



Letter No. 7924 OMC/F&E/2017  
May 20, 2017

To

**The Director(S)**  
**Ministry of Environment, Forests & Climate Change**  
**Eastern Regional Office**  
**A/3, Chandrashekharapur,**  
**Bhubaneswar-751 023**

**Sub.:** Submission of six monthly report on the status of compliance to the conditions stipulated in the grant order of EC along-with monitored data pertaining to **Sukurangi Chromite Mines** of OMC Ltd.

**Ref.:** i) EC Grant Order No. J-11015/409/2007-IA.II (M) dt. 18.02.2010  
ii) MoEF Circular No. J-11013/41/2006-IA.II(I) dt. 30.06.2009

Sir,

Six monthly reports on the status of compliance to EC conditions stipulated by MoEF, Govt. of India, under reference (i) pertaining to Sukurangi Chromite Mines for the period from Oct' 2016 - Mar' 2017 is enclosed as **Annexure-A** for kind perusal.

The environmental monitoring data (Oct' 2016 - Mar' 2017) comprising of air (ambient & fugitive), noise, water (ground & surface), waste water and soil for the above mentioned period is enclosed herewith as **Annexure-B**.

This is for your kind information and necessary action.

Encl.: As above (with a CD)

Yours faithfully

Executive Director (F&E)

No...../OMC/F&E/2017

May 20, 2017

Copy to:

1. Copy alongwith copies of enclosures (in hard & soft) to Director (IA), Ministry of Environment, Forest & Climate Change, Government of India, 3rd Floor, Vayu Vihar, Indira Paryavaran Bhawan Jorbagh Road, Aliganj New Delhi - 110 003
2. Member Secretary, Central Pollution Control Board, Zonal Office, Kolkata
3. Member Secretary, State Pollution Control Board, Odisha, Bhubaneswar-751 012
4. Regional Manager, J.K. Road, for kind information & necessary action.
5. Sr. Manager (Mining), Sukurangi Chromite Mines for kind information and necessary action

Executive Director (F&E)

**Odisha Mining Corporation Ltd.**

(A Gold Category State PSU)

Registered Office : OMC House, Bhubaneswar-751001, India  
Tel: 0674-2377400/2377401, Fax: 0674-2396889, 2391629, www.omcltd.in

**ANNEXURE A****COMPLIANCE TO THE CONDITIONS STIPULATED IN THE GRANT ORDER OF ENVIRONMENTAL CLEARANCE GRANTED BY MOEF, GOVT.OF INDIA VIDE LETTER NO.J-11015/409/2007-IA.II (M) DT 18.02.2010 PERTAINING TO SUKURANGI CHROMITE MINES OF M/S ODISHA MINING CORPORATION LIMITED**

Sl. No.	Conditions Stipulated	Compliance made by OMC
<b>A. Specific Conditions:</b>		
I	The project proponent shall obtain fresh Consent to Establish for envisaged production capacity of 1,30,000TPA of chrome ore and Consent to Operate from the State Pollution Control Board, Orissa and effectively implement all the conditions stipulated therein.	Consent to Establish has been granted for production of 1.27 lakh TPA of chrome ore by the State Pollution Control Board, Odisha vide letter no. 294/Ind-II-NOC-4700 DT 05.01.2008. Consent to Operate 0.13MTPA of chrome ore and operation of COBP at throughput capacity of 0.47MTPA has been granted by SPCB, Odisha vide letter No. 4552/IND-I-CON-388 dt 16.03.2016 (valid till 31.03.2020). The conditions stipulated by the State Pollution Control Board, Odisha in Consent to Establish and Consent to Operate are being strictly implemented.
II	Necessary forestry clearance under the Forest (Conservation) Act, 1980 for an area of 177.76ha forestland involved in the project shall be obtained before starting mining operation in that area. Till such time mining activities shall be restricted to an area of 41.34ha already broken up forestland for which approval under Section-2 of the Forest (Conservation) Act, 1980 was granted by the Ministry of Environment and Forests on 05.02.2001. Environmental clearance is subject to grant of forestry clearance.	Mining activities are restricted to 104.79 ha of forestland approved by MoEF, Govt. of India vide F. No. 8-104/2000-FC dt.21.07.2011 under Section-2 of the Forest (Conservation) Act, 1980.  The proposal for the balance forest area over 162.42 ha has been heard before FAC on 9 <sup>th</sup> Nov'2016 and the observation sought by MoEF&CC, Govt. of India vide letter dt. 19.12.2016 has been complied by OMC. The proposal is at RCCF level for recommendation to APCCF(N), Bhubaneswar.
	The environmental clearance is subject to approval of the State Land Use Department, Government of Orissa for diversion of agricultural land for non-agricultural use.	No agricultural land is diverted for use against this project. Hence approval of the State Land use Department, Govt. of Odisha may not be required.

iv	The project proponent shall develop fodder plots in the non-mineralised area in lieu of use of grazing land.	No grazing land is used for this project and kept untouched.
v	Environmental clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No. 460 of 2004, as may be applicable to this project.	OMC shall abide by the judgment of Hon'ble Supreme Court.
vi	Environmental clearance is subject to obtaining clearance under the Wildlife (Protection) Act, 1972 from the competent authority, as may be applicable to this project.	The Site Specific Wildlife conservation plan has been approved by PCCF (WL) for Sukurangi Chromite Mines vide Memo No. 4415/1WL-C-FC -270/09dt. 21.07.2009, with a total financial outlay of Rs. 154 lakhs. OMC has deposited Rs98.00 lakhs ( vide DD No. 495472dt. 26.08.2009) towards the approved activities to be taken up by the DFO, Cuttack Division in the zone of influence (10km radius) to be completed within 10 years of operation.
vii	The project proponent shall obtain prior clearance from the Chief Wildlife Warden due to proximity of mine to the elephant corridor.	Complied.
viii	The project proponent shall ensure that no natural watercourse and/or water resources shall be obstructed due to any mining operations. The first order streams, the seasonal nallahs and DamsalNallah passing through the mine lease shall not be disturbed and these shall be protected by providing garland drains.	No natural watercourse or water resources are obstructed. Diversion of seasonal streams is not felt necessary so far.
ix	The top soil, if any, shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for a period more than 3years. The topsoil should be used for land reclamation and plantation.	The top soil will be stored while operating the virgin forest area in future after getting forest clearance from MoEF, Govt. of India.

x	<p>The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site(s) only and it should not be kept active for a long period of time and their phase-wise stabilization shall be carried out. The project proponent shall carry out slope stability study through an expert organization like Central Institute of Mining and Fuel Research, Dhanbad for attaining the proposed height of dump as 60m in three lifts of 20m each and submit report to the Ministry and its Regional Office, Bhubaneswar within three months. The proponent shall ensure that the overall slope of dumps be maintained to 28 degree. OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface run off. The waste dumps shall be stabilized using coir matting or any similar mechanism to avoid gully formation in the waste dumps. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment &amp; Forests and its Regional Office located at Bhubaneswar on six monthly basis.</p>	<p>The over burden dump is stacked at an earmarked dump site A. Present first step (20 m height) is under progress. As soon as it will reach its ultimate limit, necessary action shall be taken for stabilization with suitable native species and also by coir matting. At present slope stability study is being conducted through Central Institute of Mining Fuel Research, Dhanbad to direct any instability well in advance so that any damage to men and machineries can be avoided.</p>
xi	<p>Catch drains and siltation ponds of appropriate size shall be constructed for the working pits, soil, OB and mineral dumps to prevent run off of water and flow of sediments directly into the DamsalNallah and other water bodies. The water so collected should be utilized for watering the mine area, roads, plantation etc. The drains should be regularly desilted and maintained properly.</p> <p>Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dumps to prevent run off of water and flow of sediments directly into the DamsalNallah and other water bodies and sump capacity</p>	<p>Garland drains, settling tanks and check dams of appropriate size, gradient and length have been constructed and are being maintained regularly to control water pollution. The supernatant water collected from the settling tank is being reused for dust suppression purpose.</p>

