

26th May, 2017

To
The Additional Principal Chief Conservator of Forests (C)
Ministry of Environment Forests and Climate Change
4th Floor, E&F Wings, Kendriya Sadan,
Kormangala, Bangalore – 560 034

Respected Sir,

Subject: Submission of Six monthly compliance report towards Environment Clearance for 2nd Half (period-October'16 to March'17) for A. Narrain Iron Ore Mine, M/s Vedanta Ltd (ML: 2677) situated in Chitradurga, Karnataka.

Reference:

1. Environmental Clearance letter no: J-110151/1167/2007-IA.II (M) Dated 05.02.2009 for A. Narrain Iron Ore Mine (ML: 2677).
2. Letter No. EP/12.1/560/KAR/8138 Dated 08th March 2016 regarding submission of Half yearly compliance report

With reference to the above subject, we are herewith submitting six monthly compliance report along with CD version towards Environment Clearance for 2nd Half (period-October'16 to March'17) for A. Narrain Iron Ore Mine (ML:2677) of M/s. Vedanta Ltd situated in Chitradurga District, Karnataka.

Thanking you,
Yours Faithfully
For Vedanta Limited



Vijayanand Chakrasali
Head- Operations

VEDANTA LIMITED
Mining Division , Karnataka,
"Megalahalli Office Complex"
Near Megalahalli Village,
BHEEMASAMUDRA - 577 520.
DIST. CHITRADURGA.
Ph:- 08194 238 110/100

Enclosures: Six monthly Compliance Report with Annexures and CD version.

Copy to:

1. The Senior Environmental Officer, KSPCB, Parisara Bhavana, Church Street, Bangalore.
2. The Regional Director (ENV) Ecology & Environment Department Dr.Saleem Building, Radio Park, Bellary
3. The Regional Environmental Officer, KSPCB, Chitradurga.

VEDANTA LIMITED (Formerly known as Sesa Sterlite Ltd. / Sesa Goa Ltd)
sesa goa iron ore Sesa Ghor, 20 EDC Complex, Patto, Panjim, Goa – 403 001, India
T +91 0832 2460600 | Website www.sesagoaironore.com

Registered Office Vedanta Limited, 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai 400093,
Maharashtra, India.
CIN L13209GA1965PLC000044

Half Yearly Compliance Report to condition of Environment Clearance issued by

**Ministry of Environment, Forest and Climate Change, Government of India for
A. Narrain Iron Ore Mine, M/s Vedanta Limited (Mining Lease: 2677)**

Letter No. J- 110151/1167/2007-IA.II (M) Dated 05/02/2009

Production : 6.0 MTPA, as per Environment Clearance, however current production limit is 2.29 MTPA

Period: October 2016- March 2017 (2nd Half)

S No.	Clearance Condition	Compliance Status	Remarks
A.	Specific Conditions		
1	Environment 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.	The condition is not applicable.	
2	Environmental clearance is subject to obtaining clearance under the wildlife (Protection) Act. 1972 from the competent Authority	The provisions of Wildlife (protection) Act, 1972 is not applicable as A. Narrain Mines does not fall within 10 km of Eco sensitive Zone.	
3	No two pits shall be simultaneously worked i.e. before the first pit is exhausted and reclamation work completed, no mineral bearing area shall be worked	The lease area is divided into two parts namely South and North Block bifurcated by M/s John Mines of Mr. Praveen Chandra. Exploration has revealed that, there is variation of Quality in two blocks. The south block has higher Fe% content (> 56%Fe) whereas north block having lower Fe % (<56%Fe) which is not feasible to mine by independent operation. From the Mineral Conservation Point, it is essential to work both the block simultaneously in order to optimize / maximize mineral utilization and achieve zero waste from mining. The same is approved by IBM in Mining Plan and by CEC in Reclamation and Rehabilitation Plan.	
4	After exhausting the first mine pit and before starting mining operations in the next pit, reclamation and plantation works in the	As mentioned above it is not feasible to operate the North and South block independently. The exploitation of ore has been restricted to limited area. After exhausting the ore, the back	The total plantation carried on the waste dumps for the year 2016-17 is

	exhausted pit shall be completed so as to ensure that reclamation, forest cover and vegetation are visible during the first year of mining operations in the next pit. This process will follow till the last pit is exhausted. Adequate rehabilitation of mined pit shall be completed before any new ore bearing area is worked for expansion.	filling will be carried out and reclamation will be taken up. Exploitation of ore, back filling the pit & reclamation are in sequence until the life of the Mine. However the dumping of overburden waste is carried out in the designated non-mineralized areas within the lease and the finalized portions are taken up for reclamation immediately.	27000 nos.																																							
5	Adequate buffer zone shall be maintained between two consecutive mineral bearing deposits.	The lease area is divided into two parts namely South and North Block bifurcated by M/s John Mines of Mr. Praveen Chandra. In the mineral conservation point of view we have obtained common boundary permission to exploit maximum mineral. Hence it is not applicable to have any buffer between the two mineral bearing deposits.																																								
6	Primary survey of flora and fauna shall be carried out and data shall be submitted to the Ministry within six months before start of expansion activity.	Primary survey of flora and fauna was carried out while preparing EIA document. The latest survey was conducted in 2011 through Forestry College Sirsi and submitted to your good office along with July 2011 to December 2011 compliance report.																																								
7	Conservation plan for wildlife shall be prepared in consultation with the chief wild life warden for implementation	The detail plan was prepared and approved by Chief wild life warden. The works taken for the period are as follows:																																								
		<table border="1"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Particulars</th> <th colspan="2">Achieved from Oct'16 -Mar'17</th> <th colspan="2">Cumulative from 1999 to 2014</th> </tr> <tr> <th>Qty.</th> <th>Cost</th> <th>Qty.</th> <th>Cost</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>Construction of rubble check dams</td> <td>-</td> <td>-</td> <td>7</td> <td>68500</td> </tr> <tr> <td>Water holes & Maint.</td> <td>-</td> <td>-</td> <td>12</td> <td>194239</td> </tr> <tr> <td>2</td> <td>Construction & maintenance of masonry check dams including Desilting</td> <td>19883 m³</td> <td>1371871</td> <td>6</td> <td>291914</td> </tr> <tr> <td>3</td> <td>Agave plantation in the valley</td> <td>-</td> <td>-</td> <td>1000</td> <td>7000</td> </tr> <tr> <td>4</td> <td>Raising of fruit</td> <td></td> <td></td> <td>277600</td> <td>289970</td> </tr> </tbody> </table>		Particulars	Achieved from Oct'16 -Mar'17		Cumulative from 1999 to 2014		Qty.	Cost	Qty.	Cost	1	Construction of rubble check dams	-	-	7	68500	Water holes & Maint.	-	-	12	194239	2	Construction & maintenance of masonry check dams including Desilting	19883 m ³	1371871	6	291914	3	Agave plantation in the valley	-	-	1000	7000	4	Raising of fruit			277600	289970	
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		bearing and shed giving plantations					
		5	Erection of watch towers	-	-	3	27767
		6	Provision of salt lick blocks	-	-	1	5000
		7	Watch and ward (person/month)	3	2,82,982	3	30,76779
		Total Cost in Rs.		13,71,871		1,30,34,755	
8	Zero waste mining concept shall be implemented either by putting up pelletisation plant or dispose of 100% low grade ores / fines to prospective buyers.	The Iron ore having +50% Fe consider as Ore. Non saleable ore are blended with the high grade ore and being made saleable. The sub-grade ore 45 to 50 % Fe ore stacked separately for future use.					
9	Hydro-geological study of the area shall be reviewed annually.	Comprehensive and detailed hydrogeological studies were conducted through NGRI (National Geo- Physical Research Institute). Scope of the studies include Groundwater quality, its regime, Solid waste dump stability and feasibility of Rain water harvesting structures in and around mining lease.					Final report of Hydrogeological studies attached as Annexure- I
10	Fugitive dust generation shall be controlled. Fugitive dust emission shall be regularly monitored at locations of nearest human habitation (including schools and other public amenities located nearest to sources of dust generation as applicable) and records submitted to the Ministry.	Fugitive dust generation is controlled by spraying the water on the main hauling road. Green belt has developed all along the lease boundary and tall growing saplings have planted all along the road side which acts as wind barrier. The ambient air quality monitoring is carried out twice a week in core zone as well as in buffer zone and results are regularly submitted to State Pollution control Board.					Abstract of Air monitoring results are attached as Annexure-II.
11	A 50m barrier of no mining zone all along both the side(s) facing the nallah (if any) passing through the lease area shall be demarcated and thick vegetation of native species raise. Status of implementation shall be submitted to the regional office of the Ministry on half yearly basis.	No nallah is present within the mining lease area.					
12	Need basis assessment for the nearby villages shall be conducted to study	Company in association with Society for Educational Welfare & Economic Development (SEED) is carrying out Baseline					The details of CSR activities carried out for

