



To,
Addl. PCCF,
MoEF, Eastern Regional Office,
Government of India,
A/3 Chandrasekharapur,
Bhubaneswar-751023.

Ref No. - JMB/115/ **001081** /2015

May 23, 2015


Re: Half Yearly Compliance Report of the conditions of Environmental Clearance issued by Ministry of Environment & Forest, New Delhi, for Jamadoba Coal Washery, Tata Steel Limited, Dhanbad for the period October'14 to March'15.

Dear Sir,

We are enclosing herewith compliance report for the EC granted vide letter no.- J-11015/203/2011-IA.II(M) dated- 3rd March 2014 issued by Ministry of Environment & Forest, 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.

TATA STEEL LIMITED

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HALF YEARLY COMPLIANCE REPORT
(PERIOD: OCTOBER'14 - MARCH'15)

OF

JAMADOBA COAL WASHERY



TATA STEEL LIMITED, JHARIA DIVISION

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

ENVIRONMENTAL CLEARANCE GRANTED
VIDE LETTER NO. - J-11015/203/2011-IA.II(M) DATED- 03RD MARCH 2014
ISSUED BY GOVT. OF INDIA, MINISTRY OF ENVIRONMENT & FOREST, NEW DELHI.

A. SPECIFIC CONDITIONS:

- (i) Adequate green belt shall be provided around coal handling and other areas.
 - **Greenbelt development plan has been made and will be implemented this year.**
- (ii) Action plan be developed and implemented for abandoned tailing ponds and for their restoration to the original land use.
 - **Tailing ponds will be removed except for 2 emergency ponds after the commissioning of the 2 MTPA washery and installation of Mechanical Tailing Dewatering Plant (around June'2018). An action plan for its restoration to the original land use will be made and submitted accordingly.**
- (iii) Fly ash generated from the captive power plant of the washery be utilized for house construction, roads and such uses, strictly complying to the timeline in the EIA Notification, 2006 and maintaining proper records.
 - **100% of the fly ash and bottom ash generated is being disposed off in the various applications. Proper records are being maintained.**
 1. **Fly ash bricks manufacturing plant- 6-8% of fly ash is disposed. The bricks that are manufactured are utilized for internal as well as external purposes.**
 2. **Disposal in the abandoned open-cast mines and low-lying areas. 51-53% fly ash is consumed here.**
 3. **Remaining fly ash in the form of bottom ash (35-40%) is being utilized along with sand in stowing purpose.**
 4. **Utilization in Goaf-filling activities/ reclamation of degraded land available in the leasehold areas. Large parks have been created by using fly ash along with top soil.**
 5. **Utilization as a road-lining material or filling material.**
- (iv) No use of fly ash with sand will take place for stowing in underground mines.
 - **It will be strictly followed.**
- (v) Transportation of fly ash to be done properly by mechanically covered trucks.
 - **It will be implemented phase-wise. The plan for deployment of mechanically covered trucks will be made and submitted later.**
- (vi) The proponent shall connect all the villages in the leasehold area with water pipeline connection.
 - **All the villages in the leasehold areas will be connected with water pipeline connection. In FY15, about 16200 metres of raw water pipeline and 23 water tanks (each having capacity of 4500 litres) were provided for domestic usage in villages with approx. expenditure of Rs. 52 lakhs). In FY16, 5500 mtrs. pipeline connection & 10 water tanks covering 11 villages is proposed to be provided with an estimated expenditure of Rs. 62 lakhs.**

- (vii) The proponent shall expedite and implement the pilot plant to convert mine water into drinking/ domestic water to supply the same to the population of Dhanbad and surrounding areas and shall continue to carry out this activity.
- **Mine water is already being converted to safe drinking water (about 8000 KL/D being treated) and supplied to our colonies and leasehold villages. This will continue in future too. The pilot plant being installed is that of BCCL and they have a proposal to supply the water to the population of Dhanbad.**
- (viii) Tanks/ponds shall be regularly cleaned and maintained. Plantation activities shall be intensified in the mine areas.
- **Tanks/ ponds are regularly cleaned and maintained by TSRDS. Plantation activities will be intensified in the barren mine leasehold areas. We are also approaching the villagers for providing land for plantation incase availability of company land is an issue.**
- (ix) The proponent shall expedite the activities undertaken by TSRDS in over 30 villages in the leasehold area over 15000 households covering a population of about 1.4 lakh.
- **It will be expedited.**
- (x) The CSR cost should be Rs 5 per Tonnes of Coal produced which should be adjusted as per the annual inflation.
- **The amount spent on CSR in the FY 2014-15 was about 847 lakhs and it is about Rs.58.65/tonne of raw coal production. This includes all the Tata Steel mines in Jharia coalfield.**
- (xi) Cost for additional environmental protection measures shall be not less than Rs. 503.00 lakhs. The status of implementation including costs incurred shall be regularly reported to this Ministry and its respective Regional Office in the region as part of the compliance report and also uploaded on the company website.
- **The status of implementation of environmental protection measures including costs will be regularly submitted and the compliance uploaded on company website.**
- (xii) The slope of the embankment towards the river shall at least 1:3 for stability and shall be stabilized with plantation using native species selected from the study area.
- **The washery is about 1.5 kms away from the Damodar River. Hence it is not applicable.**
- (xiii) Top soil shall be stored in the earmarked area and used within a year of its generation for green belt development and for plantation/reclamation.
- **Not applicable.**