	<p>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. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.</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>	
xii	Dimension of retaining wall at the toe of over burden dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.	Complied.
xiii	Mine water discharge and/or any waste water shall be properly treated to meet the prescribed standards before reuse/discharge. The runoff from OB dumps and other surface run off should be analyzed for Cr+6 and in case its concentration is found higher than the permissible limit, the waste water should be treated before discharge/reuse.	There is no mine water discharge. The surface run off is used for agricultural purposes. The runoff from OB dumps does not contain Cr <sup>+6</sup> . In future if the concentration is beyond permissible limit the same shall be routed through ETP at South Kaliapani ML (adjacent to the mine).
xiv	Effluents containing Cr <sup>+6</sup> shall be treated to meet the prescribed standards before reuse/discharge. Effluent Treatment Plant shall be provided for treatment of mine water discharge and wastewater generated from the workshop and mineral separation plant.	There is no effluent generation so far and there is no workshop within the ML area. However the adjoining mining lease of OMC is having effluent treatment plant (ETP) and in case of effluent is generated in future, the same shall be treated routed through the same ETP at adjoining lease for necessary treatment. There is no workshop existing within the ML area.
xv	Separate impervious concrete pits for disposal of sludge shall be provided for the safe disposal of sludge generated from the mining operations.	No such sludge is being generated during the mining operation.

xvi	Regular monitoring of water quality upstream and downstream of Damsalnallah shall be carried out and record of monitoring data should be maintained and submitted to Ministry of Environment and Forests, its Regional Office, Bhubaneswar, Central Groundwater Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.	Regular monitoring of water quality upstream and downstream of Damsalnallah is being carried out through monthly monitoring plan and the results are being displayed in the website: <a href="http://www.orissamining.com">www.orissamining.com</a> .
xvii	The project proponent shall ensure that the quality of decanted effluents from the tailing pond, if any, conform to the prescribed standards before discharge. The decanted water from the tailing pond shall be re-circulated within the mine and there shall be zero discharge from the mine.	There is no tailing pond within the ML area.
xviii	The project proponent shall explore the possibility to reduce concentration of Cr+6 in the tailing pond, if any, in consultation with an expert scientific institution like NEERI.	There is no tailing pond within the ML area.
xix	Plantation shall be raised in an area of 204.7ha including a 7.5m wide green belt in the safety zone around the mining lease by planting the native species around ML area, over burden dumps, mine benches, roads etc. In consultation with the local DFO/Agriculture Department. The tree density should be two thousands trees per hectare. At least 1500 trees per year shall be planted. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.	Plantation in quarry benches, backfilled and reclaimed area shall be taken up by OMC as per the reclamation schedule approved by IBM after the mineral is exhausted.
xx	The void left unfilled in an area of 57.21ha shall be converted into the water body. The higher benches of excavated void/mining pit shall be terraced and plantation done to stabilize the slopes. The slope of higher benches shall be made gentler for easy accessibility by local people to use the water body. Peripheral fencing shall be carried out all along the excavated	Shall be complied at the end of mining operation.

	area.	
xxi	Effective safeguard measures including metalling of haul road shall be undertaken for control of dust level in the area. Other safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as around crushing and screening plant, loading and unloading point and all transfer points. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.	<p>Following protection measures being undertaken to control air pollution:</p> <ul style="list-style-type: none"> <li>• Regular maintenance of haul roads</li> <li>• Water sprinkling on roads as well as dust prone areas like crushing and screening plant, loading and unloading point and all transfer points</li> <li>• Transportation of chromite ore by trucks only after proper covering by tarpaulin sheets</li> </ul> <p>We are ensuring the air quality status by periodically monitoring the ambient air as per the prescribed CPCB norms.</p>
xxii	The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.	<p>OMC has engaged an Agency, M/s. Vislontek Consultancy Services Pvt. Ltd., to carry out the hydro-geological studies in and around Sukurangi chromite mines of OMC, including the Artificial re-charge and rain water harvesting aspect.</p> <p>The report has been uploaded alongwith application for permission to de-water ground water for mining in the website of Central Ground Water Authority (CGWA) i.e. in <a href="http://www.cgwa-noc.gov.in">www.cgwa-noc.gov.in</a> for approval of CGWA, New Delhi. The recommendations as proposed in the report shall be implemented based on the decision of the Central Ground Water Board.</p>
xxiii	Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and installing new piezometers during the mining operation. The periodic monitoring [(at least four times in a year- pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January)); once in each season)] shall be carried out in consultation with the State Ground	OMC has engaged an Agency to carry out the hydro-geological studies in and around the Sukurangi chromite mines of OMC. In the report, the agency has also recommended for construction of piezometers 3 nos. within the mine premises having a depth of 40m, 60m and 100m respectively. However the recommendations as proposed in the report shall be implemented based on the decision of the Central Ground Water Board.

	Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Bhubneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.	Regular monitoring of ground water level and quality is being carried out on quarterly basis and reflected in monthly monitoring report displayed in our web site: <a href="http://www.orissamining.com">www.orissamining.com</a> .
xxiv	Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintained.	Regular monitoring of flow rate of the springs and the perennial nallah is carried out and reflected in monthly monitoring report displayed in our web site: <a href="http://www.orissamining.com">www.orissamining.com</a> .
xxv	The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) required for the project.	Application has been submitted to CGWB for grant of permission for drawl of ground water, which is under consideration by CGWA, New Delhi.
xxvi	Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board.	Compliance same as against Condition No. xxii.
xxvii	Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral from mine face to the beneficiation plant. The vehicles shall be covered with a tarpaulin and shall not be overloaded.	Regular maintenance of vehicles used in mining operation & transportation of ore are being done to control pollution. Vehicular emissions are also being regularly monitored twice in a year. The mineral transportation is being carried out only through covered trucks and we ensure that the vehicles carrying the mineral are not over loaded.
xxviii	No blasting shall be carried out after the sunset. Blasting operation shall be carried out only during the daytime. Controlled blasting shall 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 only during the daytime between 5.00 A.M. to 6.00 P.M. Controlled blasting is practiced to control ground vibration and to arrest fly rocks.
xxix	Digital processing of the entire lease area using remote sensing technique	The digital processing of the entire lease area for the monitoring of land