	economic measures which can help in upliftment of poor section of society.	<p>Survey and CSR Implementation Plan in 19 Peripheral Villages of the mining Lease in Chitradurga. The baseline survey will cover a detailed assessment of Socio-economic profile of the villages, Household Database, Resource mapping (Physical and Substitution), Status of Human Development Indices and Quality of life Indices, Infrastructure requirement and Socio-economic Development Options.</p> <p>Based on the outcomes of the survey a broad CSR Implementation Plan will be prepared taking into consideration Village Development (short term & long Term), Community and Stakeholder Management and Risk & Grievance Mapping.</p>	the reporting period in surrounding villages and their expenditure is attached as Annexure –III																												
13	Land use pattern of the nearby villages shall be studied and action plan for abatement and compensation for damage to agricultural land / common property land (if any) in the nearby villages	<p>Land use pattern has been studied by UAS, Dharwad. The data is shown in the following table:</p> <table border="1" data-bbox="1025 646 1742 930"> <thead> <tr> <th>S No.</th> <th>Land Use Type</th> <th>Area (Ha)</th> <th>(%)age</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Irrigated</td> <td>2797</td> <td>8.9</td> </tr> <tr> <td>2</td> <td>Un Irrigated</td> <td>14561</td> <td>46.4</td> </tr> <tr> <td>3</td> <td>Cultivable Waste Land</td> <td>3738</td> <td>11.9</td> </tr> <tr> <td>4</td> <td>Area N/A for Cultivation</td> <td>2007</td> <td>6.4</td> </tr> <tr> <td>5</td> <td>Forest Area</td> <td>8298</td> <td>26.4</td> </tr> <tr> <td colspan="2">Total</td> <td>31400</td> <td>100</td> </tr> </tbody> </table> <p>Agriculture damages if any are evaluated by appointing agriculture valuator and damages are paid to the concerned farmers. Apart from this, company has carried out various agriculture development programs in the villages in association with UAS, Dharwad and MYRADA NGO. The same has improved the crop production and thereby increasing the income of the farmers. Company has also helped 800 farmers of the neighboring villages by providing Fertilizers.</p>	S No.	Land Use Type	Area (Ha)	(%)age	1	Irrigated	2797	8.9	2	Un Irrigated	14561	46.4	3	Cultivable Waste Land	3738	11.9	4	Area N/A for Cultivation	2007	6.4	5	Forest Area	8298	26.4	Total		31400	100	
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14	Maintenance of village roads through which transportation of ores are undertaken shall be carried out by the company regularly at its own expenses.	The road used for transportation of ore is regularly maintained by the company. Roads are also regularly cleaned by manual sweeping to remove ore spillage from the transport trucks. A total of 4 workers are engaged for carrying out cleaning activity	Copy of contract for the maintenance and cleaning of road attached as Annexure-IV.																												

		of daily basis at the junction and speed breakers.	
15	Rain water harvesting shall be undertaken to recharge the ground water source.	Company has carried out rain water harvesting in surrounding villages under water shed development programme under the guidance of UAS, Dharwad. Rain water harvesting system is also installed in the office complex and at laboratory site. Also a series of settling ponds and check dams has been constructed along the mining lease which acts as rain water harvesting structures. Regular desilting is also done prior to monsoon to increase their retaining capacity.	
16	Measures for prevention and control of soil erosion and management of silt shall be undertaken.	As per the approved R&R plan by CEC, All the waste dumps are covered with Geo textile and plantation has carried on in-active dump slope. In the said period a total of 48200 m ² of the area is covered from Geotextile on the dumps which will be taken for plantation this year. All the Waste dumps are protected with Retaining wall and Garland drainage. Settling ponds and check dams are also constructed to arrest silt.	
17	Trenches / garland drains shall be constructed at foot of dumps and coco filters installed at regular intervals to arrest silt from being carried to water bodies	As per R&R plan approved by CEC Check dams, gully checks and retaining wall are constructed at foot of the dump. Coco filters are installed in the Garland drainages to control the silt being carried to water bodies.	
18	Ground water in the core zone shall be regularly monitored for contamination and depletion due to mining activity and records maintained. The monitoring data shall be submitted to the regional office of the ministry regularly. Further, monitoring points shall be located between the mine and drainage in the direction of flow of ground water shall be set up and records maintained.	The mining activity is ben carried out at top of the hill. The pit top& bottom is 940 mts and 846 mts from M.S.L. There is no contamination of ground water due to mining activity. However regular monitoring of ground water is carried out and same has been regularly submitted to regional office and Karnataka Pollution Control Board.	Abstract of Water monitoring results are attached as Annexure-V .
19	Cultivable waste land shall be identified and fodder farming or other suitable productive use of waste land shall be taken up in phased manner. Status of implementation shall be submitted to the regional office of the ministry	Company in association with UAS, Dharwad had taken a project called ALOP (Alternative Livelihood Opportunities Project) in surrounding villages from 2008 to 2012 for developing the farmers in cultivation and to increase their farm productivity. The outcome of the project are implemented and reviewed on annually.	
20	Monitoring of soil samples for assessment of	Soil analysis of samples from core zone and buffer zones is	Soil Analysis report is

	transformation to acidic state or contamination due to mining activity shall be regularly conducted.	carried out and same has been regularly submitted to regional office and Karnataka Pollution Control Board.	enclosed as Annexure-VI .
21	Transportation of ore shall be done by covering the trucks with tarpaulin or other suitable mechanism so that no spillage of ore / dust takes place. Transportation shall be done only during day time.	All the transportation trucks carrying ore are covered with Tarpaulin and the same instructions in local language is displayed near security point for all the transportation truck drivers. Transportation of Ore is carried as per the E-auction in day time only.	
22	Occupational health and safety measures for the workers including identification of work related health hazards, training on malaria eradication, HIV, and health effects on exposure to mineral dust shall be carried out. The company shall engage a full time qualified doctor who is trained in occupational health. Periodic monitoring for exposure to respirable mineral dust on the workers shall be conducted and records maintained including health records of the workers. Awareness programme for workers on impact of mining on their health and precautionary measures like use of personal equipment's etc. shall be carried out periodically. Review of impact of various health measures undertaken (at interval shall be conducted followed by follow up action wherever required	Company has got an in house Occupational health unit with a fulltime doctor and nurses. All the hazards related to our activities are identified and addressed. Various healths's related training programs are conducted for the workers. Company has also adopted a formal HIV- AIDS policy. Periodic health checkups are also been conducted for all the employees working in the company. In the said period company has conducted awareness programs on HIV-AIDS, Breast Cancer, Water Bourne diseases and Silicosis. Free eye checkup camp was also organized for company as well as contractor employees.	
23	Top soil / solid waste shall be stacked properly with proper slope and adequate safeguards and shall be utilized for backfilling for reclamation and rehabilitation of mined out area.	No top soil is available within the mine lease as the entire area is broken up for mining and allied activities. The solid waste is properly stacked as per approved mining plan.	
24	Over burden (OB) shall be stacked at earmarked dump site and shall not be kept active for long period. The maximum height of the dump shall not exceed 30m, each	Solid waste is stacked by adopting step dumping method on designated non mineralized areas within the lease. Finalized portions of the dumps are covered with geotextiles and afforestation immediately.	

