



To,
Shri. A. N. Sharan, IFS
Addl. PCCF, MoEFCC,
Regional Office (ECZ),
Bungalow No. A-2, Shyamali Colony,
Ranchi – 834002.

Ref No. - JMB/115/ 001621 /2016

May 20, 2016


SUB: Half Yearly Compliance Report of the conditions of EC issued by MoEFCC, New Delhi, to Digwadih Colliery, Tata Steel Limited, Dhanbad for the period October'15 to March'16.

Dear Sir,

We are enclosing herewith compliance report for the period October'15 to March'16 for the EC granted vide letter no.- J-11015/372/2010-IA.II(M) dated- 30th September 2013 issued by Ministry of Environment, Forest and Climate Change, New Delhi. This is for your kind perusal.

Thanking you,

Yours faithfully,


General Manager (Jharia)
Email I.D.- skumar.singh@tatasteel.com

Encl: As above.

Copy to: Member Secretary, CPCB Zonal Office, Southend Conclave, 502, 5th Floor 1582, Rajdanga Main Road, Kolkata-700107.

Copy to: Member Secretary, JSPCB, T.A. Division Building (Ground Floor), H.E.C, Dhurwa, Ranchi -834004.

TATA STEEL LIMITED

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Tel 91 22 66658282 Fax 91 22 66657724
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

HALF YEARLY COMPLIANCE REPORT

(PERIOD: OCTOBER'15 – MARCH'16)

DIGWADIH COLLIERY

(CAPACITY: EXPANSION FROM 0.38 TO 0.6 MTPA RAW COAL)
TEHSIL: JHARIA, DIST: DHANBAD, JHARKHAND



TATA STEEL LIMITED, JHARIA DIVISION

**P.O.- JAMADOBA, DIST. - DHANBAD,
STATE- JHARKHAND, PIN CODE – 828112**

**ENVIRONMENTAL CLEARANCE GRANTED VIDE LETTER NO. - J-11015/372/2010-
IA.II(M) DATED- 30.09.2013 ISSUED BY GOVT. OF INDIA, MINISTRY OF
ENVIRONMENT, FOREST AND CLIMATE CHANGE, NEW DELHI.**

A. SPECIFIC CONDITIONS:

- (i) The maximum production from the mines shall not exceed beyond that for which environmental clearance has been granted.
- **It will be strictly followed.**
- (ii) The impact on the Damodar river due to mining activity which is at a distance of 2 km be studied through a reputed 3rd Party and submitted to the SPCB and the regional office of the MoEF for monitoring.
- **The underground coal mines operated by Tata Steel Ltd are adjacent to the Damodar River. Other coal mines of BCCL, SAIL are also in close proximity to the river basin. Hence, there is a cumulative impact on the river due to the mining activity carried out in the Jharia coalfield. We had undertaken a project to determine the impact of mining activity with the help of the reputed organization, Indian School of Mines, Dhanbad. The study has been completed and it covers the impact of all underground mines of Tata Steel Ltd as well as impact of other nearby mines.**
- (iii) Details of underground transportation of coal from mine to coal yard/ rail yard be submitted to the MoEF for record.
- **Coal from the mine is sent to the captive Jamadoba coal washery for beneficiation purpose through a network of underground conveyor belts. The detailed diagram of transportation network has already been submitted in earlier compliance reports.**
- (iv) Adequate care be taken to prevent sand spillages from the trucks/tippers.
- **The trucks that are being used for the transportation of sand are properly covered using tarpaulin sheets. Larger trucks have been engaged for reducing no of cycles. Quality checks are done on trucks to ensure its health and punitive action is taken against defaulters by the management.**
- (v) The test results of the study of leaching of heavy metals from bottom-ash be submitted to SPCB and the regional office of the MoEF for monitoring.
- **A study conducted in 2013, by Indian School of Mines, Dhanbad to assess the leachability characteristics of fly ash and bottom ash samples taken from our 10 MW FBC power plant, has determined that the concentration of heavy metals in the leachates were invariably well below the permissible limits for discharge of effluents as per the Indian standards IS 2490 (1993). The test results have already been submitted in December'13.**

- (vi) The CSR activities shall be need based and detailed CSR plan be prepared for implementation.
- **The CSR plan for each financial year is prepared by TSRDS (Tata Steel Rural Development Society) only after proper discussions to assess the needs have been held with the elected/ senior members of the communities where our CSR activities are to be undertaken.**
- (vii) The detailed breakup of funds during 2012-13 be submitted to the MoEF for record. A social audit to be got done annually by a reputed institute and uploaded on the company's website.
- **The detailed breakup has already been submitted to MOEF. The Corporate Sustainability Reports are made annually for the company which is certified by an assurance agency. It also includes the Social Audit of the company. All the reports are uploaded on the Tata Steel website. Further, an internal Social audit is also conducted once in five years. In 2012, a HDI (Human Development Index) survey of surrounding villages was conducted with the help of XLRI, Jamshedpur.**
- (viii) There should be no OB dumps at the end of the mining.
- **Since this is an underground mine, no OB dumps will be created.**
- (ix) Regular monitoring of subsidence movement on the surface over and around the working area and impact on natural drainage pattern, water bodies, vegetation, structure, roads, and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence movement, appropriate effective corrective measures shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil/suitable material.
- **Regular monitoring of subsidence is done by CIMFR, Dhanbad. According to the reports, the impact of subsidence is negligible since the mine workings are now at great depth and proper filling of voids through sand stowing is being done.**
- (x) If subsidence is found exceeding the permitted limits, then the landowners shall be adequately compensated with mutual agreement of the landowners.
- **It will be strictly followed.**
- (xi) Mining shall be carried out as per statuette at a safe distance from the river/nallah flowing adjacent to the lease boundary.
- **Since this is an underground project, there is hardly any impact on the river/ nallah. The closest jore is at a distance of about 2kms from the mine office area. Therefore, no impact on the course of flow in the jore is anticipated.**

