

COMPLIANCE REPORT PERIOD : OCT'2014 TO MAR'2015

ENVIRONMENTAL CLEARANCE NO. SEIAA-38/11 OF MANMORA MANGANESE MINE OF TATA STEEL LIMITED VIDE SEIAA's LETTER NO. SEIAA/329 DATED 29.06.2011

Present Status of the Project:-

The Scheme of Mining & Progressive Mine Closure Plan from 2010-11 to 2014-15 over an area of 16.350 ha. has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no. MS/OTF.MECH/55-ORI/BHU/2009-10, Dt. 01.04.2010.

Sl. no	Stipulated Conditions	Compliance status
1	The earthen embankments are planned as per WAPCO design; it needs stone walling on both sides to prevent collapse of the embankment as immediately down of the mine are the townships, railway line and some agricultural land.	<ul style="list-style-type: none">• The outer face as well as the inner face of the embankment has been stone patched to prevent collapse of the embankment. Annexure-I: Photographs of Stone Pitched Embankment
2	Since the mine has been fully worked and mineral resources have been fully removed, mine closure plan should be implemented forthwith reclaiming the mine pits and re-vegetation of the mine lease area.	<ul style="list-style-type: none">• The Progressive Mine Closure Plan has been prepared and duly approved by IBM under MCRD, 1988 for the period 2010-11 to 2014-15.• Green belt development plan has been under taken at the mine with a total of 10450 nos. of sapling planted of local species in the year 2014-15. Annexure-II: Photographs of Sapling Plantation at Manmora.
3	The existing overburden dumps and the entire quantity of waste generated shall be back filled and liquidated within five years and there shall be no external overburden dump in the mining lease area. The back filled area shall be afforested and back filling has to be done in a manner that it is restored to the normal ground level. A complete mine closure plan with afforestation / re-vegetation component with year wise details submitted to the SEIAA within six months and strictly implemented.	<ul style="list-style-type: none">• The back filling of opencast void is being done by disposal of slime of Joda East Iron Mine as per the approved mining scheme from Indian Bureau of Mines (IBM) which is under same management control.• The vacant area and dump slope has been planted with 10450 nos. of local forestry saplings over 1.5 ha during 2014-15.
4	The project proponent shall prepare wild life conservation plan in consultation with DFO and adequate safety and mitigation measures should be incorporated to protect the wild life, flora, fauna to mitigate adverse impact.	<ul style="list-style-type: none">• The site specific wildlife conservation plan for entire lease area of 671.093 ha of Joda East Iron Mine (Within which Manmora lease area of 16.35 ha is included) has been prepared and re-submitted for approval as per the new guidelines.• Moreover, ₹ 1,00,66,395/- has been deposited with DFO, Keonjhar, Odisha as the contribution towards implementation of Wild Life Management Plan prepared for Bonai & Keonjhar division during approval of Forest Clearance along with Joda East Iron Mine.

5	<p>Shelter Belt i.e. Wind Break of 15m width consisting of at least 5 tiers around the lease facing the human habitation, school / agricultural land etc. (if any in the vicinity), in the safety zone / backfilled & reclaimed areas around voids & roads shall be raised. Green belt development and selection of plant species shall be as per CPCB guidelines. Density of the trees has to be around 2500 plants per hectare. Herbs and shrubs shall also form a part of afforestation programme besides tree plantation. Help & guidance of local DFO may be sought in the matter. Details of year-wise afforestation programme including rehabilitation of mined out area shall be submitted to the SEIAA, Odisha within six months.</p>	<ul style="list-style-type: none"> The afforestation program since 2005-06 to till date is furnished below- <table border="1" data-bbox="820 248 1528 734"> <thead> <tr> <th>Year of Plantation</th> <th>Saplings Planted (Nos.)</th> <th>Area (ha)</th> <th>Survival Rate (%)</th> <th>Tree Density/ha</th> </tr> </thead> <tbody> <tr> <td>2005-06</td> <td>1500</td> <td>0.500</td> <td>83</td> <td>2490</td> </tr> <tr> <td>2006-07</td> <td>1500</td> <td>0.500</td> <td>80</td> <td>2400</td> </tr> <tr> <td>2007-08</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>2008-09</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>2009-10</td> <td>11693</td> <td>1.500</td> <td>75</td> <td>5847</td> </tr> <tr> <td>2010-11</td> <td>13060</td> <td>2.300</td> <td>90</td> <td>5110</td> </tr> <tr> <td>2011-12</td> <td>5205</td> <td>1.000</td> <td>88</td> <td>4580</td> </tr> <tr> <td>2012-13</td> <td>4000</td> <td>1.000</td> <td>82</td> <td>4000</td> </tr> <tr> <td>2013-14</td> <td>15500</td> <td>2.5</td> <td>81</td> <td>6200</td> </tr> <tr> <td>2014-15</td> <td>10450</td> <td>3.14</td> <td>83</td> <td>2762</td> </tr> <tr> <td>Total</td> <td>62908</td> <td>12.44</td> <td>83</td> <td>4197</td> </tr> </tbody> </table> <p>Development of green belt and reclamation is being adhered in accordance with Approved Progressive Mine Closure Plan.</p>	Year of Plantation	Saplings Planted (Nos.)	Area (ha)	Survival Rate (%)	Tree Density/ha	2005-06	1500	0.500	83	2490	2006-07	1500	0.500	80	2400	2007-08	-	-	-	-	2008-09	-	-	-	-	2009-10	11693	1.500	75	5847	2010-11	13060	2.300	90	5110	2011-12	5205	1.000	88	4580	2012-13	4000	1.000	82	4000	2013-14	15500	2.5	81	6200	2014-15	10450	3.14	83	2762	Total	62908	12.44	83	4197
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6	<p>The applicant (Project Proponent) will take necessary measures for prevention, control and mitigation of Air Pollution, Noise Pollution and Land Pollution including solid waste management as mentioned by him in Form - 1, Final EIA reports and Environment Management Plan (EMP) in compliance with the prescribed statutory norms and standards.</p>	<ul style="list-style-type: none"> As the entire mineable resource has been depleted, no further mining activities is being undertaken within the lease hold area. However, the production of finished ore will be continued by manual screening and processing of sub-grade mineral and mineral rejects already available at pit head during dry season only. Hence, there is no Air Pollution, Noise Pollution and Land pollution could be observed which emanates from Manmora Mn Mine. Further, to control the air pollution during dry seasons, water sprinkling by mobile water tanker is being done. 																																																												
7	<p>The applicant will take necessary steps for socio-economic development of the people of the area on need based assessment for providing employment, education, health care, drinking water and sanitation, road and communication facilities etc. after a detailed primary socio-economic survey.</p>	<ul style="list-style-type: none"> The company deploys the Tata Steel Rural Development Society (TSRDS) for socio-economic development of the area on need based assessment by providing employment, education, health care, drinking water and sanitation. 																																																												
8	<p>The applicant will comply to the points, concerns and issues raised by the people during public hearing on 01.02.2010 in accordance with the commitments made by him thereon.</p>	<ul style="list-style-type: none"> Most of the commitments made during the Public Hearing, have been complied suitably and the point wise status report is enclosed as Annexure-III: PH commitment implementation report. 																																																												
9	<p>The project proponent shall take necessary safeguard measures to ensure that there is no leaching from the tailing pond.</p>	<ul style="list-style-type: none"> The disposal of tailings is being temporarily discontinued during the period Oct' 14 to Mar' 15. The Tailing dam has been designed by M/s. WAPCOS Ltd. a Central Govt. organization having expertise in designing and construction of such dams. Adequate safeguard measures have been taken to prevent any leaching from the tailing dam. No spill or leaching incidents have taken place to date. 																																																												

