FORM - V
(See Rule -14)

ENVIRONMENT STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31st MARCH, 2014

SUKINDA CHROMITE MINE, TATA STEEL LTD.

PART-A

1. Name and address of the owner/ Occupier of the industry, operation	: Sukinda Chromite Mine : Tata Steel Ltd., P.O-Kalarangiatta Dist - Jajpur, Orissa -755028	
Agent	: Mr. Rajesh Patel	
Nominated Owner	: Mr. T.V Narendran, Managing Director Tata Steel, Jamshedpur	
2. Industry Category	: Major	
3. Production Capacity	: Chrome Ore (ROM)	: 2.4 MTPA
	Pyroxenite Ore (ROM)	: 0.5 MTPA
	Chrome Concentrate	: 0.65 MTPA
4. Year of establishment	: 20.12.1960	
5. Date of submission of previous Environment Audit Report.	: 27th September' 2014	

PART-B

A) Water consumption in m³ / day under all the three heads for the assessment Year is as follows:

(i) Water Consumption:

Quarry water is used for processing, spraying and cooling.

Consumption Head:	**2013-14 (Cum/day) (Annual average)**	**2014-15 (Cum/day) (Annual average)**
Process	2763.16	407.056**
Spraying in mine pit , Services	885.15	649.038
Cooling	Completely recycled	Completely recycled
Domestic	1976.20	2039.23
Process water consumption per product output		
Name of the product	During the previous financial Year (2013-14)	During the current financial Year (2014-15)
Chrome Concentrate	2.09 Cum / MT	2.091 Cum / MT

** Average consumption is less as mining and COB Plant operations were suspended since 17.05.2014 to 22.01.2015 after pronouncement of Supreme Court Judgment in WP (C) 114 of 2014.

(ii) Raw Material Consumption

The following items have been consumed/ utilized:

Name of Raw materials	Consumption of Raw Material	
	During previous financial Year (2013 – 14)	During current financial Year (2014 – 15)
High Speed Diesel	8190318 Liters	2354625 Liters
Lubricants	296 Barrels	105 Barrels
Brake fluid	295 Liters	145 Liters
Grease	810 Barrels	10 Barrels
Explosives of all types (Explosive, codex, detonator)	1783327.7 kg, 69490 m, 54718 Nos	187882 Kg, 7580 m, 3874 Nos
Electric Power:		
Consumed	27491080.5 KWH	14274979.5
Generated	110901 KWH	75113.6
Gas	6718.98 Cum	4706.91
Tires	89 Nos.	40 Nos.
Drill rods	8 Nos.	0 Nos
Acids & Chemicals:		
Nitric Acid	300 liters	130 liters
Sulphuric Acid	2.5 liters	2.50 liters
Acetone	2.5 liters	1.0 liters
Borax	40 Kg	28.5 Kg
Sodium Carbonate	60 Kg	37.5 Kg
Diphenyl Carbazide	100 gm	100 gm
Cobaltous Nitrate	0.6 Kg	0.5 Kg
Hydrochloric Acid	240 liters	465 liters
Iso Propyle Alcohol	0.5 liters	0.5 Liters

PART-C

POLLUTION DISCHARGED TO ENVIROMENT/ UNIT OF OUTPUT (Parameters as specified in the consent issued)

Water Pollution:

The quarry water, which gets accumulated in the mine sump, is pumped out as and when required to continue mining operation. This water utilized for different purposes during 2014-15: Process - 407.56 Kl/day , Cooling - completely recycled, Spraying in mine pit & services – 649.04 Kl / day. Process water as shown above is used in the COB plant for making the entire process wet so as to prevent pollution due to particulate matter. Eighty five percent of water is re-circulated for

processing & makeup water is to the tune of only fifteen percent max. The water going out with slime is discharged into slime pond and clear water is recycled back to the COB plant for reuse. Recently Tailing dewatering unit has been installed in Chrome ore beneficiation plant. Higher and instant recovery of clear water is now possible using Filter Press. With this we have achieved reduction in Specific consumption of water for COB plant and eliminated loss of water from tailing pond.

The balance water is discharged out of lease boundary to the fallow land after necessary treatment. The status of water quality parameters for the financial year is as given below.

Details of Water Quality Monitoring:

Pollutants	**Conc. of Pollutants (mg/ltrs.)**	**Standards (mg/ltrs.)**	**% of variation from standards with reasons**
pH	7.14	5.5-9.0	--
TSS	27.50	100	-73.5%
Oil & Grease	ND	10	-100%
BOD	1.67	30	-94%
COD	4.77	250	-98%
Cr+6	<0.005	0.1	-100%
Total Cr	0.54	2	-73%
Nickel	<.001	3	-100%
Iron	0.47	3	-84%

Note: BDL- Below Detectable limit, ND- Not Detectable. (-) deviation implies better than standard

Details of Ambient Air Quality Monitoring:

Location	Type of Air	Avg. Conc. Of Pollutants (Annual Avg in µg/m3)	Prescribed Standards (Annual Avg in µg/m3)	Prescribed Standards (24 Hrs. Avg in µg/m3)	% of variation from the norms with reasons
Industrial Area COB Plant (Canteen top)	PM_{10}	55.07	60	100	-45%
	$PM_{2.5}$	31.41	40	60	-48%
	SO_2	4.51	50	80	-94%
	NOX	11.59	40	80	-85.5%
	CO*	0.20	2	4	-95%
Industrial Area Mining (Near Stack yard Office)	PM_{10}	59.67	60	100	-40%
	$PM_{2.5}$	34.00	40	60	-43%
	SO_2	4.83	50	80	-94%
	NOX	12.06	40	80	-85%
	CO*	0.23	2	4	-94%
Residential Area (Chemical Lab.	PM_{10}	50.77	60	100	-49%
	$PM_{2.5}$	29.11	40	60	-51%

Roof top)	SO_2	4.30	50	80	-95%
	NOX	11.15	40	80	-86%
	CO*	0.17	2	4	-96%
Sensitive Area (Near Hospital)	PM10	42.82	60	100	-57%
	PM2.5	25.18	40	60	-58%
	SO2	4.07	20	80	-95%
	NOX	10.32	30	80	-87%
	CO*	0.13	2	4	-97%
Mining Complex	PM10	46.85	60	100	-53%
	PM2.5	27.20	40	60	-55%
	SO2	4.16	50	80	-95%
	NOX	10.73	40	80	-86%
	CO*	0.14	2	4	-96%
Near Tailing Pond	PM10	38.52	60	100	-61%
	PM2.5	22.74	40	60	-62%
	SO2	4.03	50	80	-95%
	NOX	9.96	40	80	-88%
	CO*	0.12	2	4	-97%

Note: *Unit of measure for CO is mg/m^3. (-) deviation implies better than standard. CO is measured on 8 hours and 24 hours basis.

This is an opencast mine and does not have any single point source of air pollution. Hence, quantitative estimation of air pollutants discharged in Kg/day cannot be ascertained. The above ambient air quality data shows that the concentrations of the pollutants are well within the permissible standards.

PART-D

HAZARDOUS WASTES

As specified under the Hazardous Waste (Management, Handling and Trans-boundary) Rules, 2008 and amendment thereof

Hazardous Wastes	Total Quantity	
	During the Current Financial Year (2013-14)	During the Current Financial Year (2014-15)
I) From Process:		
▪ Used Oil	20.15 MT	9.653 MT
▪ Waste containing Oil	0.5 MT	0.78 MT
▪ Waste Battery	44 Nos.	48 Nos.
▪ ETP Sludge	85.21 MT	148.17 MT

II) From Pollution Control Facility: ▪ Waste oil from oil & grease separation pit ▪ Sludge from oil and grease separation pit	Included in the Item I	Included in the Item I

PART-E

SOLID WASTES

Sources	TOTAL QUALITY	
	During the Current Year (2013-14)	During the Current Year(2014-15)
a) From Process: ▪ From Mining as Overburden ▪ From COB plant as Tailing ▪ From Canteen, Office, Colony etc b) From Pollution Control Facility c) i. Quantity recycled or reused within the unit ii. Quantity sold ▪ General Office Waste iii. Quantity disposed ▪ Mining overburden ▪ Canteen and colony waste	 40.82 Lakh Cum 409315.226 MT 0.51 MT Not Applicable Study under progress 0.62 MT 4081726.43 Cum Organic wastes are disposed off in the bio gas plant & in dumps	 13.4 lakh Cum 59404.803 MT 0.52 MT Not Applicable Study under progress 1.63 MT 1343867 Cum Organic wastes are disposed off in the bio gas plant & in dumps

The slime generated from the beneficiation plant has a potential mineral value. So it is pumped into the tailing/slime pond where it is stored for future use.

PART-F

THE CHARACTERISTICS (in terms of composition and quantum) **OF HAZARDOUS AS WELL AS SOLID WASTES AND INDICATE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES.**

The composition of hazardous wastes like used oil & waste containing oil are Gear oil: SP460, 320, 220 & 90, Hydraulic oil: 68, 10, 46, and 100, Mobil oil: 20W40, 30, 40 Transformer oil, Grease: Senogem EP2, KG 10. The composition of ETP sludge is compounds of Cr, Fe, Ni, Al, Si, etc. The composition of the solid wastes (overburden) contains Nickeli-ferrous limonite, Serpentinite, and quartzite.

DISPOSAL PRACTICE:-

a) SOLID WASTES:

The overburden is systematically and scientifically dumped on a geologically barren area and properly supported with hard material and the same is being reclaimed by plantation after being declared inactive.

The organic wastes from the canteen and other places are stored in buckets (3 cum capacity) which are later on disposed on the over burden dumps to enrich the nutrient content. This has been found to hasten the plant growth and the seeds contained in the vegetable waste have contributed to the green cover in the dumps.

The food and vegetable wastes from the canteens of the mine, plant, hospital, guest house, clubs etc. are processed in bio-gas plants (two nos.). While the gas generated is used for cooking, the waste is used as manure.

The municipal solid wastes (other than above) are segregated as per their characteristics e.g. paper, jute bags, tins, bottles, plastics, metal scraps etc. and are sold to a party at Cuttack for recycling. The inert material like building debris etc. is used as landfills development of landscapes etc.

b) HAZARDOUS WASTE:

ETP Sludge:

ETP sludge removed from the ETP is kept in an impervious drying bed so that the moisture from the sludge gets evaporated and it becomes easy to handle the material.

Now, we have entered into an agreement with Orissa Waste Management Project, a Division of M/s Ramky Enviro. Engineers Ltd. to dispose the ETP sludge at their Common Hazardous Waste-Treatment Storage Disposal Facility (CHWTSDF) located at Kanchichuan near Sukinda of Jajpur district.

Used Oil:

The waste oil generated at various sources is collected in leak proof barrels and then are kept under a covered roof and on concrete platforms (Capacity- 200 liters) in the barrels very carefully and sealed properly to avoid any spillage or leakage. The storage area is properly fenced and caution board displayed.
During transfer of waste oil to barrels, a trough is placed underneath in order to prevent land contamination due to oil spillage. Then at a fixed interval, these barrels are disposed through auction to the authorized recycler after due intimation to State Pollution Control Board. After dispatch of same, intimation of auction along with copy of manifest is also being sent to State Pollution Control Board

Waste containing Oil:

Oil soaked jutes, filter and filter materials are produced during the schedule maintenance and repair of the vehicles from the workshop. It is stored in the HDPE lined placer dumper buckets. The HDPE enclosure prevents contamination of land and water bodies. Oil soaked sand/soil are stored in a vat made before the oil and grease separation system. Water is added to make the waste free from oil. The oil containing water is led to oil and grease separation system and the sand/soil is disposed off like filters and filter material mentioned above.

Now we have made an agreement with M/s West Bengal Waste Management Limited, a division of Ramky Enviro Engineers Limited located at Haldia, West Bengal to dispose the waste containing oil falling in line with the directive from Member Secretary, State Pollution Control Board, Orissa vide his letter no. 14315/ IND-IV-Misc,-256, dated 04.09.09.

c) WASTE BATTERIES :

The used lead acid batteries with diluted acid and caps intact are kept under a shed having impervious floor. Then at a fixed interval, these batteries are disposed through auction to the authorized recycler after due intimation to State Pollution Control Board. After dispatch of same, intimation of auction along with copy of manifest is also being sent to State Pollution Control Board.

PART-G

IMPACT OF POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION

DUST SUPPRESSION:

- New stationary water sprinkler system has been installed alongside the main haulage road of the mine covering a length of 1.5 Km and being constructed with a cost of 20Lakh Rupees in 2014-15.
- Water spraying on mine haulage roads by water sprinklers has reduced the dust levels in the ambient air. The spraying of water in crushers, screens and transfer points has improved the work zone environment at Chrome ore beneficiation plant, Lumpy Ore Processing Plant and Naresh Kumar Plant. Spray nozzle assembly along with dry fog system has been installed at jaw crusher and cone crusher discharge chutes in Naresh Kumar Plant to reduce fugitive dust generation.
- Tarpaulin sheets are now being used to cover the concentrate stacks to avoid dust nuisance during dry seasons.
- Additional plantation has been made to provide a thick green belt in between the colony and mining area to prevent dust from reaching the colony area.
- The people working in the areas of potential dust generation points have been provided with dust respirators.
- To reduce dust generation in workshop area, automatic sprinkling system has been installed.
- To reduce dust generation at dry tailing plant floor concreting and side drain construction has been done with the cost of Rs. 24.17 Lakh.
- Concreting of the parking area of Administration Building was done with the cost of 7.81 Lakhs.
- Tarpaulin covers are being used in stock yard and COBP to reduce dust generation with the expenditure of Rs. 10 Lakh per year.
- Dust sampling study including dust fall monitoring with expenditure of 28 Thousand rupees. and mineralogical composition analysis was done in FY 15.
- Photographs of different activities of dust suppression are attached as **Annexure-1**

MANAGEMENT OF ASSOCIATED MINERAL STORAGE AREAS:

- Garland drains around the mines of 15,755m stretch have been maintained regularly at the toe of dumps, periphery of the quarries, stack yard, COB plant and camp area. Prior to monsoon above drains are cleaned and made ready to check runoff from overburden dumps and to prevent surface runoff from entering into the quarry. These drains (avg. width 1.5 m and depth min. 1m) are made ready by constructing new ones, wherever required, and cleaning the existing ones through machines as well as by manual excavation. Settling pits are made ready to arrest the suspended solids. The washout from the OB dumps was diverted through effluent treatment plants located at Old Geological camp and near Jagannath temple for treatment before final discharge out of leasehold.