- (xii) High root density tree species shall be selected and planted over areas likely to be affected by subsidence.
- **Impact on land by subsidence has been found to be negligible as per the subsidence monitoring reports prepared by CIMFR, Dhanbad.**
- (xiii) Coal extraction shall also be optimized in areas where agricultural production is continuing. Some pillars shall be left below the agricultural land. No depillaring & coal extraction should be carried out below habitation, H.T. Lines & beneath road, water bodies.
- **It will be strictly followed.**
- (xiv) Subsidence shall be monitored closely and if subsidence is found exceeding the permitted limits, then the landowners shall be adequately compensated with mutual agreement with the landowners.
- **Regular monitoring of subsidence is being done by CIMFR, Dhanbad.**
- (xv) 3-tier plantation should be developed 2 km stretch of road from the mine using native species.
- **Plantation along stretches of road has been done during previous monsoon.**
- (xvi) Garland drains (size, gradient and length) around the safety areas such as mine shaft and low lying areas and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine sites. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.
- **Garland drains of adequate size and gradient already exist around the colliery area to channelize the surface runoff.**
- (xvii) Specific mitigative measures identified for the Jharia Coalfields in the Environmental Action Plan prepared for Dhanbad as a critically polluted area and relevant for Digwadih colliery shall be implemented.
- **The following measures relevant for Digwadih colliery have been implemented-**
 - i. Movement of covered trucks used for sand transportation**
 - ii. Water spraying by tankers on the roads within colliery premises.**
 - iii. The mine water is collected in a reservoir where the sediments in the water settle before any water overflows from the tank.**
 - iv. Sewage Treatment Plant project is being implemented in a phased manner in all the colonies of Tata Steel, Jharia Division.**
 - v. Adequate tree plantation done on the barren areas of the leasehold.**
 - vi. Hazardous wastes are disposed off to CPCB-authorized recyclers.**
 - vii. Natural ponds in the leasehold are regularly cleaned and maintained to enhance the recharging of ground water in the area.**
 - viii. Sand stowing of underground voids created during mining.**
 - ix. Nitrogen flushing into the mines to control the mine fires.**
 - x. Compliance to all the legal requirements, like monitoring of pollutants, submission of reports to JSPCB, etc.**

(xviii) The locations of monitoring stations in the Jharia Coalfields should be finalized in consultation with the Jharkhand State Pollution Control Board. The smoke/dust emission varies from source to source (fuel wood, coal, flyash from TPPs, silica from natural dust, etc). Mineralogical composition study should be undertaken on the composition of the suspended particulate matter (PM10 and PM2.5) in Jharia Coalfields and also quantified. These studies would help ascertain source and extent of the air pollution, based on which appropriate mitigative measures could be taken.

- **The locations of monitoring stations for our colliery have already been finalized in consultation with JSPCB, Dhanbad. The mineralogical composition study has been carried out by an independent laboratory (accredited by NABL) and the results are provided in Annexure-II.**

(xix) Water sprinkling system shall be provided to check fugitive emissions from loading operations, conveyor system, haulage roads, transfer points, etc. Major approach roads shall be black topped and properly maintained.

- **Water spraying arrangement is present in the underground mines at all transfer points. Water spraying via tankers is done on sand transportation routes. Major approach roads have been black-topped and maintained regularly.**

(xx) Transportation of coal from the mine to railway siding should be by 20T mechanically covered trucks.

- **Not applicable due to transportation of coal via underground belt conveyor network system directly to washery.**

(xxi) A progressive afforestation plan shall be prepared and implemented over the mine lease area acquired and shall include areas under green belt development, areas along roads, infrastructure, along ML boundary and township etc, by planting native species in consultation with the local DFO/Agriculture Department.

- **Tree plantation activities are carried out every year on the barren/ degraded areas, areas along road-side, infrastructure, etc of the colliery leasehold. Apart from these, fruit plants are distributed to employees and also to villagers, schools, institutions, etc. Species planted include Sisam, Ficus, Arjun, Gamahar, Lagastromia, Gulmohar, etc.**

The environment department is responsible for implementing the afforestation plan which is prepared along with the mine management. In the last two years, about 5000 trees have been planted in the leasehold areas.