10	The decanted water from the tailing pond shall be re-circulated and there should be zero discharge from the tailing pond.	<ul style="list-style-type: none"> The disposal of tailings has commenced on trial basis during the period Apr'12 to Sept'12 and is being continued. The slime is stored in the zero discharge slime pond. The decanted water from the slime pond is completely recycled back to beneficiation plant within the Joda East Iron Mine ensuring zero outside discharge.
11	The applicant will take statutory clearance / approval / permissions from the concerned authorities in respect of his project as and when required.	<ul style="list-style-type: none"> All required statutory clearances/ approvals/ permissions from the concerned authorities in respect of the project have been obtained.
12	For post environment clearance monitoring, the applicant will submit half-yearly compliance report in respect of stipulated terms and conditions of Environment Clearance to the State Environmental Impact Assessment Authority (SEIAA), Orissa on 1 st June & 1 st December of each calendar year.	<ul style="list-style-type: none"> 2nd Half yearly compliance report for the year 2014-15 in respect of the stipulated terms and conditions of the EC is being submitted herewith to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar and also by e-mail.
13	The core zone should be monitored intensively with nos. of stations as prescribed by CPCB, Delhi. The detailed methodology adopted for analysis of samples shall be clearly indicated.	<ul style="list-style-type: none"> Due to small lease area and non-operative mine, one ambient air monitoring station has been identified at the stack yard which will active during manual processing of sub-grade and mineral reject of manganese ore. The detailed methodology for analysis of samples are furnished below- <ul style="list-style-type: none"> a. PM₁₀ : Avg. Flow rate not less than 1.1 m³ / min b. PM_{2.5} : Avg. Flow rate not less than 1.1 m³ / min c. SO₂ : Improved West Gaeke & Ultraviolet Fluorescence d. NO_x : Jacob & Hochhelser modified (Na-Arsenite) and Gas Phase Chemiluminescence e. CO : Non dispersive Infrared Spectroscopy & f. Mn : Colorimetric method
14	The proponent shall submit base line data on flora and fauna and CSR activities carried out within three months to the SEIAA.	<ul style="list-style-type: none"> The base line data on flora & fauna and the list of CSR activities already carried out in the area have been submitted to SEIAA vide our letter No. MD/ENV/519/116/2011, dated: 07/10/2011.
15	The following shall be implemented viz (a) dump run-off should be diverted into a settling pond (b) adequate rain water harvesting and ground water recharging facilities should be developed in the core zone (c) attempt should be made to achieve zero water balance.	<ul style="list-style-type: none"> Waste dump had become inactive and therefore the slopes have been stabilized by plantation to prevent soil erosion. Catch drains and a garland drain has been provided along the entire dump slope which emanates at low lying part to sedimentation pit. Further, the catch drains and sedimentation pits are periodically de-silted and maintained properly. Rain water harvesting and ground water recharge facilities have been made at the mine site. After the project is implemented it will be ensured to achieve zero water balance.

