

To,
The Additional Director (South)
Ministry of Environment and Forest
Regional Office (Southern Zone)
Kendriya Sadan, IVth Floor, E & F Wings
17th Main Road, II Block, Kormangala
Bangalore – 560 034

Date: 24.05.2016

Sub: Six monthly compliance report of Mareto Sodo Iron Ore Mine (T.C. No. 06/55), Goa for the period October 2015 to March 2016.

Respected Sir,

We are herewith submitting the condition wise compliance report as per the conditions and their corresponding annexures laid down in the Environmental Clearance Letter No: J-11015/1241/2007-IA.II(M) dated 24/12/2009 for the period **October 2015 to March 2016**.

Thanking you,

Yours faithfully,

For Vedanta Ltd.



Mr. Sebastian Pereira
Mines Manager
Mareto Sodo Mines

Enclosed: Six monthly compliance report of Mareto Sodo Iron Ore Mine for the period of **October 2015 to March 2016**.

C.C – Member Secretary, Goa State Pollution Control Board
-- CGWB

Compliance report to conditions of environmental clearance issued by

**Ministry of Environment & Forests, Govt. of India, for Mareto Sodo Iron Ore Mine
(T.C. No. 06/55)**

Letter No: J-11015/1241/2007-IA.II(M) dated 24/12/2009

Production: 1 MTPA as per Environment clearance, however the current production limit is 0.451 MTPA as per capping imposed by state govt.

Period – October 2015 to March 2016

S. No	Condition of clearance	Status of compliance	Remarks
A.	Specific Conditions		
(I)	Environmental clearance is subject to obtaining clearance under the wildlife (Protection) Act, 1972 from the National Board for Wildlife. Further, grant of environmental clearance does not necessarily imply that wildlife clearance shall be granted to the project and the proposal shall be considered by the National Board for Wildlife on merits. The investment made in the project, if any, based on environmental clearance so granted, in anticipation of clearance from the wildlife angle shall be entirely at the cost and the risk of the company and MoEF in this regard shall not be responsible in any matter.	The provision of Wildlife (Protection) Act, 1972 is not applicable as the mine falls outside the Eco sensitive zones notified for the State of Goa	

(ii)	Environmental Clearance is subject to final order of the Hon'ble Supreme of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) no. 460 of 2004, as may applicable to this project.	Noted.	
(iii)	The company shall comply with the conditions stipulated in the environmental clearance accorded to the project for the existing capacity.	Noted and complying.	
(iv)	Wild life Conservation Plan shall be prepared in consultation with the office of the Chief Wile life warden and implemented within six months. The plan shall comprise of in-built monitoring mechanism with special emphasis to protection of Schedule- I species. The status of implementation shall be submitted to the Ministry	Conservation plan for wild life has been prepared in consultation with state forest department and submitted to forest department.	A detailed biodiversity management plan is being prepared in association with CEE. The study period is one year and final report is awaited.
(v)	A 50 m barrier no mining zone on the side(s) of the nallahs flowing across or adjacent the lease shall be demarcated and the barrier shall be thickly vegetated with native species of trees and shrubs.	Not applicable as there is no nallah passing through the lease area.	

(vi)	<p>The company shall ensure that no silt originating due to mining activity is transported in the surface water course and nearby agricultural fields.</p>	<p>The mine run off water is channelized within the pit. The discharge water point is regularly monitored so as to keep a check on the water quality. The weak mine faces, ore stacks are covered with silpaulin to prevent overflow of silt.</p> <p>The old waste dumps are located outside mine lease. Protective measures are effectively implemented to control the silt flow. Geotextiles in the form of coir mats and jute mats are laid on the dump slopes. Glyricidia cuttings are used to staple the geotextiles to the dump surface. Seeds of stylo santhus hamata are sprayed on the geotextiles so as to form a green cover. Step dumping method is followed; each step is restricted to 10-12 m height.</p> <p>Settling ponds, check dams, filterbeds are constructed all along the toe of the dump to prevent flow of silt outside the area.</p>	
(vii)	<p>Need based assessment for the nearest two villages shall be conducted to study economic measures which can help in upliftment of poor section of society. Income generating projects consistent with the traditional skills of the people besides development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development activities and income generating programmes. This</p>	<p>Baseline studies are carried out for the nearby villages in 2015. Depending on the stakeholder response, various community development works are initiated in the surrounding areas. Separate funds are earmarked for socio economic development of the villages. Company also runs sesa technical school which provides technical education to local youth and makes them</p>	<p>Separate budget is earmarked for carrying out various CSR activities. Various activities in the field of health, education, infrastructure, agriculture and women empowerment has been carried out.</p>

	will be in addition to vocational training for individuals imparted to take up self-employment and jobs.	employable.	
(viii)	Maintenance of village roads through which transportation of ores are undertaken shall be carried out by the company regularly at its own expenses. The roads shall be black topped.	Roads used for transporting iron ore are tarred and maintained by mining companies.	
(ix)	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.	For the control of the fugitive dust, various possible measures are adopted some of which are as below: (a) Manual cleaning followed by washing of the shoulders of the transport routes. (b) Regular water sprinkling on haul road is carried out to prevent the dust from getting air borne. The monitoring is carried out in nearest habitation areas; the same is done twice a week.	Graphical Representation of Air Monitoring Results is attached as Annexure-1 .
(x)	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 trucks moving out of mining premises are well covered with tarpaulin and sufficient free board is maintained to prevent the spillage of ore/dust on the road. The transportation of material is carried out during the day time.	
(xi)	Rain water harvesting shall be undertaken to recharge the ground water source. Status of implementation shall be submitted to the Ministry within six months.	Mining pits are utilized for harvesting the rain water .The rain water harvested in mining pit is utilized for the dust suppression, etc.	

(xii)	Permission from the competent authority for extraction of ground water (if any) shall be obtained.	Permission from competent authority obtained.	Permission from WRD for pumping water from Mine pit is obtained for MS Mine via registration certificate No. MIN/06/2015 dated 11/08/2015.
(xiii)	Monitoring of ground and surface water quality shall be regularly conducted and records maintained and data submitted to the Ministry regularly. Further, monitoring points shall be located between the mine and drainage in the direction of flow of ground water and records maintained. Monitoring for Arsenic in ground water shall be undertaken.	Regular monitoring of Ground water and surface water is carried out and data is regularly submitted to GSPCB and Ministry.	Graphical representation of Water Monitoring Results is attached as Annexure-2 .
(xiv)	Measures for prevention and control of soil erosion and management of silt shall be undertaken. Protection of dumps against erosion shall be carried out with geo textile matting or other suitable material, and thick plantations of native trees and shrubs shall be carried out at the dump slopes. Dumps shall be protected by retaining walls.	<p>The mine run off water is channelized within the pit. The discharge water point is regularly monitored so as to keep a check on the water quality. The weak mine faces, ore stacks are covered with silpaulin to prevent overflow of silt.</p> <p>The old waste dumps are located outside mine lease. Protective measures are effectively implemented to control the silt flow. Geotextiles in the form of coir mats and jute mats are laid on the dump slopes. Glyricidia cuttings are used to staple the geotextiles to the dump surface. Seeds of stylo santhus hamata are sprayed on the geotextiles so as to form a green cover. Step dumping method is followed; each step is</p>	