(xxii) Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected shall be submitted to the MoEF and to the CPCB quarterly within one month of monitoring.

- **The monitoring of groundwater level is done four times a year. The hydro-geological study of the area being done by Indian School of Mines, Dhanbad has been completed.**

The groundwater quality report & groundwater level for the post-monsoon (October) and winter (January) are provided in Annexure-I.

- (xxiii) Acid Water Treatment Plant, volume of water to be treated and disposal of brine should be provided.
- **Not applicable.**
- (xxiv) Mine discharge water outside the ML shall be monitored, particularly for TDS and treated to conform to prescribed levels before discharge into the natural environment.
- **It is being strictly followed. The analysis report is given later.**
- (xxv) The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource, in case water table shows a declining trend. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.
- **Since the mine workings are located at depths of 450-600 mtrs, impact on water table will be marginal to negligible. There are many ponds in the leasehold area which act as an artificial groundwater recharge. These ponds are regularly cleaned and maintained by Tata Steel. More than 50 % of the water pumped out of the mine is recycled back by stowing process.**
Tata Steel is also providing free clean drinking water as well as mine water to the villages located in the leasehold as part of its CSR activities. In last two years, nearly 22000 metres of pipeline connection was established along with 33 water tanks (each having capacity of 4500 litres). More pipeline connections are proposed to be undertaken this year also.
- (xxvi) Besides carrying out regular periodic health checkup of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health checkup for occupational diseases and hearing impairment, if any, through an agency such as NIOH, Ahmedabad within a period of one year and the results reported to this Ministry and to DGMS.
- **The periodic health checkup of the workers is done regularly by our Occupational Health Department, Tata Central Hospital, Jamadoba. We have a PME (Periodic Medical Examination) centre approved by DGMS where 20 % of the workers identified from workforce engaged in active mining operations are subjected to full medical checkup including hearing impairment checkup, etc. These results are regularly submitted to DGMS as per mines rules.**
- (xxvii) The mining in the existing mines would be phased out after expiry of the current mining lease and after reclamation of mined over area. The operating mines may be analyzed and monitored for compliance of conditions, having bearing with movement of wild life until such time they are closed/ phased out.
- **It is not applicable in our case.**

(xxviii) Project specific CSR for an amount of Rs 5/Tonne of coal production should be provided for the activities under CSR undertaken for the neighboring villages shall be for not less than Rs 10 per tonne of coal and the progress made thereon shall be uploaded by the company annually on the company website. Monitoring of the impacts of activities under CSR shall be carried out periodically.

- **The proposed CSR expenditure for the entire company is decided as per the new Company Rules. Once the CSR budget is fixed, a share of that amount is dedicated and utilized for implementing the CSR activities at our division level. The progress report is uploaded every year on the company website. Internal social audits are carried out regularly to assess the impact of CSR activities.**

(xxix) A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

- **Mine Closure Plan as per new guidelines has been prepared and submitted to MOC for its approval.**

(xxx) Corporate Environment Responsibility:

- a) The Company shall have a well laid down Environment Policy approved by the Board of Directors.
 - b) The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.
 - c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.
 - d) To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.
- **The Company already has an Environment Policy approved by the Managing Director and it addresses all the issues mentioned.**

Every month, the environmental legal compliance is submitted by Jharia Division to VP (Raw Materials) for onward submission and further review to MD and Head Office, Mumbai. Therefore, the status of adherence to the policy and compliance to Environmental laws and regulations is regularly discussed at higher levels. Any non-compliance noticed is corrected at divisional level. If any issue is beyond our control, it is brought to the notice of higher management through the above channel.

B. GENERAL CONDITIONS:

- (i) No change in technology and scope of working shall be made without prior approval of the MoEF.
 - **It is being strictly followed. Bord and Pillar method is being used for mining.**
- (ii) No change in the calendar plan including quantum of mineral coal and waste being produced shall be made.
 - **It will be strictly followed.**
- (iii) Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring PM10, PM2.5, SO2 and NOx. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, in RSPM etc. shall be carried out at least once in six months.
 - **The Air quality monitoring stations are:**
 - (i) **Jamadoba Group Office (Core Zone)**
 - (ii) **New Village Colony, Jamadoba (Buffer Zone)**
 - (iii) **Digwadih 12 No. Colony (Buffer Zone)**
 - (iv) **6&7 Pits Kalimandir area (Buffer Zone)**

Monitoring of heavy metals in ambient air is being performed by an independent laboratory (accredited by NABL) once in six months. The results are enclosed as Annexure-II.

- (iv) Data on ambient air quality (PM10, PM2.5, SO2 and NOx and heavy metals such as Hg, As, Ni, Cr, etc) and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the SPCB and the CPCB once in six months. Random verification of samples through analysis from independent laboratories recognised under the EP Rules, 1986 shall be furnished as part of the compliance report.
 - **Ambient air quality report (PM10, PM 2.5, SO2 and NOx) for the period from October'15 to March'16 is attached as Annexure-I. Additionally, M/s SGS India Pvt Ltd (an NABL accredited Laboratory) has done monitoring on ambient air quality (PM10, PM 2.5, SO2 and NOx) and heavy metals in the month of March'16. The results are enclosed as Annexure-II.**

(v) Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.