16	Maintenance of roads through which transportation are undertaken shall be carried out by the project proponent regularly at its own cost.	<ul style="list-style-type: none"> All the haul roads are made up of morrum & compacted. Regular repair is being done by dozer & grader after spreading the layer of morrum over it. Water sprinkling arrangement is adequate for suppressing the road dust. 										
17	Fugitive dust generation shall be controlled. Fugitive dust emission shall be regularly monitored at locations of near human habitation (including schools and other public amenities located nearest to sources of dust generation as applicable) and records shall be submitted to SEIAA, Odisha.	<ul style="list-style-type: none"> The AAQ (fugitive dust) being monitored at one location (near stack yard) twice in a week. Data on ambient air quality monitoring for every month is being submitted to State Pollution Control Board. Abstract of the monthly monitoring data on ambient air quality is enclosed as Annexure-IV: AAQ monitoring report. There has been no mining activity at Manmora Mn. Mines during the period Oct'14 to March'15 therefore, no fugitive dust emission monitoring has been carried out. 										
18	Mineral handling area shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.	<ul style="list-style-type: none"> The mineral handling is only by manual means during dry season only for manual processing (sorting and sizing) and screening of available sub grade and mineral rejects available at pit head. So, water sprinkling over the area is sufficient to allay the dust generation. 										
19	Transportation shall be done by covering the trucks by tarpaulin or other suitable mechanism so that no spillage of ore / dust takes place.	<ul style="list-style-type: none"> The trucks are being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding located at Joda. 										
20	Rain Water Harvesting shall be undertaken to recharge the ground water source.	<ul style="list-style-type: none"> Rain water harvesting pond has been made at the side of the mining lease under expert consultation of M/s. KRG Foundation, Chennai, to recharge the ground water. 										
21	Monitoring of ground and surface water quality shall be regularly conducted and records should be maintained and data shall be submitted regularly to the SEIAA.	<ul style="list-style-type: none"> The ground water quality at existing well outside the lease hold area and surface water quality is being monitored and the analysis results are enclosed as Annexure-V: Surface Water Quality Report. Annexure-VI: Ground Water Quality Report 										
22	The proponent shall ensure that no silt originating due to mining activity is transported in the surface water course. Measures for prevention and control of soil erosion and management of silt shall be undertaken. Protection of dumps against erosion shall be carried out with geo-textile matting or other suitable material and thick plantation of native trees and shrubs shall be carried out at the dump slopes. Dump shall be protected by retaining wall.	<ul style="list-style-type: none"> Waste dump had become inactive and therefore the slopes has been stabilized by plantation to prevent soil erosion. Catch drains and a garland drain has been provided along the entire dump slope which emanates at low lying part to sedimentation pit. Further, the catch drains and sedimentation pits are periodically de-silted and maintained properly. The afforestation program since 2005-06 to till date has been undertaken to stabilize the waste dump slope and vacant areas. The details are furnished below: <table border="1" data-bbox="820 1944 1528 2047"> <thead> <tr> <th>Year of Plantation</th> <th>Saplings Planted (Nos.)</th> <th>Area (ha)</th> <th>Survival Rate (%)</th> <th>Tree Density/ha</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Year of Plantation	Saplings Planted (Nos.)	Area (ha)	Survival Rate (%)	Tree Density/ha					
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		<ul style="list-style-type: none"> The retaining wall of 710 mtr. has been provided at the toe of the waste dump. 																																																							
23	Trenches / garland drains shall be constructed at foot of dumps to arrest silt from being carried to water bodies. Adequate check dams shall be constructed across the seasonal / perennial nallahs (if any) flowing through the ML area and silts be arrested. De-silting at regular intervals shall be carried out.	<ul style="list-style-type: none"> Catch drains and garland drains are covering the entire dump slope at toe part. Similarly, a garland drain with settling pit has been provided near the railway track and causeway near railway culverts for directing the flow of surface run-offs after settling. 																																																							
24	Provision shall be made for the housing of labourers within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may in the form of temporary structures to be removed after the completion of the project.	<ul style="list-style-type: none"> Housing facilities for the employees has been provided within a centralized camp at Joda East beyond the mining lease hold area. 																																																							
25	Occupational health and safety measures for the workers including identification of work related hazards, training on malaria eradication, HIV and healthy effects on exposure to mineral dust etc. shall be carried out. The proponent shall engage a full time qualified doctor who is trained in occupational health. Periodic monitoring of exposure to respirable mineral dust on the workers shall be conducted and record maintained including health record of workers. Awareness programme for workers on impact of mining on their health and precautionary measures like use of personal equipments etc. shall be carried out periodically. Review of impact of various health measures undertaken (at interval of five years or less) shall be conducted followed by follow up action wherever required. Occupational Health	<ul style="list-style-type: none"> The production of finished ore will be continued by manual screening and processing of sub-grade mineral and mineral rejects already available at pit head during dry season only. Due to this temporary nature of job, the laborers from our Joda West Manganese Mine will be deployed at the mine. Hence, Periodical Medical Examination of employees (departmental & contractual) are conducted as per prescribed norms of Mines Rule, 1955 at Joda West Mn. Mine covering the workers identified for Manmora. The initial and periodical examination includes blood haematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. All chest radiographs are being classified for detection of pneumoconiosis, diagnosis and documentation made in accordance to ILO classifications. During 2011-12, 415 nos. of employees were examined while during 2012-13, 301 nos. of employees (contractual and departmental) were examined. During 2013-14 a total no. of 66 																																																							