	should be done regularly once in three years for monitoring land use pattern and report submitted to MoEF and its Regional Office located at Bhubaneswar.	use pattern has been prepared by ORSAC, Dept. of Science & Technology, Govt. of Odisha. The copy of the same is enclosed herewith as <b>Plate - I.</b>
xxx	Drills shall either be operated with dust extractors or equipped with water injection system.	Drills are being operated with water injection system.
xxxi	Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.	Regular water sprinkling is being carried out in and around loading and unloading point, transfer points and on haul roads. Environmental monitoring is being carried out regularly.
xxxii	Sewage treatment plant shall be installed for the colony. ETP shall also be provided for the workshop and wastewater generated during the mining operation.	The waste water generated from the colony is sent to the soak pit through the septic tank.
xxxiii	Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.	Pre-placement medical examination and periodical medical examination of the workers engaged in the project are carried out and records maintained regularly as per the DGMS guidelines. As of now no occupational diseases have been detected in any of the workers.
xxxiv	The critical parameters such as RSPM (Particulate matter with size less than 10micron i.e., PM10), NOX in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharged water shall also be monitored [(TDS, DO, PH and Total Suspended Solids (TSS)]. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the Company in public domain. The Circular No. J-20012/1/2006-IA.II(M) dated 27.05.2009 issued by Ministry of Environment and Forests, which is	<p>PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> are being measured regularly (twice a week) in ambient air within the impact zone.</p> <p>There is no waste water discharge from the mining activity except surface run off during monsoon for which check dams, boulder walls etc. have been constructed. However the waste water quality for the said parameters are being carried out and monitored regularly.</p> <p>The monitored data is being up loaded in the web site of OMC as well as on digital display board at the main gate of OMC.</p>

	available on the website of the Ministry <a href="http://www.envfor.nic.in">www.envfor.nic.in</a> shall also be referred in this regard for its compliance.																																								
xxxv	A final Mine 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.	Shall be complied before closure.																																							
<b>B. General Conditions:</b>																																									
i	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	There is no change in the mining technology.																																							
ii	No change in the calendar plan including excavation, quantum of mineral chrome ore and waste should be made.	<p>Due to want of forest clearance for the balance forest area within mining lease the production is much below the targeted quantity mentioned in the calendar plan. The details of the planned and actual iron ore production and waste generation from Oct' 2015 to Mar' 2016 is mentioned as under:</p> <table><tr><th rowspan="2">Month</th><th colspan="2">Production in MT</th><th colspan="2">Waste generation in m<sup>3</sup></th></tr><tr><th>Planned</th><th>Actual</th><th>Planned</th><th>Actual</th></tr><tr><td>Oct' 2016</td><td>10816</td><td>19004.55</td><td>41683</td><td>35615.25</td></tr><tr><td>Nov' 2016</td><td>10816</td><td>3199.58</td><td>41683</td><td>49291.4</td></tr><tr><td>Dec' 2016</td><td>10816</td><td>47600.12</td><td>41683</td><td>2047.6</td></tr><tr><td>Jan' 2017</td><td>10816</td><td>21099.5</td><td>41683</td><td>2922.5</td></tr><tr><td>Feb' 2017</td><td>10816</td><td>3999.52</td><td>41683</td><td>44921.6</td></tr><tr><td>Mar 2017</td><td>10816</td><td>4605.9</td><td>41683</td><td>40974.0</td></tr></table>	Month	Production in MT		Waste generation in m <sup>3</sup>		Planned	Actual	Planned	Actual	Oct' 2016	10816	19004.55	41683	35615.25	Nov' 2016	10816	3199.58	41683	49291.4	Dec' 2016	10816	47600.12	41683	2047.6	Jan' 2017	10816	21099.5	41683	2922.5	Feb' 2017	10816	3999.52	41683	44921.6	Mar 2017	10816	4605.9	41683	40974.0
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iii	Conservation measures for protection of flora and fauna in the core & buffer zone should be drawn up in consultation with the local forest and wildlife department and effectively implemented.	<p>Site specific wildlife conservation plan has been approved by PCCF (WL) &amp; Chief Wildlife Warden, Odisha.</p> <p>The conservation measure for protection of flora and fauna in the core zone i.e. project area is a continuous process and is being followed as per the approved site specific wildlife conservation plan. The regular activities being followed are as</p>																																							

		<p>under:</p> <ul style="list-style-type: none"> <li>• Fire Management plan being followed to have a check on forest fires within the lease hold area by provision of walkie-talkies/mobile phones to fire watchers for communicating the fire incident to other ground staff.</li> <li>• Awareness programmes through meetings/hoardings/posters/pamphlets/ and drum beating at market places</li> <li>• Awareness among staffs, loading labour and PR Miners regarding snake, reptiles and birds found in locality.</li> <li>• The safety zone and nalla bank are being restored by plantation as prescribed in the approved mining plan.</li> <li>• Soil and water conservation measures are implemented by construction of dry stone masonry check dams, siltation ponds, garland drains, settling ponds, retaining wall, stabilization of Overburden dump</li> <li>• Prevention of fall of wild animal into the mining pit by fencing the open pit area</li> <li>• Minimizing the adverse impact of active mining on wildlife by control of air and noise pollution by adoption of various pollution control measures within mining area.</li> </ul> <p>The conservation measures for protection of flora and fauna in the buffer zone is being taken care by the State Forest Department by utilizing the funds of ₹ 98,00,000.00 (vide DD No. 495472/26.08.2009) deposited by OMC towards the approved activities to be taken up by the DFO, Cuttack Division</p>
iv	Four ambient quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM (Particulate matter with size	Ambient air quality-monitoring at six different locations is being carried out and recorded regularly as per CPCB norm and the

	less than 10micron i.e PM <sub>10</sub> NO <sub>x</sub> should be regularly submitted to the Ministry of Environment and Forests including its Regional Office located at Bhubaneswar and the State Pollution Control Board/Central Pollution Control Board once in six months.	monitoring results are displayed in the web site: <a href="http://www.orissamining.com">www.orissamining.com</a> .
v	Data on ambient air quality RSPM (Particulate matter with size less than 10micron i.e PM <sub>10</sub> ) NO <sub>x</sub> should be regularly submitted to the Ministry of Environment and Forests including its Regional Office located at Bhubaneswar and the State Pollution Control Board/Central Pollution Control Board once in six months.	Six monthly data on AAQ is submitted to the Ministry including its Regional office located at Bhubaneswar and the State Pollution Control Board and the report is displayed in the web site: <a href="http://www.orissamining.com">www.orissamining.com</a> .
vi	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.	Complied.
vii	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM etc. should be provided with ear plugs/muffs.	Noise level is maintained below 85 dBA. Workers engaged are provided with adequate safety equipments.
viii	Industrial waste water (workshop and 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 and grease trap should be installed before discharge of workshop effluents.	There is no waste water generation from the mine except surface run off during monsoon for which gully drain, check dams and boulder walls has been constructed to check the water pollution. There is no workshop within the ML area.
ix	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 constructions due to exposure to dust and take corrective measures, if needed.	Personnel working in dusty areas wear protective respiratory devices and they are also being provided with adequate training and information on safety and health aspects in OMC Vocational Training Centre.

