quarry, (PZ-25)	119	9.51	8.83
10.	North Dump, (PZ-1)	155	40.46	37.1
11.	North Dump, (PZ-2)	154	42.46	42.51
12.	North Dump, (PZ-3)	154	43.73	42.69
13.	North Dump, (PZ-4)	154	43.34	40.98
14.	North Dump, (PZ-5)	154	45.04	40.13





**MONITORING OF GROUND WATER QUALITY (Cr<sup>+6</sup>) IN BORE HOLES AROUND TAILING POND**

PROJECT : OSTAPAL CHROMITE MINES  
PERIOD : OCTOBER, 2017 TO MARCH, 2018

HOLE No.	Location w.r.t. Tailing Pond	Distance from Tailing Pond (Mtr)	CONCENTRATION OF Cr <sup>+6</sup> IN mg/l	
			Oct'17 to Dec'17	Jan'18 to Mar'18
B1	NE	35	0.26	0.24
B2	NE	30	0.49	0.45
B3	E	30	0.33	0.30

### AMBIENT AIR QUALITY MONITORING AT OSTAPAL CHROMITE MINES

SI.No.	STATIONS	PARAMETERS	Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	March'18	NAAQ STANDARD
<b>CORE ZONE</b>									
1	Mines Main Gate/weigh bridge	PM <sub>10</sub>	94	92	88	90	88	86	100
		PM <sub>2.5</sub>	57.03	59.3	58.34	59.33	58.34	56.04	60
		SO <sub>2</sub>	12.3	13.4	14.4	16.8	14.4	15.6	80
		NO <sub>x</sub>	38.1	37.3	36.5	38.1	33.4	35.5	80
		CO	2.4	2.4	2.2	2.4	2.2	2.1	4
2	Near Tarini Temple	PM <sub>10</sub>	85	87	84	87	84	81	100
		PM <sub>2.5</sub>	54.4	56.8	54.86	56.29	54.86	50.11	60
		SO <sub>2</sub>	9.7	10.4	11.3	10.3	11.7	12.6	80
		NO <sub>x</sub>	36.1	35.1	36.3	29.14	30.4	28.8	80
		CO	1.3	1.1	1	1.1	1	1.1	4
3	Middle of the Opencast Quarry	PM <sub>10</sub>	88	93	88	89	90	88	100
		PM <sub>2.5</sub>	56.23	58.2	59.33	58.58	53.33	57.06	60
		SO <sub>2</sub>	10.7	10.2	11.2	8.8	10.2	11.3	80
		NO <sub>x</sub>	28.4	41.5	39.7	29.3	28.5	26.7	80
		CO	1.8	1.7	1.6	1.4	1.6	1.5	4
4	Middle of the COB Plant	PM <sub>10</sub>	90	85	84	86	88	85	100
		PM <sub>2.5</sub>	58.34	55.5	54.63	56.29	56.29	55.33	60
		SO <sub>2</sub>	11.4	12.2	13.3	14.4	13.2	12.2	80
		NO <sub>x</sub>	30.5	28.8	29.6	31.4	32.6	29.4	80
		CO	2.3	2.1	2.3	2.4	2.2	2	4



**FUGITIVE DUST EMISSION DATA**

PROJECT : OSTAPAL CHROMITE MINES  
PERIOD : OCTOBER, 2017 TO MARCH, 2018

**UNIT- $\mu\text{g}/\text{M}^3$**

Sl. No.	Stations	Months	SPM
1.	Mines Ore Plot Area	OCT'17-DEC'17	705
		JAN'18-MAR'18	712
2.	COB Plant area	OCT'17-DEC'17	515
		JAN'18-MAR'18	522
3.	Near Loading point	OCT'17-DEC'17	650
		JAN'18-MAR'18	665

**Annexure-6****Noise level monitoring dB(A)Leq**

Sl.No.	Sampling Location	OCT'17-DEC'17	JAN'18-MAR'18	Standard
1	Near weigh bridge	58.2	59.1	75
2	Middle of the Quarry	49.1	50.2	75
3	Middle of the COB plant	67.9	68.6	75