- **Regular noise survey is being conducted in the underground work environment. Workers are provided with ear-plugs/ muffs in high noise areas. The noise levels monitored in the month of February'16 is given below:**

Sl. No.	Unit/Place	Equipment/ Location	Distance In meter	Leq (in dB "A")	Exposure (Hours)
1.	8 Seam	LHD working face at 7L/9R	-	81.3	8 hrs.
2.		Conveyor '0' dip discharge '0'L conveyor, At operator's seat	12	75.5	
3.		Compressor B T - 4 1 dip At operator's seat	10	76.3	-
4.		320 DGC pump At operator's seat	10	79.5	8 hrs.
5.	Surface	Fan house main ventilator (Old)	5	82.5	
6.		Tele-monitoring cum Nitrogen plant room At operator's room	-	66.5	
7.		Winder room 9 pit At operator's seat	-	80.2	

(vi) Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, and treated so as to conform to the standards including for heavy metals before discharge prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.

- **No industrial wastewater is generated in Digwadih Colliery premises. There is a central workshop and garage in Jamadoba where oil and grease trap has been provided.**

(vii) Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transportation of the mineral shall be covered with tarpaulins and optimally loaded.

- **Only the vehicles having valid PUC certificates are being allowed to operate for sand transportation.**

Coal transportation is done through underground belt network. Only sand transportation is done through trucks which are covered with tarpaulins as well as optimally loaded.

(viii) Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with SPCB and data got analysed through a laboratory recognised under EP Rules, 1986.

- **We have a fully equipped Environment Cell Laboratory with qualified personnel. Laboratory has been recognized and registered with the Jharkhand State Pollution Control Board vide letter ref no. B-3922, dated-30.08.2012. The monitoring and analysis is also done at regular intervals by a NABL accredited laboratory.**

We have also installed a Continuous Ambient Air Quality Monitoring Station at Jamadoba for online monitoring with data transfer to JSPCB, Ranchi.

(ix) Monitoring of outlet points should be carried out and records of same should be maintained and submitted to the Regional Office of the MOEF as part of the Compliance Report.

- **There is one mine-water outlet point in the colliery which is regularly monitored by the Environmental Laboratory. The analysis results are given below:**

Month	pH	TSS	TDS	BOD	COD	Oil/Grease
		mg/l	mg/l	mg/l	mg/l	mg/l
Limits	6.5-8.5	100	2100	30	250	10
Oct'15	No Discharge					
Nov'15	8.0	12	582	2.5	35	1.2
Dec'15	7.5	24	558	2.8	38	1.7
Jan'16	No Discharge					
Feb'16	7.6	17	592	2.6	35	1.5
Mar'16	7.8	15	586	2.9	38	1.7
Minimum	7.5	12	558	2.5	35	1.2
Maximum	8	24	592	2.9	38	1.7
Average	7.73	17.33	578	2.7	36.5	1.5

(x) Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects. Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.

- **Persons working in dusty area have been provided with dust masks & have been given awareness training on safety & health aspects. Regular PME (Periodic Medical Examinations) are being done. The details have been provided earlier.**

(xi) A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.

- **We have a separate Environmental Management Cell with three qualified personnel. (one Head (Safety & Env't) and two Manager (Env't)). The reporting of Environmental Cell is directly to General Manager of the Division.**

(xii) The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional Office at Bhubaneswar.

- **The Environment Cell has a separate fund for Environmental protection measures and for complying with legal requirements. The annual environmental expenditure for the financial year 2015-16 is Rs. 813.39 lakhs. The details are given below-**

S. No.	Environment Management Activity	Expenditure in Lakhs
1	Stowing activities i.e filling of U/G voids for surface protection and prevention of subsidence	750.04
2	Fire Control measures (Fire/Isolation Stopping and Nitrogen plant)	8.79
3	Goaf Filling activities	5.74
4	Drain repairing and maintenance, settling tank maintenance jobs	4.83
5	Making potable water in Water Treatment Plant & Supply to colonies	33.76
6	Horticultural activities including green belt development and regular lawn and garden maintenance	9.34
7	Plantation of saplings and maintenance	0.89
	Total Cost incurred	813.39

(xiii) The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at <http://envfor.nic.in>.

- **The details have been advertised in two local newspapers as required.**

(xiv) A copy of the environmental clearance letter shall be marked to concerned Panchayat/Zila Parishad, Municipal Corporation or Urban Local Body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on the company's website.

- **It has been complied with.**

(xv) A copy of the clearance letter shall be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.