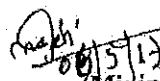
x	A separate environmental Management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of Organization.	There is one Environmental management cell for Sukurangi Chromite Mine.
xi	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should not be diverted for other purpose .Year wise expenditure should be reported to the Ministry of Environment and Forests and its Regional Office at Bhubaneswar.	Complied. The year wise expenditure is attached herewith as <b>Annexure-1</b> .
xii	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.	It will be intimated before closure.
xiii	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full co-operation of the officer (s) of the Regional Office by furnishing the requisite data/ information/ monitoring reports.	OMC renders all support and co-operation during inspection by the officer (s) of the Regional Office.
xiv	The project proponent shall submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) to the Ministry of Environmental and Forests, its Regional Office Bhubaneswar, the respective Zonal Office of Central Pollution Control Board the State Pollution Control Board. The proponent shall upload the status of compliance of the EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar, the respective Zonal Office of Central Pollution Control Board and the State Pollution Control Board.	Complied.

xv	A copy of the clearance letter shall be sent by the proponent to concerned Panchyat, ZilaParisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	Complied.
xvi	The State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and the Collector's Office/Tahasildar's Office for 30 days.	Complied
xvii	The environmental statement for each financial year ending 31 <sup>st</sup> March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986 as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar by e-mail.	Complied.
xviii	The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.	Complied

**ANNEXURE-1**

**YEAR –WISE EXPENDITURE FOR ENVIRONMENTAL PROTECTION MEASURES PERTAINING TO**  
**SUKRANGI CHROMITE MINES (October' 16 to March'17)**

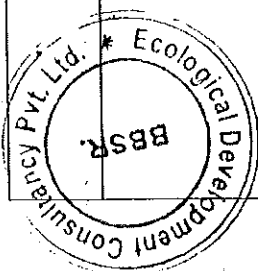
ACTIVITIES	EXPENDITURE (AS ON March '17)	REMARKS	
Pollution control (Oct' 16 to March'17)	----	----	
Pollution monitoring (Oct' 16 to March'17)	225000.00		
Occupational safety (Oct' 16 to March'17)	40279.00	Medical bill reimbursement	
	As per data given by the central hospital kaliapani		
	Month	Deptt.	Periphery
	Oct-16	51466.10	232152.28
	Nov-16	534959.22	235710.70
	Dec-16	51822.95	274550.00
	Jan-17	48122.55	279650.15
	Feb-17	54322.20	281103.82
March-17	57645.40	293152.85	
		Medicine	
Green Belt (Oct' 16 to March'17)	Departmental	Planation at dump	
Compensatory afforestation (Oct' 16 to March'17)	Complied at HO		
Socio-economic welfare Measures in nearby villages (Oct' 16 to March'17)	----	-----	

  
 Manager (Mining)  
 Sukrangi Chromite Mines

**Environmental Monitoring Report – Sukrangi Chromite Mine of M/s Odisha Mining Corporation**  
**Limited during the period (October 2016 to March 2017)**

**1. Ambient Air Quality**

Sl. No.	Location	Month	Date	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )
1.	Transit House 21°02'44.05"N 85°48'7.28" E	October '16	04.10.2016	Monitoring has not been done due to rain				
			08.10.2016	Monitoring has not been done due to rain				
			13.10.2016	48	17	5.1	9.6	BDL
			18.10.2016	62	29	6.8	11.9	BDL
			22.10.2016	69	28	7.2	13.2	BDL
			25.10.2016	57	25	6.5	11.4	BDL
			29.10.2016	Monitoring has not been done due to rain				
		November '16	01.11.2016	68	27	6.8	15.3	BDL
			04.11.2016	81	40	7.2	17.2	BDL
			08.11.2016	57	21	5.4	15.1	BDL
			11.11.2016	66	26	5.8	15.4	BDL
			15.11.2016	75	35	6.6	16.9	BDL
			18.11.2016	70	28	6.4	15.5	BDL
			22.11.2016	72	30	6.6	16.2	BDL
			25.11.2016	65	26	5.9	15.3	BDL
			29.11.2016	59	24	5.5	14.9	BDL
		December '16	01.12.2016	70	29	6.8	12.4	BDL
			05.12.2016	68	26	6.6	12.0	BDL
			08.12.2016	89	38	8.2	15.5	BDL
			12.12.2016	82	33	7.8	14.6	BDL
			15.12.2016	74	30	7.0	13.8	BDL
			19.12.2016	66	26	6.5	11.8	BDL
			22.12.2016	73	29	7.1	12.5	BDL
			26.12.2016	69	27	6.6	12.0	BDL
			29.12.2016	71	25	5.9	12.2	BDL
		January '17	02.01.2017	74	29	7.2	11.5	BDL
			05.01.2017	85	36	7.4	14.9	BDL
			09.01.2017	80	33	6.8	12.6	BDL
			12.01.2017	71	29	5.7	10.8	BDL
			16.01.2017	79	32	6.4	11.9	BDL
			19.01.2017	68	26	5.2	9.9	BDL
			23.01.2017	70	28	5.6	10.4	BDL
			30.01.2017	75	31	6.9	11.2	BDL
		February '17	02.02.2017	70	27	6.4	12.9	BDL
			06.02.2017	79	32	6.9	13.1	BDL
			09.02.2017	87	37	7.9	13.8	BDL
			13.02.2017	85	35	7.4	13.4	BDL
			16.02.2017	77	30	6.7	12.5	BDL
			20.02.2017	82	33	7.0	12.9	BDL
			23.02.2017	79	31	6.9	12.6	BDL
			27.02.2017	73	29	6.2	12.2	BDL

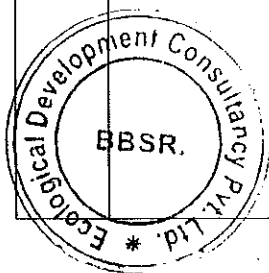


SUCFRE  
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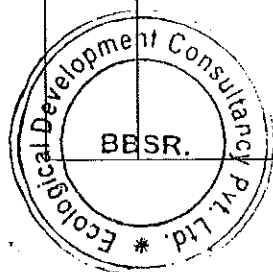
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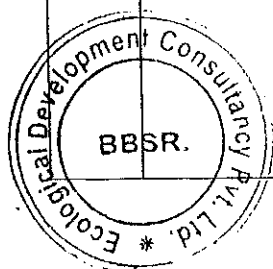
		March'17	02.03.2017	84	33	6.8	11.8	BDL
			06.03.2017	78	29	6.2	11.1	BDL
			09.03.2017	82	31	6.6	11.3	BDL
			15.03.2017	85	35	7.1	12.5	BDL
			18.03.2017	91	39	8.2	13.8	BDL
			20.03.2017	70	28	5.9	10.6	BDL
			23.03.2017	87	38	8.5	14.5	BDL
			27.03.2017	69	26	6.1	10.8	BDL
			30.03.2017	80	30	6.2	11.2	BDL
2.	Sukrangi Hospital 21°02'46.92" N 85°58'21.10"E	October '16	04.10.2016	Monitoring has not been done due to rain				
			08.10.2016					
			13.10.2016	67	20	5.4	10.6	BDL
			18.10.2016	61	25	6.1	11.0	BDL
			22.10.2016	70	39	7.2	14.2	BDL
			25.10.2016	64	22	5.9	10.8	BDL
			29.10.2016	Monitoring has not been done due to rain				
		November'16	01.11.2016	78	39	7.0	16.8	BDL
			04.11.2016	62	25	5.8	15.9	BDL
			08.11.2016	55	22	4.9	14.6	BDL
			11.11.2016	61	24	5.6	15.1	BDL
			15.11.2016	73	29	6.8	16.2	BDL
			18.11.2016	67	26	6.3	15.0	BDL
			22.11.2016	69	29	6.5	15.3	BDL
			25.11.2016	71	31	6.0	15.9	BDL
		December'16	29.11.2016	64	26	5.8	15.6	BDL
			01.12.2016	65	26	6.2	11.8	BDL
			05.12.2016	74	30	7.0	13.8	BDL
			08.12.2016	73	29	6.9	13.6	BDL
			12.12.2016	59	23	5.3	11.1	BDL
			15.12.2016	63	25	5.8	11.5	BDL
			19.12.2016	76	32	7.2	13.8	BDL
			22.12.2016	64	25	5.8	11.4	BDL
		January '17	26.12.2016	71	30	6.9	12.2	BDL
			29.12.2016	67	27	6.3	11.8	BDL
			02.01.2017	64	23	5.0	9.6	BDL
			05.01.2017	70	27	5.5	10.6	BDL
			09.01.2017	78	32	6.4	11.4	BDL
			12.01.2017	65	26	5.1	9.7	BDL
			16.01.2017	69	28	5.4	10.8	BDL
			19.01.2017	72	30	5.8	11.2	BDL
		February '17	23.01.2017	76	32	7.1	11.8	BDL
			30.01.2017	73	31	6.8	11.5	BDL
			02.02.2017	82	32	7.1	13.2	BDL
			06.02.2017	69	26	5.8	10.9	BDL
			09.02.2017	70	28	6.1	11.2	BDL
			13.02.2017	75	30	6.6	11.8	BDL
			16.02.2017	80	32	6.9	12.4	BDL