- New concrete garland drains of 671 mtrs was constructed in 2014-15 with a cost of around 54.31 lakhs.
- We implemented Vetiver system technology for Overburden dump stabilization at Kakudia dump in collaboration with IIT Kgaragpur with a cost of around 27Lakhs , the project was successful as the Vetiver grass has shown a very good growth and has completely eliminated the soil erosion of the planted site. Photographs are attached as **Annexure-13**
- Hard rocky material was dumped at outer slope of running overburden dump benches to stop erosion of dump slope. In 2014-15 we did boulder pitching in 2507.3 m^2 area with a cost of 6.07 lakhs.
- To prevent soil erosion and to stabilize the dump slope of associated minerals, 63000 m^2 slope area was planted with 54150 Nos. of small plants at a total cost of Rs.98.5 Lakh during 2014-15
- Company has spent Rs. 54.82 Lakhs for preparation of toe-wall garland drain and strengthening of toe wall for dump protection near Kakudia village. In 2014-15 we constructed dry boulder toe wall of length 337m with a cost of 2.29 lakhs along with it we have constructed a boulder masonry of length 211.6 with a cost of around 2.07.
- Company has spent an amount of Rs. 10 Lakhs on a study on Dump Stability engaging CIMFR Nagpur. After the study it was established that the factor of safety of dump is lying in the safe zone.
- Photographs of dumps management activities are attaches as **Annexure-2**.

SOLID WASTE MANAGEMENT:

- Organic waste of canteen was put to the bio-gas plant made near canteen for the purpose. Organic waste of Hospital, Guest House& Valley club are also put to the bio-gas plant made near Valley club and other biodegradable waste including plant wastes are put in the overburden dumps to improve the nutrient content and thereby the plant growth.
- Each work place has been provided with containers for segregation of solid wastes depending on its characteristics for proper management.
- All the houses in the camp have been provided with two separate buckets for storage of bio - degradable and non-bio-degradable waste separately for safe disposal.

WATER TREATMENT & RECYCLING:

- During 2014-15, company has spent Rs.45 Lakh towards mine water treatment and recycling to ensure that the water quality meets all the parameters as prescribe by the statutory authorities.
- The oil and grease separation system was in effective operation for treating workshop effluent. For operation & maintenance of the system the company has spent an amount of Rs.0.40 Lakh during the period.
- Herbal Treatment Plant is in use at our COB Plant for treatment of Hexavalent Chromium in the chrome concentrate. The water from tailing dam is recycled back to COBP for further reuse.
- Company has introduced single line intake system at COB Plant to monitor and reduce water consumption.
- Recently Tailing dewatering unit has been installed in Chrome ore beneficiation plant. Higher and instant recovery of clear water is now possible using Filter Press. With this we have achieved reduction in Specific consumption of water for COB plant and eliminated loss of water from tailing pond.
- Rainwater harvesting study was done with a cost of Rs. 3.14 lakh and submitted to Eastern Regional Office, CGWB, Bhubaneswar and final approval is awaited. As per the report, one roof top rain water harvesting structure has already started at GM office building which is fully functional. Photograph showing the same is enclosed **Annexure-15** as with cost of around 8

lakh. Further, feasibility study has been carried out for possible water harvesting in the periphery through KRG Foundation which shall be implemented in future in phased manner.

- Company is now installing a new ETP in modules of 1500 KL/ hr each with total capacity 4500 KL/ Hr. with a cost of around 330 Lakhs to cater the future requirement of mine discharge water and surface runoff post deepening of mines in course of opencast mining and underground mining. The first phase was opened for testing in December 2014, and was finally commissioned on June 2015.
- Photographs of water treatment are attached as **Annexure-3.**

ENVIRONMETNAL MONITORING:

- An amount of Rs.39.8 Lakh was spent towards monitoring of various environmental parameters. This consists of air quality monitoring at a frequency of twice in a week with 24 hourly sampling and water quality monitoring once in a month for all the parameters.
- Weather monitoring is done through automatic weather monitoring station and compiled report on rain fall, humidity, temperature, wind speed, wind direction etc. For the annual maintenance of this weather System Company has spent Rs.4.0 Lakh.

PREVENTION OF LAND CONTAMINATION:

- 100% Epoxy flooring of the HEMM maintenance workshop area for preventing the oil to reach the soil or ground.
- Usage of movable oil collection tray with built in pneumatic oil pump during any kind of HEMM maintenance to ensure no oil is spilled to the ground.
- Use of high pressure cleaning system in maintenance to reduce oil leakage incidents.
- Leakage of fresh & waste oil from various places were contributing to land contamination and thereby, generation of hazardous wastes. Targets have been put at concerned locations to reduce the leakages/ spillages, which are monitored in a structured manner as per the laid down EMS procedure.
- Installation of one water column near pipe yard for departmental water sprinkler reducing lead distance and hence diesel consumption of water sprinkling.
- Introduction barrel handler for handling oil barrels to reduce oil spillage.
- Introduction of offline oil cleaner resulting in enhancement of oil life (increased oil replacement interval) and hence reducing the waste oil generation
- Modification in the hose kits in CAT dumper that has resulted in oil consumption.
- Separate dustbins have been provided at COB Plant and Workshop for collection of oil soaked waste to prevent contamination of land.
- Photographs of Oil Separation Pit are attached as **Annexure-4.**

AFFORESTATION:

- A total of 55150 nos. of saplings were planted during 2014-15 to stabilize 63000 Sq.m. of overburden dumps.
- Apart from the above, TSRDS (Tata Steel Rural Development Society) has planted approximately 1660 no. of trees in Avenue plantation from Chingudipal to Baguasahi Road, Kuhika, Kalarangi, Ranga-matia, Ghaghia-sahi, Deogaon, Annatapur, Koriapal, Gurujang, Chingudipal, Natore.
- We implemented Vetiver system technology for Overburden dump stabilization at Kakudia dump in collaboration with IIT Kgaragpur with a cost of around 27 Lakhs. We planted aroung 1 lakh vetiver saplings in an area of around 10000 Sq.m. The project was successful as the Vetiver

grass has shown a very good growth and has completely eliminated the soil erosion of the planted site. Photographs are attached as **Annexure-13**

- The previous year plantations were maintained and the dead plants were replaced to maintain the original no. of plants planted at the beginning.
- On the above items we have spent Rs. 98.5 Lakh. This cost does not include the plantation done by Tata Steel Rural Development Society in the nearby villages.
- We are also doing coir matting in scientific manner by proper terracing at 1m height and plantation in every meter horizontally in staggered manner.
- Further to above, under the guidance of Dr. V. P Upadhyay, Director (S), MoEF, the unit has developed "Demonstration Plantation Plots" on experimental basis during 2011-12 & 2012-13. The plantations of Demonstration Plots have shown significant growth during last 3 years.
- Photographs of afforestation, coir matting & Demo plot are attached as **Annexure-5.**

NOISE REDUCTION:

- In-house ambient noise monitoring has also carried out once in three months and the noise level has been found to be within the prescribed norms of Noise Pollution (Regulation & Control) Rules, 2000.
- To reduce the noise level at source a lot of work has been done at COB plant and in the machines. In all the places proper operational control procedures have been practiced for same.
- In the crusher area polymer liners have been fitted to reduce noise.
- Constant monitoring and adjustment reduced the noise level by 4 dB in 30% of mining equipment deployed in mines, COBP, & LOP Plant
- All the shovels and haul pack cabins have been air conditioned to prevent adverse impact of dust and noise on the operators. To start with two dozer cabins have been made air conditioned.
- The DG sets working inside the camp have been provided with acoustic enclosures. The noise outside the acoustic enclosure, at the time of running DG sets measures to be within 45 - 65 dB.
- Employees working in the noisy areas have been provided earmuffs to reduce impact of noise.
- Noise mapping study both core zone and buffer zone with a cost of 12 Lakh
- Photographs of noise reduction measures & noise monitoring data are attached as **Annexure-6.**

BEAUTIFICATION:

- For landscaping and horticultural development in the colony and workplaces an amount of Rs.56.05 Lakh was spent including watering arrangement to different gardens and plantation sties.
- We have developed a Hibiscus Garden at Sir Dorabji Tata Park , Sukinda where we have planted more than 65 different varieties of Hibiscus plants in 2014-15.

SANITATION & WATER SUPPLY:

- Towards potable water supply for the camp residents Rs.35.5 Lakh was spent during 2014-15.
- For sanitation jobs in the residential areas as well as work place and for maintenance of sewer lines and storm water drains, an amount of Rs.43.2 Lakh was spent.
- Towards operation & maintenance of full-fledged STP an amount of Rs.7.25 lakh was spent during 2014-15.
- Company has spent Rs. 1.58 Lakhs for renovation of colony drains, septic tanks and maintenance at STP.
- Company has spent Rs. 2.50 Lakhs to concrete mining complex area.

- Photographs of Sewage Treatment Plant are attached as **Annexure-7**.

MALARIA ERADICATION:

- Also took integrated mosquito control management programme to eradicate malaria cases in the colony.
- TSRDS has done several mobile treatment programs in different villages regarding diseases and their remedial measures with full checkup.
- Mosquito net have been procured by Tata steel for the villagers.
- Regular medicine distribution and anti-mosquito spray was being spread inside the colony area.

RESOURCE CONSERVATION:

- The establishment of Chrome ore beneficiation plant has been able to utilize low grade ore having no market to produce beneficiated ore of the desired market value. This has been the best example of our dedication towards the conservation of natural resources, which would otherwise have been wasted. The water from slime dam was also been re-circulated to COB plant for reuse.
- Tailing Dewatering unit plant has been installed in Chrome ore beneficiation plant. Higher and instant recovery of clear water is now possible using Filter Press. With this we have achieved reduction in consumption of water for COB plant and eliminated loss of water from tailing pond.
- To measure quantities of water used for various purposes like processing & cooling in COBP, sprinkling on mine haul rods and domestic/ human consumption, water meters are installed at the inlet points of each connections.
- In COB plant translucent sheets have been fixed on the roof for the purpose of reducing wastage of electricity and to reduce water consumption water recycling sump pump with automation was in operation.
- Documents have been made as per the provisions of ISO-14001 and targets have been put off reduce generation of solid waste/ overburden to prevent land degradation due to dumping.
- Composting of garden waste is done at major locations.
- Different measures have been taken to prevent oil leakage and spillage resulting reduction in 35% oil consumption by equipment and one environmental management programme is going on now for further conservation.
- Diesel pumps used for pumping water from Damsala River to drinking water treatment plant have been replaced with electric pumps resulting prevention of waste oil generation, leakage of lubricant and diesel, reduction of noise and air pollution.
- Installation of Fuel indicator, Magnetizer and HSD additives reduces fuel consumption in mining machinery compared to the base year.
- Fuel additive in diesel has been introduced to reduce diesel consumption with the expenditure of Rs.12.54 Lakh to reduce the carbon foot print of the mine.
- Vehicular exhaust monitoring for all diesel and petrol driven vehicles is done once in six months as per the provisions of E P Act, 1986. Towards this end the company has spent Approx. Rs 0.10 Lakh. It has also helped to optimize the HSD and petrol consumption by vehicles.
- Achieved reduction of oil leakage by 95% and grease by 10% in VS ball mill of COB plant over the years.
- COBP uses about 85% of re-circulated water.
- One pump with hydro cyclone and level sensors has been installed in COBP for arresting the washout beneficiated chrome ore concentrate with the expenditure of Rs. 6.00 Lakh.

- Flocculent dosing was changed from pump dosing to gravity dosing, which reduced 8000 running hour of 2 KW motor per year.
- With the expenditure of Rs. 1.2 Lakhs company has modified the tailing management system which results as reduction of 8000 hours of 75 KW motor per year.
- With the expenditure of Rs. 1.5 Lakh we installed a single pump to remove slurry during COB plant maintenance, which results reduction of 4 hours of 1850 KW machineries per year.
- We have installed sun reflectors in Chrome Ore Beneficiation Plant with the expenditure of Rs. 5 Lakhs, which results as 937 KWH energy per light per year.
- We have installed Turbo Ventilators in Chrome Ore Beneficiation Plant with the expenditure of Rs. 2.50 Lakhs, which results as 1753 KWH energy per year per turbo ventilator.
- Photographs of sun reflectors & turbo ventilator are attached as **Annexure–8.**

HEALTH MONITORING:

All the employees do undergo periodical medical examination (PME) in hospital every five years. However as per the recent notification, PME of all the employees shall be carried out once in three years for those employees who have reached 45 years of age or more. As of now, no occupational diseases have been reported till date. Approx. 216 nos. of contract workers and 270 company employees were covered under PME and pre placement medical examination respectively during year 2014-2015. To improve the occupational health and removing the safety hazards at industrial workplace, 3 ACT (Advice, Connect & Transform) teams have been made under Wellness@ Workplace programme.

The medical facilities are also extended to the local community. Health initiatives in the nearby villages were taken care by our TSRDS unit whose report is enclosed herewith. Company has done lots of camps like primary health camps, mega health camps, eye screening camp, blood donation cam, TB awareness camp, general health camp, cataract screening camp, family planning camp, pulse polio camps etc.