	<p>stage shall preferably be of 10m and overall slope of the dump shall not exceed 28°. The OB dump shall be scientifically vegetated with suitable native species to prevent soil erosion and surface runoff.</p> <p>Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the ministry of environment & forests on six monthly basis.</p>																																
25	<p>Slope of the mining bench and ultimate pit limit shall be as per the mining scheme approved by Indian Bureau of Mines</p>	<p>The ultimate pit limit and slope of the mining bench is maintained as per the IBM approved mining scheme.</p>																															
26	<p>Adequate plantation shall be raised in the ML area, haul roads, OB dump sites etc. Green belt development shall be carried out considering CPCB guidelines including selection of plant species and in consultation with the local DFO/Agriculture department. Herbs and shrubs shall also form a part of afforestation programme besides tree plantation. The density of the trees shall not be less than 2500 plants per ha. The company shall involve local people with the help of self-help group for plantation programme. Details of year wise afforestation programme including rehabilitation of mined out area shall be submitted to the regional office of the ministry area.</p>	<p>Plantation was carried in ML area, outside ML, haul roads, OB dumps under the guidance of RFO & Dy.RFO. The total plantation carried for 2016-17 is 27000 Nos. The total area covered for the year 2016-17 is 4.76 Ha.</p> <table border="1" data-bbox="1025 767 1744 1182"> <thead> <tr> <th>Location</th> <th>No. of saplings</th> <th>Area Covered (Ha)</th> </tr> </thead> <tbody> <tr> <td>Backside of Sample shed</td> <td>2580</td> <td>0.33</td> </tr> <tr> <td>BP3/BP14 - Green Belt</td> <td>4920</td> <td>0.52</td> </tr> <tr> <td>Gate - 1 Green belt</td> <td>750</td> <td>0.08</td> </tr> <tr> <td>Dump-3 - 2nd Step</td> <td>3750</td> <td>0.72</td> </tr> <tr> <td>Dump-1 - 1st Step</td> <td>2000</td> <td>0.29</td> </tr> <tr> <td>Dump-1 - 2nd Step</td> <td>1000</td> <td>0.11</td> </tr> <tr> <td>Dump-1 - 3rd Step</td> <td>7000</td> <td>0.71</td> </tr> <tr> <td>Forest area near to BP-3</td> <td>5000</td> <td>2.0</td> </tr> <tr> <td>Total</td> <td>27000</td> <td>4.76</td> </tr> </tbody> </table>	Location	No. of saplings	Area Covered (Ha)	Backside of Sample shed	2580	0.33	BP3/BP14 - Green Belt	4920	0.52	Gate - 1 Green belt	750	0.08	Dump-3 - 2 nd Step	3750	0.72	Dump-1 - 1 st Step	2000	0.29	Dump-1 - 2 nd Step	1000	0.11	Dump-1 - 3 rd Step	7000	0.71	Forest area near to BP-3	5000	2.0	Total	27000	4.76	
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27	<p>Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year – pre-</p>	<p>The existing tube wells are far away from the mining activity as such there is no influence on these bore wells due to mining activity. Collected water samples are checked for the quality of the water every month.</p>	<p>Abstract of Water monitoring results are attached as Annexure-V.</p>																														

	monsoon (April-May), monsoon (August), post-monsoon (November) and winter(January) and the data thus collected shall be regularly sent to MoEF, Central ground water Authority and Regional Director, Central Ground water Board		
28	Adequate air monitoring stations shall be installed in areas of human habitations near the mine and the results of ambient air quality shall be maintained and regularly submitted to regional office of the ministry	The ambient air quality monitoring is carried out in Core Zone as well as buffer zone. There are 6 monitoring stations in Core Zone and 4 monitoring stations in Buffer zone which is monitored twice in a week for every month. The results of ambient air quality are maintained and same are regularly submitted to regional Office of ministry and Karnataka State Pollution Control Board.	Abstract of Air monitoring results are attached as Annexure-II.
29	The waste water from the mines shall be treated to conform to the prescribe standards before discharging in to the natural stream. The discharged water shall be regularly monitored and report submitted to the ministry of Environment& Forests, Central Pollution Control Board and the state Pollution control board	There is no waste water discharge from the Mine. During monsoon the runoff water is collected in the settling pond. Only the overflow water will be allowed into the natural stream. The natural stream water is collected in the village tank for public usage which is monitored and regularly submitted to regional office of ministry and Karnataka Pollution Control Board.	
30	Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transportation of ores and others shall have valid permissions as prescribed under Central Motor Vehicle Rules, 1989 and its amendments. Transportation of ore shall be done only during day time. The vehicles transporting ores shall be covered with a tarpaulin or other suitable enclosures so that no dust particles/ fine matters escape during the course of transportation. No over loading of ores for transportation shall be committed. The trucks transporting ore shall not pass through wild life sanctuary.	Vehicles used for transporting ore are having the vehicle emission certificates. The copy of test certificate is enclosed with previous compliance report. Over loading of the trucks is not allowed. The trucks transporting the ore are not passing through wild life sanctuary.	
31	Prior permission from the Competent	Complied.	

	Authority shall be obtained for extraction of ground water, if any		
32	Action plan with respect to suggestions/improvements and recommendations made during public consultation/hearing shall be submitted to the ministry and the state Govt. within six months	Is Complied with	
33	A final mine closure plan, along with details of Corpus Fund, shall be submitted to the Ministry of Environment & Forests, 5 years in advance of final mine closure for approval.	Will be complied	
B.	General Conditions		
1	No change in mining technology and scope of working shall be made without prior approval of the MoEF	If any changes were made in mining technology and scope of the working, it will be informed to the MOEF.	
2	No change in the calendar plan including excavation, quantum of mineral and waste shall be made	Will be complied	
3	Fugitive dust emissions from all the sources shall be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points shall be provided and properly maintained	Fugitive dust emissions from all the sources are controlled regularly by water spraying, covering the waste dumps with Coir matt. Water spraying on haul roads, loading and unloading points and at transfer points are carried out regularly for proper maintenance.	
4	Four ambient air quality - monitoring stations shall be established in the core zone as well as in the buffer zone for RSPM, SPM, SO _x , NO _x monitoring. Location of the stations should be decided based on the metrological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the state pollution control Board.	Air quality monitoring is carried out in two zones such as Core Zone and Buffer Zone. 6 nos of ambient air quality monitoring stations in Core Zone are Plant-I, Haulage Road, Loading point, unloading point, BBH Siding and Ore stock yard. 4 nos of Ambient air quality monitoring stations in Buffer Zone are Megalahalli Village, Tanigehalli Village, Medikeripura Village and Konanuru Village. Monitoring is carried out twice a week for every month as per the Consent to Operate. Monitoring reports are submitted to pollution board once in quarter.	

No.	Location	Latitude	Longitude
C1	Loading Point	14°13'09.0"N	76°12'31.4"E
C2	Haulage road	14°13'29.7"N	76°12'39.8"E
C3	Unloading Point	14°13'10.6"N	76°12'41.6"E
C4	Ore Stockyard	14°13'30.6"N	76°12'32.8"E
C5	Crushing Plant	14°13'18.5"N	76°12'20.9"E
C6	BBH Railway Siding	14°11'30.6"N	76°13'19.8"E
B1	Meghalahally Village	14°13'49.9"N	76°13'05.9"E
B2	Konanuru Village	14°15'11.7"N	76°13'55.2"E
B3	Medikeripura Village	14°14'32.8"N	76°10'42.5"E
B4	Tenigehally Village	14°12'37.6"N	76°11'13.4"E

5	Data on ambient air quality should be regularly submitted to the Ministry, including its Regional Office Bangalore, SPCB / CPCB once in six months	Ambient air quality data is submitted regularly to the ministry, its Regional office Bangalore and KSPCB once in six months.
6	Measures shall be taken for control of noise levels below 85dBA in the work environment. Workers engaged in operations of HEMM, etc., shall be provided with ear plugs/muffs.	Control measures like providing acoustic enclosures to DG sets are done. Staff working in the noise area is provided with ear plugs & ear muffs. All the mining machineries have air conditioned cabins which provides noise and dust free environment to the operator.
7	Industrial waste water (work shop 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 th may, 1993 and 31 st December, 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.	Oil & grease traps are provided at workshop where the oil is separated from water and is reused for dust suppression.
8	Personal working in the dusty areas shall be provided with protective respiratory devices and they shall also be imparted adequate training and information on safety and health aspects.	Regular trainings are provided in safety and health aspects. Dust mask, Ear plugs and safety goggles are provided for the persons working in dusty areas.