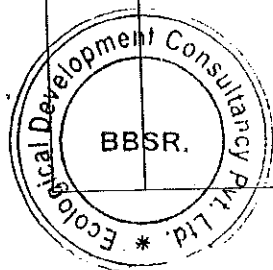
			20.02.2017	76	29	6.2	11.6	BDL
			23.02.2017	71	27	5.9	11.9	BDL
			27.02.2017	66	25	5.6	11.2	BDL
		March'17	02.03.2017	60	30	5.4	9.8	BDL
			06.03.2017	72	27	6.1	10.2	BDL
			09.03.2017	79	30	6.8	11.6	BDL
			15.03.2017	69	25	5.9	12.3	BDL
			18.03.2017	74	28	6.6	12.8	BDL
			20.03.2017	59	21	4.9	9.5	BDL
			23.03.2017	63	23	6.2	11.6	BDL
			27.03.2017	78	29	7.1	13.2	BDL
			30.03.2017	61	22	6.6	12.8	BDL
3.	Saruabil village 21°03'25.50" 85°48'38.76"	October'16	04.10.2016	Monitoring has not been done due to rain				
			08.10.2016					
			13.10.2016	58	26	6.4	12.5	BDL
			18.10.2016	45	14	5.5	10.4	BDL
			22.10.2016	60	28	6.7	13.5	BDL
			25.10.2016	51	21	5.9	10.2	BDL
			29.10.2016	Monitoring has not been done due to rain				
		November'16	01.11.2016	51	20	5.0	14.3	BDL
			04.11.2016	55	22	5.4	14.8	BDL
			08.11.2016	60	24	6.1	15.0	BDL
			11.11.2016	69	28	6.6	15.4	BDL
			15.11.2016	49	19	4.8	13.0	BDL
			15.11.2016	57	23	5.6	13.9	BDL
			18.11.2016	53	22	4.8	14.4	BDL
			22.11.2016	50	20	4.4	14.1	BDL
			25.11.2016	47	17	4.1	13.4	BDL
		December'16	01.12.2016	75	33	7.4	13.7	BDL
			05.12.2016	72	31	7.2	12.3	BDL
			08.12.2016	64	25	5.8	11.3	BDL
			12.12.2016	79	34	7.3	14.1	BDL
			15.12.2016	58	22	5.1	10.9	BDL
			19.12.2016	52	20	4.9	10.3	BDL
			22.12.2016	60	24	5.4	11.2	BDL
			26.12.2016	69	28	5.9	12.1	BDL
			29.12.2016	76	30	7.2	13.8	BDL
		January '17	02.01.2017	79	33	7.0	13.2	BDL
			05.01.2017	75	30	6.6	12.6	BDL
			09.01.2017	71	28	5.2	12.4	BDL
			12.01.2017	64	24	4.6	9.7	BDL
			16.01.2017	76	31	6.9	13.1	BDL
			19.01.2017	82	31	7.2	13.8	BDL
			23.01.2017	73	29	6.4	12.2	BDL
			30.01.2017	71	27	6.2	11.9	BDL
		February '17	02.02.2017	82	33	7.3	13.5	BDL
			06.02.2017	78	31	6.8	12.6	BDL
			09.02.2017	85	35	7.5	13.9	BDL



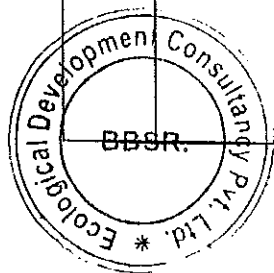
			13.02.2017	79	32	6.9	13.2	BDL
			16.02.2017	82	33	7.2	13.5	BDL
			20.02.2017	68	26	5.4	10.8	BDL
			23.02.2017	74	30	6.3	12.6	BDL
			27.02.2017	80	31	6.7	12.9	BDL
		March'17	02.03.2017	88	36	7.4	13.9	BDL
			06.03.2017	74	30	6.4	12.4	BDL
			09.03.2017	90	38	7.8	13.2	BDL
			15.03.2017	92	41	8.6	14.6	BDL
			18.03.2017	84	35	7.9	14.5	BDL
			20.03.2017	77	29	6.8	12.6	BDL
			23.03.2017	94	43	8.8	14.8	BDL
			27.03.2017	75	29	6.1	12.9	BDL
			30.03.2017	81	32	6.6	13.5	BDL
4.	Sukrangi Hatting 21°03'07.62" N 85°48'41.22" E	October'16	04.10.2016	Monitoring has not been done due to rain				
			08.10.2016					
			13.10.2016	67	35	7.0	13.8	BDL
			18.10.2016	65	33	6.7	13.2	BDL
			22.10.2016	59	28	5.9	12.1	BDL
			25.10.2016	63	30	6.2	12.6	BDL
			29.10.2016	Monitoring has not been done due to rain				
		November'16	01.11.2016	63	25	5.9	14.2	BDL
			04.11.2016	61	24	5.8	15.4	BDL
			08.11.2016	59	21	5.2	15.5	BDL
			11.11.2016	54	19	4.8	14.6	BDL
			15.11.2016	46	15	4.8	14.2	BDL
			15.11.2016	50	20	4.5	13.9	BDL
			18.11.2016	66	27	6.0	15.4	BDL
			22.11.2016	60	23	5.8	14.8	BDL
			25.11.2016	51	20	4.2	13.8	BDL
		December'16	01.12.2016	57	23	5.0	10.7	BDL
			05.12.2016	64	26	5.3	11.4	BDL
			08.12.2016	62	24	5.1	11.2	BDL
			12.12.2016	71	28	6.0	12.2	BDL
			15.12.2016	53	21	5.1	10.4	BDL
			19.12.2016	65	26	5.5	11.6	BDL
			22.12.2016	50	20	4.7	10.1	BDL
			26.12.2016	63	25	5.2	11.5	BDL
			29.12.2016	55	21	5.4	10.5	BDL
		January '17	02.01.2017	55	21	4.6	9.6	BDL
			05.01.2017	59	23	5.1	9.8	BDL
			09.01.2017	68	26	5.8	10.2	BDL
			12.01.2017	63	25	5.2	9.9	BDL
			16.01.2017	74	30	6.5	11.6	BDL
			19.01.2017	70	27	6.1	10.6	BDL
			23.01.2017	72	28	5.9	11.2	BDL