A new digital X-ray system was inaugurated during the year 2014-15 for the purpose of health monitoring this has significantly reduced the health monitoring time as well as the amount of radiation exposure of the patients. Critical ambulance vehicle was also put in operation in our mine. It is useful in transportation of patient of cardiac disease, respiratory problem and severed injured person from our hospital to different referral hospital in addition to that ambulance facility is also being provided

ENVIRONMENT AWARENESS:

To make the camp residents and local people aware on the environment, the mine celebrated World Environment Day on 5th June' 2014. Programme like Prabat Phery, plantation at Sharmshakti High School, skit competition and craft display made from waste were organized in this occasion. TSRDS also organized rally program like rally in village Chingudipal GP and Katepurty Nagar, plantation Shri Arobindo Shiksha Kendra, Rangamatia on the theme ''*Raise the Voice, not your Sea level*" and prize distribution to create awareness about environment in this occasion. Solar Lanterns were given to the Aurobindo Integral Education Centre, Rangamatia, for resident students.

Mines Environment and Mineral Conservation week was observed by participation of most of the mines of Bhubaneswar region, under the aegis of Indian Bureau of Mines, Govt. of India. Our mine bagged total 7 numbers of prizes including first prize in Overall category. The mine has also hosted the environment and mineral awareness programme amongst school children, organized by SGAT on 14 September 2014. Awareness development program on environmental protection for school

children and camp residents “Spot The Species Competition” was organized. We also organized a innovative awareness programme “Leaf identification by its scent” for creating environmental awareness amongst the local residents photographs of the same are attached as **Annexure 14**. From time to time knowledge sharing session are being organized from top industry leaders.

Campaign for safe segregation and disposal of household waste was organized among camp ladies and environmental awareness was developed.

Drive has also been taken to combat Climate Change. Carbon Foot Print of all the units, employees has been mapped and suitable action plan has also been initiated to reduce CO2 emission. Energy Audit was also conducted through ERDA and various actions have also been taken up to reduce the energy consumption. To promote awareness amongst employees hoarding boards depicting environment related issues are put at key locations.

Biodiversity conservation program was started with the help of IUCN. The aim of this initiative was to adopt a Comprehensive Biodiversity Conservation and Management Policy for Sukinda Chromite Mine to enhance the knowledge of biodiversity conservation and management within TATA Steel and local stakeholders and develop a mechanism for collaborative activities. An Agreement has signed between the IUCN & Tata Steel for the study and conservation of biodiversity. It also aims to promote good practice by sharing the learning with the wider industry and conservation communities through dialogue, which will provide input into the development of Indian minerals policies and laws

PERIPHERAL DEVELOPMENT:

The Tata Steel Rural Development Society, an independent body of Tata Steel is engaged in peripheral development activities in the nearby villages around the mine. During 2014-15 a total amount of Rs. 873.2 Lakhs were spent on various plantation programmes, civil projects, agricultural extensions, medical facilities, and sports, cultural and other developmental activities taken up in these villages. The details of expenditure done in field peripheral development during the year 2014-15 are attached in **Annexure 9**.

We spent an amount of 787.6 lakhs towards Environment management in the year 2014-15 this includes expenditure on environment proctection measures , prevention of pollution and abatement of pollution. The above expenditure does not include statutory payments, the cost of in-built pollution control facilities in the Chrome ore beneficiation plant, and other equipment like wet drilling etc., the wages, medical facilities and other allowance/ facilities given to the4 concerned employees.

The above abatement measures have resulted in improvement of air and water quality, reduction in noise levels, stabilization of dump slopes, conservation of natural resources, prevention of land contamination, proper management of hazardous wastes, greenery and aesthetics in the mine as well as residential areas. A sum of Rs. 1660.8 Lakh approx. has been spent on environment management and peripheral development activities during 2014-15. Only for Environment Management activities Rs. 787.6 Lakh has been spent and this has a cost share of Rs 441.5 / tonne (all products).

PART-H

ADDITIONAL MEASURES/ INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION

The following budgetary provisions have been made for 2014-15

Sl no.	Item/ Particulars	Plan	Actual
1	Afforestation	80.0	98.5
2	Dust suppression	60.0	55
3	Treatment of mine discharge & recycling	60.0	45
4	Environment & weather , exhaust monitoring	30.0	39.8
5	Horticulture development	54.0	56.05
6	Drinking water supply	40.0	35.5
7	STP Operation & Maintenance	5.0	7.25
8	Sanitation	60.0	43.2
9	Malaria eradication	5.0	5.46
10	Garland drain& storm water drain	25.0	54.82
11	Family planning	2.0	1.3
12	Slime dam management	80.0	86.12
13	Environment awareness (EMS)	6.0	6.0
14	Community Development through TSRDS	140	249
15	Hazardous waste management	6.0	2.6
16	Bio medical waste	4.0	2
	Total (Rs Lakh)	657	787.6

PART-I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

- Company is committed for prevention of pollution, continual improvement of environmental performance, committed to comply with relevant environmental and other legislation, regulation & other requirements and continual effort are made to minimize the adverse environmental impacts of our activities, products or services.

- The mine has already been certified to ISO-14001 (Environment Management System), ISO-9001 (Quality Management System), OHSAS–18001 (Occupational Health and Safety Assessment Series), (SA-8000) Social Accountability system and maintaining the systems satisfactorily. This also to note that our camp has also been certified with ISO-14001 (Environment Management System).

- Rainwater harvesting study was done and submitted to Eastern Regional Office, CGWB, Bhubaneswar. As per the report, one roof top rain water harvesting structure has already been completed and is operational at GM office building.

- Company is now installing a new ETP in modules of 1500 KL/ hr each with total capacity 4500 KL/Hr with an expenditure of around 330 Lakh rupees to cater the future requirement of mine discharge water and surface runoff post deepening of mines in course of opencast mining and underground mining. The new sophisticated ETP will have automated dosing system, clari-focculator, and flash mixture, dry sludge collection system, multi-bed filtration system etc. to ensure more effective treatment of surface runoff and mine discharge water before it is let out of the lease boundary. Two phases of the abovementioned ETP has already been commissioned by Aug 2015 and are now in operation. Photographs attached a **Annexure -3.**

- Herbal Treatment Plant has been installed in our COB Plant for removal of hexavalent chromium from chrome concentrate in eco-friendly way by using naturally occurring plant product (Organic reductant). It does not create/contribute additional pollution like conventional method. Hence the chrome concentrates treated using the developed technology is green (eco-friendly) product. Company spent Rs. 1.5 Lakhs on material cost and operation for the treatment in 2014-15. Photographs of herbal treatment plant are attached in **Annexure-3.**

- The conventional technology also requires huge (~200lit/ton) amount of water for treatment whereas the Organic reductant method requires negligible amount of additional water due to its online nature in continuous production process. Therefore, the developed process technology saves huge quantity of water. Company was awarded DISR National Award for the Herbal Treatment Plant installed at our COB Plant for treatment of Hexavalent Chromium.

- The Management conducts the awareness development programme on environmental protection for school children and camp residents.

- Company has started initiative to combat Climate Change. Energy Audit has already been conducted and time bound action plan has been made to reduce energy consumption.

- The Mine management celebrates and participates in 'Mine Environment & Mineral Conservation Week" every year under the aegis of Indian Bureau of Mines, Bhubaneswar

Region and company has spent Rs. 2.40 lakh for the same. Photographs attached **as Annexure - 14.**

- Company is operating online weather monitoring system at mine office.

- Company is updating real time data board at Main gate. Further company has installed one Multi Line Electronic Display Board to display the Environmental parameters.Photograph of the same is attached as **Annexure-10**.

- Company has got seven awards in 17th MEMC Final Day, including overall First prize in its category, Gem Granite Environment award by FIMI, Greentech Environment GOLD Award for Environment Management. National Energy Conservation award in 2014-15. Photographs of the same are attached as **Annexure-11.**

- Environmental Monitoring data of air, water & Noise are attached as **Annxure-12.**

- Meteorological Data for the year 2014-15:

  Maximum temperature: - 43.2^0 C (21st May'14)
  Minimum temperature: - 12.2^0 C (20th Dec'14)
  Cumulative rainfall : - 1393.38 mm.

Sd/-

Manager,
Sukinda Chromite Mine,
Tata Steel Limited.

Copy to : Regional Officer, OSPCB, Kalinganagar.
Central Pollution Control Board, Kolkata
Ministry of Forest and Environment, Eastern Regional office through Email.

Annexure – 1
Dust Control Measures

Stationary Water Sprinkling System

Photograph showing concrete roads

Photograph showing concentrates is covered with tarpaulins

Photograph showing high pressure water spray nozzles at feed hopper

Photograph showing Dust suppression using Stationary as well as Mobile water sprinklers

Photograph showing covering of trucks by tarpaulin

Photograph showing Green Barrier and Avenue Plantation done

Near Mine Office

Near Hospital

Between Workshop and Colony

Along Northern Boundary of Lease

Garland drain concrete culvert

Toe wall

Coir Matting on Dump

Inwardly slope dump top

Rocky material on running dump slope

Toe wall along the dump

Drainage System (Concrete Channel)

Annexure – 3

Effluent treatment Plant

Main ETP to treat Mine discharge (ETP-1)

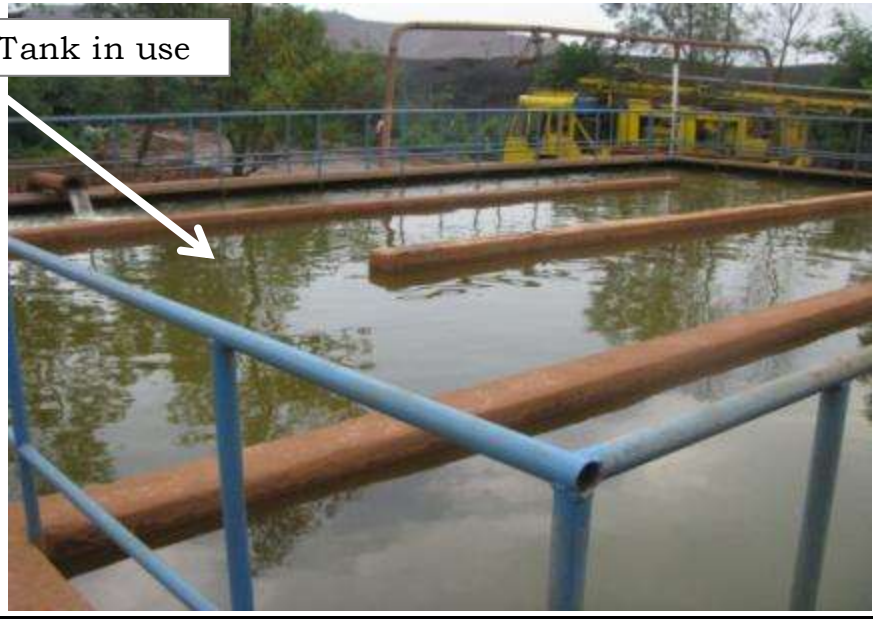
Temple ETP (ETP-3)

Geological ETP (ETP-2)

Cr+6 TREATMENTS: Mine water & surface runoff

One Standby Settling Tank

One Settling Tank in use



Herbal Treatment Plant

New ETP CLF-1 in operation

Online monitoring

Raw Water Collection Tank at N-E side

Raw water collection tank at S-W side of Lease

Annexure-4

Oil Separation Plant

Oil and grease Separation pit

Annexure – 5
Afforestation

Coir matting over dump

Plantation over dump




Significant growth in Plantation at Demonstration Plot.

Annexure – 6
Noise control measure


Acoustic enclosure for DG set

Air tight air conditioned cabin in HEMM

Annexure-7
Sewage treatment plant

Sewage treatment plant

Pipe lights

Turbo Ventilators

Annexure 9
The details of expenditure done in field peripheral development

CSR Expenditure in FY 2014-15			
CSR Sub-components	**Expenditure in INR**		
	SUKINDA (TSRDS)	**SUKINDA (PDF)**	**Total CSR**
Environmental sustainability, protection of flora & fauna, agro forestry, animal welfare, resource conservation, maintaining quality of soil, air, water	157727	1644360.51	**1802087.51**
Livelihood enhancement projects Total	6481832	4070414.74	**10552246.7**
Making safe Drinking Water available Total	4088878	7709907.2	**11798785.2**
Promoting health care including preventive Healthcare Total	4114215	2837015.02	**6951230.02**
Promotion and development of traditional arts and handicrafts Total		522422.7	**522422.7**
Promotion of education including special education Total	8897359	19809869.9	**28707228.9**
Promotion of Rural, Nationally recognised, Paralympic and Olympic sports especially training Total	497540	1071107.16	**1568647.16**
Protection and restoration of national heritage, Promotion of art, culture, handicrafts, setting up public libraries etc. Total	325008	160721.72	**485729.72**
Rural development projects (infrastructure and other developments) Total	3563971	8059481.67	**11623452.7**
Sanitation Total		4308146.04	**4308146.04**
Setting up homes, hostels, old age homes, day care centres for women, orphan, elderly Total		168290.11	**168290.11**
Administration expenses	8834082		**8834082**
Grand Total	**36960612**	**50361736.8**	**87322348.8**
Total Expenditure in FY 2014-15			**8.732 CR**

Annexure – 10

Multiline electronic display board at the Mines gate.

Annexure – 11

Greentech environment Gold Award Ceremony.