9	Provision shall be made for the housing the laborers within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc., the housing may be in the form of temporary structures to be removed after the completion of the project.	All the laborers are from adjacent villages and are residing there. Hence, no provision of housing is provided in the mines area. The Reverse osmosis water purifier has been installed in the mines and office area for drinking purpose.																												
10	A separate Environmental Management Cell with suitable qualified personnel shall be set-up under the control of a senior Executive, who will report directly to the head of the organization	<p>Separate Environmental Management cell has been established with qualified people who are reporting directly to head of the organization. Below are the contact details of the responsible persons-</p> <p>(1) Mr. Krishna Reddy (Head- IOK) MK.Reddy@vedanta.co.in +91-9483211966 (M)</p> <p>(2) Mr. B Sivakumar (Head- HSE) B.Sivakumar@vedanta.co.in +91-9893379754 (M)</p>	<p>Chief Operating Officer (COO)</p> <p>↓</p> <p>B Sivakumar (Head HSE- IOB)</p> <p>↓</p> <p>Parthiban Madesh (Head HSE-Karnataka)</p> <p>↓</p> <p>Aditya Anchliya (Engineer- Environment)</p>																											
11	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year wise expenditure shall be reported to the Ministry.	<p>Year wise expenditure records are maintained separately for Environmental Protection Measures and the same is submitted regularly to regional office and Karnataka state pollution control board.</p> <table border="1" data-bbox="1032 1042 1731 1369"> <thead> <tr> <th colspan="3">Environment Expenditure for Apr'16 to Mar'17</th> </tr> <tr> <th></th> <th>Description of the cost centers</th> <th>Total (in Rs.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>General and Statutory Requirement</td> <td>5497354</td> </tr> <tr> <td>2</td> <td>Dust Suppression</td> <td>23998046</td> </tr> <tr> <td>3</td> <td>Wildlife Protection Scheme</td> <td>277012</td> </tr> <tr> <td>4</td> <td>Afforestation and Mine Reclamation</td> <td>2695751</td> </tr> <tr> <td>5</td> <td>Soil Erosion Control Measures</td> <td>3256475</td> </tr> <tr> <td>6</td> <td>Environment Monitoring</td> <td>2744101</td> </tr> <tr> <td colspan="2">Total</td> <td>3,84,68,739.00</td> </tr> </tbody> </table>	Environment Expenditure for Apr'16 to Mar'17				Description of the cost centers	Total (in Rs.)	1	General and Statutory Requirement	5497354	2	Dust Suppression	23998046	3	Wildlife Protection Scheme	277012	4	Afforestation and Mine Reclamation	2695751	5	Soil Erosion Control Measures	3256475	6	Environment Monitoring	2744101	Total		3,84,68,739.00	
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12	The project authorities shall inform to the regional office of the ministry located at Bangalore regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land and development work	Will be complied with	
13	The regional office of the ministry located at Bangalore shall monitor compliance of the stipulated conditions. The project authorities shall extend full cooperation to the officers of the regional office by furnishing the requisite data/ information/monitoring reports.	The data/ information are being sent to the regional office in the form of compliance reports.	
14	A copy of clearance letter will be marked to concerned panchayat/ local NGO, if any from whom suggestion/ representation has been received while processing the proposal	Will be complied with	
15	State Pollution Control board shall display a copy of the clearance letter at the Regional office, District industry and collector's office/ tehsildars office for 30 days.	Complied	
16	The project authorities shall advertise at least in two local newspapers widely circulated one 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 website of the Ministry of Environment and Forests at http://envfor.nic.in and a copy of the same shall be forwarded to the Regional office of the ministry located in Bangalore	Complied	

Contact Details		
1	Address	<p>A. Narrain Iron Ore Mine, M/sVedanta Limited, Meghalahalli Office Complex, Bheemasamudra Post, Chitradurga (Karnataka)- 577520</p> <p>Registered Office Vedanta Limited 1st Floor, 'C' wing, Unit 103, Corporate Avenue, Atul Projects, Chakala, Andheri (East), Mumbai (Maharashtra)- 400093</p>
2	Contact Numbers	<p>(T) +91-8194238100 (F) +91-8194238170</p>
3	Contact details of the responsible persons-	<p>(1) Mr. Krishna Reddy (Head- IOK) MK.Reddy@vedanta.co.in +91-9483211966 (M)</p> <p>(2) Mr. B Sivakumar (Head- HSE) B.Sivakumar@vedanta.co.in +91-9893379754 (M)</p>
4	GPS Location	<p>Latitude: N 14 13'34.61" Longitude: E 76 12'41.73"</p>
5	Website	<p>www.sesagoa.co.in or www.vedantalimited.com</p>

Tech. Rep. No. NGRI-2017-GW-935

(Restricted)



Integrated Geophysical, Hydrogeological and Water quality studies for
Assessment of sustainable groundwater in the downstream of operating
A. Narrain Iron Ore Mines of M/s. Vedanta Limited (ML No. 2677),
Chitradurga district, Karnataka

Sponsored by
M/s. A. Narrain Iron Ore Mine
(M/s. Vedanta Limited)
Chitradurga, Karnataka

Ratnakar Dhakate, Ms. Priyanka Mishra, G. Venkata Ratnalu,
M. Durgaprasad and K. Rajkumar



CSIR-National Geophysical Research Institute
(Council of Scientific & Industrial Research)

Hyderabad – 500 007

May 2017

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17. Results and Discussion

In order to assess the sustainable groundwater resources in the downstream of operating M/s. A. Narrain Iron Ore Mines of M/s. Sesa Goa Limited, Chitradurga, Karnataka and integrated geophysical, hydrogeological and geochemical studies have been carried out in the watershed covering M/s. A. Narrain Iron Ore Mine. Fourteen observation bore well were monitored in the watershed for water levels during pre and post-monsoon season. During pre-monsoon season the depth to groundwater level ranges from 11.38m (N10) at Tenigehalli village to 39.47m (N6) Siddapura village, while during post-monsoon the depth to groundwater level ranges from 8.88m (N10) at Tenigehalli village to 36.07m (N6) at Siddapura village. All these observation wells were brought into a common datum point i.e. mean sea level. The groundwater level contours drawn for these periods clearly indicate that groundwater flow direction was from mine towards all directions. The minimum groundwater level for pre-monsoon was 646.815m (amsl) and for post-monsoon was 650.215m (amsl) was observed at observation well No. N6 at Siddapura village. Similarly, the maximum groundwater level for pre-monsoon was 724.071m (amsl) and for post-monsoon was 724.301m (amsl) was observed at observation well No. N5 at administrative block opposite to Nursery well.

The water quality analysis was made on 12 obs wells for groundwater and two surface water samples during pre-monsoon (July 2016) and during post-monsoon (October 2016) seasons from the existing dug wells and bore wells located within watershed. The analyses were focused on major ion chemistry. The water quality data indicates that the groundwater at most places has shown permissible drinking water quality (BIS, 1991 & WHO 1984). During post-monsoon season the sample Nos. N7 and N9 showing little high concentration of Fluoride. This was due to the dissolution of surface waste materials resulting in the increase of Fluoride locally.