- (xiv) No external OB dump shall be created for the expansion project. Monitoring and management of existing reclaimed dumpsites shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its respective Regional Office on yearly basis.
- **Not applicable.**
- (xv) Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilised for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly.
- **There are no waste dumps in washery premises, hence not applicable.**
- (xvi) Garland drains (size, gradient and length) 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 site. 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 washery area to channelize the surface runoff. The runoff is diverted to the tailing ponds and utilized in the washery.**
- (xvii) Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.
- **Not applicable**
- (xviii) Crushers at the CHP shall be operated with high efficiency bag filters/water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system which shall be closed, haulage roads, transfer points, etc.
- **The following measures have been implemented at CHP:**
 - i) Dry-fog system at all transfer points.**
 - ii) Enclosures around crushers.**
 - iii) Belts have been covered on top and both sides. These arrangements will protect the coal mass moving on belt from blowing wind. In this way the dust generation would be minimized.**
 - iv) Fixed water sprinklers on the haulage roads.**
- (xix) Drills shall be wet operated only.
- **Not applicable.**

- (xx) Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.
- **Not applicable.**
- (xxi) The Washery shall be a zero-discharge and no wastewater shall be discharged from the washery into the drains/natural watercourses. No groundwater shall be used for washery operations. Recycled water shall be used for development and maintenance of green belt and in the plant operations.
- **Washery is already operating on a zero-discharge principle. No waste-water is discharged into the drains/ natural water systems. Only mine water is utilized for the washery operations. The recycled water is again used for plant operations and green-belt development.**
- (xxii) The raw coal, washed coal and middling and coal wastes (rejects) shall be stacked properly at earmarked site(s) within sheds/stockyards fitted with wind breakers/shields. Adequate measures shall be taken to ensure that the stored minerals do not catch fire. The storage period shall be not more than 2-3 days.
- **The material is being stacked at earmarked sites. We have a well-established system for disposal of rejects/ tailings to consumers so that storage period is not more than 2-3 days.**
- (xxiii) The proponent shall maintain proper records of the ash content of raw (ROM) coal, clean coal, middling and coal rejects along with quantum of raw coal obtained and washed and dispatched every month and the same shall be uploaded on the company website every month.
- **Proper records are already maintained.**
- (xxiv) All internal roads shall be concreted or black topped and the approach roads used for the project shall be blacked topped. Facilities for parking of trucks carrying raw coal from the linked coalmines shall be created within the Unit.
- **All the internal roads have been concreted while the approach roads are black-topped. The trucks carrying coal to the washery have their parking within the washery premises.**
- (xxv) Roads used for coal transportation to the linked DRI/TPP shall be developed with 3-tier avenue plantation using a mix of native species. The trucks used for coal transportation shall be high capacity trucks. Drivers of trucks for coal transportation shall be engaged based on past records of road safety and compliance of safety regulations and shall be suitably sensitized about road safety and maintenance of vehicles to keep vehicular emissions to be within prescribed limits.
- **The power plant and the coal dispatch rail yard are all close to the washery premises.**

- (xxvi) The roads (internal/approach and roads used for the project) shall be regularly cleaned with mechanical sweepers and with water sprinklers. A 3-tier avenue plantation shall be developed along the major approach roads, internal roads and nearby roads used by the company.
- **Mechanical sweeping machines are proposed to be deployed to clean the internal and approach roads of the washery. The details of plantation activities have been discussed earlier.**
- (xxvii) Green belt shall be developed along the areas such as the washery unit, crushing unit, and stockyards and at transfer points and in between mine operations and habitations.
- **Tree plantation has been done in the washery premises. Now green belt will be developed all around the washery as per plan.**
- (xxviii) Hoppers of the coal crushing unit at the crushing shed and washery unit shall be fitted with high efficiency bag filters/Dust extractors and mist spray water sprinkling system shall be installed and operated effectively at all times of operation to check fugitive emissions from crushing operations, transfer points of belt conveyor systems which shall be closed and from transportation roads.
- **Dry-fog system has been already installed to suppress the dust generated at CHP and transfer points of belt conveyor systems and is operated at all times to check fugitive emissions. Fixed-type water sprinklers are also installed at the internal roads of the washery.**
- (xxix) The proponent shall ensure that coal such as stones, shale and other wastes of an ash content of 77% or more only shall be dumped into the mine voids. Coal rejects with an ash content of 76% or less shall be fully utilized for power generation in linked TPP.
- **It is being followed.**
- (xxx) Regular monitoring of groundwater level and quality including levels of heavy metals such as Hg, Cd, Cr, Se, etc shall be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring for quantity and quality of ground water as per IS: 10500 shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons. Proper records of the data thus collected shall be maintained submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.
- **The monitoring of groundwater level is done four times a year. The hydro-geological study of the area is being done by Indian School of Mines, Dhanbad and it will assess the requirement of piezometers in the area.**