	Center shall be established near the mine itself.	employees (Departmental-16 and contractor employees-50) were examined. During 2014-15, for the period of October-14 to March-15 a total no. of 58 employees were examined (departmental-5 and contractor- 53) which are included in the compliance report of Joda West. There are no findings of pneumoconiosis and manganese poisoning which is classified as occupational disease.
26	The Environmental Clearance is subject to Forest Clearance under Forest (Conservation) Act, 1980.	<ul style="list-style-type: none"> • Forest clearance over the entire forest area of 9.373 Ha within the lease has been granted along with FC of Joda East Iron Mine vide letter no. F. No. 8-32/1993-FC (vol - II), dated 24.09.2007.
27	The mining operation shall be restricted to above ground water table and it should not intersect the ground water table.	<ul style="list-style-type: none"> • Mining is not intersecting the ground water as the ground water being at lower level in comparison to existing maximum quarry depth. No further mine development will be in place due exhaustion of mineable resource.
28	The top soil shall be temporarily be stored at earmarked site (s) only and it should not be kept unutilized for long (not more than 3 years). The top soil shall be used for land reclamation and plantation.	<ul style="list-style-type: none"> • No top soil was generated during Oct'14 to March'15 because there was no mine development work undertaken due to exhaustion of mineable resource.
29	The fund earmarked for the environment protection measures shall be judiciously utilized. Under no circumstances this funds shall be diverted for other purposes. Year-wise expenditure for this fund should be reported to the SEIAA, Odisha.	<ul style="list-style-type: none"> • Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose. • The utilization of environment management for the financial year 2014-15 was Rs. 10,12,981 (Monitoring – Rs 8,11,239/- & Plantation - Rs. 2,01,742/-) against the annual budget of Rs 10,22,500/- (Monitoring - Rs, 4,60,000/- & Plantation - Rs.5,62,500/-) for Manmora Manganese Mines. • Moreover, where replacing the loose boulder retaining wall with cemented retaining wall at strategic points in the cost included in mining operation.
30	The critical parameters in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharge water shall be monitored {[TDS, DO, pH and Total suspended solids (TSS)}. The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near main gate of the company in public domain. The Circular No. J-20012/1/2006-IA.II(M), dated 27.05.2009 issued by MoEF which is available on the website of Ministry www.envfor.nic.in shall also be referred in this regard for its compliance.	<ul style="list-style-type: none"> • The critical parameters in the Ambient Air Quality are being analysed. The monthly average of analysis is enclosed as Annexure-IV: AAQ monitoring report. • There is no blasting operation being carried out within lease hold area as there is no mine developmental work due to exhaustion of mineable resource. • There is no generation of mine drainage water as the mine is working at high hill slope area and does not intersects the ground water table. • The monitoring data has been displayed on a board near entrance of the mine.
31	The project proponent shall obtain necessary prior permission of the	<ul style="list-style-type: none"> • Water required for water sprinkling and drinking water during dry season is being supplied from Joda West

	competent authorities for drawl of requisite quantity of water (surface water and ground water) required for the project.	Manganese Mine which has got the surface water drawl permission from competent authority.
32	The above mentioned stipulated conditions shall be complied in time bound manner. Failure to comply with any of the conditions mentioned above may result withdrawal of this environmental clearance and attract penal action under the provisions of Environmental Protection (EP) Act, 1986.	<ul style="list-style-type: none"> All the conditions mentioned above are complied.

As per letter no. 106-9/11/EPE: To discuss the impact of mining activities on habitation and develop a code of practice on these issues, a meeting was held under the Chairmanship of Shri M.S. Nagar, Chairman EAC (Non coal Mining Sector) on 23.06.2014. After detailed deliberations by the Exports, the following suggestions were made as part of mitigation measures to avoid adverse impact of mining operation in the case of habitations/villages:-

Sl. no	2 : <u>Additional Conditions</u>	Compliance status
a	The project Authority shall adopt Best Mining Practice for the mining conditions. In the mining area, adequate number of check dams, retaining walls/structures garland drains and settling ponds should be provided to arrest the wash-off with rain water in catchment area.	There is no mining activity being carried at Manmora Mine lease. The exhausted pit of the mine is now being used as slime pond. The water from the lease area is diverted to the slime pond. Further, in order to prevent the siltation and check the run-off, retaining wall and garland drain are provided.
b	The natural water bodies and or streams which are flowing in and around the village should not be disturbed. The Water Table should be natured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the project Authorities have to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug well located in village should be incorporated to ascertain the impact of mining over ground water table.	Since there is no mining activity being carried at Manmora Mine, the natural water bodies and or streams which are flowing in and around the village is not disturbed. The water table is recharged by the water bodies/streams flowing around the villages and also by the direct seepage of the rainfall occurring in the area. Regular monitoring of water table is being carried out in the open dug well located in the village.
c	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right to darkness and minimal noise levels at night. The Project Proponents (PPs) must ensure that the	Since there is no mining activity being carried at Manmora Mine, therefore the sound at night at project site is not applicable. Moreover, the illumination at night level is also low, as it not used for supporting the night shift operation. It is ensured that the biological clock of the villagers is not disturbed by orienting the floodlights/masks away from the villages and keeping the noise levels well within the prescribed limits for day/night hours.