		<p>restricted to 10-12 m height.</p> <p>Settling ponds, check dams, filter beds are constructed all along the toe of the dump to prevent flow of silt outside the area. As a measure of erosion control, an area of 1200 m² is covered with silpaulin.</p>	
(xv)	<p>The design of the check dam shall be so as to Prevent downstream flow of the silt and regular de-siltation of the check dam shall be carried to prevent impact on the downstream water bodies and agricultural land.</p>	<p>Dump run off water is channelized through Garland drains and M.S.pipes into the settling ponds at the toe of the dumps. Check dam is constructed at toe of the dump. De-silting was not required to carry out as there was no silt accumulated in the settling pond.</p>	
(xvi)	<p>Provision shall be made for the housing the laborer's within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.</p>	<p>No workmen/ labor stays in the mine lease area. To and fro transport arrangement is made for all the people working on mines.</p>	
(xvii)	<p>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. Adequate number of Check Dams and Gully Plugs shall be constructed across seasonal/perennial nallahs (if any flowing through the ML area and silts arrested. De- silting at regular intervals shall be carried out.</p>	<p>Dump run off water is channelized through Garland drains and M.S.pipes into the settling ponds at the toe of the dumps. De-silting if required is carried out well before the onset of monsoon. During the reporting period there was no de-silting carried out as there is no silt within the settling pond.</p>	

(xviii)	Occupational health and safety measures for the workers including identification of work related health hazards, training on malaria eradication, HIV, and health effects on exposures to mineral dust etc. 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 equipments etc. shall be carried out periodically. Review of impact of various health measures undertaken (at interval of five years or less) shall be conducted followed by follow up action wherever required.	Company has employed doctor who is trained in occupational health. Well-equipped occupational health center is at the site to conduct the spirometry, audiometry etc. Periodic monitoring is carried out for all the employees for the exposure to dust and health records are maintained. Various awareness programmes are organized for the workers related to occupational health and safety issues.	
(xix)	Green belt development and selection of plant species shall be as per CPCB guidelines. Herbs and shrubs shall also form a part of afforestation programme besides tree plantation. Details of year wise afforestation programme including rehabilitation of mined out area shall be submitted to the Ministry within six months.	Company carries out annual plantation programme. The plantation comprises a mix of fast growing species, native species and grasses and shrubs. Details of afforestation programme submitted to ministry on regular basis. The company has established its own state of art 'Root Trainer Nursery' at Codli mine.	Total no. of plantation carried out on Pissurlem dump is 2395 covering an area of 0.533 Hectares. Plantation details for the year 2014-15 are attached in the Annexure-4 .
(xx)	Top soil/ solid waste shall be stacked properly with proper slope and adequate safeguards and shall be utilized for backfilling (wherever applicable) for reclamation and rehabilitation of mined out area. Top soil shall be separately stacked for utilization later for reclamation and shall not be stacked along with over burden.	There is no top soil within the lease area.	

xxi	Over burden (OB) shall be stacked at earmarked dump site(s) only and shall not be kept active for long period. The maximum height of the dump shall not exceed 30 m, each stage shall preferably be of 10m and overall slope of the dump shall not exceed 28°. The OB lump shall be backfilled. The OB dumps shall be scientifically vegetated with suitable native species to prevent erosion and surface run off. Monitoring and management of areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests on six monthly basis.	Over Burden is been stacked at earmarked dumps sites only and not kept active for a long period. The dumps are located outside the lease area .Dumping is carried out as per the approved mining plan, Step dumping method is followed and each step is of 10 -15 m each. Over all angle is maintained approx. 28 degrees. The finalized areas are covered with geotextiles and jute and taken up for plantation. .	
(xxii)	Slope of the mining bench and ultimate pit limit shall be as per the mining scheme approved by Indian bureau of mines.	Complied. Mining is carried out as per mining plan an approved by Indian Bureau of Mines.	
(xxiii)	The waste water from the mine shall be treated to conform to the prescribe standards before discharging in to the natural stream. The discharged water from the Tailing Dam (if any) shall be regularly monitored and report submitted to the Ministry of Environment & Forests, Central Pollution Control Board and the State Pollution Control Board.	Regular monitoring of discharge water is done to ensure that the discharge water is conforming to the standards. No tailing dam is present.	Graphical representation of Water Monitoring Results is attached as Annexure-2 .
(xxiv)	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.	Action plan prepared for the issues / suggestion made during public hearing had been submitted to MOEF.	

(xxv)	A final mine closure plan , along with details of Corpus Fund, shall be submitted to the Ministry of Environment & Forest ,5 years in advance of final mine closure for approval.	Final closure plan approved by Indian Bureau of mines would be submitted to MOEF in due course of time in accordance with rule 23C of MCDR.	
(xxvi)	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 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 overloading of ores for transportation shall be committed. The trucks transporting ore shall not pass through wild life sanctuary.	PUC check certificate of all the truck plying for the transportation of the ore is checked and kept as record. All trucks leaving mining premises is covered with tarpaulin. No wild life sanctuaries fall in our transport routes. Trucks are weighed before the exit point to prevent the overloading.	
(xxvii)	The environmental clearance is subject to the condition. If any, stipulated by the IBM on the mining scheme submitted by the project proponent for its approval.		
(xxviii)	Adequate buffer zone shall be maintained between two consecutive mineral bearing deposits.	Since it is single pit operation, this is not applicable.	

B	GENERAL CONDITIONS		
S. No	Condition of clearance	Status of compliance	Remarks
i	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment & Forest.	Complied. There is no change in mining technology and scope of working. Mining is carried out as per mining plan an approved by Indian Bureau of Mines	
ii	No change in the calendar plan including excavation, quantum of mineral and waste shall be made.	Mining is carried out as per mining plan approved by Indian Bureau of Mines	
iii	Fugitive dust emission 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.	Complied (a) Manual cleaning followed by washing of the shoulders of the transport routes. (b) Regular water sprinkling on haul road is carried out to prevent the dust from getting air borne. (3) Ore carrying trucks plying on public road are covered with tarpaulin & free board is provided to prevent spillage.	

iv	Four ambient air quality -monitoring stations shall be established in the core zone as well in the buffer zone for RPM, SPM,SO ₂ ,NOX monitoring data , topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution control Board.	Complied. Four Air monitoring stations are fixed within the core & buffer zone and monitored as per new Mining standards in core zone and NAAQ in buffer zone at the in-house environment laboratory approved by MOEF.	Graphical Representation of the Air Monitoring results is attached as Annexure 1 .
v	Data on ambient air quality (RSPM, SPM, SO ₂ , and NOX) Should be regularly submitted to the Ministry including its Regional office located at Bangalore and the State Pollution Control Board /Central Board /Central Board / Central Pollution Control Board once in six months. The monitored data of criteria pollutants mentioned above shall be regularly uploaded on the company's website and also displayed at project site.	Monitoring for Ambient Air Quality is carried out twice a week as per guidelines stipulated under Consent to Operate and the results are submitted to Ministry and GSPCB on regular basis.	
vi	Measures shall be taken for control of noise levels below 85 dB in the work environment .Workers engaged in operations of HEMM, etc. Shall be provided with ear Plugs /muffs.	Complied. Most of the dumpers & HEMM is with A/C cabins which minimize the impact of noise on operator. DG sets are provided with acoustic enclosures. All people working in mines are provided with requisite personal protective equipment's.	

vii	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 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.	There is no work shop within the mine, however the facilities of adjoining gaval sonshi mine of cosme costa is utilized .Oil and grease trap is installed to treat the workshop effluent water. The treated water is utilized for vehicle washing ramp.	
viii	Personnel working in dusty areas shall be provided with protective respiratory devices and they shall also be imparted adequate training and information on safety and health aspects.	Dust mask are provided to the personnel's exposed to dusty conditions. All the dumpers & HEMM are with A/C cabins. Regular on the job training on health and safety aspects is provided to all personnel working on mines.	
ix	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.	Not applicable as there is no additional infrastructure facilities developed.	