Annexure 12

Ambient Air Quality Report Annual and Monthly Average April' 14 to March 15

1. COB PLANT

Monthly Average	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a)Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Apr-14	62.50	35.21	5.06	12.11	0.22	7.04	0.018	<20	0.74	<0.1	<0.05	<0.05
May-14	61.56	34.89	4.76	11.84	0.24	6.88	<0.00005	<20	0.76	<0.1	<0.05	<0.05
Jun-14	58.00	32.93	4.73	11.94	0.23	6.53	<0.00005	<20	0.73	<0.1	<0.05	<0.05
Jul-14	45.89	26.69	4.10	11.18	0.14	5.39	<0.00005	<20	0.58	<0.1	<0.05	<0.05
Aug-14	38.67	23.10	4.07	10.57	0.13	5.10	<0.00005	<20	0.55	<0.1	<0.05	<0.05
Sep-14	37.50	22.09	4.05	10.58	0.12	5.20	<0.00005	<20	0.55	<0.1	<0.05	<0.05
Oct-14	55.67	31.92	4.51	11.83	0.18	6.91	<0.00005	<20	0.78	<0.1	<0.05	<0.05
Nov-14	66.38	37.44	5.20	12.89	0.26	7.90	<0.00005	<20	0.85	<0.1	<0.05	<0.05
Dec-14	64.33	35.93	4.83	12.12	0.23	7.77	0.00081	<20	0.81	<0.1	<0.05	<0.05
Jan-15	61.56	34.61	4.57	11.50	0.21	7.43	0.00017	<20	0.76	<0.1	<0.05	<0.05
Feb-15	61.25	34.45	4.23	11.63	0.24	7.38	0.00008	<20	0.79	<0.1	<0.05	<0.05
Mar-15	47.56	27.67	4.01	10.91	0.15	5.57	<0.00005	<20	0.68	<0.1	<0.05	<0.05
ANNUAL AVERAGE	55.07	31.41	4.51	11.59	0.20	6.59	0.0019	<20	0.72	<0.1	<0.05	<0.05

2. STACK YARD

Monthly Average	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a)Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Apr-14	67.25	37.09	5.43	12.49	0.26	7.46	0.022	<20	0.81	<0.1	<0.05	<0.05
May-14	65.56	37.69	5.06	12.29	0.28	7.29	0.015	<20	0.82	<0.1	<0.05	<0.05
Jun-14	63.11	36.33	5.10	12.49	0.26	7.08	<0.00005	<20	0.79	<0.1	<0.05	<0.05
Jul-14	49.89	28.91	4.30	11.72	0.16	5.78	<0.00005	<20	0.63	<0.1	<0.05	<0.05
Aug-14	42.89	25.21	4.21	11.01	0.14	5.54	<0.00005	<20	0.60	<0.1	<0.05	<0.05
Sep-14	41.38	23.96	4.19	10.99	0.13	5.54	<0.00005	<20	0.59	<0.1	<0.05	<0.05
Oct-14	61.56	34.69	4.89	12.31	0.22	7.41	<0.00005	<20	0.84	<0.1	<0.05	<0.05
Nov-14	72.13	41.08	5.71	13.41	0.30	8.46	0.0008	<20	0.92	<0.1	<0.05	<0.05
Dec-14	68.89	39.21	5.29	12.53	0.28	8.21	0.0010	<20	0.86	<0.1	<0.05	<0.05
Jan-15	65.67	36.79	5.04	11.97	0.25	7.89	0.00028	<20	0.82	<0.1	<0.05	<0.05
Feb-15	66.00	37.54	4.64	12.21	0.27	7.89	0.00011	<20	0.84	<0.1	<0.05	<0.05
Mar-15	51.78	29.48	4.16	11.36	0.17	5.89	<0.00005	<20	0.74	<0.1	<0.05	<0.05
ANNUAL AVERAGE	59.67	34.00	4.83	12.06	0.23	7.04	0.022	<20	0.77	<0.1	<0.05	<0.05

3. LABORATORY TOP												
Monthly Average	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a)Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Apr-14	58.38	33.55	4.74	11.69	0.18	6.55	0.015	<0.01	0.69	<0.1	<0.05	<0.05
May-14	56.89	32.23	4.48	11.30	0.21	6.44	<0.00005	<0.01	0.71	<0.1	<0.05	<0.05
Jun-14	54.11	30.23	4.50	11.52	0.20	6.00	<0.00005	<0.01	0.68	<0.1	<0.05	<0.05
Jul-14	41.44	24.39	4.02	10.59	0.12	5.01	<0.00005	<0.01	0.53	<0.1	<0.05	<0.05
Aug-14	35.22	20.76	4.02	10.21	0.11	4.78	<0.00005	<0.01	0.51	<0.1	<0.05	<0.05
Sep-14	33.63	20.24	4.03	10.14	0.11	4.89	<0.00005	<0.01	0.50	<0.1	<0.05	<0.05
Oct-14	51.56	29.60	4.29	11.38	0.15	6.44	<0.00005	<0.01	0.73	<0.1	<0.05	<0.05
Nov-14	61.25	34.64	4.80	12.53	0.21	7.45	<0.00005	<0.01	0.80	<0.1	<0.05	<0.05
Dec-14	59.78	33.87	4.43	11.70	0.20	7.39	0.00067	<0.01	0.74	<0.1	<0.05	<0.05
Jan-15	55.78	31.78	4.23	11.04	0.17	6.94	0.00009	<0.01	0.71	<0.1	<0.05	<0.05
Feb-15	57.38	32.35	4.04	11.18	0.18	6.98	0.00006	<0.01	0.74	<0.1	<0.05	<0.05
Mar-15	43.78	25.68	4.00	10.51	0.13	5.24	<0.00005	<0.01	0.63	<0.1	<0.05	<0.05
ANNUAL AVERAGE	50.77	29.11	4.30	11.15	0.17	6.18	0.0011	<0.01	0.66	<0.1	<0.05	<0.05

4. HOSPITAL TOP												
Monthly Average	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a)Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Apr-14	49.13	28.41	4.23	10.80	0.13	5.55	<0.00005	<0.01	0.58	<0.1	<0.05	<0.05
May-14	49.11	28.86	4.12	10.33	0.15	5.59	<0.00005	<0.01	0.62	<0.1	<0.05	<0.05
Jun-14	46.00	28.76	4.12	10.66	0.15	5.20	<0.00005	<0.01	0.58	<0.1	<0.05	<0.05
Jul-14	34.56	20.69	BDL	9.74	0.11	4.39	<0.00005	<0.01	0.43	<0.1	<0.05	<0.05
Aug-14	28.44	17.13	BDL	9.62	0.10	4.29	<0.00005	<0.01	0.41	<0.1	<0.05	<0.05
Sep-14	26.88	15.74	BDL	9.49	0.10	4.48	<0.00005	<0.01	0.42	<0.1	<0.05	<0.05
Oct-14	43.44	25.59	4.04	10.64	0.12	5.77	<0.00005	<0.01	0.63	<0.1	<0.05	<0.05
Nov-14	53.38	30.99	4.18	11.70	0.15	6.60	<0.00005	<0.01	0.71	<0.1	<0.05	<0.05
Dec-14	51.00	28.54	4.11	10.81	0.15	6.33	<0.00005	<0.01	0.64	<0.1	<0.05	<0.05
Jan-15	47.33	27.77	BDL	10.03	0.12	6.04	<0.00005	<0.01	0.58	<0.1	<0.05	<0.05
Feb-15	48.63	28.20	BDL	10.26	0.16	6.01	<0.00005	<0.01	0.64	<0.1	<0.05	<0.05
Mar-15	36.00	21.50	4.00	9.70	0.11	5.02	<0.00005	<0.01	0.53	<0.1	<0.05	<0.05
ANNUAL AVERAGE	42.82	25.18	4.07	10.32	0.13	5.44	<0.00005	<0.01	0.56	<0.1	<0.05	<0.05

5. Mining Complex

Monthly Average	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a)Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Apr-14	54.13	30.93	4.41	11.20	0.15	6.03	<0.00005	<0.01	0.63	<0.1	<0.05	<0.05
May-14	53.33	30.38	4.26	10.83	0.18	6.02	<0.00005	<0.01	0.67	<0.1	<0.05	<0.05
Jun-14	50.00	28.93	4.27	11.10	0.17	5.62	<0.00005	<0.01	0.63	<0.1	<0.05	<0.05
Jul-14	37.89	22.49	BDL	10.17	0.11	4.70	<0.00005	<0.01	0.49	<0.1	<0.05	<0.05
Aug-14	31.67	19.07	BDL	9.91	0.11	4.51	<0.00005	<0.01	0.45	<0.1	<0.05	<0.05
Sep-14	30.63	18.40	BDL	9.79	0.10	4.61	<0.00005	<0.01	0.46	<0.1	<0.05	<0.05
Oct-14	47.56	27.52	4.11	10.98	0.13	6.09	<0.00005	<0.01	0.67	<0.1	<0.05	<0.05
Nov-14	56.88	32.44	4.39	12.09	0.18	7.05	<0.00005	<0.01	0.75	<0.1	<0.05	<0.05
Dec-14	55.22	31.59	4.26	11.29	0.17	6.89	0.00033	<0.01	0.69	<0.1	<0.05	<0.05
Jan-15	51.44	29.98	4.07	10.53	0.14	6.46	<0.00005	<0.01	0.63	<0.1	<0.05	<0.05
Feb-15	53.75	30.93	BDL	10.75	0.16	6.45	<0.00005	<0.01	0.68	<0.1	<0.05	<0.05
Mar-15	39.67	23.70	4.00	10.13	0.12	5.02	<0.00005	<0.01	0.58	<0.1	<0.05	<0.05
ANNUAL AVERAGE	**46.85**	**27.20**	**4.16**	**10.73**	**0.14**	**5.79**	**<0.00005**	**<0.01**	**0.61**	**<0.1**	**<0.05**	**<0.05**

Near Tailing Pond

Monthly Average	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a)Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Apr-14	45.00	26.20	4.10	10.41	0.12	5.15	<0.00005	<0.01	0.54	<0.1	<0.05	<0.05
May-14	42.56	25.16	4.02	9.86	0.13	5.08	<0.00005	<0.01	0.57	<0.1	<0.05	<0.05
Jun-14	42.11	24.53	4.12	10.20	0.12	4.84	<0.00005	<0.01	0.53	<0.1	<0.05	<0.05
Jul-14	31.33	18.94	BDL	9.42	0.10	4.19	<0.00005	<0.01	0.39	<0.1	<0.05	<0.05
Aug-14	24.11	14.79	BDL	9.36	0.10	4.13	<0.00005	<0.01	0.37	<0.1	<0.05	<0.05
Sep-14	23.25	13.99	BDL	9.28	0.10	4.48	<0.00005	<0.01	0.38	<0.1	<0.05	<0.05
Oct-14	39.78	23.71	BDL	10.31	0.11	5.43	<0.00005	<0.01	0.59	<0.1	<0.05	<0.05
Nov-14	48.00	27.93	4.08	11.29	0.13	6.15	<0.00005	<0.01	0.66	<0.1	<0.05	<0.05
Dec-14	47.11	26.84	4.04	10.43	0.13	5.77	<0.00005	<0.01	0.59	<0.1	<0.05	<0.05
Jan-15	42.89	25.91	BDL	9.64	0.11	5.57	<0.00005	<0.01	0.53	<0.1	<0.05	<0.05
Feb-15	44.13	25.81	BDL	9.90	0.14	5.56	<0.00005	<0.01	0.58	<0.1	<0.05	<0.05
Mar-15	32.00	19.01	4.00	9.40	0.10	5.00	<0.00005	<0.01	0.48	<0.1	<0.05	<0.05
ANNUAL AVERAGE	**38.52**	**22.74**	**4.03**	**9.96**	**0.12**	**5.11**	**<0.00005**	**<0.01**	**0.52**	**<0.1**	**<0.05**	**<0.05**