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d	The project Authority shall make necessary alternatives, where required, in consultation with the State Government to provide alternate areas for livestock grazing. In this context, Project Authority should implement the directions of the Hon'ble Supreme Court with regard to acquiring grazing land. The spares trees on such grazing ground, which provide midday shelter from the scorching sun should be scrupulously guarded against felling, last the cattle abandon the grazing ground or return home by noon.	Livestock grazing have not been witnessed in the manmora mine lease area, therefore this condition is not applicable.
e	Where ever blasting is undertaken as part mining activity, the Project Authority shall carry out vibration studies well before approaching any such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighbourhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoption of alternative means of mineral extraction, such as ripper/dozer combination/rock breakers/surface miners etc. should be seriously considered and practiced wherever practicable. A provision for monitoring of each blast should be made so that the impact of blasting on nearby habitation and dwelling units could be ascertained. The covenant of lease deed under Rule 31 of MCR 1960 provides that no mining operations shall be carried out within 50 meters of public works such as public roads and buildings or inhabited sites except with the prior permission from the Competent Authority.	Since there is no mining activity being carried at Manmora Mine, therefore this condition is not applicable.
f	Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers	Since there is no mining activity being carried at Manmora Mine, therefore there is no material handling/ transfer activity taking place at the mine. Hence, there is no requirement of bag filters, dry fog

	fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt conveyors should be fully covered to avoid air borne dust.	and belt conveyors at the mine. The mine road is suitable compacted and wetted by mobile water sprinkles.
g	The Project Authority shall ensure that the productivity of agricultural crops is not affected due to mining operations. Crop liability insurance policy has to be taken by the PP as a precaution to compensate for any crop loss. The impact zone shall be 5km from the boundary of mine lease area for such insurance policy. In case, several mines are located in a cluster, the Associations of owners of the cluster mines, formed inter-alia, to sub-serve such an objective, shall take responsibility for securing such Crop Liability Policy.	Since there is no mining activity being carried at Manmora Mine, therefore this condition is not applicable.
h	In case any village is located within the mining leasehold which is not likely to be affected due to mining activities during the life of mine, the Expert Appraisal Committee (EAC) for reduced mining area. The Mining lease may be executed for the area for which EC is accorded. The mining plan may also be accordingly revised and required stipulations under the MMDR Act, 1957 and MCR, 1960 met.	The mining was carried earlier as per the Progressive Mine Closure Plan approved by IBM. At present there is no mining activity being carried at the mine and the exhausted pit is used for storage of slime. Further, there is no village located within the mining leasehold area.
i	Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The PP shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such road.	Since there is no mining activity being carried at Manmora Mine, therefore there is no material handling/ transfer activity taking place at the mine. Hence, this condition is not applicable.
j	Likewise, alteration or re-routing of foot paths, pagdandies, cart roads and village infrastructure/public utilities or	Since there is no mining activity being carried at Manmora Mine, therefore there is no material handling/ transfer activity taking place at the mine.

	<p>roads (for purposes of land acquisition for mining) shall be avoided to the extent possible and in case such acquisition is inevitable, alternative arrangements shall be made first and then only the area acquired. In these types of cases, Inspection Reports by site visit by experts may be insisted upon which should be done through reputed Institutes.</p>	<p>Hence, this condition is not applicable.</p>
<p>k</p>	<p>As CSR activities by Companies including the Mining Establishments has become mandatory up to 2% of their financial turn-over, Socio Economic Development of the neighbourhood Habitats could also be planned and executed by the PPs more systematically based on the ‘Need based door to door survey ‘by established Social Institutes / Workers on the lines as required under TOR. “R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs / STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectorial programmes of line departments of the State Government. It may be clearly brought out whether the village located in the mine lease area will be shifted or not. The issues relating to shifting of village including their R&R and socio-economic aspects should be discussed in the EIA report.”</p>	<p>Socio Economic Development of the neighborhood Habitats is planned and executed by us through a separate wing formed for the said purpose, TSRDS (Tata Steel Rural Development Society) in which Need based door to door survey is done and accordingly the CSR activities are planned. No displacement is there; hence R&R Plan is not applicable.</p>

Yours faithfully
F: TATA STEEL LTD.

Sd/-
Agent, Manmora Mn.Mine

Annexure – I



Annexure – II



Annexure - III

Action plan for implementation of commitments made during public hearing on 1/2/2010 for Manmora Mn Mine

Issues raised by public	Commitment of the project proponent	Detail work to be done	Target Date	Fund Required/ Allocated	Status as on 29th May 2015
Road & Communication	During last 3-4 years Tata Steel has spent more than 12 Crores for construction of roads to improve communication in Joda area. Further Tata Steel is planning to strengthen the roads in subsequent period.	Repairing and resurfacing of main road at Joda and Banspani area.	31st Mar, 11	Rs. 3,00,00,000/-	Completed
		Repairing and resurfacing of roads at Banspani Railway station, Ranasal Ghati to Dharanidhar Chowk, Fountainpark to Dharanidhar Chowk		Rs. 2,00,00,000/-	
Educational infrastructure	Tata Steel has always been committed in developing the educational infrastructure in and around the area they operate for strengthening the educational qualities by way of providing better class rooms, good teachers and other necessary infrastructure like g desks / benches / tables and this is a continuous process.. Further, responding to the demands of the people of Kamarjoda, Khuntpani and Banspani regarding educational facilities, it was agreed to provide more infrastructural facilities like class room, desks / benches / tables. Replying for opening a general college at Joda, Sri Verma suggested / proposed the people of Joda to form a committee. It was further proposed that this committee should get the land allocated from the Government after which necessary classrooms will be constructed phase-wise by Tata Steel.	Construction of more class rooms in the village Kamarjoda, Khuntpani and Banspani	31 st Dec, 10	Rs. 24,00,000/-	Completed
		Provision of desks benches & tables in the village Kamarjoda, Khuntpani and Banspani.	31 st Aug, 10	Rs.6,00,000/-	Completed
		Construction of classrooms for proposed college.	Within 10 months from the date of receiving land for construction.	Rs. 50,00,000/-	Land has not been provided by the State Govt. At the same time the infrastructure facilities at Joda Women's College and Badbil College has been strengthened. Also arrangements have been made to have XI and XII standard education in Tata DAV School which is under construction with a budget of Rs 10 Crore and is likely to be completed in FY'16.
Hospital / Health care	Tata Steel is already having a 45 bedded hospital and there is a plan to increase the capacity further by 20 beds and also adding laparoscopic surgery facility in the hospital.	Provision of Laparoscopic surgery facility.	30 th April, 10	Rs.17,00,000/-	Completed
		Getting permission from Govt. for 20 more beds.	By 30 th Sept, 2010	Rs. 10,000/-	Application has been submitted for getting permission and approval is awaited.