x	A separate Environment 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>Complied</p> <p>Environment cell has multidisciplinary staff, qualified in –Environment engineering, Agriculture, Forestry who directly reports to the CEO of the Company.</p>	<p>Chief Executive Officer</p> <p>↓</p> <p>Krishna Kulkarni (Head, HSE)</p> <p>↓</p> <p>Jagdish Desai (Manager environment)</p> <p>↓</p> <p>Mayank Sharma (Environment Engineer)</p>
xi	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 development work.	It is an ongoing mining project.	
xii	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 and its Regional Office located at Bangalore.	<p>Complied</p> <p>Expenditure for all the environmental measure / monitoring /reclamation etc. is separately earmarked in operational budget. Yearly expenditure on environment activities is submitted to ministry regional office.</p>	The total Environmental Expenditure for FY: 2015-16 is Rs. 166827.

xiii	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 development work.	It is an ongoing mining project.	
xiv	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 officer (s) of the Regional Office by furnishing the requisite data / information /monitoring reports .	Necessary support shall be provided to the regional officer for the visit, furnishing requisite data etc.	
xv	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests its Regional office, Bangalore, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environment of the environmental clearance conditions on their website and update the same periodically and simultaneously send the same by e-mail to the Regional Office, Ministry of Environment and Forests, Bangalore. 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.	Is Submitted	
xvi	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality /office of Municipal Corporation/Gram Panchayat concerned and on the company's web site within seven days from the date of this clearance letter, informing that the project has been accorded	Copy of advertisement of the Environment Clearance letter in two local newspapers has been done.	

	environmental clearance and copies of clearance letter are available with the State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests at http://envfor.nic.in .		
xvii	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. The clearance letter shall also be put on the website of the company.	Is complied	
xviii	State Pollution Control Board shall display a copy of the clearance letter at the Regional office, District industries center and collector office/Tehsildar's Office for 30 days.	--	
xix	The environmental statement for each financial year ending 31st March in Form-V as is mandated shall be submitted to the State Pollution Control Board as prescribed under The Environment (Protection) Rules, 1986, as amended subsequently and shall also be put on the website of the company along with the status of compliance of environmental clearance conditions. The same shall also be sent to the Regional Office of Ministry by e-mail.	Is complied.	
5	The Ministry of Environment and Forests reserves the right to revoke the clearance if conditions stipulate are not implemented to the satisfaction of the Ministry. MOEF may impose additional environmental conditions or modify the existing ones, if necessary.		

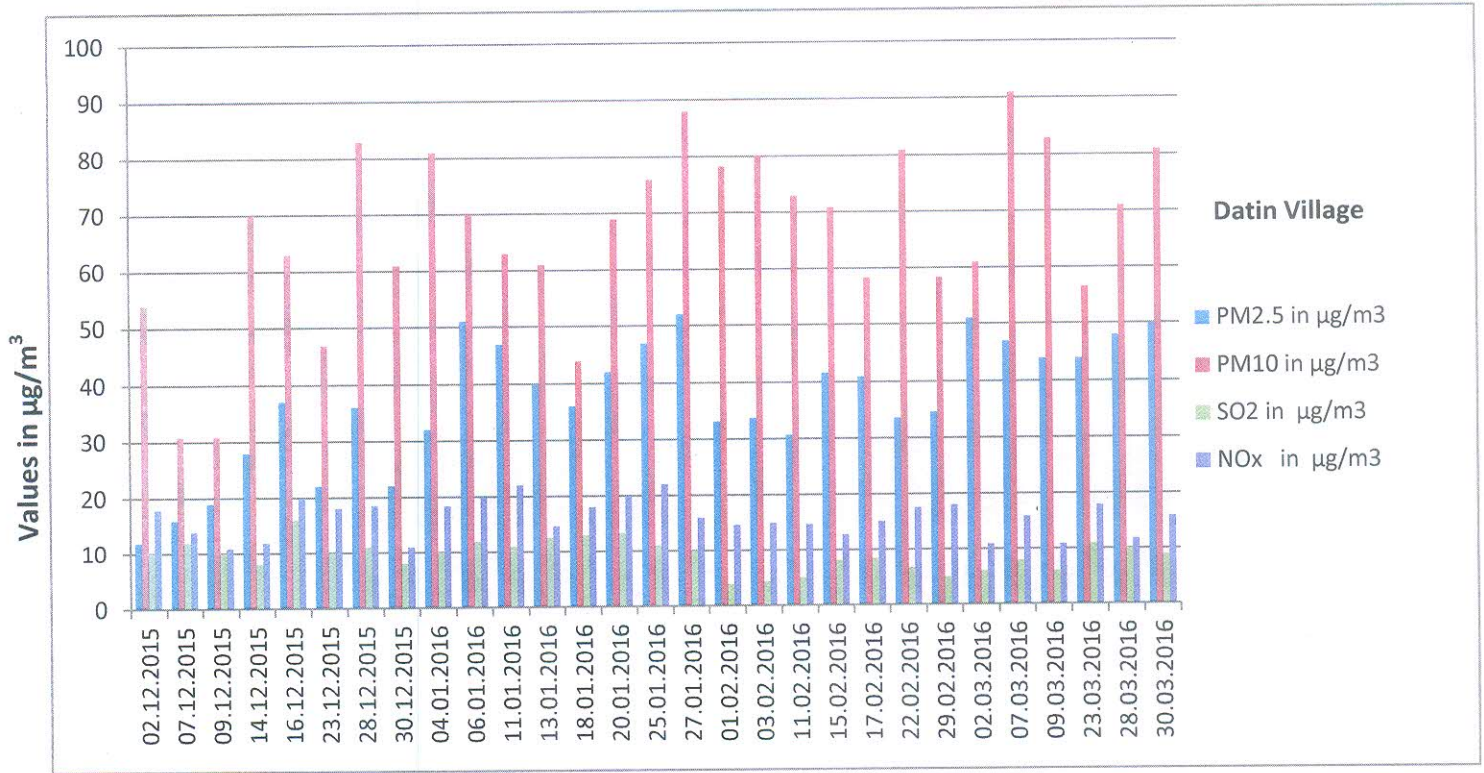
6	In case of any deviation or alteration in the project proposed from those submitted to this Ministry for clearance, a fresh reference should be made to the Ministry to assess the adequacy of the condition(s) imposed and to add additional environmental protection measures required, if any.		
7	Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.		
8	Any appeal against this environment clearance shall lie with the National Environment Appellate Authority, if preferred, within a period of 30 days as prescribed under section 11 of the National Environment Appellate Authority Act, 1997.		
9	The above conditions will be enforced inter -alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made thereunder and also any other orders passed by the Hon'ble Supreme Court of India/ High Court of Goa and any other Court of Law relating to the subject matter.		