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

(xxxii) As the entire mine water is proposed to be used for the mine-cum-washery operations, measures shall be taken for recharging ground water in and around the mine in the study area. A Plan for water conservation and recharge measures of ground water along with budgetary provisions be prepared and implemented in consultation with the Central/State Ground Water Board to mitigate the adverse impact of mining which may lead to depletion of ground water in the area. The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring of groundwater levels indicate decline of water table. Any additional water requirement for mining operation shall be met from rainwater use only. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.

- **There are a number of ponds existing in the surface of the mining lease which act as natural reservoirs for recharging ground water. Mining is being practiced along with backfilling by stowing using sand which is having the porosity to hold the underground water thus helping aquifer to retain the underground water. The variation in the ground water level is only seasonal. The water requirement of the nearby villages is being met by the company already. Now piped drinking water is also being provided.**

(xxxiii) ETP shall also be provided for treatment of effluents from workshop, CHP and an STP shall be provided in the colony and the treated effluents shall be used for green belt development. Outflow of rainfall, if any, from the mine shall meet prescribed norms and the water quality of such discharge including levels of heavy metals such as Hg, Cd, Cr., Se, etc shall be monitored at the exit points and records maintained thereof and also uploaded on the company website. Online monitoring equipment shall be installed by the proponent to ensure that the water quality parameters of mine water discharge are well within the General Discharge Standards under EP, Rules, 1986.

- **No effluent is discharged outside of the washery. There is no separate workshop in the washery premises. A central workshop exists in Jamadoba Colliery with adequate Oil and Grease Trap. A pilot Sewage Treatment Plant (STP) is being installed in one of the colonies of Jharia Division and its treated water shall be used for gardening.**

(xxxiii) Besides carrying out regular periodic health check-up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, through a recognised agency found in the district, and the results reported to this Ministry and to DGMS.

- **Not applicable. Though PME is done for washery workers periodically at our OH centre.**

(xxxiv) For monitoring land use pattern and for post mining land use, a time series of landuse maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its concerned Regional Office in the region.

- **Not applicable.**

(xxxv) Land oustees shall be compensated as per the norms laid out R&R Policy of CIL or the National R&R Policy or R&R Policy of the State Government whichever is higher.

- **Not applicable.**

(xxxvi) A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests five year before mine closure for approval. Habitat Restoration Plan of the mine area shall be carried out using a mix of native species found in the original ecosystem, which were conserved in-situ and ex-situ in an identified area within the lease for reintroduction in the mine during mine reclamation and at the post mining stage for habitat restoration and for development of grasslands.

- **Not applicable.**

(xxxvii) 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 mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.

- **The points mentioned in the EC letter will be strictly followed.**

- (ii) No change in the calendar plan of production for quantum of mineral coal 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 PM10, PM2.5, SO2 and NOx monitoring. 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, etc carried out at least once in six months.
 - **The Air quality monitoring stations are:**
 - (i) **Jamadoba Office Area (CAAQMS)**
 - (ii) **Digwadih 12 No. Colony**
 - (iii) **New Village Colony, Jamadoba**
 - (iv) **6&7 Pits Kalimandir area**

The monitoring of heavy metals in RSPM has been done by M/s-SGS India Pvt Ltd (an NABL accredited Laboratory) in the month of May'15. The results shall be submitted in the next compliance report.

- (iv) Data on ambient air quality (PM10, PM 2.5, SO2 and NOx) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its concerned Regional Office and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognized under the EPA rules, 1986 shall be furnished as part of compliance report.
 - **The Ambient air quality report (PM10, PM 2.5, SO2 and NOx) for the period from October'14 to March'15 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 such as Hg, As, Ni, Cd, Cr in the month of May'15. The results shall be submitted in the next compliance report.**
- (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 December'14 is given below:**