Ambient Air Quality Report in buffer zone April' 14 to March 15

Sl.No	Location	Month of Monitoring	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a) Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
1	Birasal	**June'2014**	48	27.5	<4	9.6	0.12	5.8	<0.00005	<20	0.58	<0.1	<0.05	<0.05
		Sept'14	36	21.5	<4	10.8	0.11	<5	<0.00005	<20	0.54	<0.1	<0.05	<0.05
		Dec'14	58	32.5	<4	11.4	0.19	6.7	<0.00005	<20	0.81	<0.1	<0.05	<0.05
		March'15	46	27.5	<4	10.9	0.14	5.4	<0.00005	<20	0.69	<0.1	<0.05	<0.05
2	Kanehipal	**June'2014**	53	29.2	<4	10.4	0.16	6.5	<0.00005	<20	0.71	<0.1	<0.05	<0.05
		Sept'14	41	25.8	<4	11.2	0.13	5.3	<0.00005	<20	0.59	<0.1	<0.05	<0.05
		Dec'14	64	36.8	4.2	11.9	0.23	7.1	<0.00005	<20	0.88	<0.1	<0.05	<0.05
		March'15	51	29.3	<4	11.4	0.18	5.8	<0.00005	<20	0.74	<0.1	<0.05	<0.05
3	Kalarangiatta	**June'2014**	64	36.5	<4	11.6	0.29	8.1	<0.00005	<20	0.89	<0.1	<0.05	<0.05
		Sept'14	46	27.1	<4	11.4	0.14	5.9	<0.00005	<20	0.62	<0.1	<0.05	<0.05
		Dec'14	78	44.1	5.3	13.2	0.35	8.5	<0.00005	<20	0.93	<0.1	<0.05	<0.05
		March'15	66	27.5	4.4	12.8	0.24	7.3	<0.00005	<20	0.89	<0.1	<0.05	<0.05
4	Kaliapani	**June'2014**	55	30.2	4.3	10.9	0.18	7.3	<0.00005	<20	0.77	<0.1	<0.05	<0.05
		Sept'14	39	24.6	<4	10.6	0.12	<5	<0.00005	<20	0.54	<0.1	<0.05	<0.05
		Dec'14	52	29.3	<4	11.1	0.17	5.9	<0.00005	<20	0.66	<0.1	<0.05	<0.05
		March'15	40	23.8	<4	10.2	0.13	<5	<0.00005	<20	0.62	<0.1	<0.05	<0.05
5	Kakudia	**June'2014**	49	28.9	<4	9.2	0.14	6	<0.00005	<20	0.64	<0.1	<0.05	<0.05
		Sept'14	40	23.8	<4	10.9	0.12	5.1	<0.00005	<20	0.58	<0.1	<0.05	<0.05
		Dec'14	61	35.5	<4	11.4	0.2	6.7	<0.00005	<20	0.74	<0.1	<0.05	<0.05
		March'15	53	29.5	<4	11.7	0.16	6.1	<0.00005	<20	0.75	<0.1	<0.05	<0.05
6	Sendashara	**June'2014**	33	18.2	<4	<9	<0.1	4.8	<0.00005	<20	0.49	<0.1	<0.05	<0.05
		Sept'14	28	16.5	<4	<9	<0.1	<5	<0.00005	<20	0.44	<0.1	<0.05	<0.05
		Dec'14	45	27.8	<4	10.7	0.13	5.3	<0.00005	<20	0.71	<0.1	<0.05	<0.05
		March'15	37	21.2	<4	9.8	<0.1	<5	<0.00005	<20	0.59	<0.1	<0.05	<0.05
7	Laxmidharpur	**June'2014**	55	30.4	<4	<9	0.17	7.2	<0.00005	<20	0.73	<0.1	<0.05	<0.05
		Sept'14	48	27.9	<4	11.4	0.15	6.1	<0.00005	<20	0.63	<0.1	<0.05	<0.05
		Dec'14	63	36.1	<4	11.6	0.21	7.1	<0.00005	<20	0.89	<0.1	<0.05	<0.05
		March'15	56	31.8	<4	11.9	0.19	6.4	<0.00005	<20	0.77	<0.1	<0.05	<0.05
8	Sukarangi	**June'2014**	68	37.6	<4	11.3	0.22	8.4	<0.00005	<20	0.81	<0.1	<0.05	<0.05
		Sept'14	51	31.4	4.6	12.2	0.18	6.5	<0.00005	<20	0.69	<0.1	<0.05	<0.05
		Dec'14	69	38.4	4.7	12.3	0.26	7.7	<0.00005	<20	0.96	<0.1	<0.05	<0.05
		March'15	62	35.5	<4	12.6	0.22	6.9	<0.00005	<20	0.84	<0.1	<0.05	<0.05
9	Muruabil	**June'2014**	39	24.3	<4	9.5	<0.1	5.9	<0.00005	<20	0.62	<0.1	<0.05	<0.05
		Sept'14	33	18.5	<4	9.8	0.11	<5	<0.00005	<20	0.51	<0.1	<0.05	<0.05
		Dec'14	51	29.7	<4	11.5	0.15	6	<0.00005	<20	0.58	<0.1	<0.05	<0.05
		March'15	44	26.9	<4	10.8	0.12	5.1	<0.00005	<20	0.65	<0.1	<0.05	<0.05
10	Kharkhari	**June'2014**	46	27.1	<4	9.8	0.13	7.3	<0.00005	<20	0.69	<0.1	<0.05	<0.05
		Sept'14	40	23.9	<4	9.8	0.14	5.3	<0.00005	<20	0.64	<0.1	<0.05	<0.05
		Dec'14	57	31.9	<4	11.8	0.18	6.5	<0.00005	<20	0.72	<0.1	<0.05	<0.05
		March'15	49	31.9	<4	11.2	0.15	5.6	<0.00005	<20	0.69	<0.1	<0.05	<0.05

Annual Average in buffer zone

Sl.No	Location		PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a)Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
1	Birasa Birasal	AVG	47.00	27.25	<4	10.68	0.14	5.97	<0.00005	<20	0.66	<0.1	<0.05	<0.05
2	Kanehipal	AVG	52.25	30.28	<4	11.23	0.18	6.18	<0.00005	<20	0.73	<0.1	<0.05	<0.05
3	Kalarangiatta	AVG	63.50	33.80	4.42	12.25	0.26	7.45	<0.00005	<20	0.83	<0.1	<0.05	<0.05
4	Kaliapani	AVG	46.50	26.98	<4	10.70	0.15	6.60	<0.00005	<20	0.65	<0.1	<0.05	<0.05
5	Kakudia	AVG	50.75	29.43	<4	10.80	0.16	5.98	<0.00005	<20	0.68	<0.1	<0.05	<0.05
6	Sendashara	AVG	35.75	20.93	<4	9.56	0.11	5.05	<0.00005	<20	0.56	<0.1	<0.05	<0.05
7	Laxmidharpur	AVG	55.50	31.55	<4	10.66	0.18	6.70	<0.00005	<20	0.76	<0.1	<0.05	<0.05
8	Sukarangi	AVG	62.50	35.73	4.43	12.10	0.22	7.38	<0.00005	<20	0.83	<0.1	<0.05	<0.05
9	Muruabil	AVG	41.75	24.85	<4	10.55	0.12	5.67	<0.00005	<20	0.59	<0.1	<0.05	<0.05
10	Kharkhari	AVG	48.00	28.70	<4	10.65	0.15	6.18	<0.00005	<20	0.69	<0.1	<0.05	<0.05

Water Quality Parameters of ETP -Inlet Sukinda Chromite Mine TATA STEEL LTD. (2014-2015)

Parameter	Unit	Standards (In land Surface water)	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	**AVERAGE**
			Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	**Inlet**
Colour & Odour	Hazan/-	5.0 / U/O	24 & U/O	28 & U/O	1 & U/O	2 & U/O	4 & U/O	8 & U/O	8 & U/O	5 & U/O	3 & U/O	4 & U/O	2 & U/O	4 & U/O	**8.09 & U/O**
Suspended Solids	mg/ltr	100	64	83	45	51	88	94	71	37	28	48	51	47	**58.92**
Particular Size of Suspended Solids	µ(micron)	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	**<850**
PH	--	5.5-9.0	6.8	6.6	7.9	7.6	6.9	6.8	6.9	6.7	6.8	6.7	6.8	6.6	**6.93**
Temperature	^{0}c.	Shall not exceed 5ºC	25	25	25	25	24	24	25	24	24	23	25	25	**24.50**
Oil & Grease	mg/ltr	10	0.48	0.56	0.8	0.6	0.8	1.2	0.9	0.74	0.62	0.54	0.64	0.71	**ND**
Total Residual Chlorine	mg/ltr	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Amm. Nitrogen as N	mg/ltr	50	1.22	1.31	0.2	0.32	0.4	0.51	0.44	0.35	0.25	0.33	0.48	0.53	**0.53**
Total Kjeldal Nitrogen as NH_3	mg/ltr	100	1.65	1.93	3.08	2.86	3.14	2.74	2.58	1.26	1.19	1.26	1.36	1.47	**2.04**
Free Ammonia as NH_3	mg/ltr	5	ND	ND	0.009	0.007	0.002	0.002	0.002	0.001	0.002	0.0008	0.002	0.003	**ND**
BOD (3) days at 27^{0}c.	mg/ltr	30	10.4	12.8	11.6	12.8	9.4	5.6	4.9	4.9	4.2	3.7	3.1	2.87	**7.19**
COD	mg/ltr	250	31.7	37.6	30	34.2	27.6	17.3	15.7	13.7	12.5	11.3	8.4	7.15	**20.60**
Arsenic as As	mg/ltr	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Mercury as Hg	mg/ltr	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
Lead as Pb	mg/ltr	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Cadmium as Cd	mg/ltr	2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Hexa Chromium as Cr $^{+6}$	mg/ltr	0.1	0.69	0.77	1.26	1.15	0.74	0.58	0.73	0.63	0.71	0.4	0.37	0.29	**0.693**
Total Chromium as Cr	mg/ltr	2	0.75	0.89	0.72	0.88	0.78	0.49	0.42	0.34	0.29	0.43	0.32	0.37	**0.56**
Copper as Cu	mg/ltr	3	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	**<0.003**
Zinc as Zn	mg/ltr	5	0.18	0.22	0.19	0.23	0.26	0.22	0.19	0.22	0.26	0.31	0.26	0.31	**0.24**
Selenium as Se	mg/ltr	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**<0.005**
Nickel as Ni	mg/ltr	3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Cyanide as CN	mg/ltr	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**
Fluoride as F	mg/ltr	2	0.11	0.14	0.08	0.074	0.069	0.065	0.074	0.065	0.08	0.06	0.05	0.06	**0.077**
Diss. Phosphate as P*	mg/ltr	5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**<0.1**
Sulphide as S*	mg/ltr	2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Phenolic Compounds as C_6H_5OH	mg/ltr	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Bio-assay Test	--	90% survival of fish after 96 hours in 100% effluent	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	**97.00%**
Manganese as Mn	mg/ltr	2	0.11	0.093	0.085	0.068	0.059	0.047	0.036	0.029	0.033	0.029	0.043	0.036	**0.06**
Iron as Fe	mg/ltr	3	0.46	0.55	0.01	1.04	1.17	0.79	0.68	0.51	0.51	0.63	0.47	0.38	**0.60**
Vanadium as V	mg/ltr	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Nitrate Nitrogen	mg/ltr	10	0.27	0.33	0.396	0.38	0.34	0.29	0.36	0.48	0.39	0.48	0.38	0.27	**0.36**
Pesticides (max)	µg/l	10	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

Water Quality Parameters of ETP -Outlet Sukinda Chromite Mine TATA STEEL LTD. (2014-2015)

Parameter	Unit	Standards (In land Surface water)	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	**AVERAGE**
			Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet
Colour & Odour	Hazan /-	5.0 / U/O	CL & U/O	CL & U/O	2 & U/O	4 & U/O	6 & U/O	10 & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	2 & U/O	**CL & U/O**
Suspended Solids	mg/ltr	100	17	24	28	38	29	34	24	19	14	36	33	34	**27.50**
Particular Size of Suspended Solids	µ(micron)	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	**<850**
PH	--	5.5-9.0	7.1	7.2	7.1	7.2	7.3	7.1	7.2	7.1	7.2	7.2	7.1	6.9	**7.14**
Temperature	^{0}c.	Shall not exceed 5ºC	25	25	25	25	24	24	25	24	24	23	25	25	**24.50**
Oil & Grease	mg/ltr	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Total Residual Chlorine	mg/ltr	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**BDL**
Amm. Nitrogen as N	mg/ltr	50	1.14	1.2	0.1	0.18	0.28	0.43	0.38	0.28	0.21	0.28	0.39	0.45	**0.44**
Total Kjeldal Nitrogen as NH_3	mg/ltr	100	1.53	1.74	2.52	2.34	2.52	1.96	1.74	1.17	1.11	1.17	1.24	1.35	**1.70**
Free Ammonia as NH_3	mg/ltr	5	ND	ND	0.0007	0.002	0.002	0.003	0.003	0.002	0.002	0.0022	0.002	0.003	**ND**
BOD (3) days at 27^{0}c.	mg/ltr	30	1.63	2.17	1.98	2.26	1.96	1.3	1.22	1.22	1.34	1.42	1.84	1.65	**1.67**
COD	mg/ltr	250	4.82	5.9	6	9.4	4.3	3.82	3.72	1.63	3.87	3.64	5.2	4.96	**4.77**
Arsenic as As	mg/ltr	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Mercury as Hg	mg/ltr	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
Lead as Pb	mg/ltr	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Cadmium as Cd	mg/ltr	2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Hexa Chromium as Cr $^{+6}$	mg/ltr	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**
Total Chromium as Cr	mg/ltr	2	0.82	0.85	0.7	0.64	0.6	0.53	0.48	0.39	0.33	0.46	0.38	0.28	**0.54**
Copper as Cu	mg/ltr	3	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	**<0.003**
Zinc as Zn	mg/ltr	5	0.15	0.17	0.16	0.19	0.21	0.18	0.17	0.18	0.2	0.28	0.22	0.24	**0.196**
Selenium as Se	mg/ltr	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**<0.005**
Nickel as Ni	mg/ltr	3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Cyanide as CN	mg/ltr	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**
Fluoride as F	mg/ltr	2	0.086	0.098	0.06	0.066	0.057	0.051	0.066	0.053	0.04	0.05	0.04	0.05	**0.060**
Diss. Phosphate as P*	mg/ltr	5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**<0.1**
Sulphide as S*	mg/ltr	2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Phenolic Compounds as C_6H_5OH	mg/ltr	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Bio-assay Test	--	90% survival of fish after 96 hours in 100% effluent	98%	98%	98%	98%	98%	98%	98%	98%	98%	97%	98%	98%	**98.00%**
Manganese as Mn	mg/ltr	2	0.076	0.081	0.073	0.054	0.051	0.039	0.031	0.022	0.026	0.023	0.031	0.029	**0.045**
Iron as Fe	mg/ltr	3	0.33	0.42	0.36	1.19	0.3	0.42	0.59	0.47	0.4	0.45	0.35	0.33	**0.47**
Vanadium as V	mg/ltr	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
Nitrate Nitrogen	mg/ltr	10	0.21	0.25	0.378	0.36	0.28	0.23	0.31	0.36	0.32	0.36	0.32	0.21	**0.30**
Pesticides (max)	µg/l	10	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

Water Quality Parameters at Oil Separation System –Inlet Sukinda Chromite Mine TATA STEEL LTD. (2014-2015)