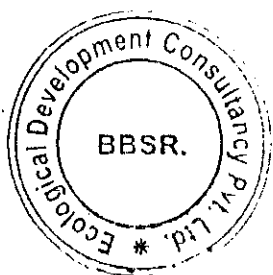
		February '17	30.01.2017	61	20	5.0	10.5	BDL
			02.02.2017	56	21	4.9	9.6	BDL
			06.02.2017	62	24	5.1	10.2	BDL
			09.02.2017	73	29	6.5	12.4	BDL
			13.02.2017	69	27	5.9	10.8	BDL
			16.02.2017	77	32	6.8	12.3	BDL
			20.02.2017	67	25	6.1	11.5	BDL
			23.02.2017	72	28	6.3	11.9	BDL
			27.02.2017	75	31	6.6	12.7	BDL
		March '17	02.03.2017	57	20	4.6	10.8	BDL
			06.03.2017	66	25	6.0	11.2	BDL
			09.03.2017	73	29	6.9	12.8	BDL
			15.03.2017	69	26	6.2	10.9	BDL
			18.03.2017	74	28	7.2	12.3	BDL
			20.03.2017	80	31	7.6	12.9	BDL
			23.03.2017	61	22	5.8	13.2	BDL
			27.03.2017	79	26	6.9	12.9	BDL
			30.03.2017	67	24	6.1	11.3	BDL
5.	Sukrangi School 21°03'14.40" N 85°48'58.02" E	October '16	04.10.2016	Monitoring has not been done due to rain				
			08.10.2016					
			13.10.2016	42	13	4.9	9.4	BDL
			18.10.2016	52	21	6.0	10.7	BDL
			22.10.2016	56	28	6.5	11.4	BDL
			25.10.2016	44	15	5.4	9.8	BDL
			29.10.2016	Monitoring has not been done due to rain				
		November '16	01.11.2016	61	23	5.9	14.8	BDL
			04.11.2016	52	22	5.6	14.3	BDL
			08.11.2016	63	25	5.4	14.2	BDL
			11.11.2016	65	27	6.0	15.2	BDL
			15.11.2016	57	22	5.8	15.1	BDL
			15.11.2016	59	25	5.6	14.9	BDL
			18.11.2016	61	26	5.2	14.8	BDL
			22.11.2016	46	15	4.8	13.6	BDL
			25.11.2016	50	19	5.0	14.2	BDL
		December '16	01.12.2016	74	30	7.1	13.6	BDL
			05.12.2016	82	33	7.8	14.6	BDL
			08.12.2016	69	28	5.9	12.1	BDL
			12.12.2016	75	31	7.3	13.9	BDL
			15.12.2016	79	34	7.6	14.1	BDL
			19.12.2016	81	35	7.7	14.4	BDL
			22.12.2016	66	26	5.6	11.9	BDL
			26.12.2016	72	33	7.1	13.6	BDL
			29.12.2016	80	32	7.3	14.2	BDL
		January '17	02.01.2017	70	26	5.5	10.9	BDL
			05.01.2017	73	29	5.7	12.4	BDL
			09.01.2017	69	24	5.2	11.1	BDL
			12.01.2017	64	21	4.9	10.4	BDL



			16.01.2017	59	20	4.8	9.6	BDL
			19.01.2017	54	19	4.4	9.3	BDL
			23.01.2017	81	30	7.8	11.5	BDL
			30.01.2017	78	28	7.2	11.2	BDL
		February '17	02.02.2017	55	21	4.6	9.4	BDL
			06.02.2017	71	27	6.1	11.2	BDL
			09.02.2017	68	25	5.2	10.4	BDL
			13.02.2017	64	23	5.9	10.9	BDL
			16.02.2017	74	29	6.6	12.6	BDL
			20.02.2017	70	27	6.2	11.5	BDL
			23.02.2017	69	26	6.0	11.2	BDL
			27.02.2017	59	23	5.3	10.6	BDL
		March '17	02.03.2017	82	34	7.8	13.2	BDL
			06.03.2017	75	29	6.8	12.9	BDL
			09.03.2017	80	31	7.2	12.5	BDL
			15.03.2017	65	23	5.8	11.8	BDL
			18.03.2017	62	21	5.1	10.5	BDL
			20.03.2017	85	36	7.6	13.9	BDL
			23.03.2017	81	32	7.3	13.4	BDL
			27.03.2017	73	28	6.5	12.4	BDL
			30.03.2017	68	25	5.9	11.6	BDL
6.	Ostapal Village 21°03'34.14" N 85°48'09.90" E	October '16	04.10.2016	Monitoring has not been done due to rain				
			08.10.2016					
			13.10.2016	39	11	BDL	BDL	BDL
			18.10.2016	55	26	5.9	11.5	BDL
			22.10.2016	49	17	4.8	10.3	BDL
			25.10.2016	54	23	5.2	11.1	BDL
			29.10.2016	Monitoring has not been done due to rain				
		November '16	01.11.2016	48	17	4.9	13.8	BDL
			04.11.2016	55	21	5.2	14.2	BDL
			08.11.2016	51	19	5.0	14.0	BDL
			11.11.2016	57	23	5.2	14.6	BDL
			15.11.2016	60	25	5.6	15.8	BDL
			18.11.2016	54	21	5.0	15.2	BDL
			22.11.2016	59	24	5.3	15.3	BDL
			25.11.2016	61	26	5.6	15.8	BDL
		December '16	29.11.2016	58	23	5.2	15.2	BDL
			01.12.2016	51	20	4.8	10.2	BDL
			05.12.2016	67	27	5.8	11.8	BDL
			08.12.2016	61	24	5.0	11.2	BDL
			12.12.2016	63	25	5.2	11.5	BDL
			15.12.2016	56	22	4.9	10.6	BDL
			19.12.2016	47	18	4.2	9.8	BDL
			22.12.2016	58	23	4.7	10.9	BDL
		January '17	26.12.2016	60	24	5.2	11.1	BDL
			29.12.2016	64	26	5.5	11.3	BDL
			02.01.2017	63	24	5.9	11.6	BDL
			05.01.2017	59	21	5.2	10.4	BDL
			09.01.2017	60	22	5.4	10.9	BDL