	Responding to the sale of medicines, it was agreed to make necessary arrangements with the help of local medical shops near to the hospital.	Construction of new building for accommodation of 20 more beds.	31st March, 2011	Rs. 80,00,000/-	Completed
					To have better quality control of the medicines and better patient compliance, the medicines are purchased locally and made available through the hospital.
	Responding to the demand for free medical service, it was agreed to provide the same to the patients coming through Tata Steel Rural Development Society, even if those people do not have BPL cards.	Provision of free medical facility for the patients coming through TSRDS, even if those people do not have BPL cards.	Already implemented	Rs.1,38,00,000/- FY'14 expenditure (~Rs. 1,00,00,000/- per annum)	Completed
			Total	Rs.7,65,10,000/-	

Annexure - IV

MANMORA Monthly Avgs	Location	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	Mn µg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a) Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Oct'14	STACK YARD	40.78	23.97	4.06	10.67	0.12	0.54	5.54	BDL	BDL	0.53	BDL	BDL	BDL
Nov'14	STACK YARD	46.75	27.34	4.00	11.46	0.15	0.64	6.00	BDL	BDL	0.69	BDL	BDL	BDL
Dec'14	STACK YARD	41.78	24.32	4.26	10.77	0.11	0.55	5.23	0.00015	BDL	0.49	BDL	BDL	BDL
January'15	STACK YARD	41.56	24.67	4.00	10.23	0.11	0.60	5.04	BDL	BDL	0.54	BDL	BDL	BDL
Feb'15	STACK YARD	32.88	19.75	4.00	9.24	0.10	0.48	BDL	BDL	BDL	0.41	BDL	BDL	BDL
March'15	STACK YARD	42.89	25.48	4.27	10.41	0.13	0.51	5.00	BDL	BDL	0.64	BDL	BDL	BDL
6 Months Avgs	STACK YARD	41.10	24.25	4.10	10.46	0.12	0.55	5.36	BDL	BDL	0.55	BDL	BDL	BDL

Annexure – V

MANMORA (UPSTREAM) W-1				Oct'14		Nov'14		Dec'14		Jan'15		Feb'15		March'15		Avg 6 months
Sl.	Parameters	Unit	Standards as per	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	W-1
1	Colour & Odour	--	300 & \$	18 & U/O	10 & U/O	CL & U/O	2 & U/O	2 & U/O	3 & U/O	3 & U/O	5 & U/O	3 & U/O	3 & U/O	3 & U/O	3 & U/O	7 & U/O
2	Suspended Solids	mg/l	\$	37	29	64	55	58	48	57	45	48	39	39	32	45.92
3	Particular Size of S.S.	μ(micron)	\$	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850
4	Dissolved Solids	mg/l	1500	128	111	158	164	147	153	148	164	137	151	125	136	143.50
5	pH	--	6.5-8.5	7.2	7.2	7.3	7.2	7.2	7.3	7.3	7.2	7.2	7.2	7.2	7.2	7.23
6	Temperature	°C	\$	25	25	24	24	23	23	22	22	24	24	25	25	23.83
7	Oil & Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	Total Residual Chlorine	mg/l	\$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	Amm. Nitrogen as N	mg/l	\$	0.42	0.34	0.63	0.54	0.58	0.47	0.42	0.4	0.36	0.34	0.29	0.31	ND
10	Total Kjeldal Nitrogen as N	mg/l	\$	1.06	0.95	1.31	1.35	1.26	1.26	1.35	1.29	1.26	1.17	1.19	1.08	1.21
11	Free Ammonia as NH ₃	mg/l	\$	0.006	0.005	0.004	0.005	0.004	0.004	0.003	0.003	0.002	0.003	0.003	0.003	ND
12	Dissolved Oxygen	mg/l	4	7.2	7.2	7.1	7.3	7.2	7.3	7.1	7.2	7.2	7.3	7.1	7.1	7.19
13	BOD(3) days at 27°C	mg/l	3	1.18	1.13	1.36	1.44	1.31	1.29	1.28	1.31	1.15	1.23	1.1	1.18	1.25
14	COD	mg/l	\$	3.44	3.34	4.15	4.26	3.95	4.17	3.56	3.29	3.38	3.17	3.27	3.26	3.60
15	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Mercury as Hg	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Lead as Pb	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Hexa Chromium as Cr ⁺⁶	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Total Chromium as Cr	mg/l	\$	0.16	0.12	0.37	0.38	0.34	0.32	0.34	0.21	0.24	0.16	0.19	0.12	0.25
21	Copper as Cu	mg/l	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Zinc as Zn	mg/l	15	0.18	0.14	0.29	0.38	0.22	0.34	0.39	0.33	0.31	0.26	0.26	0.19	0.27
23	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Nickel as Ni	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Fluoride as F	mg/l	1.5	0.059	0.042	0.07	0.08	0.06	0.07	0.08	0.08	0.07	0.07	0.06	0.06	0.07
27	Diss. Phosphate as P	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Sulphide as S	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Phenolic Compounds as C ₆ H ₅ OH	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30	Bio-assay Test	--	\$	98%	98%	98%	98%	98%	98%	97%	97%	98%	97%	97%	97%	98%
31	Manganese as Mn	mg/l	\$	0.067	0.058	0.07	0.075	0.063	0.066	0.078	0.072	0.066	0.062	0.058	0.054	0.07
32	Iron as Fe	mg/l	50	0.3	0.22	0.53	0.63	0.48	0.58	0.47	0.42	0.39	0.36	0.32	0.32	0.42
33	Vanadium as V	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
34	Nitrate as NO ₃	mg/l	50	0.21	0.17	0.33	0.38	0.31	0.34	0.35	0.31	0.28	0.24	0.21	0.21	0.28