Sl. No	Parameter	Unit	Standards	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	**AVERAGE**
				Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	Inlet	**Inlet**
1	Colour & Odour	--	5 & U/O	18 &	22 &	18 &	14 &	10 &	5 & U/O	5 & U/O	7 & U/O	5 & U/O	2 & U/O	CL &	2 & U/O	**9.81 U/.O**
2	Suspended Solids	mg/l	100	94	116	109	113	128	101	88	96	74	49	56	47	**89.25**
3	Particular Size of S.S.	µ(micr	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	**<850**
4	pH	--	5.5-9.0	7.4	7.3	7.4	7.5	7.4	7.5	7.4	7.5	7.4	7.5	7.4	7.3	**7.42**
5	Temperature	0C	Shall not exceed 5ºC	25	25	25	25	24	24	25	24	24	23	25	25	**24.50**
6	Oil & Grease	mg/l	10	2.18	1.94	2	1.8	1.4	1.6	1.3	1.4	1.8	2.2	1.9	1.6	**1.76**
7	Total Residual Chlorine	mg/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
8	Amm. Nitrogen as N	mg/l	50	0.74	0.83	0.65	0.54	0.29	0.34	0.41	0.37	0.28	0.34	0.42	0.38	**0.47**
9	Total Kjeldal Nitrogen	mg/l	100	1.46	1.65	1.39	1.25	1.13	1.42	1.22	1.17	1.26	1.41	1.37	1.25	**1.33**
10	Free Ammonia as NH3	mg/l	5	ND	ND	0.009	0.008	0.004	0.006	0.006	0.006	0.004	0.005	0.004	0.004	**ND**
11	BOD(3) days at 270c	mg/l	30	6.8	7.3	8.4	8.7	7.6	3.9	3.4	2.9	2.4	1.9	1.4	1.26	**4.66**
12	COD	mg/l	250	19.6	21.5	24	26.4	21.9	10.5	9.7	8.7	7.8	6.5	4.8	3.78	**13.77**
13	Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
14	Mercury as Hg	mg/l	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
15	Lead as Pb	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
16	Cadmium as Cd	mg/l	2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
17	Hexa Chromium as Cr	mg/l	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**
18	Total Chromium as Cr	mg/l	2	0.14	0.17	0.21	0.17	0.22	0.34	0.38	0.29	0.36	0.27	0.22	0.23	**0.25**
19	Copper as Cu	mg/l	3	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	**<0.003**
20	Zinc as Zn	mg/l	5	0.2	0.24	0.19	0.24	0.26	0.23	0.18	0.22	0.18	0.26	0.21	0.28	**0.22**
21	Selenium as Se	mg/l	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**<0.005**
22	Nickel as Ni	mg/l	3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
23	Cyanide	mg/l	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**
24	Fluoride as F	mg/l	2	0.096	0.087	0.08	0.074	0.082	0.065	0.044	0.036	0.05	0.03	0.04	0.05	**BDL**
25	Diss. Phosphate as P	mg/l	5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**<0.1**
26	Sulphide as S	mg/l	2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
27	Phenolic Compounds as	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
28	Bio-assay Test,	%	90% survival of fish after 96 hours in 100% effluent	97%	97%	96%	97%	97%	97%	97%	97%	97%	98%	98%	98%	**97.08%**
29	Manganese as Mn, mg/l	mg/l	2	0.065	0.069	0.078	0.062	0.058	0.032	0.026	0.021	0.018	0.016	0.022	0.017	**0.040**
30	Iron as Fe, mg/l	mg/l	3	0.14	0.17	0.12	0.19	0.66	0.48	0.37	0.44	0.32	0.41	0.32	0.36	**0.33**
31	Vanadium as V, mg/l	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
32	Nitrate Nitrogen , mg/l	mg/l	10	0.31	0.37	0.352	0.28	0.29	0.36	0.28	0.33	0.25	0.37	0.27	0.24	**0.31**
33	Pesticides (as Benzene	µg/l	10	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

*Diss. Phosphate and Sulphide is tested using Titrimetric method

Water Quality Parameters at Oil Separation System –Outlet Sukinda Chromite Mine TATA STEEL LTD. (2014-2015)

Sl. No	Parameter	Unit	Std.	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
				Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	**Outlet**
1	Colour & Odour	--	5 & U/O	CL &	CL &	CL &	CL &	CL &	CL &	CL &	CL &	CL &	CL &	CL &	CL &	**CL & U/O**
2	Suspended Solids	mg/l	100	26	35	44	39	49	37	29	18	14	16	21	19	**28.92**
3	Particular Size of S.S.	µ(micr	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	**<850**
4	pH	--	5.5-9.0	7.1	7.1	7.2	7.1	7.2	7.1	7.2	7.2	7.1	7.2	7.1	7.1	**7.14**
5	Temperature	0C	Shall not exceed 5ºC	25	25	25	25	24	24	25	24	24	23	25	25	**24.50**
6	Oil & Grease	mg/l	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
7	Total Residual	mg/l	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
8	Amm. Nitrogen as N	mg/l	50	0.62	0.69	0.57	0.47	0.22	0.29	0.35	0.31	0.21	0.28	0.36	0.31	**0.39**
9	Total Kjeldal	mg/l	100	1.31	1.44	1.27	1.18	1.04	1.31	1.15	1.04	1.1	1.28	1.22	1.16	**1.21**
10	Free Ammonia as	mg/l	5	ND	ND	0.005	0.002	0.002	0.002	0.003	0.0028	0.002	0.0022	0.005	0.004	**ND**
11	BOD(3) days at 270c	mg/l	30	1.37	1.45	1.94	1.32	1.2	1.1	1.6	1.3	1.3	1.2	1.1	1.14	**1.34**
12	COD	mg/l	250	3.91	4.26	6	3.84	3.54	3.4	4.8	2.1	3.7	3.9	3.6	3.42	**3.87**
13	Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
14	Mercury as Hg	mg/l	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000	<0.0001	<0.000	<0.0001	<0.0001	**<0.0001**
15	Lead as Pb	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
16	Cadmium as Cd	mg/l	2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
17	Hexa Chromium as Cr	mg/l	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**
18	Total Chromium as Cr	mg/l	2	0.092	0.13	0.19	0.14	0.18	0.28	0.31	0.24	0.21	0.25	0.19	0.19	**0.200**
19	Copper as Cu	mg/l	3	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	**<0.003**
20	Zinc as Zn	mg/l	5	0.17	0.2	0.21	0.18	0.22	0.19	0.16	0.19	0.14	0.22	0.18	0.23	**0.19**
21	Selenium as Se	mg/l	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**<0.005**
22	Nickel as Ni	mg/l	3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
23	Cyanide	mg/l	0.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**<0.002**
24	Fluoride as F	mg/l	2	0.082	0.074	0.06	0.068	0.074	0.052	0.037	0.031	0.04	0.02	0.03	0.04	**BDL**
25	Diss. Phosphate as P	mg/l	5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**<0.1**
26	Sulphide as S	mg/l	2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
27	Phenolic Compounds	mg/l	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
28	Bio-assay Test,	%	90% survival of fish after 96 hours in 100% effluent	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	**98.00%**
29	Manganese as Mn,	mg/l	2	0.058	0.06	0.065	0.056	0.051	0.024	0.022	0.016	0.014	0.01	0.019	0.011	**0.034**
30	Iron as Fe, mg/l	mg/l	3	0.11	0.13	0.14	0.13	0.52	0.4	0.32	0.38	0.27	0.35	0.27	0.31	**0.28**
31	Vanadium as V, mg/l	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
32	Nitrate Nitrogen ,	mg/l	10	0.26	0.29	0.327	0.22	0.25	0.3	0.24	0.28	0.21	0.29	0.22	0.19	**0.26**
33	Pesticides (as	µg/l	10	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

*Diss. Phosphate and Sulphide is tested using Titrimetric method

Water Quality Parameters of Domestic Effluent at Sukinda Chromite Mine TATA STEEL LTD. (2014-2015)

INLET OF DOMESTIC EFFLUENT			STANDARD	INLET	INLET	INLET	INLET	INLET	INLET	INLET	INLET	INLET	INLET	INLET	INLET	INLET
Sl.No	Parameter	Unit	Inland Surface Water Sewers (Part-A Effluents)	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	TSS	mg/l	100	265	319	289	319	287	265	230	203	246	197	218	204	**253.50**
2	pH	-	5.5-9.0	7.7	8.1	7.8	8.1	7.8	7.6	7.5	7.4	7.5	7.6	7.9	8.1	**7.76**
3	BOD (3) days at 27°c	mg/l	30	101	108	113	114	99	87	96	101	96	101	110	113	**103.25**
4	COD	mg/l	250	297	326	354	329	287	258	281	304	289	306	328	322	**306.75**
5	Hexavalent Chromium as Cr^{+6}	mg/l	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**
6	Total Chromium as Cr	mg/l	2.0	0.25	0.31	0.21	0.22	0.34	0.26	0.38	0.21	0.38	0.29	0.14	0.15	**0.26**
7	Oil & Grease	mg/l	10	0.85	1.18	0.96	0.87	0.71	0.65	0.58	0.55	0.55	0.49	1.1	0.79	**0.77**

OUTLET OF DOMESTIC EFFLUENT			STANDARD	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET	OUTLET
Sl.No	Parameter	Unit	Inland Surface Water Sewers (Part-A Effluents)	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	TSS	mg/l	100	21	33	41	54	41	34	29	36	29	22	32	26	**33.17**
2	pH	-	5.5-9.0	7.1	7.3	7.2	7.3	7.2	7.1	7.2	7.1	7.2	7.3	7.4	7.3	**7.23**
3	BOD (3) days at 27°c	mg/l	30	12.2	13.7	14.5	13.7	12.8	11.4	10.8	12.2	11.8	12.6	14.2	14.7	**12.88**
4	COD	mg/l	250	35.9	38.1	96	56.9	36.5	29.2	33.5	31.7	33.7	37.2	43.7	46.5	**43.24**
5	Hexavalent Chromium as Cr+6	mg/l	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**<0.05**
6	Total Chromium as Cr	mg/l	2.0	0.19	0.26	0.18	0.19	0.26	0.18	0.22	0.19	0.32	0.21	0.13	0.13	**0.205**
7	Oil & Grease	mg/l	10	ND	0.32	0.58	0.62	0.59	0.53	0.4	0.43	0.47	0.42	0.72	0.66	**ND**

Drinking Water Quality Sukinda Chromite Mine TATA STEEL LTD. (2014-2015)

DW-1 INLET

Sl.No	Parameter	Unit	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	Colour	Hazen	CL	CL	CL	CL	10	15	10	6	CL	CL	CL	CL	**CL**
2	Odour	-	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	**U/O**
3	pH	-	7.2	7.3	7.2	7.2	7	7.4	7.3	7.2	7.2	7.3	7.2	7.2	**7.2**
4	Dissolved Oxygen	mg /ltr	7.1	7.2	7.3	7.4	7.3	7.2	7.2	7.3	7.2	7.3	7.3	7.2	**7.3**
5	Total dissolved solids	mg /ltr	154	164	171	184	197	185	161	149	137	135	124	136	**158.1**
6	Suspended solids	mg /ltr	32	45	38	47	68	89	74	49	37	29	45	37	**49.2**
7	Chloride as Cl	mg /ltr	9.1	9.8	11.1	10.6	11.1	9.8	8.7	9.1	9.6	10.2	10.4	9.9	**10.0**
8	Sulphate as SO_4	mg /ltr	19.4	21.7	19.6	21.4	23.8	26.1	28.9	23	18	23	28	22	**22.9**
9	Fluoride as F	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
10	Calcium as Ca	mg /ltr	8.6	9.7	9.4	9.8	10.3	9.8	8.7	9.4	9.8	9.2	9.8	9.4	**9.5**
11	Magnesium as Mg	mg /ltr	5.9	6.2	5.9	7.2	8.9	7.6	6.8	7.1	7.6	6.8	6.9	6.6	**7.0**
12	Hexavalent Chromium	mg /ltr	0.021	0.021	0.29	0.09	0.11	0.09	0.094	0.06	0.051	0.062	0.054	0.039	**0.08**
13	Mercury as Hg	mg /ltr	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
14	Total Chromium as Cr	mg /ltr	0.17	0.25	0.38	0.43	0.26	0.31	0.38	0.32	0.42	0.37	0.17	0.16	**0.3**
15	COD	mg /ltr	3.74	4.14	3.87	3.18	3.86	3.69	3.27	2.86	3.14	3.48	4.17	3.86	**3.6**
16	BOD(3) days at 27^0 c	mg /ltr	1.28	1.36	1.26	1.26	1.34	1.21	1.12	0.92	1.2	1.2	1.19	1.11	**1.2**
17	Iron (as Fe)	mg /ltr	0.26	0.38	0.35	0.4	0.44	0.36	0.28	0.36	0.39	0.46	0.38	0.31	**0.4**
18	Insecticide	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**
19	Total Coliform MPN Count/100ml	--	530	559	580	580	640	554	480	430	466	440	460	460	**515**

DW-2 OUTLET

Sl.No	Parameter	Unit	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	Colour	Hazen	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	**CL**
2	Odour	-	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	**U/O**
3	pH	-	7.1	7.2	7.1	7.1	7.2	7.1	7.2	7.1	7.1	7.1	7.1	7.1	**7.1**
4	Dissolved Oxygen	mg /ltr	7.3	7.4	7.5	7.5	7.4	7.3	7.2	7.5	7.4	7.4	7.3	7.4	**7.4**
5	Total dissolved solids	mg /ltr	97	101	118	128	108	101	98	86	91	86	79	87	**98.3**
6	Suspended solids	mg /ltr	4.1	5.3	7.8	6.9	7.6	7.1	6.4	5.2	4.4	6	8	6	**6.2**
7	Chloride as Cl	mg /ltr	9.4	10.2	12.3	11.4	11.8	10.1	9.2	9.8	10.2	10.8	11.1	10.4	**10.6**
8	Sulphate as SO_4	mg /ltr	14.7	16.5	14.8	16.5	19.6	21.4	20.4	19	16	19	21	17	**18.0**
9	Fluoride as F	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
10	Calcium as Ca	mg /ltr	9.5	9.9	10.2	10.6	11.6	10.6	9.2	9.7	9.9	9.6	10.4	9.7	**10.1**
11	Magnesium as Mg	mg /ltr	6.4	6.6	7.1	8.3	9.7	8.4	7.5	7.8	7.8	7.1	7.4	7.1	**7.6**
12	Hexavalent Chromium	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
13	Mercury as Hg	mg /ltr	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
14	Total Chromium as Cr	mg /ltr	0.21	0.19	0.22	0.38	0.48	0.53	0.46	0.39	0.36	0.31	0.19	0.17	**0.3**
15	COD	mg /ltr	1.2	1.34	1.17	1.04	0.94	0.88	0.93	1.33	1.24	2.18	2.36	2.74	**1.4**
16	BOD(3) days at 27^0 c	mg /ltr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
17	Iron (as Fe)	mg /ltr	0.15	0.17	0.13	0.13	0.17	0.15	0.13	0.11	0.13	0.15	0.13	0.18	**0.1**
18	Insecticide	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**
19	Total Coliform MPN Count/100ml	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	**<2**