- **To be done by SPCB and other bodies as mentioned.**

- (xvi) The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in the public domain. The monitoring data of environmental quality parameters (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO2 and NOx (ambient and stack if any) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mines office and in corporate office and on the company's website.
- **The clearance letter has been uploaded on the company's website. The compliance status will be uploaded every time as required. The display of information near the mine's office has been done.**
- (xvii) The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB.
- **It will be complied with.**
- (xviii) The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.
- **It will be complied with.**
- (xix) The environmental statement for each financial year ending 31st March in Form-V is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MOEF by E-mail.
- **The environmental statement is sent to JSPCB every year and it is also uploaded on the company website as well as sent to MOEF by email.**


General Manager (Jharia)

AIR QUALITY REPORT
Core zone & Buffer zone

Period- January'16 to March'16

Core zone (as per Air quality standards for coal mines in EPA Notification, 1988)							
Location	Latitude/ Longitude	Date	Weather Condition	SPM 24 Hourly Limit- 700 µg/m ³	RSPM 24 Hourly Limit- 300 µg/m ³	SO ₂ 24 Hourly Limit- 120 µg/m ³	NO _x 24 Hourly Limit-120 µg/m ³
Jamadoba Group Office	23°42'15.3" N/ 86°24'11" E	12.01.2016	Clear	223.1	131.7	28.8	31.1
		12.02.2016	Clear	256.6	142.6	32.7	27.7
		10.03.2016	Clear	266.9	149.5	35.6	24.4
Buffer zone (as per NAAQS 2009 for ambient air quality standards)							
Location	Latitude/ Longitude	Date	Weather Condition	PM10 24 Hourly Limit- 100µg/m ³	PM2.5 24 Hourly Limit- 60µg/m ³	SO ₂ 24 Hourly Limit-80µg/m ³	NO ₂ 24 Hourly Limit-80µg/m ³
Digwadih 12 No. Colony	23°41'42" N/ 86°24'45.3" E	08.01.2016	Clear	87.4	36.8	19.8	17.7
		02.02.2016	Clear	95.6	48.2	21.1	18.9
		15.03.2016	Clear	85.7	39.4	24.3	21.1
New Village Colony, Jamadoba	23°41'51" N/ 86°23'19" E	09.01.2016	Clear	82.5	41.1	16.9	16.4
		10.02.2016	Clear	92.7	42.2	17.3	22.1
		12.03.2016	Clear	83.7	43.2	22.5	19.9
6&7 Pits Kalimandir colony	23°43'15" N/ 86°24'12" E	11.01.2016	Clear	98.4	52.3	23.2	19.5
		11.02.2016	Clear	88.1	47.7	19.3	17.8
		11.03.2016	Clear	98.4	51.1	26.6	19.9


Manager (Environment)

AIR QUALITY REPORT**Core zone & Buffer zone**

Period- October'15 to December'15

Core zone (as per Air quality standards for coal mines in EPA Notification, 1988)							
Location	Latitude/ Longitude	Date	Weather Condition	SPM 24 Hourly Limit- 700 µg/m3	RSPM 24 Hourly Limit- 300 µg/m3	SO2 24 Hourly Limit- 120 µg/m3	NOx 24 Hourly Limit-120 µg/m3
Jamadoba Group Office	23°42'15.3" N/ 86°24'11" E	16.10.2015	Clear	245.7	126.6	25.6	31.8
		19.11.2015	Clear	222.8	114.5	21.9	27.7
		08.12.2015	Clear	246.9	144.6	38.8	36.6
Buffer zone (as per NAAQS 2009 for ambient air quality standards)							
Location	Latitude/ Longitude	Date	Weather Condition	PM10 24 Hourly Limit- 100µg/m3	PM2.5 24 Hourly Limit- 60µg/m3	SO2 24 Hourly Limit-80µg/m3	NO2 24 Hourly Limit-80µg/m3
Digwadih 12 No. Colony	23°41'42" N/ 86°24'45.3" E	14.10.2015	Clear	81.9	42.9	10.9	23.7
		04.11.2015	Clear	63	28.5	13.5	19
		11.12.2015	Cloudy	61.9	27.7	8.4	18.7
New Village Colony, Jamadoba	23°41'51" N/ 86°23'19" E	19.10.2015	Clear	92.7	41.2	13.5	19.8
		02.11.2015	Clear	95.6	32.7	18.9	15.8
		22.12.2015	Cloudy	71.2	35.2	11.3	21.1
6&7 Pits Kalimandir colony	23°43'15" N/ 86°24'12" E	15.10.2015	Clear	83.5	38.5	10.5	22.5
		30.11.2015	Clear	96.3	38.5	10.5	22.5
		07.12.2015	Clear	61.5	26.5	18.4	17.9


Manager (Environment)