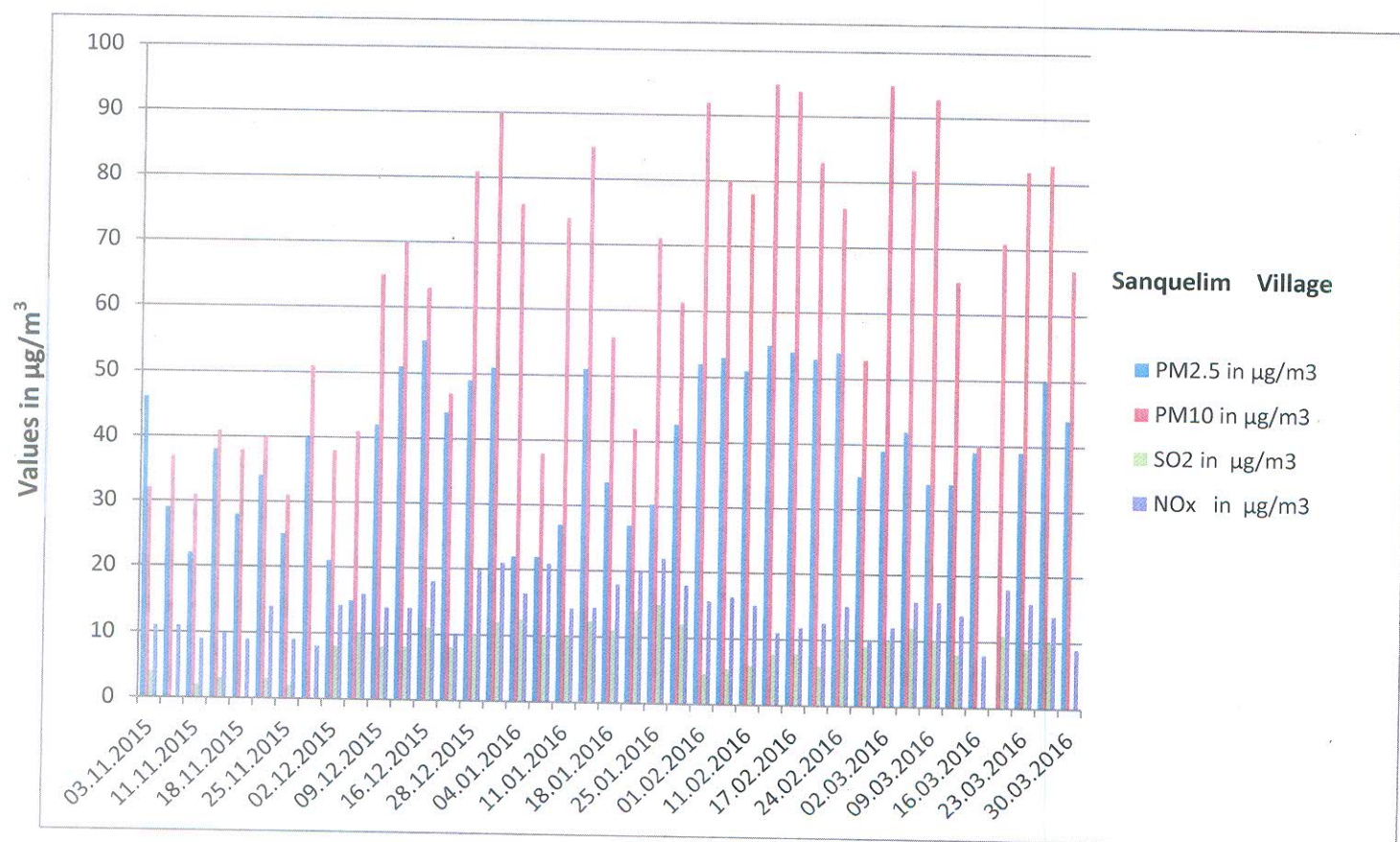
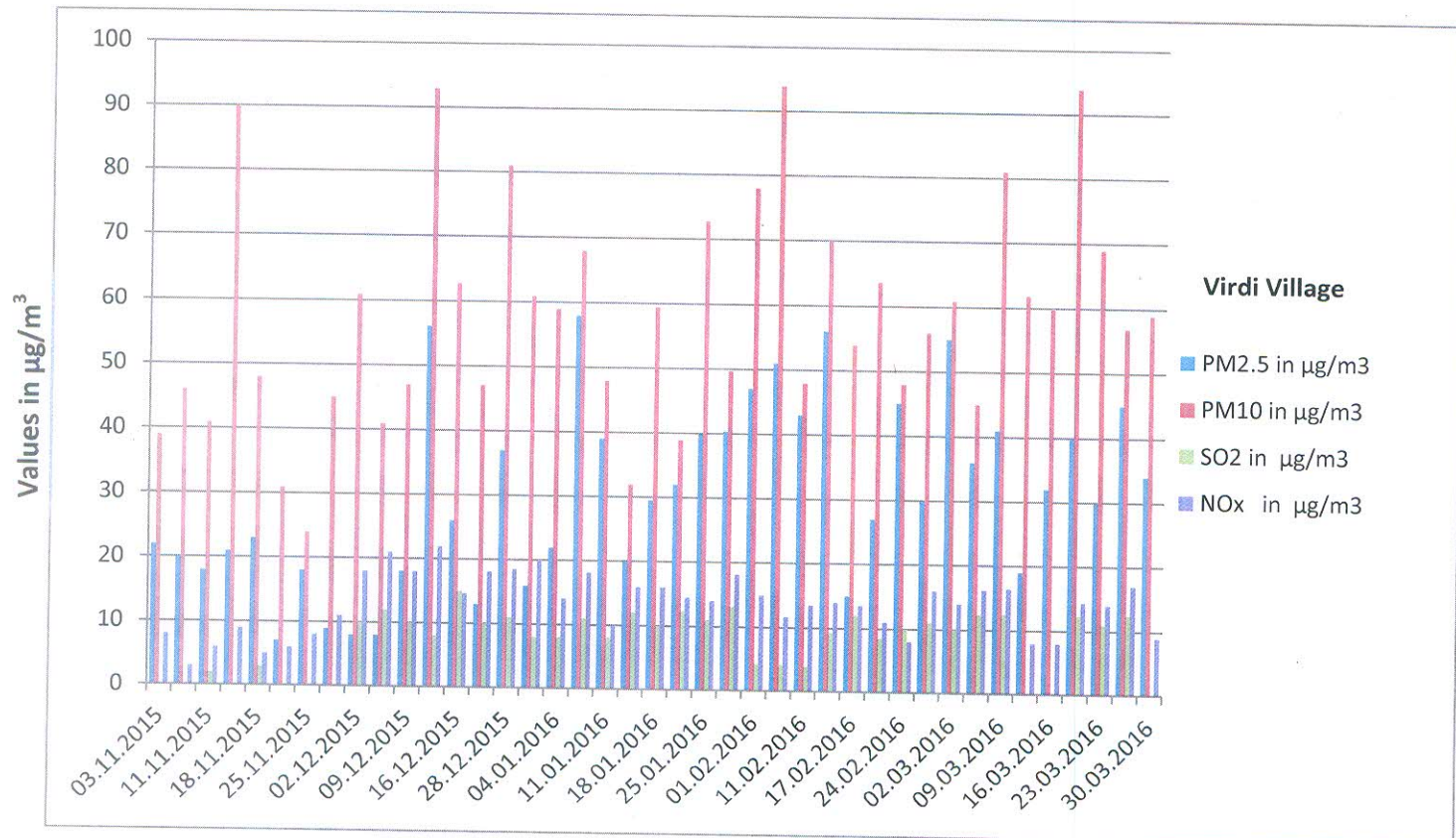
Ambient Air Quality Monitoring Report