DW-3 : Tubewell near 3R-Quarter. .....**in Sep'11 Report Location Changed from **3R Quarter** to **Market Area.**

Sl.No	Parameter	Unit	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	Colour	Hazen	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	**CL**
2	Odour	-	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	**U/O**
3	pH	-	6.9	6.8	6.9	6.8	6.9	6.8	6.9	7.1	6.9	7	6.9	7	**6.9**
4	Dissolved Oxygen	mg /ltr	6.6	6.9	6.8	6.6	6.8	6.9	6.7	6.6	6.5	6.4	6.5	6.3	**6.6**
5	Total dissolved solids	mg /ltr	142	137	146	154	147	124	134	121	128	114	119	126	**132.7**
6	Suspended solids	mg /ltr	7.9	8.6	9.6	8.3	9.4	8.7	12.4	3.9	9.7	14	12	17	**10.1**
7	Chloride as Cl	mg /ltr	11.2	10.6	10.9	12.1	13.4	11.3	10.8	11.4	12.1	11.6	10.8	11.1	**11.4**
8	Sulphate as SO_4	mg /ltr	18.2	19.4	16.8	18.3	21.5	23.8	23.2	26	21	28	33	19	**22.4**
9	Fluoride as F	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
10	Calcium as Ca	mg /ltr	9.6	9.2	9.7	8.9	9.8	9.4	9.9	9.1	9.5	10.1	9.6	9.2	**9.5**
11	Magnesium as Mg	mg /ltr	6.5	5.9	6.3	6.7	7.5	7.2	8.1	6.6	6.9	7.9	6.7	6.4	**6.9**
12	Hexavalent Chromium	mg /ltr	0.033	0.033	0.027	0.036	0.042	0.029	0.024	0.021	0.033	0.041	0.042	0.04	**BDL**
13	Mercury as Hg	mg /ltr	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
14	Total Chromium as Cr	mg /ltr	0.25	0.27	0.26	0.41	0.64	0.48	0.53	0.46	0.51	0.42	0.28	0.21	**0.4**
15	COD	mg /ltr	1.43	1.39	1.29	0.96	0.91	0.82	1.42	1.21	1.36	2.46	2.53	2.48	**1.5**
16	BOD(3) days at 27^0 c	mg /ltr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
17	Iron (as Fe)	mg /ltr	0.22	0.19	0.17	0.17	0.22	0.21	0.19	0.16	0.15	0.2	0.19	0.2	**0.2**
18	Insecticide	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**
19	Total Coliform MPN Count/100ml	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	**<2**

DW-4 Tap water Near Stack Yard

Sl.No	Parameter	Unit	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	Colour	Hazen	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	**CL**
2	Odour	-	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	**U/O**
3	pH	-	7.1	7.2	7.1	7.2	7.2	7.1	7.1	7.1	7.1	7.2	7.1	7.2	**7.1**
4	Dissolved Oxygen	mg /ltr	7.3	7.4	7.3	7.4	7.4	7.3	7.2	7.5	7.4	7.3	7.2	7.3	**7.3**
5	Total dissolved solids	mg /ltr	99	103	114	108	111	104	101	91	87	91	81	91	**98.4**
6	Suspended solids	mg /ltr	4.3	5.4	8.1	7.3	7.9	7.4	7.1	5.8	4.8	7	8	7	**6.7**
7	Chloride as Cl	mg /ltr	9.3	9.7	12.4	11.6	11.8	10.6	9.4	9.6	9.9	10.4	11.3	10	**10.5**
8	Sulphate as SO_4	mg /ltr	15.2	16.8	15.2	16.8	19.9	20.6	19.7	18	16	17	23	20	**18.2**
9	Fluoride as F	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
10	Calcium as Ca	mg /ltr	9.3	9.8	10.4	10.2	11.5	10.8	9.4	9.6	9.9	9.5	10.3	9.5	**10.0**
11	Magnesium as Mg	mg /ltr	5.9	6.7	6.9	8.2	9.8	8.7	7.6	7.7	7.4	7.2	7.3	7.2	**7.6**
12	Hexavalent Chromium	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
13	Mercury as Hg	mg /ltr	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
14	Total Chromium as Cr	mg /ltr	0.22	0.2	0.19	0.32	0.51	0.33	0.44	0.37	0.38	0.32	0.18	0.2	**0.3**
15	COD	mg /ltr	1.23	1.28	1.19	1.1	0.97	0.84	0.89	0.96	1.22	1.94	2.28	2.34	**1.4**
16	BOD(3) days at 27^0 c	mg /ltr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
17	Iron (as Fe)	mg /ltr	0.16	0.18	0.13	0.13	0.18	0.16	0.15	0.12	0.12	0.16	0.14	0.17	**0.2**
18	Insecticide	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**
19	Total Coliform MPN Count/100ml	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	**<2**

DW-5 Tap water Near Jagannath Temple

Sl.No	Parameter	Unit	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	Colour	Hazen	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	**CL**
2	Odour	-	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	**U/O**
3	pH	-	7.2	7.2	7	7.1	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.1	**7.1**
4	Dissolved Oxygen	mg /ltr	7.2	7.3	7.4	7.5	7.4	7.3	7.2	7.4	7.5	7.4	7.3	7.3	**7.4**
5	Total dissolved solids	mg /ltr	101	102	125	112	113	102	96	85	90	89	79	85	**98.3**
6	Suspended solids	mg /ltr	4.7	5.7	7.9	7.1	7.6	7.6	6.8	5.6	4.5	6	9	6	**6.5**
7	Chloride as Cl	mg /ltr	9.4	10.2	12.1	11.3	11.7	10.4	9.1	9.9	10.1	10.4	10.9	10.4	**10.5**
8	Sulphate as SO_4	mg /ltr	14.9	16.5	14.7	15.6	19.7	21.1	20.3	19	17	21	21	23	**18.7**
9	Fluoride as F	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
10	Calcium as Ca	mg /ltr	9.5	9.9	10.1	10.4	11.8	10.6	9.3	9.8	9.8	9.4	10.5	9.8	**10.1**
11	Magnesium as Mg	mg /ltr	6.1	6.8	7.1	7.8	9.6	8.4	7.4	8.1	7.5	7.1	7.4	7.1	**7.5**
12	Hexavalent Chromium	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
13	Mercury as Hg	mg /ltr	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
14	Total Chromium as Cr	mg /ltr	0.21	0.21	0.23	0.36	0.48	0.29	0.41	0.39	0.36	0.3	0.19	0.18	**0.3**
15	COD	mg /ltr	1.19	1.33	1.22	1.08	0.94	0.86	0.9	0.83	1.25	2.1	2.33	2.41	**1.4**
16	BOD(3) days at 27^0 c	mg /ltr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
17	Iron (as Fe)	mg /ltr	0.15	0.17	0.14	0.13	0.17	0.14	0.13	0.11	0.12	0.15	0.13	0.19	**0.1**
18	Insecticide	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**
19	Total Coliform MPN Count/100ml	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	**<2**

DW-6 Tap water Near COB Plant

Sl.No	Parameter	Unit	Apr'14	May'14	June'14	July'14	Aug'14	Sep'14	Oct'14	Nov'14	Dec'14	Jan'15	Feb'15	Mar'15	AVERAGE
1	Colour	Hazen	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	CL	**CL**
2	Odour	-	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	U/O	**U/O**
3	pH	-	7.1	7.2	7.1	7.1	7.2	7.1	7.1	7.1	7.1	7.1	7.1	7.1	**7.1**
4	Dissolved Oxygen	mg /ltr	7.3	7.3	7.3	7.4	7.4	7.3	7.2	7.5	7.4	7.4	7.3	7.4	**7.4**
5	Total dissolved solids	mg /ltr	97	101	120	106	109	101	99	88	91	86	80	89	**97.3**
6	Suspended solids	mg /ltr	4.2	5.5	8.1	6.9	7.8	7.3	7	5.5	4.9	7	8	7	**6.6**
7	Chloride as Cl	mg /ltr	9.3	10.4	11.9	11.2	11.9	10.7	9.3	9.7	10	10.7	11	11.2	**10.6**
8	Sulphate as SO_4	mg /ltr	15.1	16.6	14.9	16.2	19.6	20.8	21.8	19	17	20	23	21	**18.8**
9	Fluoride as F	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
10	Calcium as Ca	mg /ltr	9.2	9.7	9.9	10.6	11.6	10.5	9.1	9.5	9.9	9.6	10.4	9.6	**10.0**
11	Magnesium as Mg	mg /ltr	6.3	6.6	7	7.6	9.7	8.2	7.5	7.9	7.4	7.2	7.3	7	**7.5**
12	Hexavalent Chromium	mg /ltr	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
13	Mercury as Hg	mg /ltr	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
14	Total Chromium as Cr	mg /ltr	0.22	0.19	0.2	0.38	0.49	0.31	0.45	0.38	0.39	0.31	0.18	0.17	**0.3**
15	COD	mg /ltr	1.2	1.32	1.18	1.14	0.92	0.85	0.92	0.99	1.21	2	2.35	2.38	**1.4**
16	BOD(3) days at 27^0 c	mg /ltr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
17	Iron (as Fe)	mg /ltr	0.15	0.18	0.13	0.12	0.17	0.15	0.14	0.11	0.13	0.16	0.13	0.18	**0.1**
18	Insecticide	--	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**
19	Total Coliform MPN Count/100ml	--	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	**<2**

Noise survey report at COB plant, LOP plant of SCM TSL

SL.No.	LOCATION	June'14	Sep'14	Dec'14	Mar'15	AVERAGE
		Noise level in dB(A)	**Noise level in dB(A)**	**Noise level in dB(A)**	**Noise level in dB(A)**	
1	COB Plant Gate	56.4	55.3	53.8	54.6	**55.0**
2	Canteen	63.7	63.1	61.9	55.4	**61.0**
3	Work Shop	68.6	67.2	68.5	61.2	**66.4**
4	Office	61.3	62	61.3	58.4	**60.8**
5	D.G.Shed	72.3	71.4	69.9	56.3	**67.5**
6	MCC Room	69.4	68.8	67.3	58.1	**65.9**
7	Vibrating Screen	73.2	71.8	72.5	61	**69.6**
8	Scrubber	69.5	68.9	67.7	53.4	**64.9**
9	Control Room	62.8	61.4	62.5	51.6	**59.6**
10	Secondary Appron	68.2	68.9	66.3	60	**65.9**
11	Cone Crusher	68.9	68	67.1	56.2	**65.1**
12	DTJ Crusher	70.1	69.5	68.9	57.3	**66.5**
13	Concentrated Ore Loading	70.2	68.8	66.4	55.2	**65.2**
14	Wobbler area	70.0	69.4	68.2	58.9	**66.6**
15	Primary Apron feeder	73.6	72.2	71.5	59.6	**69.2**
16	C -1A	65.7	66.4	65.0	53.4	**62.6**
17	Shaking Table	72.5	71.9	70.4	61.2	**69.0**
18	Multiple Bin	74.0	72.6	73.9	64.4	**71.2**
19	H.T Room	63.7	62.6	60.7	51.4	**59.6**
20	Hydro Cyclone	67.2	66.6	64.5	53.6	**63.0**
21	Spirals	64.2	62.8	61.3	49.7	**59.5**
22	VS Ball Mill	74.0	74.7	71.9	62.7	**70.8**
23	C.6A	71.5	70.6	69.7	58.2	**67.5**
24	H.F Screen	72.4	71.3	70.5	61.2	**68.9**
25	Sieve band area	73.0	72.4	71.7	59.8	**69.2**
26	C3	72.3	71.7	68.4	58.1	**67.6**
27	C4	73.6	72.2	71.6	56.7	**68.5**
28	LOPP Sayaji Crusher	75.2	75.9	74.5	54.9	**70.1**
29	LOPP Screen	71.2	70.3	71.8	57.6	**67.7**
30	LOPP Control Room	71.7	71.1	70.4	53.8	**66.8**
31	LOPP Hopper	69.8	68.4	67.0	56.1	**65.3**