**EFFLUENT WATER ANALYSIS REPORT**

STATION:MINES FINAL DISCHARGE WATER AFTER TREATMENT IN ETP

SL. NO.	CHARACTERISTICS	OCT'17-DEC'17	JAN'18-MAR'18	Limit as Per IS-2490 & MOEF Guideline
1	Colour	Colorless	Colorless	-
2	Odour	U/O	U/O	Unobjectionable
3	Suspended solids mg/l	10	20	100
5	pH Value	7.3	7.2	5.0 – 9.0
6	Total residual chlorine(Cl)mg/l	0.3	0.2	1
7	Ammonical Nitrogen(N) mg/l	<0.03	<0.03	50
8	Total Kjeldahl Nitrogen(N)mg/l	1.68	2.3	100
9	BOD(O <sub>2</sub> )mg/l(3 days at 27°C)	5	10	30
10	COD (O <sub>2</sub> ) mg/l	20	41	250
11	Total Chromium(Cr)mg/l	-	<0.01	2
12	Nitrate Nitrogen(N)mg/l	0.3	0.5	10
13	Iron (Fe) mg/l	0.07	0.08	3
14	Bio-Assay Test	100% survival	100% survival	90% survival of fish in 100% effluent after 96 hrs.
15	Oil & grease mg/l	<0.4	<0.4	10
17	Arsenic(As)mg/l	<0.01	<0.01	0.2
18	Mercury(Hg),mg/l	<0.001	<0.001	0.01
19	Lead(Pb)mg/l	<0.01	<0.01	0.1
20	Cadmium(Cd),mg/l	<0.001	<0.001	2
21	Hexavalent Chromium(Cr <sup>+6</sup> )mg/l	<0.05	0.002	0.1
22	Copper(Cu)mg/l	<0.01	<0.01	3
23	Zinc (Zn),mg/l	0.03	0.038	5
24	Selenium(Se)mg/l	<0.01	<0.01	0.05
25	Nickel mg/l	BDL	BDL	3
26	Cyanide (CN)mg/l	<0.01	<0.01	0.2
27	Fluorides(F) mg/l	0.5	0.7	2
28	Dissolved Phosphate(P)mg/l	<0.5	<0.5	5
29	Sulphide(S) mg/l	<0.05	<0.05	2
30	Phenolic compounds (C <sub>6</sub> H <sub>5</sub> OH),mg/l	<0.001	<0.001	1
31	Manganese(Mn),mg/l	<0.1	<0.1	2
32	Vanadium(V) mg/l	BDL	BDL	0.2

**CALENDAR PLAN INCLUDING EXCAVATION, QUANTUM OF MINERAL CHROMITE AND  
WASTE GENERATED DURING THE PERIOD 2017-2018  
IN OUR OSTAPAL CHROMITE MINES**

SL. NO.	MATERIALS	CALENDER PLAN PER ANNUM	QUANTITY GENERATED DURING THE PERIOD FROM APRIL, 2017 TO MARCH, 2018
01.	CHROME ORE	1.042 Lakh Tonnes	1.062 Lakh Tonnes
02.	WASTE OVER BURDEN	4.80 Lakh M <sup>3</sup>	3.508 Lakh M <sup>3</sup>

**DETAILS OF EXPENDITURE INCURRED ON ENVIRONMENTAL PROTECTION MEASURES  
DURING THE YEAR 2017-18 AND PROPOSED BUDGETED AMOUNT FOR THE YEAR 2018-19  
OF OSTAPAL CHROMITE MINES**

<b>Sl. No.</b>	<b>I T E M</b>	<b>Expenses during the Year 2017-18 (in Rupees ₹)</b>	<b>Proposed budgeted amount for the year 2018-19 (in Rupees ₹)</b>
1.	<b>AFFORESTATION</b>		
a)	Seedlings @ Rs.56/- each	3,62,040	5,20,000
b)	Fertilizer/Insecticide/Cow-dung(@ Rs. 11)	71,000	97,500
c)	Digging of Pits/Planting (Labor cost)	2,00,100	2,47,610
d)	Post Plantation care @ Rs. 155/- (Watering, Weeding, basin making etc.)	10,02,075	13,20,000
e)	Supervising	4,84,000	4,88,000
	<b>Sub-Total</b>	<b>21,19,215</b>	<b>26,73,110</b>
2.	<b>WATER MANAGEMENT &amp; TREATMENT</b>		
a)	ETP Operation & Maintenance (including costs of chemical & Manpower)	16,00,000	17,50,000
b)	Power Consumption	8,73,730	9,00,000
c)	Sludge disposal	58,000	70,000
d)	Water sample analysis	1,15,404	70,000
	<b>Sub-Total</b>	<b>26,47,134</b>	<b>27,90,000</b>
3.	<b>DUST SUPPRESSION &amp; AIR MONITORING</b>		
a)	Water spraying at dust generating points by water tanker around 205 days in a year @ Rs.817/- per trip costing 10 trips per day (10 x 817 x 205)	16,74,850	18,50,000
b)	Air monitoring charges	1,86,440	2,30,000
c)	Noise level measurement	7,080	10,000
	<b>Sub-Total</b>	<b>18,68,370</b>	<b>20,90,000</b>
	<b>GRAND TOTAL</b>	<b>Rs.66,34,719/-</b>	<b>Rs.75,53,110/-</b>