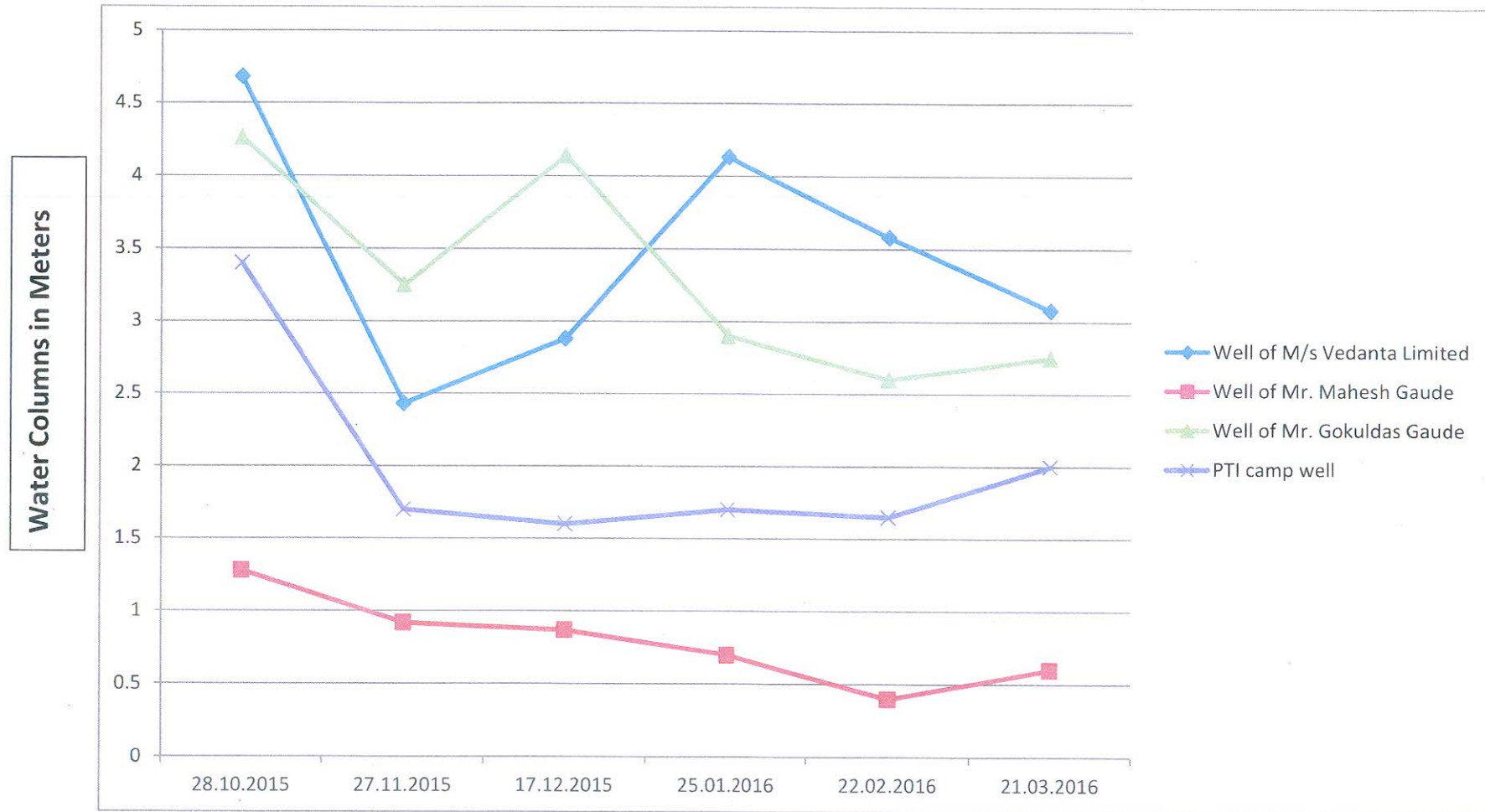


Ambient Air Quality Monitoring Report





Well Water Level Report



M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Codli Mines, P.O. Kirlapale, Goa-403727

Recognised by Ministry of Environment, Forests and Climate change, Govt. of India Vide Notification .S.O.137(E).
dated 12th January 2015, Valid up to 11.01.2020

* Certified by ISO 9001:2008, ISO 14001 :2004 and OHSAS 18001:2007

Surface Water Analysis Report for the Month of March 2016

Mine Name: Mareto Sodo Mine

Date of Sample collection: 21/03/2016

Standard method used for analysis: APHA Standard

Date of Receipt of sample: 22/03/2016

Analysis completion date: 28/03/2016

Parameter	Unit	Permissible limits	Location	
			Pit Discharge	Sonshi Nallah near Ajoba Temple
Colour	Hazen	----	6	38
pH	---	5.5 to 9.0	6.58	7.09
Turbidity	NTU	----	1.58	3.77
Dissolved Solids	mg/lit	----	18	31.1
Conductivity	μ S/cm	----	36	62.2
Suspended Solids	mg/lit	50	2	2
Chlorides	mg/lit	----	6.8	7.7
Total Hardness as CaCO ₃	mg/lit	----	12	26
Calcium as Ca ⁺⁺	mg/lit	----	3.2	4.8
Magnesium as Mg ⁺⁺	mg/lit	----	1.0	3.4
Sulphate as SO ₄	mg/lit	----	1.8	1.8
Phosphate as PO ₄	mg/lit	5	BDL	0.14
Nitrate as NO ₃	mg/lit	10	0.1	0.2
B.O.D (3days, 27°C)	mg/lit	30	<3	<3
C.O.D	mg/lit	250	10	20
Total Iron	mg/lit	3	0.12	0.11
Manganese as Mn	mg/lit	2	BDL	0.01
D.O	mg/lit	----	7	7
Oil & Grease	mg/lit	10	<1	<1

Note :- No water discharge from Pissurlem dump run off , Sonshi Dump run off , Vaghure side dump run off & Upstream Advoi Nallah , Downstream Advoi nallah, Upstream sonshi nallah, Downstream sonshi nallah.

BDL- Below Detection Limit

Govt. Analyst



Laboratory Incharge

M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Codli Mines, P.O. Kirlapale, Goa-403727

Recognised by Ministry of Environment, Forests and Climate change, Govt. of India Vide Notification S.O.137(E).

Dated 12th January 2015, valid up to 11.01.2020

* Certified by ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007

Well Water Analysis Report

Mine Name: Mareto Sodo Mine

Date of Sample collection :21.03.2016


Standard method used for analysis: APHA Standard

Date of Receipt of sample:22.03.2016

Analysis completion date:28.03.2016

Parameter	Unit	Permissible Limit	Location			
			Sonshi Well	PTI Camp Well	Mahesh Gauda Well	Mr. Gokuldas Gawde Well
Colour	Hazen	<5.0	<5	<5	<5	<5
pH	-	6.5-8.5	6.68	6.13	6.07	6.02
Turbidity	NTU	5	3.42	2.35	1.61	3.06
Conductivity	µs/cm	-	30	46.4	55.5	54.8
Dissolved Solids	mg/lit	500	15	23.2	27.7	27.4
Suspended Solids	mg/lit	-	1	2	1	1
Chloride	mg/lit	250	5.8	7.7	6.8	8.7
Total Hardness as CaCO ₃	mg/lit	200	12	16	18	36
Calcium as Ca ⁺⁺	mg/lit	75	2.4	4.0	4.0	3.2
Magnesium as mg ⁺⁺	mg/lit	30	1.5	1.5	1.9	6.8
Sulphate as SO ₄	mg/lit	200	1.2	1.2	1.3	1.3
Nitrate as NO ₃	mg/lit	45	0.2	0.3	0.4	0.6
Alkalinity	mg/lit	200	12	16	13	16
Iron as Fe	mg/lit	0.3	0.07	0.05	0.06	0.10
Manganese as Mn	mg/lit	0.1	0.03	0.01	BDL	0.04
MPN/100ml	mg/lit	Absent	Absent	21	17	17