Sl. No	Mines Div No.	Equipment	Noise level in d B(A)			
			Idle Speed		Max. RPM	
			Door Open	Door Closed	Door Open	Door Closed
1	O-352	Haul pack	83.2	79.5	87.2	84.8
2	O-353	Haul pack	83.4	80.0	86.7	83.1
3	O-354	Haul pack	89.0	84.6	94.4	89.7
4	O-355	Haul pack	87.1	83.3	92.3	87.6
5	O-356	Haul pack	89.8	86.4	96.1	91.5
6	O-357	Haul pack	96.8	92.7	99.4	96.1
7	O-358	Haul pack	84.4	79.2	88.1	84.2
8	O-359	Haul pack	92.1	88.4	96.6	91.4
9	O-360	Haul pack	90.9	85.6	93.2	88.6
10	O-361	Haul pack	88.3	84.9	93.8	90.1
11	O-362	Haul pack	86.5	82.4	90.8	86.3
12	O-363	Haul pack	87.9	83.0	91.9	86.9
13	O-375	Haul pack	86.7	83.1	91.2	87.9
14	O-376	Haul pack	88.9	86.3	92.8	89.4
15	O-377	Haul pack	87.7	84.2	90.9	87.2
16	O-378	Haul pack	89.0	85.4	93.3	88.9
17	O-379	Haul pack	87.6	81.6	93.6	86.3
18	O-380	Haul pack	90.1	84.7	95.3	91.0
19	O-381	Haul pack	85.7	81.0	89.1	86.4
20	O-382	Water Sprinkler	79.7	76.7	84.5	80.2
21	O-385	Water Sprinkler	76.2	80.5	81.0	85.9
22	S-404	TDV Explosive van	77.7	74.1	81.8	77.4
23	S-516	TDV Explosive van	72.9	69.3	77.5	73.0
24	S-470	TDV Scoop Tripper	72.0	68.6	76.2	73.8
25	S-474	TDV Scoop Tripper	75.2	70.5	78.9	75.3
26	S-431	TDV Scoop Tripper	81.8	77.6	86.3	82.7
27	S-466	TDV Scoop Tripper	82.1	77.5	85.8	80.7
28	S-302	Box Tipper	76.8	73.0	82.5	77.1
29	S-378	Box Tipper	81.8	77.4	85.5	82.3
30	S-382	Box Tipper	80.0	74.7	85.3	81.0
31	S-403	Box Tipper	73.7	68.5	78.1	72.9
32	S-418	Service van	81.3	77.1	86.5	82.3
33	S-485	Service van	73.9	75.7	79.1	80.4
34	S-427	Truck	77.2	74.6	82.3	79.7
35	S-484	Truck	75.3	71.5	80.2	76.4
36	S-490	Box Tipper	76.0	72.2	80.0	75.9
37	S-491	Box Tipper	73.5	69.6	76.8	73.1
38	SB-405	Bus	76.7	73.1	81.4	76.4
39	S-444	Diesel Tanker	79.3	75.6	83.9	79.3
40	S-387	Diesel Tanker	79.5	75.7	85.1	81.4
41	S-392	Placer Dumper	79.3	75.6	83.7	79.7
42	S-393	Placer Dumper	78.2	75.1	84.0	78.8
43	EX-300	Excavator	80.3	76.4	85.8	80.8
44	EX-600V	Excavator	83.2	80.0	88.1	84.6
45	T-465	Dozer	77.4	74.1	81.9	77.8
46	T-468	Dozer	78.9	74.8	77.7	79.1
47	T-469	Dozer	77.5	74.5	79.7	83.4

48	T-491	Dozer	78.4	75.2	83.6	81.2
49	T-494	Dozer	83.4	79.4	87.9	83.9
50	D-644	ReCp Drill	86.5	81.8	90.5	86.6
51	D-648	ReCp Drill	84.4	80.2	88.3	83.9
52	D-652	ReCp Drill	82.1	78.0	86.1	81.4
53	T-501	Loader	79.0	73.9	82.5	78.0
54	T-480	Loader	83.3	78.7	87.0	84.0
55	T-485	Loader	81.3	77.1	85.6	82.5
56	T-486	Loader	82.5	77.0	86.4	82.3
57	T-488	Loader	86.8	82.7	91.0	87.2
58	T-489	Loader	88.6	84.8	93.0	89.0
59	D-650	IR Drill	86.7	-	90.9	-
60	D-654	IR Drill	85.6	-	89.1	-
61	G-712	Grader	88.7	-	92.8	-
62	G-713	Grader	87.4	-	93.4	-
63		Compressor Mining Complex	88.6	-	94.6	-
64		Compressor Mining Complex	87.6	-	91.8	-
65		Compressor Eng. Complex	86.8	-	91.6	-
66		Compressor Work Shop	89.7	-	94.3	-

Ambient Noise Level Survey in Residential Areas of SCM, TSL from 6AM to 6AM (Next Day)

Sl. No	Time in Hrs.	Locations	June'14 Noise level in dB(A)	Sep'14 Noise level in dB(A)	Dec'14 Noise level in dB(A)	Mar'15 Noise level in dB(A)	AVERAGE
1	6.00	Main Gate	63.3	61.9	62.5	63.6	**62.8**
2	6.30	Market Complex	58.4	59.1	60.5	59.6	**59.4**
3	7.00	Hospital	47.1	46.2	48.1	48.6	**47.5**
4	7.30	Post Office	42.7	42.1	44.9	44.2	**43.5**
5	8.00	Study Center	46.5	45.1	42.8	43.6	**44.5**
6	8.30	Water treatment Plant (D.G was not in operation)	51.1	50.5	48.5	49	**49.8**
7	9.00	STP	51.6	50.2	49.1	48.4	**49.8**
8	9.30	Shishu Mandir	<40	<40	43.6	44.4	**<40**
9	10.00	Children's Park	49.9	49	51.3	52.4	**50.7**
10	10.30	3RSF Qtrs	49.8	49.2	50.9	50	**50.0**
11	11.00	L2R Qtrs	50.5	49.1	48.6	49.1	**49.3**
12	11.30	Recreation Club	47.8	47.2	52.8	53.6	**50.4**
13	12.00	B4-B6 Block Qtrs	55.2	53.8	50.2	51.3	**52.6**
14	12.30	B3-B4 Block Qtrs	50.7	51.4	49.1	48.2	**49.9**
15	13.00	Geological Camp	45.6	45	47.9	48.4	**46.7**
16	13.30	Babu Line	49.9	48.5	46.4	45.7	**47.6**
17	14.00	Guest House	48.4	47.3	44.5	45.3	**46.4**
18	14.30	3R Qtrs	54.6	54	52.6	53.7	**53.7**
19	15.00	VT Centre	53.7	52.3	51.9	51	**52.2**
20	15.30	SS High school	45.9	46.6	53.5	54	**50.0**
21	16.00	2RF Qtrs	47.1	46.2	48.1	47.4	**47.2**
22	16.30	CT Qtrs	<40	<40	45.4	46.2	**<40**
23	17.00	STP	44.0	43.4	41.3	41.8	**42.6**

24	17.30	Police Out Post	52.6	52	48.6	47.9	**50.3**
25	18.00	Jagarnnath Temple	45.0	43.6	41.9	42.7	**43.3**
26	18.30	GM Banglow	46.8	47.5	48.9	50	**48.3**
27	19.00	Market Complex	59.5	58.6	60.4	59.5	**59.5**
28	19.30	Laboratory	43.8	43.2	48.9	49.4	**46.3**
29	20.00	Chrome Vally Club	52.3	50.9	49.6	50.4	**50.8**
30	20.30	Atwal's Camp	46.9	46.3	47.2	48.3	**47.2**
31	21.00	Duplex Qtrs	45.0	43.6	44.9	44	**44.4**
32	21.30	FootBall Ground	<40	<40	43.1	43.6	**<40**
33	22.00	B4-B6 Block Qtrs	43.7	42.6	48.1	49.2	**45.9**
34	22.30	Sisu Mandir	<40	<40	46.9	46	**<40**
35	23.00	5 Star Qtrs	47.3	45.9	44.2	44.7	**45.5**
36	23.30	Stewart School	<40	<40	49.4	48.7	**<40**
37	0.00	A9-A13 Qtrs	48.9	47.5	50.6	51.4	**49.6**
38	0.30	A14-A19 Qtrs	42.6	43.3	48.5	49	**45.9**
39	1.00	A-17 - A23 Qtrs	<40	<40	42.7	42	**<40**
40	1.30	B1-B3 Block	<40	<40	44.9	45.7	**<40**
41	2.00	Hospital	<40	<40	42.7	43.8	**<40**
42	2.30	SBI	<40	<40	51.5	50.6	**<40**
43	3.00	Jagarnnath Temple	<40	<40	48.4	48.9	**<40**
44	3.30	TSRDS	<40	<40	44.3	45.1	**<40**
45	4.00	Babu Line	39.7	38.3	40.9	42	**40.2**
46	4.30	Guest House Annexe	<40	<40	43.8	42.9	**<40**
47	5.00	Banabharati Dance School	<40	<40	44.5	45	**<40**
48	5.30	Main Gate	43.7	43.1	56.9	56.2	**50.0**

Ambient Noise Level Survey in Industrial Area of SCM, TSL from 6AM to 6AM (Next Day)

			June'14	Sep'14	Dec'14	Mar'15	AVERAGE
Sl.No	**Time in Hrs.**	**Location**	**Noise level in d B(A)**	**Noise level in d B(A)**	**Noise level in d B(A)**	**Noise level in d B(A)**	
1	6.00	Canteen Gate	56.4	55.3	56.5	57.6	**56.5**
2	6.30	Quarry Pump House	63.7	63.1	62.1	61.2	**62.5**
3	7.00	Stack Yard	68.6	67.2	66	66.5	**67.1**
4	7.30	Lumpy Plot	61.3	62	63.8	63.1	**62.6**
5	8.00	40 t. Weigh Bridge	72.3	71.4	70.5	71.3	**71.4**
6	8.30	Concentrated Ore Stack Yard	69.4	68.8	67.9	68.4	**68.6**
7	9.00	OB Dump	73.2	71.8	73.4	72.7	**72.8**
8	9.30	OB IX Quarry	69.5	68.9	67.2	68	**68.4**
9	10.00	Atwal's Pyroxinate Crusher	62.8	61.4	70.5	71.6	**66.6**
10	10.30	Magazine	68.2	68.9	69.4	68.5	**68.8**
11	11.00	Pyroxinate Quarry	68.9	68	66.2	66.7	**67.5**
12	11.30	OB-II Quarry	70.1	69.5	70.5	71.3	**70.4**
13	12.00	OB Dump	70.2	68.8	67.2	68.3	**68.6**
14	12.30	Naresh Kumar Crusher	70.0	69.4	68.5	67.6	**68.9**
15	13.00	OB-X Quarry	73.6	72.2	71.1	71.6	**72.1**
16	13.30	Old ETP	65.7	66.4	65.6	64.9	**65.7**
17	14.00	Mining Complex	72.5	71.9	70.8	71.6	**71.7**
18	14.30	Slime Dam	74.0	72.6	71.5	72.6	**72.7**

19	15.00	OB-IX Quarry	63.7	62.6	64.8	63.9	**63.8**
20	15.30	Pyroxinate Plot	67.2	66.6	65.9	66.4	**66.5**
21	16.00	OB Dump	64.2	62.8	63.6	62.9	**63.4**
22	16.30	Temple Gate	74.0	74.7	72.8	73.6	**73.8**
23	17.00	Air Strip	71.5	70.6	69.5	70	**70.4**
24	17.30	Hauling Gate	72.4	71.3	68.7	68	**70.1**
25	18.00	Work Shop	73.0	72.4	71.5	72.3	**72.3**
26	18.30	New ETP	72.3	71.7	62.8	63.9	**67.7**
27	19.00	20T Weigh Bridge	73.6	72.2	70.4	69.5	**71.4**
28	19.30	Engg. Complex	75.2	75.9	72.2	72.7	**74.0**
29	20.00	Atwal's Chrome Crusher	71.2	70.3	68.6	69.4	**69.9**
30	20.30	New ETP	71.7	71.1	69.4	70.5	**70.7**
31	21.00	Canteen Gate	69.8	68.4	67.2	66.3	**67.9**
32	21.30	Hauling Gate	73.7	73.1	71.9	72.4	**72.8**
33	22.00	Work Shop	53.2	51.8	60.4	61.5	**56.7**
34	22.30	Old ETP	45.6	46.3	54.9	54	**50.2**
35	23.00	Petrol Pump	45.6	44.5	56.3	56.8	**50.8**
36	23.30	Quarry Pump House	46.6	46	72.8	72.1	**59.4**
37	0.00	Hospital Gate	42.7	41.3	49.4	50.2	**45.9**
38	0.30	OB X Quarry	59.6	60.3	57	57.5	**58.6**
39	1.00	Alwal's chrome crusher	62.9	61.5	66.2	65.5	**64.0**
40	1.30	Atwal's Garage	54.8	55.5	57.9	58.7	**56.7**
41	2.00	Old OK Line	42.6	41.5	43.8	44.9	**43.2**
42	2.30	Air Strip	<40	<40	41.5	40.6	**<40**
43	3.00	Stack Yard	57.6	57.0	61.9	62.4	**59.7**
44	3.30	40Ton Weigh Bridge	61.2	59.8	64.5	65.3	**62.7**
45	4.00	Naresh Kumar Crusher	65.4	64	66.2	67.3	**65.7**
46	4.30	OB IX Quarry	61.4	60.8	64.5	63.6	**62.6**
47	5.00	Work shop	70.6	69.2	65.2	65.7	**67.7**
48	5.30	Canteen Gate	49.0	50.1	52.4	51.7	**50.8**

NOISE LEVEL SURVEY AT GEOLOGICAL LABORATORY IN COB PLANT SCM TSL

Sl.No	Location	June'14		Sep'14		AVERAGES	
		Noise Level in dB(A)		Noise Level in dB(A)		Noise Level in dB(A)	
		Max	Min	Max	Min	Max	Min
1	Exhaust Fan	59.2	55	64.8	59.2	62.0	57.1
2	Dry Sieve Shaker Machine	64.7	59.3	67.5	62.9	66.1	61.1
3	Wet Sieve Shaker Machine	61.2	56.7	66.3	61.1	63.8	58.9
4	Manual sample preparation table	65.9	56.5	68.7	62.4	67.3	59.5

NOISE LEVEL SURVEY AT GEOLOGICAL LABORATORY IN COB PLANT SCM TSL							
Sl.No	**Location**	**Dec'14**		**March'15**		**AVERAGES**	
		Noise Level in dB(A)		**Noise Level in dB(A)**		**Noise Level in dB(A)**	
		Max	Min	Max	Min	Max	Min
1	ICT Room of Laboratory	65.1	61.8	63.5	57.2	64.3	59.5
2	Analytical Hal of Laboratory	56.4	50.9	55.1	51.5	55.8	51.2
3	Fuming Chamber of Laboratory	72	64.5	68.6	62.3	70.3	63.4

Annexure – 13

Vetiver plantation on dump slope.

Annexure – 14
Environment Awareness Programs

Leaf Identification

MEMC Week celebration

Annexure – 15
Rain water harvesting

Inauguration of roof top rain water harvesting system at Administrative office.