Ground Water Quality Analysis (Hand Pump & Dugwell)
Winter Season- January 2016

S. No.	Location	Date of Sampling	Sample Parameter				
			pH	Temperature' °C	TDS, mg/l	Total Hardness (as CaCO ₃), mg/l	Ground Water Table, Mtrs.
1	Lower Dungri (well)	15.01.16	7.1	25	428	388	7.2
2	Upper Dungri Basti (well)	15.01.16	7.2	24	474	424	3.2
3	Jamadoba (Well)	15.01.16	7.1	26	526	452	2.9
4	Jorapokhar (Tube Well)	15.01.16	7.1	24	620	366	-
5	Jorapokhar (well)	15.01.16	6.9	27	576	408	4.9
6	Purnadih Basti (well)	15.01.16	7	24	424	412	6.3
7	Bhowra 13 No. (well)	15.01.16	7.1	26	624	466	7.9
8	Trilok Nath Madhya Vidyalaya (Tube well)	15.01.16	7.2	24	438	394	-
9	Mahulbani (Tube well)	15.01.16	7	25	523	398	-
10	Mahulbani Basti (well)	15.01.16	7.1	22	525	432	7.3
11	Digwadih 12 No. Officers Colony (well)	15.01.16	7.2	27	387	388	7.5
12	Digwadih 10 No. F&J School (well)	15.01.16	7.3	24	627	456	8.15
13	Bhaga Anil Talkies (Hand Pump)	15.01.16	7.3	26	678	432	-
14	6 & 7 Pit Ayodhya Nagri (well)	15.01.16	7.1	24	624	412	4.5
15	Kendnadih Basti (well)	15.01.16	7.1	21	768	474	2.2
16	Kendnadih Basti (Tube well)	15.01.16	6.8	24	725	528	-
17	Kalimela Kalimandir	15.01.16	6.8	25	455	566	4.8
18	Kalimela Shiv Mandir	15.01.16	6.9	27	567	468	4.2
19	Pattiya Basti (well)	15.01.16	7	24	624	410	2.8


Manager (Environment)

**Ground Water Quality Analysis (Hand Pump & Dugwell)
Post-Monsoon Season- October 2015**

S. No.	Location	Date of Sampling	Sample Parameter				
			pH	Temperature °C	TDS, mg/l	Total Hardness (as CaCO ₃), mg/l	Ground Water Table, Mtrs.
1	Lower Dungri (well)	22.10.15	7.1	24	396	424	6.5
2	Upper Dungri Basti (well)	22.10.15	7.3	25	498	456	2.5
3	Jamadoba (Well)	22.10.15	6.9	26	615	576	1.7
4	Jorapokhar (Tube Well)	22.10.15	6.8	28	530	460	-
5	Jorapokhar (well)	22.10.15	6.8	26	610	432	3.2
6	Purnadih Basti (well)	22.10.15	6.7	25	452	524	4.3
7	Bhowra 13 No. (well)	22.10.15	7.1	26	482	456	7.2
8	Trilok Nath Madhya Vidyalaya (Tube well)	22.10.15	6.5	25	485	324	-
9	Mahulbani (Tube well)	22.10.15	7.5	26	454	384	-
10	Mahulbani Basti (well)	22.10.15	7.2	28	490	412	6.5
11	Digwadih 12 No. Officers Colony (well)	22.10.15	7.3	27	428	472	7.2
12	Digwadih 10 No. F&J School (well)	22.10.15	7.5	29	480	452	7.8
13	Bhaga Anil Talkies (Hand Pump)	22.10.15	7.2	27	624	408	-
14	6 & 7 Pit Ayodhya Nagri (well)	22.10.15	7.2	26	526	440	3.4
15	Kendnadih Basti (well)	22.10.15	7.2	27	696	344	1.9
16	Kendnadih Basti (Tube well)	22.10.15	6.5	25	625	366	-
17	Kalimela Kalimandir	22.10.15	6.7	25	525	410	4.2
18	Kalimela Shiv Mandir	22.10.15	6.8	23	640	384	3.7
19	Pattiya Basti (well)	22.10.15	6.8	25	746	356	2.2


Manager (Environment)

SGS

Test Report

Print Date : 29/01/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-000336.004

JOE No : KE16-000336

Report Control No : KER0000028327

Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
Client Address : Jharia Division
 : Jamadoba, Jealgoma
City : Dhanbad
Postal Code : 828112
State : Jharkhand
Country : India
Received : 16/01/2016
Marks on Sample : Tata Steel Officer Colony
Sampling Date : 12.01.2016 to 13.01.2016, time - 02.30 pm to 02.30 pm
Test Start/End Date : 16/01/2016 - 29/01/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Sulphur Dioxide (SO ₂)	IS 5182 (Part 02) : Reaff. 2006	BDL(DL:5)	ug/m ³	-	80
Nitrogen Dioxide (NO ₂)	IS 5182 (Part 06) : 2006	BDL(DL:7)	ug/m ³	-	80
Particulate Matter (PM ₁₀)	IS 5182 (Part 23) : 2006	46.9	ug/m ³	-	100
Particulate Matter (PM _{2.5})	USEPA CFR (40) Appendix - L	33.2	ug/m ³	-	60
Arsenic as As	40CFR 50	BDL(DL:2)	ng/m ³	-	-
Nickel as Ni	40CFR 50	BDL(DL:2)	ng/m ³	-	-
Chromium (as Cr)	IS:5182 (Part-22):2004	BDL(DL:2)	ng/m ³	-	-
Cadmium (as Cd)	IS:5182 (Part-22):2004	BDL(DL:2)	ng/m ³	-	-

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Member of the SGS Group (SGS SA)

Print Date : 29/01/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-000336.003