BDL- Below Detection Limit


Govt. Analyst




Laboratory Incharge

Surface Water Analysis Report for the Month of February 2016

Mine Name: Mareto Soda Mine

Date of Sample collection: 22/02/2016

Standard method used for analysis: APHA Standard

Date of Receipt of sample: 22/02/2016

Analysis completion date: 26/02/2016

Parameter	Unit	Permissible limits	Location				
			Upstream Advoi Nallah	Downstream Advoi nallah	Upstream sonshi nallah	Pit Discharge	Sonshi Nallah near Ajoba Temple
Colour	Hazen	----	11	4	5	6	42
pH	----	5.5 to 9.0	5.87	5.85	6.41	6.54	7.08
Turbidity	NTU	----	1.8	1.48	1.87	1.58	4.63
Dissolved Solids	mg/lit	----	17.3	17.2	18	18.2	30.3
Conductivity	μ S/cm	----	34.6	34.4	39	36.4	60.6
Suspended Solids	mg/lit	100	1	2	2	2	3
Chlorides	mg/lit	----	5.8	5.8	6.8	6.3	6.8
Total Hardness as CaCO_3	mg/lit	----	14	12	12	10	26
Calcium as Ca^{++}	mg/lit	----	2.4	1.6	3.2	2.4	4
Magnesium as Mg^{++}	mg/lit	----	1.9	1.9	1.0	1.0	3.9
Sulphate as SO_4	mg/lit	----	1.3	2	2.0	1.9	1.6
Phosphate as PO_4	mg/lit	5	BDL	BDL	BDL	BDL	BDL
Nitrate as NO_3	mg/lit	10	0.12	0.14	0.2	0.13	0.22
B.O.D (3days, 27°C)	mg/lit	30	<3	<3	<3	<3	<3
C.O.D	mg/lit	250	34.6	34.6	<10	34.6	60.5
Total Iron	mg/lit	3	0.05	0.02	0.35	0.12	0.11
Manganese as Mn	mg/lit	2	0.15	0.17	BDL	BDL	0.01
D.O	mg/lit	----	5	5	6	8	7
Oil & Grease	mg/lit	10	<1	<1	1	<1	<1

Note :- No water discharge from Pissurlem dump run off, Sonshi Dump run off, Vaghure side dump run off & Downstream sonshi nallah

BDL- Below Detection Limit

Govt. Analyst



for Laboratory Incharge

M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Codli Mines, P.O. Kirlapale, Goa-403727

Recognised by Ministry of Environment, Forests and Climate change, Govt. of India Vide Notification S.O.137(E). Dated 12th January 2015, valid up to 11.01.2020

* Certified by ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007

Well Water Analysis Report

Mine Name: Mareto Sodo Mine

Date of Sample collection :22.02.2016 *

Standard method used for analysis: APHA Standard

Date of Receipt of sample:22.02.2016

Analysis completion date:26.02.2016

Parameter	Unit	Permissible Limit	Location			
			Sonshi Well	PTI Camp Well	Mahesh Gaude Well	Mr. Gokuldas Gawde Well
Colour	Hazen	<5.0	<5	<5	<5	<5
pH	-	6.5-8.5	5.92	6.53	5.69	5.76
Turbidity	NTU	5	1.29	5.5	0.96	1.58
Conductivity	µs/cm	-	31.4	48.6	49	55.6
Dissolved Solids	mg/lit	500	15.7	24.3	24.5	27.8
Suspended Solids	mg/lit	-	2	2	2	2
Chloride	mg/lit	250	7.7	7.7	8.7	7.7
Total Hardness as CaCO ₃	mg/lit	200	10	12	16	14
Calcium as Ca++	mg/lit	75	2.4	3.2	3.2	2.4
Magnesium as mg++	mg/lit	30	0.97	0.97	1.94	1.94
Sulphate as SO ₄	mg/lit	200	1.35	1	1.2	1.45
Nitrate as NO ₃	mg/lit	45	0.1	0.1	0.15	0.1
Alkalinity	mg/lit	200	12	17	13	15
Iron as Fe	mg/lit	0.3	0.08	0.06	0.08	0.10
Manganese as Mn	mg/lit	0.1	0.03	0.01	BDL	0.05
MPN/100ml	mg/lit	Absent	Absent	27	14	14

Govt. Analyst

for Laboratory Incharge



M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Codli Mines, P.O. Kirlapale, Goa-403727

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Surface Water Analysis Report for the Month of January 2016

Mine Name: Mareto Sodo Mine

Date of Sample collection: 25/01/2016

Standard method used for analysis: APHA Standard

Date of Receipt of sample: 25/01/2016

Analysis completion date: 30/01/2016

Parameter	Unit	Permissible limits	Location				
			Upstream Advoi Nallah	Downstream Advoi nallah	Upstream sonshi nallah	Pit Discharge	Sonshi Nallah near Ajoba Temple
Colour	Hazen	----	4	4	15	10	11
pH	----	5.5 to 9.0	5.76	5.72	6.24	6.13	6.1
Turbidity	NTU	----	1.1	1.2	2.51	3.39	3.29
Dissolved Solids	mg/lit	----	16.9	17.6	17.4	29.3	27.1
Conductivity	µS/cm	----	33.9	35.2	34.8	58.7	54.1
Suspended Solids	mg/lit	100	2	2	3	2	2
Chlorides	mg/lit	----	5.8	4.8	4.8	6.8	5.8
Total Hardness as CaCO ₃	mg/lit	----	14	12	12.0	24	20
Calcium as Ca ⁺⁺	mg/lit	----	2.4	2.4	3.2	4.8	4
Magnesium as Mg ⁺⁺	mg/lit	----	1.9	1.5	1.0	2.9	2.4
Sulphate as SO ₄	mg/lit	----	1	2	2.8	1.8	2.3
Phosphate as PO ₄	mg/lit	5	BDL	BDL	BDL	BDL	BDL
Nitrate as NO ₃	mg/lit	10	0.3	0.17	0.2	0.9	0.3
B.O.D (3days, 27°C)	mg/lit	30	<3	<3	<3	<3	<3
C.O.D	mg/lit	250	<10	<10	<10	<10	<10
Total Iron	mg/lit	3	0.11	0.15	0.36	0.14	0.16
Manganese as Mn	mg/lit	2	0.13	0.01	0.02	BDL	BDL
D.O	mg/lit	----	6	6	7	6	7
Oil & Grease	mg/lit	10	<1	<1	1	<1	<1

Note :- No water discharge from Pissurlem dump run off, Sonshi Dump run off, Vaghure side dump run off & Downstream sonshi nallah

BDL- Below Detection Limit


Govt. Analyst




Laboratory Incharge

M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Codli Mines, P.O. Kirlapale, Goa-403727

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Well Water Analysis Report

Mine Name: Mareto Sodo Mine

Date of Sample collection :25.01.2016

Standard method used for analysis: APHA Standard

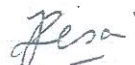
Date of Receipt of sample:25.01.2016

Analysis completion date:30.01.2016

Parameter	Unit	Permissible Limit	Location			
			Sonshi Well	PTI Camp Well	Maresh Gauda Well	Mr. Gokuldas Gawde Well
Colour	Hazen	<5.0	<5	<5	<5	<5
pH	-	6.5-8.5	5.19	5.58	5.20	5.36
Turbidity	NTU	5	1.18	1.32	0.99	1.98
Conductivity	us/cm	-	30.5	41.4	46.2	58.4
Dissolved Solids	mg/lit	500	15.2	20.7	23.1	29.2
Suspended Solids	mg/lit	-	2	2	2	2
Chloride	mg/lit	250	7.71	6.75	9.64	9.64
Total Hardness as CaCO ₃	mg/lit	200	10	12	10	12
Calcium as Ca++	mg/lit	75	2.4	4	*2.4	3.2
Magnesium as mg++	mg/lit	30	0.97	0.49	0.97	0.97
Sulphate as SO ₄	mg/lit	200	0.2	0.46	0.2	2
Nitrate as NO ₃	mg/lit	45	0.1	0.08	0.15	0.1
Alkalinity	mg/lit	200	10	14	10	14
Iron as Fe	mg/lit	0.3	0.08	0.19	0.14	0.19
Manganese as Mn	mg/lit	0.1	0.04	0.02	0.03	0.04
MPN/100ml	mg/lit	Absent	Absent	21	12	14