Geophysical investigation mainly Electrical Resistivity Tomography (ERT) were deployed at 39 different locations including mine lease area, dump sites, mine pit bottom and in virgin areas for identifying dump stability and pin-pointing the groundwater locations. Based on interpretation of ERT, fourteen sites were recommended for drilling of bore well at different locations including mine lease area and private lands. Three locations were in the mine lease area one at near canteen of administrative block and two at BBH railway siding area. Mine authorities can immediately take up drilling activities at these location to cope their demand, while for remaining locations they can negotiate with private people for their additional demand. Based on ERT investigation another new eight sites were recommended

for construction of check dams on stream channel in the watershed covering M/s. A. Narrain Iron Ore Mine for augmentation of groundwater resources in the watershed and nine rainwater harvesting pits was recommended nearby recommended newly bore well for their longer sustainable use and high yielding. The groundwater prospect map also reveals that the recharge conditions are good in pediplain weathered moderate (PPM) geomorphologic unit and moderate in pediplain weathered shallow (PPS) geomorphologic unit, while it is poor and limited in structural hills (SH) and pediment (PD) geomorphologic unit.

Similarly, ERT investigation carried out at dump sites reveals that the Dump No. 1 (non-active) shows the top and bottom portion with high resistivity value indicating its stability, while ERT carried out at Dump No. 2 (non-active) indicate low to high resistivity at top and low resistivity at bottom portion indicating that the bottom portion was still unstable. Two ERT was carried out on Dump No. 3 (active) also represents top portion shows high resistivity and bottom portion with low resistivity indicating the unstable dump. Similarly, two ERT was also carried out at Dump No. 4 (Active) represents that top portion high resistivity and bottom portion with low resistivity. Similarly, in-situ soil infiltration carried out at Dump Nos. 1, 2 and 3 indicate very low infiltration rate. The non-active dumps should be properly protected through geo-textile and planting vegetation for further rain-off erosions.

18. Conclusions

Sustainable groundwater resources in the downstream of watershed covering M/s. A. Narrain Iron Ore Mine, Chitradurga, Karnataka has been assess through integrated hydrological, hydro-chemical and geophysical investigations. Groundwater level monitoring was carried out during July 2016 (Pre-monsoon) and during October 2016 (Post-monsoon) period respectively in 14 observation well in the watershed. The depth of groundwater during pre-monsoon period varies from 11.38m (N10) at Tenigehalli village to 39.47m (N6) Siddapura village, while during post-monsoon the depth to groundwater level ranges from 8.88m (N10) at Tenigehalli village to 36.07m (N6) at Siddapura village. The groundwater level contours drawn for these periods clearly indicate that groundwater flow direction was from mine towards all directions.

The groundwater quality analyzes were carried out in selected observation wells in the watershed covering M/s. A. Narrain Iron Ore Mine, Chitradurga for pre-monsoon and post-monsoon seasons. The water quality results indicates that the groundwater has permissible drinking water quality. During post-monsoon season the sample Nos. N7 and N9 showing little high concentration of Fluoride due to local phenomenon.

Based on geophysical investigation (Electrical Resistivity Tomography) carried out in mine lease area and in virgin area for identifying waste dump stability and for groundwater prospects. Based on interpretation it was observed that the active dump are still unstable and have low rate of infiltration. Based on ERT data fourteen sites were identified and recommended for drilling of bore well to meet the demand. Similarly, eight locations were identified from groundwater prospects map for construction of additional check dams on the stream channel for groundwater augmentation in the watershed and nine for the construction of rainwater harvesting pits at a newly drilled bore wells for longer sustainable.

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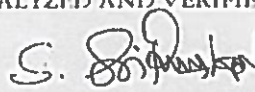
(Air Quality Monitoring Wing)

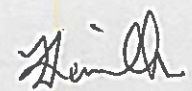
ABSTRACT OF AMBIENT AIR QUALITY MONITORING DATA

Project : Chitradurga Mine Report No : I
 Client : M/s.Vedanta Limited Season : Post Monsoon
 Month : November - 2016

S.NO	MONTH & YEAR	ZONE	LOCATION	PARAMETERS			
				SO ₂	NO ₂	PM ₁₀	PM _{2.5}
1.	November -2016	Core	Plant-I area (Crushing)	9.4	27.3	64.4	26.8
			Loading point (Mining Working)	10.0	25.6	58.6	24.2
			Unloading Point (Dumping)	9.8	25.2	62.6	26.0
			Haulage Road	8.9	22.5	57.7	21.0
			BBH Siding	8.5	23.4	56.5	23.0
			Ore Stock Yard	10.2	23.9	61.2	25.4
		Buffer	Megalahalli Village	5.4	14.8	49.8	20.3
			Tengigehalli Village	6.4	15.6	45.9	18.5
			Medikeripura Village	6.8	15.9	52.1	21.9
			Konanur	7.2	17.2	50.9	20.5

ANALYZED AND VERIFIED BY:

1. 
S. SRI RENGANATHAN
 Technical Manager

2. 
P. KAVITHA
 Technical Manager
 Govt. Analyst

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CHENNAI METTEX LAB PRIVATE LIMITED

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(Air Quality Monitoring Wing)

ABSTRACT OF AMBIENT AIR QUALITY MONITORING DATA

Project : Chitradurga Mine Report No : I
 Client : M/s.Vedanta Limited Season : Post Monsoon
 Month : December - 2016

S.NO	MONTH & YEAR	ZONE	LOCATION	PARAMETERS			
				SO ₂	NO ₂	PM ₁₀	PM _{2.5}
I.	December -2016	Core	Plant-I area (Crushing)	8.8	28.3	61.8	27.4
			Loading point (Mining Working)	9.2	23.6	58.1	26.0
			Unloading Point (Dumping)	9.6	29.1	62.5	27.9
			Haulage Road	8.4	26.5	56.6	24.8
			BBH Siding	8.0	23.2	54.5	24.2
			Ore Stock Yard	10.4	27.3	59.8	26.4
		Buffer	Megalahalli Village	6.7	15.3	53.6	22.9
			Tengigehalli Village	7.7	14.9	47.0	19.6
			Medikeripura Village	7.9	17.6	51.0	22.2
			Konanur	7.1	16.5	49.5	21.3

ANALYZED AND VERIFIED BY:

1. *D. Sathiy-Narayanan*
 Dr. D. SATHIYA NARAYANAN
 Quality Manager

2. *P. Kavitha*
 P. KAVITHA
 Technical Manager
 Govt. Analyst

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(Air Quality Monitoring Wing)

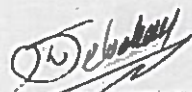
ABSTRACT OF AMBIENT AIR QUALITY MONITORING DATA

Project : Chitradurga Mine Report No : I
 Client : M/s.Vedanta Limited Season : Winter
 Month : February - 2017

S.NO	MONTH & YEAR	ZONE	LOCATION	PARAMETERS			
				SO ₂	NO ₂	PM ₁₀	PM _{2.5}
1.	February -2017	Core	Plant-I area (Crushing)	9.6	23.9	66.8	29.0
			Loading point (Mining Working)	9.4	25.0	64.0	26.9
			Unloading Point (Dumping)	10.1	26.9	63.0	28.3
			Haulage Road	9.8	27.2	68.6	29.8
			BBH Siding	8.4	21.2	59.5	26.3
			Ore Stock Yard	8.1	22.7	61.3	28.0
		Buffer	Megalahalli Village	7.9	17.0	53.0	24.1
			Tengigehalli Village	8.8	15.9	48.9	22.3
			Medikeripura Village	8.1	20.4	55.9	26.3
			Konanur	7.2	17.8	51.8	23.5

ANALYZED AND VERIFIED BY:

1. 
S. SRI RENGANATHAN
 Technical Manager

2. 
V.R. SELVAKUMAR
 Managing Director
 Govt. Analyst

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(Air Quality Monitoring Wing)