JOE No : KE16-000336

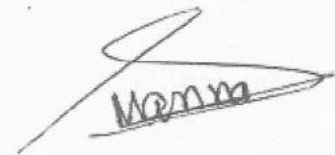
Report Control No : KER0000028327

Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
Client Address : Jharia Division
: Jamadoba, Jealgoma
City : Dhanbad
Postal Code : 828112
State : Jharkhand
Country : India
Received : 16/01/2016
Marks on Sample : Jamadoba Group Office
Sampling Date : 12.01.2016 to 13.01.2016, time - 02.00 pm to 02.00 pm
Test Start/End Date : 16/01/2016 - 29/01/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Sulphur Dioxide (SO ₂)	IS 5182 (Part 02) : Reaff. 2006	BDL(DL:5)	ug/m ³	-	80
Nitrogen Dioxide (NO ₂)	IS 5182 (Part 06) : 2006	8.0	ug/m ³	-	80
Particulate Matter (PM ₁₀)	IS 5182 (Part 23) : 2006	83.7	ug/m ³	-	100
Particulate Matter (PM _{2.5})	USEPA CFR (40) Appendix - L	50.5	ug/m ³	-	60
Arsenic as As	40CFR 50	BDL(DL:2)	ng/m ³	-	-
Nickel as Ni	40CFR 50	2.0	ng/m ³	-	-
Chromium (as Cr)	IS:5182 (Part-22):2004	<5.00	ng/m ³	-	-
Cadmium (as Cd)	IS:5182 (Part-22):2004	BDL(DL:2)	ng/m ³	-	-

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Print Date : 29/01/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-000336.002

JOE No : KE16-000336

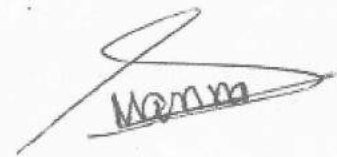
Report Control No : KER0000028327

Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
 Client Address : Jharia Division
 : Jamadoba, Jealgoma
 City : Dhanbad
 Postal Code : 828112
 State : Jharkhand
 Country : India
 Received : 16/01/2016
 Marks on Sample : Near G.M Office
 Sampling Date : 11.01.2016 to 12.01.2016, time - 01.30 pm to 01.30 pm
 Test Start/End Date : 16/01/2016 - 29/01/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Sulphur Dioxide (SO ₂)	IS 5182 (Part 02) : Reaff. 2006	BDL(DL:5)	ug/m ³	-	80
Nitrogen Dioxide (NO ₂)	IS 5182 (Part 06) : 2006	9.5	ug/m ³	-	80
Particulate Matter (PM ₁₀)	IS 5182 (Part 23) : 2006	74.2	ug/m ³	-	100
Particulate Matter (PM _{2.5})	USEPA CFR (40) Appendix - L	24.5	ug/m ³	-	60
Arsenic as As	40CFR 50	BDL(DL:2)	ng/m ³	-	-
Nickel as Ni	40CFR 50	5.7	ng/m ³	-	-
Chromium (as Cr)	IS:5182 (Part-22):2004	5.70	ng/m ³	-	-
Cadmium (as Cd)	IS:5182 (Part-22):2004	BDL(DL:2)	ng/m ³	-	-

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Test Report

Print Date : 29/01/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-000336.001

JOE No : KE16-000336

Report Control No : KER0000028327
Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
Client Address : Jharia Division
: Jamadoba, Jealgoma
City : Dhanbad
Postal Code : 828112
State : Jharkhand
Country : India
Received : 16/01/2016
Marks on Sample : Work Shop Area
Sampling Date : 11.01.2016 to 12.01.2016, time - 01.00 pm to 01.00 pm
Test Start/End Date : 16/01/2016 - 29/01/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Sulphur Dioxide (SO ₂)	IS 5182 (Part 02) : Reaff. 2006	BDL(DL:5)	ug/m ³	-	80
Nitrogen Dioxide (NO ₂)	IS 5182 (Part 06) : 2006	BDL(DL:7)	ug/m ³	-	80
Particulate Matter (PM ₁₀)	IS 5182 (Part 23) : 2006	76.6	ug/m ³	-	100
Particulate Matter (PM _{2.5})	USEPA CFR (40) Appendix - L	40.7	ug/m ³	-	60
Arsenic as As	40CFR 50	BDL(DL:2)	ng/m ³	-	-
Nickel as Ni	40CFR 50	3.7	ng/m ³	-	-
Chromium (as Cr)	IS:5182 (Part-22):2004	<5.00	ng/m ³	-	-
Cadmium (as Cd)	IS:5182 (Part-22):2004	BDL(DL:2)	ng/m ³	-	-

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Test Report

Print Date : 25/03/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-001273.001