Govt. Analyst




Laboratory Incharge

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Surface Water Analysis Report for the Month of December 2015

Mine Name: ^{Soda} Mareto Mine
 Date of Sample collection: 17/12/2015
 Standard method used for analysis: APHA Standard
 Permissible limits - Applicable only for Mine Discharge

Date of Receipt of sample: 17/12/2015
 Analysis completion date: 23/12/2015

Parameter	Unit	Location						
		Permissible limits	Upstream Advoi Nallah	Downstream Advoi Nallah	Upstream Sonshi Nallah	Downstream Sonshi Nallah	Pit Discharge	Sonshi Nallah near Ajoba Temple
Colour	Hazen	----	4	11	6	7	12	10
pH	----	5.5 to 9.0	5.91	5.73	6.56	6.61	6.23	6.75
Turbidity	NTU	----	0.66	0.75	1.31	1.28	0.93	1.02
Dissolved Solids	mg/lit	----	17	17.1	20	21	29.9	40.5
Conductivity	µS/cm	----	34	34.4	40	42	59.9	81
Suspended Solids	mg/lit	100	2	2	2	3	2	3
Chlorides	mg/lit	----	5.7	5.7	8.6	8.6	4.8	5.7
Total Hardness as CaCO ₃	mg/lit	----	9.2	7.3	14.3	16.3	20.2	29.3
Calcium as Ca ⁺⁺	mg/lit	----	2.20	2.93	3.26	4.90	5.14	6.60
Magnesium as Mg ⁺⁺	mg/lit	----	0.89	Nil	1.49	0.99	1.78	3.12
Sulphate as SO ₄	mg/lit	----	1.9	2	2.8	1.2	0.2	2.7
Phosphate as PO ₄	mg/lit	5	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate as NO ₃	mg/lit	10	0.14	0.12	0.14	0.1	1.6	0.3
B.O.D (3days, 27°C)	mg/lit	30	<3	<3	<3	<3	<3	<3
C.O.D	mg/lit	250	<10	<10	<10	<10	<10	<10
Total Iron	mg/lit	3	0.08	0.09	0.12	0.14	0.08	0.07
Manganese as Mn	mg/lit	2	BDL	BDL	0.04	0.03	BDL	BDL
D.O	mg/lit	----	4.3	4.1	4.7	4.4	4.3	4.2
Oil & Grease	mg/lit	10	<1	<1	<1	<1	<1	<1

Note :- No water discharge from Pissurlem dump run off, Sonshi Dump run off & Vaghure side dump run off
 BDL- Below Detection Limit

Govt. Analyst



Laboratory Incharge

M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Eoan Mines, P.O. Kirilapate, Goa-403727

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Well Water Analysis Report

Mine Name: Mareto Sodo Mine

Date of Sample collection :17.12.2015

Standard method used for analysis: APHA Standard

Date of Receipt of sample:17.12.2015

Analysis completion date:23.12.2015

Parameter	Unit	Permissible Limit	Locations			
			Sonshi Well	PTI Camp Well	Mahesh Gaud Well	Mr. Gokuldas Gawde Well
Colour	Hazen	<5.0	3	2	4	3
pH	-	6.5-8.5	6.6	6.58	6.50	6.42
Turbidity	NTU	5	0.69	0.68	0.77	0.72
Conductivity	µs/cm		27.7	41.9	45.7	60.1
Dissolved Solids	mg/lit	500	13.8	20.8	22.9	30
Suspended Solids	mg/lit	-	2	3	2	2
Chloride	mg/lit	250	4.75	3.8	6.65	8.55
Total Hardness as CaCO ₃	mg/lit	200	7.34	12.84	9.17	12.84
Calcium as Ca++	mg/lit	75	1.47	2.94	2.2	3.67
Magnesium as mg++	mg/lit	30	0.89	1.34	0.89	0.89
Sulphate as SO ₄	mg/lit	200	0.21	0.5	0.22	2.1
Nitrate as NO ₃	mg/lit	45	0.2	0.06	0.17	0.1
Alkalinity	mg/lit	200	4	6	10	10
Iron as Fe	mg/lit	0.3	0.14	0.11	0.09	0.07
Manganese as Mn	mg/lit	0.1	BDL	BDL	BDL	BDL
MPN/100ml	mg/lit	Absent	Absent	20	10	11


Govt. Analyst




Laboratory Incharge

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Surface Water Analysis Report for the Month of November 2015

Mine Name: Mareto Sodo Mine

Date of Sample collection: 27/11/2015

Standard method used for analysis: APHA Standard

Permissible limits - Applicable only for Mine Discharge

Date of Receipt of sample: 27/11/2015

Analysis completion date: 02/12/2015

Parameter	Unit	Permissible limits	Location					
			Upstream Advoi Nallah	Downstream Advoi nallah	Upstream sonshi nallah	Down stream sonshi nallah	Pit Discharge	Sonshi Nallah near Ajoba Temple
Colour	Hazen		5	11	<5	9	8	12
pH	----	5.5 to 9.0	5.95	6.09	6.4	6.56	6	6.34
Turbidity	NTU	----	1.83	3.3	1.31	1.09	4.66	6.13
Dissolved Solids	mg/lit	----	16.9	17.2	22	37.0	14.3	35.9
Conductivity	µS/cm	----	33.8	34.5	43.9	46	28.6	71.8
Suspended Solids	mg/lit	100	2	2	2	2	2	2
Chlorides	mg/lit	----	1.9	4.75	4	4.75	5.70	4.75
Total Hardness as CaCO ₃	mg/lit	----	14.28	12.24	18	22.44	8.16	28.56
Calcium as Ca ⁺⁺	mg/lit	----	4.08	2.45	4.9	5.71	2.45	6.53
Magnesium as Mg ⁺⁺	mg/lit	----	0.99	1.49	1.49	1.98	0.5	2.97
Sulphate as SO ₄	mg/lit	----	2.7	2.5	3.3	2.8	4.9	4.4
Phosphate as PO ₄	mg/lit	5	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate as NO ₃	mg/lit	10	0.1	0.14	0.1	0.15	0.14	0.1
B.O.D (3days, 27°C)	mg/lit	30	<3	<3	<3	<3	<3	<3
C.O.D	mg/lit	250	14	<10	19.4	<12	20	19
Total Iron	mg/lit	3	0.14	0.12	0.11	0.12	0.05	0.07
Manganese as Mn	mg/lit	2	0.07	0.07	0.02	0.03	0.03	0.03
D.O	mg/lit	----	4.2	4.1	4.1	4.1	4.3	4.2
Oil & Grease	mg/lit	10	<1	<1	1	<1	<1	<1

Note :- No water discharge from Pissurlem dump run off, Sonshi Dump run off & Vaghure side dump run off