ABSTRACT OF AMBIENT AIR QUALITY MONITORING DATA


Project : Chitradurga Mine Report No : I
Client : M/s.Vedanta Limited Season : Monsoon
Month : March - 2017

S.NO	MONTH & YEAR	ZONE	LOCATION	PARAMETERS			
				SO ₂	NO ₂	PM ₁₀	PM _{2.5}
1.	March -2017	Core	Plant-I area (Crushing)	10.1	27.2	67.9	31.3
			Loading point (Mining Working)	8.8	22.6	62.0	28.1
			Unloading Point (Dumping)	9.1	25.8	64.5	30.2
			I Haulage Road	9.5	28.7	66.2	29.0
			BBH Siding	8.6	24.4	61.5	28.8
			Ore Stock Yard	7.9	23.5	65.2	29.4
		Buffer	Megalahalli Village	6.9	20.1	57.6	25.9
			Tengigehalli Village	6.5	16.7	51.1	23.7
			Medikeripura Village	8.7	19.7	59.2	27.4
			Konanur	7.6	15.8	54.7	24.8

ANALYZED AND VERIFIED BY:

1. 
S. SRI RENGANATHAN
Technical Manager



2. 
V.K. SELVAKUMAR
Managing Director
Govt. Analyst

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Total Expenditure for Community Development Activities
A Narrain Iron Ore Mine, M/s Vedanta Limited

April 2016 to March 2017

S No.	Thrust Area	Name of the Project/ Activity	Beneficiaries	Expenditure (in Rs.)
1	Education	Evening Study Centre	450 Students	1730000
2	Women Empowerment	Self Help Groups	896 Women	235000
3	Health and Sanitation	Community Medical Centre and Medical Checkup Camps	1583 Villagers	872000
4	Agriculture and Livelihood	Artificial Insemination Centre	680 Farmers	1140000
5	Sports and Culture	Sports and Cultural Activities	-	517000
Total Expenditure (in Rs.)				4495000

Overall CSR Expenditure 2009-2017

S No	Focus Areas	2009-10	2010-11	2011-12	2012-13	2013-14	2014 -15	2015-16	2016-17
1	Health & Hygiene	17.79	14.88	57.86	188.35	385.66	184.86	3.45	8.72
2	Education	0.11	30.97	27.32	6.79	5.11	4.58	3.31	17.30
3	Infrastructure Development	129.83	283.38	238.52	51.2	0	10.04	21.00	5.17
4	Livelihood	25.55	56.85	86.1	19.91	9.01	10.64	6.05	11.41
5	Stake Holder Engagement	0.09	11.99	1.71	3.27	7.36	5.38	3.00	2.35
6	Administrative Cost	0	0	0	4.17	0.02	0.08	0	0
Total Expenditure (in Lac. Rs.)		173.37	398.07	411.51	235.68	407.17	215.59	36.81	44.95


Vedanta Limited

(Formerly known as Sesa Sterlite Limited/Sesa Goa Limited)

Sesa Ghor, 20, EDC Complex,

Patto, Panaji, Goa - 403001

 Tel: +91-832-2460600 Fax: +91-832-2450725, Website: www.vedantalimited.com
PURCHASE ORDER

Page : 1 of 84

PO Number : 4800011640
PO Date : 02.01.2016
Vendor Code : 730450
Vendor Name : S BASAVARAJA
Vendor Address :

 BheemasamudraChitradurg
 Bheemasamudra - Karnataka, 577520
 India.

Your Reference :
Our Reference :
PO Currency : Indian Rupee
Delivery Place : ENG.STR - CHITRADURGA
: BHEMASAMUDRA CHITRADURGA, Karnataka 577520 India
I) PO CONFIRMATION/ACKNOWLEDGEMENT:

You shall receive an email confirmation after release of each Purchase Order from our end. Email will provide you a link, from which you can log into SRM portal and view and/or download the PO. For downloading or saving the PO, please click on "PRINT" option. Immediately after receipt of PO, you have to provide "CONFIRMATION" to all items. Alternately, you may directly log into your account in SRM portal through our official website www.vedantalimited.com and provide "CONFIRMATIONS". In case no confirmation is received from you within 2 days of receipt of PO, then PO shall be deemed accepted to you. However, without giving "CONFIRMATION", ASN as follows, cannot be created, and it has to be done without exception.

Confirmations, acknowledgement and ASN shall not be applicable for Service line items of the PO

II) PRE-DELIVERY CONDITION:

1) At the time of dispatch of material. You have to log into SRM system, open "Create ASN" tab and enter dispatch details, like DC No., DC date, Vehicle No., Quantity, LR No. & LR Date against each proposed delivery item, and saved, when system will generate a unique no. This is called as Advance Shipping Notice (ASN), and same has to be imprinted on every Invoice.

ASN shall not be applicable for Service POs

2) In our endeavor to support and save environment, we have gone paperless w. e. f. 15.09.2016, for which we have introduced Vendor Invoice Management system (VIM). For this you have to scan and post the Invoice from now onwards on the designated e-mail Id, Invoice.sesa@vedanta.co.in; clearly indicating PO No. and ASN no as above; without which payment processing shall not take place, or may get delayed.

3) Following guidelines to be strictly followed for posting of Invoices in VIM:

VALID FROM : 02.01.2016 VALID TO : 28.02.2018
--

PURCHASE ORDER CONTINUATION

PO NO : 4800011640

Page : 2 of 84

- a) All Invoices should be uploaded in PDF format only; any other format is not recognized by the system and shall automatically become null and void. Please note.
- b) Strictly One Invoice per PO to be posted and no two or more PO nos. to be combined under the same Invoice.
- c) Strictly One Invoice to be attached and posted per e-mail, and not more than one, else such multiple Invoice mail/s will become null and void automatically.
- d) Create a new field in your Invoicing system for entering "ASN NO" by printing, and which please do not write manually.
- e) Hand written Invoices shall not be acceptable, hereinafter, and all such Invoice mail/s will become null and void automatically.
- f) Use very simple Font like "Times Roman", or "Arial" for printing the Invoices.
- g) On the Invoice, in one column/box please update only one field, and do not mix with any other field, e.g. PO and PO date should be updated in separate fields. Similarly update Invoice No.; Invoice date; DC No. ASN no etc. and all in independent fields.
- h) All Invoices will have to be digitally signed, w.e.f. 03.10.2016 and for which you will have to get your digital signature done urgently. Invoices without digital signature may not be acceptable from 03.10.2016.
- i) Requested not to send any other document/s, other than Invoice and relevant docs like copy of LR, DC etc. on this id Invoice.sesa@vedanta.co.in, else system may block sender's ID.

4) Copy of Delivery challan / Invoice, warranty/guarantee certificate may please be sent with the consignment only, but strictly do not send any documents to purchase / commercial dept, except Bank Guarantees.

5) Vendors shall prepare the DFT with Delivery Plant address and not on Head Office address and strictly dispatch / submit the excise invoices (DFT) along with material, so that we can avail CENVAT benefit without any problems. Once digital signatures are in place, no hard copy may be required, to be submitted.

6) In case if the above details are not provided on the portal, system shall throw errors for want of the same and unloading may be delayed, and payment processing may not be possible. Also ASN is required for evaluating vendor's performance, and non-compliance shall lead to negative score & thus you stand to lose points in the vendor rating. In case of repetitive default in filling ASN, or complying with any other details, as above; we reserve the right to reject the material.

III) You shall also receive regular mails confirming acceptance of material in stores and Invoice posting, from which you can view the details appropriately.

Requested to follow the above procedures and co-operate for proper functioning of SRM and VIM systems and for smooth processing of Bills, from now onwards.