JOE No : KE16-001273

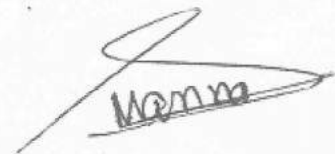
Report Control No : KER0000033295

Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
Client Address : Jharia Division
 : Jamadoba, Jealgoma
City : Dhanbad
Postal Code : 828112
State : Jharkhand
Country : India
Sample Type : AMBIENT_AIR
Received : 09/03/2016
Marks on Sample : Work Shop Area
Sampling Date : 07.03.2016 to 08.03.2016, time - 12.00 pm to 12.00 pm
Test Start/End Date : 09/03/2016 - 24/03/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Aluminium (as Al) <i>Al₂O₃=2.29 ug/m³</i>	IS:5182 (Part-22):2004	1.21	ug/m ³	-	-
Iron (as Fe) <i>FeO=0.62 ug/m³,Fe₂O₃=0.69 ug/m³.</i>	IS:5182 (Part-22):2004	0.48	ug/m ³	-	-
Calcium (as Ca) <i>CaO=5.39 ug/m³,CaCO₃=9.63 ug/m³.</i>	IS:5182 (Part-22):2004	3.85	ug/m ³	-	-
Magnesium (as Mg) <i>MgCO₃=5.24 ug/m³.</i>	IS:5182 (Part-22):2004	1.51	ug/m ³	-	-

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Test Report

Print Date : 25/03/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-001273.002

JOE No : KE16-001273

Report Control No : KER0000033295

Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
Client Address : Jharia Division
: Jamadoba, Jealgoma
City : Dhanbad
Postal Code : 828112
State : Jharkhand
Country : India
Sample Type : AMBIENT_AIR
Received : 09/03/2016
Marks on Sample : Jamadoba Group Office
Sampling Date : 07.03.2016 to 08.03.2016, time - 12.20 pm to 12.20 pm
Test Start/End Date : 09/03/2016 - 24/03/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Aluminium (as Al) <i>Al₂O₃=2.79 ug/m³</i>	IS:5182 (Part-22):2004	1.48	ug/m ³	-	-
Iron (as Fe) <i>FeO=0.57 ug/m³,Fe₂O₃=0.63 ug/m³.</i>	IS:5182 (Part-22):2004	0.44	ug/m ³	-	-
Calcium (as Ca) <i>CaO=6.26 ug/m³,CaCO₃=11.18 ug/m³.</i>	IS:5182 (Part-22):2004	4.47	ug/m ³	-	-
Magnesium (as Mg) <i>MgCO₃=6.38 ug/m³.</i>	IS:5182 (Part-22):2004	1.84	ug/m ³	-	-

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Print Date : 25/03/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-001273.003

JOE No : KE16-001273

Report Control No : KER0000033295
 Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
 Client Address : Jharia Division
 : Jamadoba, Jealgoma
 City : Dhanbad
 Postal Code : 828112
 State : Jharkhand
 Country : India
 Sample Type : AMBIENT_AIR
 Received : 09/03/2016
 Marks on Sample : Near G.M's Office
 Sampling Date : 07.03.2016 to 08.03.2016, time - 12.40 pm to 12.40 pm
 Test Start/End Date : 09/03/2016 - 24/03/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Aluminium (as Al) <i>Al2O3=2.11 ug/m3</i>	IS:5182 (Part-22):2004	1.12	ug/m3	-	-
Iron (as Fe) <i>FeO=0.22 ug/m3,Fe2O3=0.24 ug/m3.</i>	IS:5182 (Part-22):2004	0.17	ug/m3	-	-
Calcium (as Ca) <i>CaO=5.00 ug/m3,CaCO3=8.95 ug/m3.</i>	IS:5182 (Part-22):2004	3.58	ug/m3	-	-
Magnesium (as Mg) <i>MgCO3=5.51 ug/m3.</i>	IS:5182 (Part-22):2004	1.59	ug/m3	-	-

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Print Date : 25/03/2016

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

Report No : KE16-001273.004

JOE No : KE16-001273

Report Control No : KER0000033295
 Sample Described by Customer as : Ambient Air

Client Name : Tata Steel Limited
 Client Address : Jharia Division
 : Jamadoba, Jealgoma
 City : Dhanbad
 Postal Code : 828112
 State : Jharkhand
 Country : India
 Sample Type : AMBIENT_AIR
 Received : 09/03/2016
 Marks on Sample : Di Tata Steel Officer's Colony Digwadih
 Sampling Date : 07.03.2016 to 08.03.2016, time - 01.00 pm to 01.00 pm
 Test Start/End Date : 09/03/2016 - 24/03/2016

Analysis	Method	Result	Unit	Requirement/Limit NAAQS	
				Min	Max
Aluminium (as Al) <i>Al₂O₃=2.23 ug/m³</i>	IS:5182 (Part-22):2004	1.18	ug/m ³	-	-
Iron (as Fe) <i>FeO=0.58 ug/m³,Fe₂O₃=0.64 ug/m³.</i>	IS:5182 (Part-22):2004	0.45	ug/m ³	-	-
Calcium (as Ca) <i>CaO=5.27 ug/m³,CaCO₃=9.43 ug/m³.</i>	IS:5182 (Part-22):2004	3.77	ug/m ³	-	-
Magnesium (as Mg) <i>MgCO₃=4.86 ug/m³.</i>	IS:5182 (Part-22):2004	1.40	ug/m ³	-	-

Per pro SGS India Private Ltd



S_MANNA
 Authorized Signatory

****End of Report****

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