N.B. : \$- No Specific Limit, U/O-Unobjectionable , BDL- Below detection limit, ND-Not detectabl

MANMORA (DOWNSTREAM) W-2			Oct'14		Nov'14		Dec'14		Jan'15		Feb'15		March'15		Avg 6 months	
Sl.	Parameters	Unit	Standards as per	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	W-2
1	Colour & Odour	--	300 & \$	20 & U/O	12 & U/O	CL & U/O	2 & U/O	2 & U/O	3 & U/O	3 & U/O	5 & U/O	3 & U/O	3 & U/O	3 & U/O	3 & U/O	8 & U/O
2	Suspended Solids	mg/l	\$	41	31	69	58	63	51	61	53	54	46	47	38	51.00
3	Particular Size of S.S.	μ(micron)	\$	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850
4	Dissolved Solids	mg/l	1500	134	117	163	169	151	157	155	171	143	158	131	142	149.25
5	pH	--	6.5-8.5	7.1	7.2	7.2	7.3	7.2	7.3	7.2	7.1	7.3	7.2	7.2	7.2	7.21
6	Temperature	°C	\$	25	25	24	24	23	23	22	22	24	24	25	25	23.83
7	Oil & Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	Total Residual Chlorine	mg/l	\$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	Amm. Nitrogen as N	mg/l	\$	0.47	0.39	0.69	0.59	0.61	0.52	0.46	0.49	0.41	0.42	0.34	0.37	ND
10	Total Kjeldal Nitrogen as N	mg/l	\$	1.18	0.97	1.37	1.38	1.3	1.31	1.41	1.33	1.3	1.21	1.24	1.12	1.26
11	Free Ammonia as NH ₃	mg/l	\$	0.005	0.005	0.004	0.005	0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.003	ND
12	Dissolved Oxygen	mg/l	4	7.2	7.2	7.1	7.2	7.2	7.3	7	7.2	7.2	7.2	7.1	7.1	7.17
13	BOD(3) days at 27°C	mg/l	3	1.22	1.17	1.42	1.47	1.28	1.33	1.33	1.36	1.19	1.29	1.15	1.21	1.29
14	COD	mg/l	\$	3.56	3.42	4.21	4.33	4.04	4.22	3.64	3.37	3.46	3.24	3.32	3.32	3.68
15	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Mercury as Hg	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Lead as Pb	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Hexa Chromium as Cr ⁺⁶	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Total Chromium as Cr	mg/l	\$	0.17	0.15	0.42	0.43	0.38	0.38	0.4	0.27	0.28	0.21	0.22	0.17	0.29
21	Copper as Cu	mg/l	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Zinc as Zn	mg/l	15	0.21	0.17	0.33	0.42	0.35	0.36	0.47	0.38	0.36	0.32	0.31	0.24	0.33
23	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Nickel as Ni	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Fluoride as F	mg/l	1.5	0.065	0.051	0.08	0.08	0.07	0.07	0.08	0.08	0.07	0.08	0.06	0.07	0.07
27	Diss. Phosphate as P	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Sulphide as S	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Phenolic Compounds as C ₆ H ₅ OH	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30	Bio-assay Test	--	\$	98%	98%	98%	98%	98%	98%	97%	97%	97%	98%	97%	97%	98.00%
31	Manganese as Mn	mg/l	\$	0.071	0.062	0.078	0.081	0.069	0.074	0.081	0.077	0.073	0.069	0.064	0.061	0.07
32	Iron as Fe	mg/l	50	0.34	0.26	0.58	0.68	0.52	0.62	0.52	0.48	0.46	0.41	0.37	0.38	0.47
33	Vanadium as V	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
34	Nitrate as NO ₃	mg/l	50	0.24	0.21	0.36	0.42	0.34	0.38	0.42	0.36	0.31	0.28	0.26	0.25	0.32

N.B. : \$- No Specific Limit, U/O-Unobjectionable, BDL- Below detection limit, ND-Not detectabl

Annexure – VI



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O.: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674-2471574; E-mail : emails@ssenvironics.com

RefNo: SSE/14/R-2859

Date: 04.12.2014

GROUND WATER QUALITY ANALYSIS REPORT

Name of the Mines : Manmora Manganese Mines, Tata Steel Ltd.
 Location of Sampling : Well at Bachu Huting
 Date of Sampling : 18.11.2014
 Date of Analysis : 21.11.2014