			12.01.2017	71	28	6.8	11.2	BDL
			16.01.2017	54	20	4.7	9.6	BDL
			19.01.2017	68	26	6.2	10.4	BDL
			23.01.2017	51	18	4.4	9.5	BDL
			30.01.2017	58	20	4.9	9.7	BDL
		February '17	02.02.2017	55	21	4.6	9.4	BDL
			06.02.2017	71	27	6.1	11.2	BDL
			09.02.2017	68	25	5.2	10.4	BDL
			13.02.2017	64	23	5.9	10.9	BDL
			16.02.2017	74	29	6.6	12.6	BDL
			20.02.2017	70	27	6.2	11.5	BDL
			23.02.2017	69	26	6.0	11.2	BDL
			27.02.2017	59	23	5.3	10.6	BDL
			March '17	02.03.2017	62	22	6.1	10.9
		06.03.2017		74	29	6.8	9.9	BDL
		09.03.2017		76	31	7.2	11.5	BDL
		15.03.2017		54	19	4.3	9.2	BDL
		18.03.2017		62	23	5.2	10.9	BDL
		20.03.2017		70	28	7.0	12.2	BDL
23.03.2017	67	26		5.6	11.1	BDL		
27.03.2017	60	21		4.9	10.5	BDL		
30.03.2017	69	25		6.1	11.5	BDL		
CPCB Standard			24 Hrly	100	60	80	80	4(1Hr)
			Annual Average	60	40	40	50	--



## 2. Fugitive Emission Monitoring ( $\mu\text{g}/\text{m}^3$ )

Sl. No	Month	Quarry Pit	Near Crèche	Haul Road(1) (DE Quarry)	Haul Road(2) (AC Quarry)	Stack Yard	Dump
		21°02'48.18" N 85°48'40.5" E	21°02'48.24" N 85°45'30.42" E	21°02'53.28" N 85°58'46.86" E	21°02'46.26" N 85°48'36.96" E	21°03'54.00" N 85°48'38.94" E	21°03'24.54" N 85°48'27.42" E
1.	October'2016	128	214	154	186	259	134
2.	November'2016	186	242	210	195	326	172
3.	December'2016	224	292	282	210	358	208
4.	January'2017	236	310	296	248	364	226
5.	February'2017	268	344	308	268	372	251
6.	March'2017	318	362	328	295	410	363
Permissible Limit		1200( $\mu\text{g}/\text{m}^3$ )					

## 3. Noise Level (dBA)

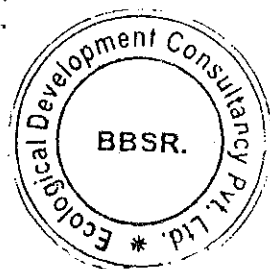
### A. Ambient noise level

Sl.No.	Location	Coordinates	Day (06:00-22:00 hrs.)			Night (22:00-06:00 hrs.)		
			Minimum	Maximum	CPCB Standard	Minimum	Maximum	CPCB Standard
1.	Transit House(R)	21°02'44.04" N 85°48'7.28" E	47.9	70.9	75	BDL	39.3	45
2.	Sukrangi Hospital(S)	21°02'46.92" N 85°48'21.06" E	34.8	48.7	50	BDL	38.4	40
3.	Saruabil Village(R)	21°11'30.12" N 85°48'4.44" E	41.4	54.6	55	BDL	43.1	45
4.	Sukrangi Hatting(R)	21°11'15.18" N 85°47'57.42" E	42.9	58.1	55	BDL	46.7	45
5.	Sukrangi School(S)	21°11'43.98" N 85°48'57.42" E	33.6	49.7	50	BDL	38.5	40
6.	Ostapal Village(R)	21°11'43.98" N 85°48'0.96" E	38.6	52.8	55	BDL	45.9	45

Note-I-Industrial Area; R-Residential Area; C-Commercial Area; S-Silent Zone; BDL of Noise Level meter is 30 dBA.

### B. Work zone noise level

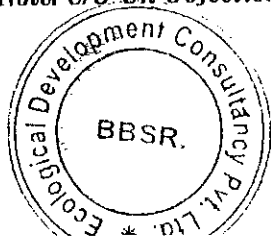
Sl. No.	Location	Coordinates	Day (08:00-15:00 hrs.)		
			Minimum	Maximum	OSHA Standard
1	Drilling site (within 30 mtrs.)	21°02'51.0" N 85°48'45.42" E	54.8	73.9	90
2	Near Excavator loading area (within 30 mtrs.)	21°02'47.46" N 85°48'42.42" E	53.6	74.8	90
3	Dumping area (within 30 mtrs.)	21°02'30.66" N 85°48'42.48" E	55.2	75.9	90



#### 4. Surface Water Monitoring

Sl. No.	parameters	Damsala Nala Before ML Area	Damsala Nala Near saurabil	Damsala Nala after ML Area
		Lat : 21° 03'30.29"N Long : 85° 47'54.2"E	Lat : 21° 03'24.97"N Long: 85° 48'23.61"E	Lat : 21° 03'29.17"N Long: 85° 48'46.37"E
1	Colour	Colourless	Colourless	Colourless
2	Odour	U/O	U/O	U/O
3	Suspended Solids	65-93	62-98	60-99
4	Turbidity	10-24	4-22	8-26
5	pH value	6.24-7.88	6.84-7.64	6.89-7.92
6	Temperature	23-36	29-36	28-37
7	Oil & Grease	<0.1	<0.1	<0.1
8	Ammonical nitrogen(as	0.16-0.24	0.20-0.30	0.22-0.28
9	Total Kjeidahl Nitrogen(as NH <sub>3</sub>	2.4-3.4	2.6-3.6	2.4-3.8
10	Total Hardness (as CaCO <sub>3</sub> )	47-61	50-62	41-60
11	Iron (as Fe)	0.26-0.49	0.30-0.52	0.32-0.44
12	Chloride (as Cl)	15-22	18-27	18-32
13	Fluoride (as F)	<0.001	<0.001	<0.001
14	Total Dissolved Solids	60-87	58-95	67-90
15	Calcium (as Ca)	16.8-20.2	15.6-20.2	17.1-21.2
16	Magnesium (as Mg)	15.9-20.6	15.2-19.8	15.4-21.4
17	Copper (as Cu)	<0.0001	<0.0001	<0.0001
18	Nickel as (Ni)	0.010-0.018	0.015-0.020	0.018-0.030
19	Manganese (as Mn)	<0.0001	<0.0001	<0.0001
20	Sulfate (as SO <sub>4</sub> )	12-25	14-30	18-28
21	Nitrate (as NO <sub>3</sub> )	0.012-0.031	0.14-0.30	0.12-0.36
22	Sulfide (as S)	<0.1	<0.1	<0.1
23	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	<0.001	<0.001	<0.001
24	Mercury(as Hg)	<0.00001	<0.00001	<0.00001
25	Cadmium (as Cd)	<0.00001	<0.00001	<0.00001
26	Chromium(VI)	0.018-0.040	0.014-0.044	0.018-0.044
27	Selenium (as Se)	<0.0001	<0.0001	<0.0001
28	Arsenic (as As)	<0.0001	<0.0001	<0.0001
29	Cyanide (as CN)	<0.002	<0.002	<0.002
30	Lead (as Pb)	<0.0001	<0.0001	<0.0001
31	Zinc (as Zn)	<0.0001	<0.0001	<0.0001
32	Anionic Detergent as MBAS	<0.01	<0.01	<0.01
33	Alkalinity (as CaCO <sub>3</sub> )	44-58	37-57	37-64
34	Free Ammonia (N)	0.08-0.30	0.12-0.38	0.10-0.40
35	Boron (as B)	<0.0001	<0.0001	<0.0001
36	Coliform Organism	130-172	143-186	124-181
37	Sodium Absorption Ratio	0.22-0.32	0.12-0.36	0.28-0.42
38	Dissolved Oxygen as O <sub>2</sub>	5.0-5.4	5.4-6.0	4.8-6.4
39	BOD, 3 days at 27°C	2.1-3.2	2.4-3.0	2.2-2.8
40	COD	5.1-5.7	5.6-6.5	5.8-6.7
41	Electrical Conductivity (EC)	95-142	99-158	116-146
42	Phosphate	0.020-0.032	0.026-0.038	0.024-0.036
43	CO <sub>2</sub>	5.2-6.6	5.8-6.6	5.2-6.2

Note: U/O-Un Objectionable.