Please supply the under mentioned materials / services subject to the prices, terms and conditions mentioned below, "General Terms and Conditions" and "Applicable Standard terms and conditions":

PURCHASE ORDER CONTINUATION

PO NO : 4800011640

Page : 3 of 84

Sr. Item code	Plant	UOM	Req. Qty	Rate	Value
No. Specification					
1	Road Maintenance Contract	ARES AU	1,000	228.000,00	228.000,00
	of Gate-3				
	9906040151				
1	CLEANING OF ROAD WITH HIGH PRESSURE		4,000	57.000,00	228.000,00
	JET WATER PUMP OR MANUALLY BY BROO M.	MON			
Line no A/c code Buss.Area Cost center Internal Order WBS Element Network no Asset id					
01	215009	I006	10C62K		
2	Cleaning of Sticky material on road at B	ARES AU	1,000	342.000,00	342.000,00
	9906040151				
1	CLEANING OF ROAD WITH HIGH PRESSURE		6,000	57.000,00	342.000,00
	JET WATER PUMP OR MANUALLY BY BROO M.	MON			
	1) Road cleaning work to be conducted using 4 labors every day for 4 months.				
	2) Contractor shall carry out the work safely as per the Vedanta safety standards.				
	3) All the required equipment's, consumables and safety gears are in the scope of the contractor.				
Line no A/c code Buss.Area Cost center Internal Order WBS Element Network no Asset id					
01	211001	I006	10C62K		
3	Cleaning of Sticky material on road at B	ARES AU	1,000	684.000,00	684.000,00
	9906040151				
1	CLEANING OF ROAD WITH HIGH PRESSURE		12,000	57.000,00	684.000,00
	JET WATER PUMP OR MANUALLY BY BROO M.	MON			
Line no A/c code Buss.Area Cost center Internal Order WBS Element Network no Asset id					
01	211001	I006	10C62K		
Total PO Value					1.254,00

Price basis : ATS - At Site
Bheemasamudra Petrol pump

Insurance :

Email: test@mettexlab.com
Web: www.mettexlab.com

Phone: 044 22323163, 22179190, 11
Fax: 044 22311031



CHENNAI METTEX LAB PRIVATE LIMITED

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032.

Analysis Report for Ground Water Samples

Client: M/s.Vedanta Limited

Report: II A

Project: Chitradurga Mine

Season: Post Monsoon-2016

Date of Collection: 12.10.2016

S.No	Parameters	Sample Code	GWQ -1	GWQ -2	GWQ -3	GWQ -4	GWQ -5	GWQ -6	GWQ -7	Standard: IS : 10500
		Time of Sampling	09:55 Hrs	13:10 Hrs	11:05 Hrs	12:40 Hrs	14:20 Hrs	15:10 Hrs	15:20 Hrs	
		Units ↓								
1	pH	-	7.18	7.22	6.69	6.91	7.18	7.21	7.23	6.5 to 8.5
2	Turbidity	NTU	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5
3	Total Dissolved Solids	mg/l	373	875	992	769	789	848	568	2000
4	Total Hardness as CaCO ₃	mg/l	206	452	460	386	398	292	319	600
5	Calcium as Ca	mg/l	41.2	110	132	98	81.2	70	68	200
6	Magnesium as Mg	mg/l	24.7	42.5	31.2	33.8	46.8	28	35.8	100
7	Total Alkalinity as CaCO ₃	mg/l	175	312	363	298	355	198	152	600
8	Fluoride as F	mg/l	0.39	0.74	0.48	0.63	0.58	0.54	0.29	1.50
9	Chloride as Cl	mg/l	30	170	138	164	77	81	90	1000
10	Sulphate as SO ₄	mg/l	52	51	54	49	24	42	7.5	400
11	Total Iron as Fe	mg/l	0.04	0.09	0.09	0.08	0.09	0.09	0.11	0.30
12	Total Suspended Solids	mg/l	BDL	BDL	BDL	BDL	4.6	BDL	BDL	-

BDL : Below Detection Limit

Note: Standard IS:10500 Permissible limits in the absence of alternative Sources

Sample Codes with Location:


GWQ-1: Meghalahalli Village (Tube Well); GWQ-2: Tanigehalli Village (Tube Well)


GWQ-3: Medikeripura Village (Tube Well); GWQ-4: Alaghatta Village (Tube Well)

GWQ-5: Bommanagathihalli Village (Tube Well) GWQ-6: Near Office Canteen (Tube Well);

GWQ-7: Near Mines Canteen (Tube Well)

Analyzed and Verified By:

1. 
S. SRI RENGANATHAN
Technical Manager

2. 
P. KAVITHA
Technical Manager
Govt. Analyst

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CHENNAI METTEX LAB PRIVATE LIMITED

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032.

Analysis Report for Ground Water Samples

Client: M/s.Vedanta Limited

Report: II A

Project: Chitradurga Mine

Season: Post Monsoon-2016

Date of Collection: 10.11.2016

S.No	Parameters	Sample Code	GWQ -1	GWQ -2	GWQ -3	GWQ -4	GWQ -5	GWQ -6	GWQ -7	Standard: IS : 10500
		Time of Sampling	09:55 Hrs	13:10 Hrs	11:05 Hrs	12:40 Hrs	14:20 Hrs	15:10 Hrs	15:20 Hrs	
		Units ↓								
1	pH	-	7.22	7.16	6.92	6.88	7.24	7.11	7.15	6.5 to 8.5
2	Turbidity	NTU	< 0.5	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5	5
3	Total Dissolved Solids	mg/l	384	818	963	678	684	884	579	2000
4	Total Hardness as CaCO ₃	mg/l	230	386	408	320	410	302	325	600
5	Calcium as Ca	mg/l	60	94	128	101	89	72	70	200
6	Magnesium as Mg	mg/l	19.5	37	21.4	16	46	29	36	100
7	Total Alkalinity as CaCO ₃	mg/l	182	306	351	264	340	205	160	600
8	Fluoride as F	mg/l	0.44	0.63	0.53	0.54	0.63	0.61	0.30	1.50
9	Chloride as Cl	mg/l	38	174	160	151	120	88	95	1000
10	Sulphate as SO ₄	mg/l	41	67	48	43	31	41	9.8	400
11	Total Iron as Fe	mg/l	0.08	0.06	0.06	0.15	0.07	0.07	0.26	0.30
12	Total Suspended Solids	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	-

BDL - Below Detection Limit

Note: Standard IS: 10500 Permissible limits in the absence of alternative Sources

Sample Codes with Location:

GWQ-1: Meghalahalli Village (Tube Well); GWQ-2: Tanigehalli Village (Tube Well)

GWQ-3: Medikeripura Village (Tube Well); GWQ-4: Alaghatta Village (Tube Well)

GWQ-5: Bommanagathihalli Village (Tube Well) GWQ-6: Near Office Canteen (Tube Well);

GWQ-7: Near Mines Canteen (Tube Well)

Analyzed and Verified By:

1.

S. SRI RENGANATHAN
Technical Manager

2.

P. KAVITHA
Technical Manager
Govt. Analyst

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CHENNAI METTEX LAB PRIVATE LIMITED

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032.