Sl. No	Parameter	Standard as per BIS: 10500	Analysis results
Essential Characteristics			
1	Colour	5	CL
2	Odour	U/O	U/O
3	Taste	Agreeable	AL
4	Turbidity (NTU), max	1	<1
5	pH Value	6.5-8.5	6.8
6	Total Hardness (as CaCO ₃), mg/l, max	300	72
7	Iron (as Fe), mg/l, max	0.3	0.19
8	Chloride (as Cl), mg/l, max	250	11.4
9	Residual, free Chlorine, mg/l, min	0.2	ND
Desirable Characteristics			
10	Dissolved Solids, mg/l, max	500	148
11	Calcium (as Ca), mg/l, max	75	9.9
12	Copper (as Cu), mg/l, max	0.05	BDL
13	Manganese (as Mn), mg/l, max	0.1	0.015
14	Sulphate (as SO ₄), mg/l, max	200	18.6
15	Nitrate (as NO ₃), mg/l, max	45	0.28
16	Fluoride (as F), mg/l, max	1.0	BDL
17	Phenolic Compounds (as C ₆ H ₅ OH), mg/l, max	0.001	ND
18	Mercury (as Hg), mg/l, max	0.001	BDL
19	Cadmium (as Cd), mg/l, max	0.01	BDL
20	Selenium (as Se), mg/l, max	0.01	BDL
21	Arsenic (as As), mg/l, max	0.05	BDL
22	Cyanide (as CN), mg/l, max	0.05	BDL
23	Lead (as Pb), mg/l, max	0.05	BDL
24	Zinc (as Zn), mg/l, max	5	0.33
25	Anionic Detergents (as MBAS), mg/l, max	0.2	Absent
26	Chromium (as Cr+6), mg/l, max	0.05	BDL
27	Polynuclear aromatic hydrocarbons (as PAH), g/l, max	-	ND
28	Mineral Oil, mg/l, max	0.01	ND
29	Pesticides, mg/l, max	Absent	Absent
30	Alkalinity, mg/l, max	200	34
31	Aluminium as Al, mg/l, max	0.03	BDL
32	Boron mg/l, max	1.0	BDL

CL – Colourless, U/O – Unobjectionable, ND – Not detectable.

BDL Values: Copper- 0.001 mg/l, Fluoride-0.001 mg/l, Cadmium- 0.001 mg/l, Mercury- 0.0001 mg/l, Lead- 0.001 mg/l, Selenium- 0.001 mg/l, Zinc- 0.005 mg/l, Cyanide- 0.001 mg/l, Cr+6- 0.001 mg/l, Al-0.001 mg/l.

Al-0.001 mg/l.

For S.S. Environics (India) Pvt. Ltd.

A Group concerned with Environmental Pollution



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O.: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674-2471574; E-mail : emails@ssenvironics.com

Ref No: SSE/14/R-3371

Date: 04.02.2015

GROUND WATER QUALITY ANALYSIS REPORT

Name of the Mines : Manmora Manganese Mines, Tata Steel Ltd.
 Location of Sampling : Well at Bachu Huting
 Date of Sampling : 27.01.2015
 Date of Analysis : 29.01.2015

Sl. No	Parameter	Standard as per BIS: 10500	Analysis results
Essential Characteristics			
1	Colour	5	CL
2	Odour	U/O	U/O
3	Taste	Agreeable	AL
4	Turbidity (NTU), max	1	<1
5	pH Value	6.5-8.5	6.9
6	Total Hardness (as CaCO ₃), mg/l, max	300	65
7	Iron (as Fe), mg/l, max	0.3	0.17
8	Chloride (as Cl), mg/l, max	250	12.6
9	Residual, free Chlorine, mg/l, min	0.2	ND
Desirable Characteristics			
10	Dissolved Solids, mg/l, max	500	157
11	Calcium (as Ca), mg/l, max	75	10.1
12	Copper (as Cu), mg/l, max	0.05	BDL
13	Manganese (as Mn), mg/l, max	0.1	0.018
14	Sulphate (as SO ₄), mg/l, max	200	24.9
15	Nitrate (as NO ₃), mg/l, max	45	0.37
16	Fluoride (as F), mg/l, max	1.0	BDL
17	Phenolic Compounds (as C ₆ H ₅ OH), mg/l, max	0.001	ND
18	Mercury (as Hg), mg/l, max	0.001	BDL
19	Cadmium (as Cd), mg/l, max	0.01	BDL
20	Selenium (as Se), mg/l, max	0.01	BDL
21	Arsenic (as As), mg/l, max	0.05	BDL
22	Cyanide (as CN), mg/l, max	0.05	BDL
23	Lead (as Pb), mg/l, max	0.05	BDL
24	Zinc (as Zn), mg/l, max	5	0.26
25	Anionic Detergents (as MBAS), mg/l, max	0.2	Absent
26	Chromium (as Cr+6), mg/l, max	0.05	BDL
27	Polynuclear aromatic hydrocarbons (as PAH), g/l, max	-	ND
28	Mineral Oil, mg/l, max	0.01	ND
29	Pesticides, mg/l, max	Absent	Absent
30	Alkalinity, mg/l, max	200	29
31	Aluminium as Al, mg/l, max	0.03	BDL
32	Boron mg/l, max	1.0	BDL

CL - Colourless, U/O - Unobjectionable, ND - Not detectable.
 BDL Values: Copper- 0.001mg/l, Fluoride-0.001 mg/l, Cadmium- 0.001 mg/l, Mercury- 0.0001 mg/l, Lead- 0.001 mg/l, Arsenic- 0.001 mg/l, Zinc- 0.005 mg/l, Cyanide- 0.001 mg/l, Cr+6- 0.001 mg/l, Selenium- 0.001 mg/l, Al-0.001 m/l.



For S.S. Environics (India) Pvt. Ltd.

A Group concerned with Environmental Pollution