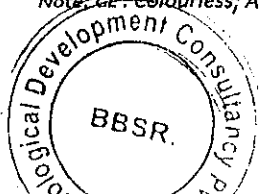




## 5. Ground Water

Sl. No	Parameter	Unit	Permissible limit	Ostapal	Talangi	Sarubil village	Battera Hatting	Sukrangi village
				Lat. : 21°03'43.6 8"N Long.: 85°48'3.1 8"E	Lat. : 21°04'4.8N Long.: 85°48'37.3 2"E	Lat. : 21°03'24.0 6N Long.: 85°48'13.6 2"E	Lat. : 21°03'17.2 8N Long.: 85°48'35.7 6"E	Lat. : 21°02'45.1 2"N Long.: 85°48'12.1 2"E
1	pH	---	6.5-8.5	7.63-7.75	7.15-7.29	6.39-7.48	6.93-7.24	7.44-7.58
2	Odour	---	Agreeable	AL	AL	AL	AL	AL
3	Colour	Hazen	5 (Max)	CL	CL	CL	CL	CL
4	Taste	---	Agreeable	AL	AL	AL	AL	AL
5	Turbidity	NTU	1 (Max)	0.32-0.38	0.34-0.40	0.50-0.52	0.32-0.34	0.22-0.26
6	Chloride (as Cl)	mg/l	250 (Max)	2.6-2.9	2.2-2.4	3.0-3.2	2.8-2.9	2.4-2.6
7	Residual free chlorine	mg/l	0.2 (Min)	ND	ND	ND	ND	ND
8	Total dissolved solid	mg/l	500 (Max)	92-104	95-101	101-112	89-121	107-135
9	Total Hardness (as CaCO <sub>3</sub> )	mg/l	200 (Max)	48-50	53-65	49-67	50-53	54-64
10	Iron (as Fe)	mg/l	0.3 (Max)	0.24-0.28	0.20-0.29	0.32-0.36	0.26-0.30	0.18-0.22
11	Calcium (as Ca)	mg/l	75 (Max)	17.8-18.2	20.6-25.6	20.9-21.2	20.8-25.8	21.5-28.1
12	Magnesium (as Mg)	mg/l	30 (Max)	17.3-18.6	11.6-14.2	14.5-15.5	13.2-16.2	15.8-17.8
13	Sulfate (as SO <sub>4</sub> )	mg/l	200 (Max)	2.2-2.5	3.6-3.8	2.2-2.8	3.2-3.6	3.8-4.2
14	Manganese (as Mn)	mg/l	0.10 (Max)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
15	Nitrate (as NO <sub>3</sub> )	mg/l	45 (Max)	2.0-2.1	2.4-2.6	2.2-2.5	3.2-3.4	2.4-2.6
16	Alkalinity (as CaCO <sub>3</sub> )	mg/l	200 (Max)	17-20	22-28	25-29	37-39	35-46
17	Aluminum (as Al)	mg/l	0.03 (Max)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
18	Fluoride (as F)	mg/l	1.0 (Max)	<0.001	<0.001	<0.001	<0.001	<0.001
19	Anionic Detergent	mg/l	0.2 (Max)	<0.01	<0.01	<0.01	<0.01	<0.01
20	Cadmium (as Cd)	mg/l	0.003 (Max)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
21	Copper (as Cu)	mg/l	0.05 (Max)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
22	Zinc (as Zn)	mg/l	5 (Max)	0.10-0.11	0.17-0.19	0.10-0.14	0.20-0.26	0.10-0.14
23	Lead (as Pb)	mg/l	0.01 (Max)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
24	Selenium (as Se)	mg/l	0.01 (Max)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
25	Phenolic compound (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	0.001 (Max)	<0.001	<0.001	<0.001	<0.001	<0.001
26	Mineral oil	mg/l	0.5 (Max)	ND	ND	ND	ND	ND
27	Hexavalent Chromium (as Cr <sup>6+</sup> )	mg/l	\$	0.008-0.012	0.016-0.018	0.010-0.010	0.004-0.008	0.012-0.016
28	Total Coli form	MPN/100ml	\$	NIL	NIL	NIL	NIL	NIL
29	Mercury (as Hg)	mg/l	0.001 (Max)	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
30	Cyanide (as CN)	mg/l	0.05 (Max)	<0.002	<0.002	<0.002	<0.002	<0.002
31	Boron (as B)	mg/l	0.5 (Max)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
32	Arsenic (as As)	mg/l	0.01 (Max)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
33	Nickel	mg/l	0.02 (Max)	0.005-0.007	0.012-0.012	0.010-0.016	0.004-0.008	0.010-0.014
34	Molybdenum (as Mo)	mg/l	0.07 (Max)	ND	ND	ND	ND	ND
35	Total Chromium (as Cr)	mg/l	0.05 (Max)	0.028-0.034	0.046-0.046	0.022-0.028	0.016-0.020	0.040-0.044
36	Polynuclear aromatic hydrocarbons (as PAH)	mg/l	0.0001 (Max)	ND	ND	ND	ND	ND

Note: CL: Colourless; AL: Agreeable; ND: Not Detected; \$: Not Specified.



## 6. Ground Water Level Monitoring

Sl. No.	Location Name	Coordinates		Water Level (Below ground level, in meter)
		Latitude	longitude	
1	Ostapal	21°03'43.68" N	85°48'3.18" E	1.85-3.92
2	Kansha	21° 03'36.36" N	85° 51'13.32" E	9.32-11.24
3	Battera Hating	21° 03'17.28" N	85° 48'35.76" E	2.46-4.32
4	Sukrangi Village	21°02'45.12" N	85°48'12.12" E	1.57-2.61

## 7. Flow of water measurement

Sl. No.	Station code	Coordinates		Flow of water in m <sup>3</sup> /min
		Latitude	Longitude	
1	FW1	21°03'30.29" N	85°47'54.02" E	16.85-34.44
2	FW2	21°03'24.97" N	85°48'23.61" E	21.29-49.30
3	FW3	21°03'29.17" N	85°48'46.37" E	18.27-30.38

## 8. Vehicular Emission

Sl. No.	Number of Vehicles monitored	Parameters			
		CO (%)	HC(ppm)	NOx(%)	Smoke(HSU)
1	58	0.023%-0.178%	15ppm-64ppm	74.35%-80.16%	21.96HSU-61.73HSU
Permissible Standard		3.0	1500	---	65