Analysis Report for Ground Water Samples

Client: M/s.Vedanta Limited

Report: II A

Project: Chitradurga Mine

Season: Post Monsoon-2016

Date of Collection: 16.12.2016

S.No	Parameters	Sample Code	GWQ -1	GWQ -2	GWQ -3	GWQ -4	GWQ -5	GWQ -6	GWQ -7	Standard: IS : 10500
		Time of Sampling	09:55 Hrs	13:10 Hrs	11:05 Hrs	12:40 Hrs	14:20 Hrs	15:10 Hrs	15:20 Hrs	
		Units ↓								
1	pH	-	7.26	7.14	6.94	6.84	7.21	7.08	7.11	6.5 to 8.5
2	Turbidity	NTU	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	5
3	Total Dissolved Solids	mg/l	388	828	977	687	698	914	582	2000
4	Total Hardness as CaCO ₃	mg/l	236	384	412	316	408	306	321	600
5	Calcium as Ca	mg/l	64	91	130	99	85	74	66	200
6	Magnesium as Mg	mg/l	18.5	38	21.4	16.5	47.6	30	40	100
7	Total Alkalinity as CaCO ₃	mg/l	186	303	354	261	336	201	165	600
8	Fluoride as F	mg/l	0.47	0.61	0.56	0.57	0.61	0.64	0.32	1.50
9	Chloride as Cl	mg/l	41	172	163	153	124	91	98	1000
10	Sulphate as SO ₄	mg/l	44	64	51	41	28	44	9.3	400
11	Total Iron as Fe	mg/l	0.09	0.04	0.07	0.18	0.07	0.06	0.29	0.30
12	Total Suspended Solids	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	-

BDL : Below Detection Limit

Note: Standard IS: 10500 Permissible limits in the absence of alternative Sources

Sample Codes with Location:

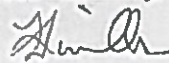
GWQ-1: Meghalahalli Village (Tube Well); GWQ-2: Tanigehalli Village (Tube Well)

GWQ-3: Medikeripura Village (Tube Well); GWQ-4: Alaghatta Village (Tube Well)

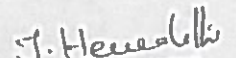
GWQ-5: Bommanagathihalli Village (Tube Well) GWQ-6: Near Office Canteen (Tube Well);

GWQ-7: Near Mines Canteen (Tube Well)

Analyzed and Verified By:

1. 
 P. KAVITHA
 Technical Manager



2. 
 J. HEMALATHA
 Dy. Quality Manager

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CHENNAI METTEX LAB PRIVATE LIMITED

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032.

Analysis Report for Ground Water Samples

Client: M/s.Vedanta Limited

Report: II A

Project: Chitradurga Mine

Season: Summer - 2017

Date of Collection: 08.03.2017

S.No	Parameters	Sample Code	GWQ -1	GWQ -2	GWQ -3	GWQ -4	GWQ -5	GWQ -6	GWQ -7	Standard: IS : 10500
		Time of Sampling	09:55 Hrs	13:10 Hrs	11:05 Hrs	12:40 Hrs	14:20 Hrs	15:10 Hrs	15:20 Hrs	
		Units ↓								
1	pH	-	7.11	7.34	7.21	7.23	7.04	7.11	7.21	6.5 to 8.5
2	Turbidity	NTU	< 0.5	< 0.5	< 0.5	0.7	< 0.5	2.1	< 0.5	5
3	Total Dissolved Solids	mg/l	638	794	524	548	872	678	551	2000
4	Total Hardness as CaCO ₃	mg/l	436	342	340	312	540	470	380	600
5	Calcium as Ca	mg/l	94	66	66	54	104	96	64	200
6	Magnesium as Mg	mg/l	49	43	42.5	43	68	56	54	100
7	Total Alkalinity as CaCO ₃	mg/l	351	260	360	305	288	172	310	600
8	Fluoride as F	mg/l	0.41	0.42	0.41	0.51	0.72	0.81	0.44	1.50
9	Chloride as Cl	mg/l	230	168	43	82	96	542	110	1000
10	Sulphate as SO ₄	mg/l	36	54	58	37	31	54	14	400
11	Total Iron as Fe	mg/l	0.06	0.06	BDL	BDL	0.04	0.04	0.03	0.30
12	Total Suspended Solids	mg/l	BDL	BDL	BDL	BDL	BDL	11	BDL	-

BDL : Below Detection Limit

Note: Standard IS: 10500 Permissible limits in the absence of alternative Sources

Sample Codes with Location:

GWQ-1: Meghalahalli Village (Tube Well); GWQ-2: Tanigehalli Village (Tube Well)

GWQ-3: Medikeripura Village (Tube Well); GWQ-4: Alaghatta Village (Tube Well)

GWQ-5: Bommanagathihalli Village (Tube Well) GWQ-6: Near Office Canteen (Tube Well);

GWQ-7: Near Mines Canteen (Tube Well)

Analyzed and Verified By:

1.



2.

Govt. Analyst

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CHENNAI METTEX LAB PRIVATE LIMITED


Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032.

S.No	Location Code	Sampling Locations	Date	L _{Max}	L _{eq}		L _{min}
					Day	Night	
Core Zone :							
16.	NQ-16	Sampling Room	16.03.2017	77.6	71.0	66.9	62.3
17.	NQ-17	Excavator	16.03.2017	73.5	68.7	65.3	60.8
18.	NQ-18	Wheel loader	16.03.2017	78.6	72.4	63.9	62.1
19.	NQ-19	Dumper	16.03.2017	77.1	73.6	65.5	61.9
20.	NQ-20	Grader	16.03.2017	73.3	67.0	62.9	58.3
21.	NQ-21	Dozer	16.03.2017	81.0	73.9	68.1	64.6
22.	NQ-22	Office Room	16.03.2017	54.8	50.3	46.9	43.2
23.	NQ-23	North Block	16.03.2017	57.6	52.1	47.6	42.1
24.	NQ-24	Work Shop	16.03.2017	63.5	59.0	55.8	53.4


The maximum permissible limit to which a worker can exposed for 8 hrs. work with unprotected ear is	DGMS		ACGIH	
	90 dB(A)		85 dB(A)	
MoEF ambient Noise standards in dB(A) Leq (no.41 dated 16.11.2010)	Residential Area Limits in dB(A) Leq		Industrial Area Limits in dB(A) Leq	
	Day Time	Night Time	Day Time	Night Time
	55	45	75	70
Method Adopted	Integrated Sound level meter			
Sample Collected by	CHIENNAI METTEX LAB PVT LTD			

Inference : It is concluded from the report that the noise level exist with in the stipulated limits as prescribed by MOEF, DGMS as well as ACGIH.

ANALYZED AND VERIFIED BY:

1. 
S. SRI RENGANATHAN
 Technical Manager



2. 
V.K. SELVAKUMAR
 Managing Director
 Govt. Analyst

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Email: test@mettexlab.com
Web: www.mettexlab.com

Phone: 044-22323163, 42179190, 91
Fax: 044-22311034



CHENNAI METTEX LAB PRIVATE LIMITED

Jothi Complex, 83, M.K.N. Road, Guindy, Chennai - 600 032.

ANALYSIS REPORT OF SOIL SAMPLES Soil Quality Monitoring Wing

Client : M/s. Vedanta Limited
Project: Chitradurga Mine
Date of Collection: 28.12.2016

Report No : VII.
Season: Post Monsoon-2016

S.No.	Parameter	VGS1	VGS2	VGS3	VGS4	VGS5	VGS6
1.	pH (1:2 aqueous solution)	6.51	6.11	6.41	6.34	6.91	6.22
2.	Electrical Conductivity (μ mhos/cm)	1460	1082	1216	1382	1516	940
3.	Organic Carbon %	0.52	0.63	0.36	0.48	0.61	0.42
4.	Phosphours as P, Kg/Hec	36	37	31	37	26	22
5.	Potassium as K, Kg/Hec	2.4	2.6	5.2	3.6	3.4	4.2
6.	Chloride as Cl, mg/100 gm	3.2	2.8	2.6	2.3	1.4	2.1
7.	Iron (Hcl Solubles), %	2.2	4.5	6.1	5.3	5.8	6.4
8.	Water Holding Capacity %	24	31	36	26	32	38
9.	Sand %	87	81	87	81	87	82
10.	Silt %	2	5	4	3	4	5
11.	Clay %	11	14	9	16	9	13
12.	Texture	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy

Sample Collected & analyzed by : CHENNAI METTEX LAB PVT LTD

Location of sampling stations:

VGS1 - Megalahalli Village (Agri land)
VGS2 - Kadlegudu Village (Agri land)
VGS3 - Hirekandewali Village (Agri land)
VGS4 - Tenegehalli Village (Agri Land)
VGS5 - Alagatta Village (Agri Land)
VGS6 - Waste dump (With in the lease area)

ANALYZED & VERIFIED BY :

1. *D. Sathya Narayanan*

D. D. SATHYA NARAYANAN
Senior Analyst

2. *[Signature]*
P. VENKIA
Technical Manager
Govt. Analyst

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