BDL- Below Detection Limit


Govt. Analyst



for 
Laboratory Incharge

M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Codli Mines, P.O. Kirlapale, Goa-403727

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Well Water Analysis Report

Mine Name: Mareto Sodo Mine


Date of Sample collection :27.11.2015

Standard method used for analysis: APHA Standard

Date of Receipt of sample:27.11.2015

Analysis completion date:02.12.2015

Parameter	Unit	Permissible Limit	Locations			
			Sonshi Well	PTI Camp Well	Maresh Gaud Well	Mr. Gokuldas Gawde Well
Colour	Hazen	<5.0	2	4	2	4
pH		6.5-8.5	6.56	6.60	6.58	6.61
Turbidity	NTU	5	1.09	1.26	0.99	1.3
Conductivity	µs/cm	-	32	44	44	66
Dissolved Solids	mg/lit	500	16	22	22	33
Suspended Solids	mg/lit	-	2	2	2	2
Chloride	mg/lit	250	5.7	5.7	5.7	6.65
Total Hardness as CaCO ₃	mg/lit	200	12.24	16.32	12.24	18.36
Calcium as Ca ⁺⁺	mg/lit	75	3.25	4.08	2.45	3.26
Magnesium as mg ⁺⁺	mg/lit	30	0.99	1.49	1.49	2.48
Sulphate as SO ₄	mg/lit	200	0.4	3.7	2.8	3.8
Nitrate as NO ₃	mg/lit	45.0	0.7	0.6	0.2	1.5
Alkalinity	mg/lit	200	2.9	3.8	4.1	3.3
Iron as Fe	mg/lit	0.3	0.14	0.11	0.09	0.07
Manganese as Mn	mg/lit	0.1	BDL	BDL	BDL	BDL
MPN/100ml	mg/lit	Absent	4	22	16	14


Govt Analyst


Laboratory Incharge



M/S Sesa Environment Laboratory

Vedanta Limited, Mining Division, Codli Mines, P.O. Kirlapale, Goa-403727

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Surface Water Analysis Report for the Month of October 2015

Mine Name: ^{Sode} Mareto Mine

Date of Sample collection: 06/10/2015

Standard method used for analysis: APHA Standard


Permissible limits - Applicable only for Mine Discharge

Date of Receipt of sample: 07/10/2015

Analysis completion date: 12/10/2015

Parameter	Unit	Location						
		Permissible limits	Upstream Advoi Nallah	Downstream Advoi nallah	Upstream sonshi nallah	Down stream sonshi nallah	Pit Discharge	Sonshi Nallah near Ajoba Temple
Colour	Hazen	---	<5	<5	10	16	16	21
pH	----	5.5 to 9.0	5.63	6.1	6.61	6.65	6.08	6.11
Turbidity	NTU	----	0.89	0.97	1.03	1.15	1.86	2.72
Dissolved Solids	mg/lit	----	17.8	17.7	26.4	40	16.8	24.3
Conductivity	μS/cm	----	35.6	35.5	52.7	54.8	34.7	48.5
Suspended Solids	mg/lit	100	2	2	3	2	2	2
Chlorides	mg/lit	----	4.75	4.75	3.8	5.70	0.95	8.55
Total Hardness as CaCO ₃	mg/lit	----	14.28	18.36	20.4	26.52	20.4	20.4
Calcium as Ca ⁺⁺	mg/lit	----	3.26	3.26	4.08	5.71	2.45	3.26
Magnesium as Mg ⁺⁺	mg/lit	----	1.49	2.48	2.48	2.97	3.47	2.97
Sulphate as SO ₄	mg/lit	----	1.4	2	2.3	1.2	0.2	2.1
Phosphate as PO ₄	mg/lit	5	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate as NO ₃	mg/lit	10	0.11	0.12	0.1	0.1	1.6	0.3
B.O.D (3days, 27°C)	mg/lit	30	<3	<3	<3	<3	<3	<3
C.O.D	mg/lit	250	<10	<10	<10	<10	<10	<10
Total Iron	mg/lit	3	0.13	0.11	0.12	0.14	0.08	0.06
Manganese as Mn	mg/lit	2	0.07	0.06	0.04	0.03	0.02	0.02
D.O	mg/lit	----	4.0	4.1	4.10	4.4	4.2	4.1
Oil & Grease	mg/lit	10	<1	<1	<1	<1	<1	<1

Note :- No water discharge from Pissurlem dump run off, Sonshi Dump run off & Vaghure side dump run off
BDL- Below Detection Limit


Govt. Analyst




for Laboratory Incharge

M/s Sesa Environment Laboratory

Vedanta Limited, Mining Division, Godli Mines, P.O. Kirlapale, Goa-403727

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Well Water Analysis Report

Mine Name: Mareto Sodo Mine


Date of Sample collection :26.10.2015

Standard method used for analysis: APHA Standard

Date of Receipt of sample:27.10.2015

Analysis completion date:31.10.2015

Parameter	Unit	Permissible Limit	Locations			
			Sonshi Well	PTI Camp Well	Maresh Gaud Well	Mr. Gokuldas Gawde Well
Colour	Hazen	<5.0	4	3	<5	2
pH	-	6.5-8.5	5.3	6.13	4.96	5.97
Turbidity	NTU	5	1.23	1.23	0.98	1.23
Conductivity	µs/cm	-	30.2	41.7	42.5	69
Dissolved Solids	mg/lit	500	15.1	20.9	21.2	34.6
Suspended Solids	mg/lit	-	3	3	2	2
Chloride	mg/lit	250	4.75	4.75	3.8	7.6
Total Hardness as CaCO ₃	mg/lit	200	10.2	16.32	20.4	20.4
Calcium as Ca++	mg/lit	75	2.45	3.26	2.45	4.08
Magnesium as mg++	mg/lit	30	0.99	1.98	3.47	2.48
Sulphate as SO ₄	mg/lit	200	0.53	3.4	2.45	2.6
Nitrate as NO ₃	mg/lit	45	0.1	1.05	1.06	0.17
Alkalinity	mg/lit	200	4	3.02	1	2.8
Iron as Fe	mg/lit	0.3	0.13	0.1	0.09	0.07
Manganese as Mn	mg/lit	0.1	BDL	BDL	BDL	BDL
MPN/100ml	mg/lit	Absent	Absent	20	10	8


Govt. Analyst


Laboratory Incharge



**PLANTATION DETAILS
FOR THE FINANCIAL YEAR 2015-2016**

Sr. No.	Name of the Species		WML		OML		Location
	Botanical Name	Common Name	Nos.	Area in Ha.	Nos.	Area in Ha.	
1)	Anacardium occidentale	Cashew	-	-	1000	0.533	6 th bench of Common Dump-Pissurlem
2)	Mangifera indica	Mango	-	-	5		
3)	Phyllanthus emblica	Awla	-	-	100		
4)	Tamarindus indica	Tamarind	-	-	100		
5)	Peltophorum	Peltophorum	-	-	60		
6)	Bauhinia Racemosa	Apta	-	-	100		
7)	Bombax ceiba	Sawar	-	-	100		
8)	Acacia Siamea	Acacia Siamea	-	-	100		
9)	Bambusoideae	Bamboo	-	-	100		
10)	Cassia fistula	Cassia fistula	-	-	120		
11)	Delonix Regia	Gulmohar	-	-	60		
12)	Sapindus mukorossi	Reetha	-	-	40		
13)	Chinchilla lanigera	V. Chinch	-	-	100		
14)	Samanea saman	Rain tree	-	-	60		
15)	Acacia Mangium	Acacia Mangium	-	-	350		
TOTAL			-	-	2395	0.533	