Sl. No.	Equipment/ Location	Leq (in dB "A")	Exposure Hours
1.	P T S control room	66.0	8 Hrs
2.	Picking Belt conv. discharge 20 mtrs. away	84.0	
3.	Junction at Belt conveyer no. 2 tail end 5 mtrs away	82.8	
4.	Belt conveyer No. 1 discharge to belt conn. No. 2 (2 mtrs away)	83.4	
5.	CHP control room	62.0	
6.	Centrifuge section screen bowl	84.0	
7.	Flocculent charging tank	83.5	
8.	Thickener # 1	74.8	

- (vi) Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.
- **No waste-water is discharged outside the washery premises. 100% water is recirculated back for re-use in the washery. 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 transporting the mineral shall be covered with tarpaulins and optimally loaded.
- **Only the vehicles having valid Emissions Test certificates are being allowed to operate. Coal transportation through trucks is done only from BCCL mines till washery and it is ensured that only trucks with proper tarpaulin cover and optimally loaded be allowed into the washery premises.**
- (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 data is analyzed at regular intervals by a laboratory recognized EP Rules, 1986. We have also installed a Continuous Ambient Air Quality Monitoring Station at Jamadoba for online monitoring with data transfer to JSPCB, Ranchi.**

- (ix) 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.
- **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.**
- (x) 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 and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.
- **The occupational health surveillance programme 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 annually 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. Contractual workers health examination is also done by PME centre**
- (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 qualified personnel (Head (Safety & Eenvt) - Rajnish Jain; Manager (Envvt.) - Mukesh Kumar Prasad; Manager(Envvt) – Ankit Agrahari)
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 2013-14 of Jharia division (comprises of 5 underground collieries, 1 open cast coal mine, 2 washery projects & 1 Power plant) was 35.27 crores. The annual environmental expenditure for the financial year 2014-15 will be submitted in next compliance report.**
- (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 will take place soon and its compliance will be submitted later.**
- (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 now it will be uploaded on the company website as well as sent to MOEF by email.**

Annexure- I

Ambient Air & Groundwater Analysis Report

TATA STEEL LIMITED, Jamadoba Group							
Ambient Air Analysis Report For The Month Of October'2014							
Sampling Station	Latitude/ Longitude	Date of Sampling	Weather Condition	PM ₁₀ (µg/M ³)	PM _{2.5} (µg/M ³)	SO ₂ (µg/M ³)	NO _x (µg/M ³)
Jamadoba Office Area (CAAQMS)	23°42'15.8" N/ 86°24'10.2" E	05.10.14	Clear	132.7	57.8	26.8	26.6
Digwadih 12 No. Colony	23°41'42.2" N/ 86°24'45.3" E	20.10.14	Clear	105.2	55.4	19.5	18.6
New Village Colony, Jamadoba	23°41'51.1" N/ 86°23'19.9" E	06.10.14	Clear	98.2	48.5	14.8	18.5
6&7 Pits Kalimandir area	23°43'15.5" N/ 86°24'12.1" E	28.10.14	Clear	71.2	39.5	15.7	17.6

Ambient Air Analysis Report For The Month Of November'2014							
Sampling Station	Latitude/ Longitude	Date of Sampling	Weather Condition	PM ₁₀ (µg/M ³)	PM _{2.5} (µg/M ³)	SO ₂ (µg/M ³)	NO _x (µg/M ³)
Jamadoba Office Area (CAAQMS)	23°42'26.0"N/ 86°23'59.4"E	08.11.14	Clear	90.6	55.8	24.4	26.6
Jamadoba Colliery Mine Office Area	23°41'42.2" N/ 86°24'45.3" E	11.11.14	Clear	108.5	57.5	22.5	24.6
New Village Colony, Jamadoba	23°41'51.1" N/ 86°23'19.9" E	24.11.14	Clear	99.6	51.5	21.6	24.2
6&7 Pits Colliery Mine Office Area	23°43'15.5" N/ 86°24'12.1" E	12.11.14	Clear	74.6	43.5	18.7	20.5

Ambient Air Analysis Report For The Month Of December'2014							
Sampling Station	Latitude/ Longitude	Date of Sampling	Weather Condition	PM ₁₀ (µg/M ³)	PM _{2.5} (µg/M ³)	SO ₂ (µg/M ³)	NO _x (µg/M ³)
Jamadoba Office Area (CAAQMS)	23°42'26.0"N/ 86°23'59.4"E	17.12.14	Clear	94.9	54.0	22.1	51.0
Jamadoba Colliery Mine Office Area	23°41'42.2" N/ 86°24'45.3" E	08.12.14	Clear	110.4	59.2	18.2	23.6
New Village Colony, Jamadoba	23°41'51.1" N/ 86°23'19.9" E	04.12.14	Clear	113.5	59.5	16.5	22.0
6&7 Pits Colliery Mine Office Area	23°43'15.5" N/ 86°24'12.1" E	11.12.14	Clear	95.5	55.5	18.5	20.5

Ambient Air Analysis Report For The Month Of January'2015

Sampling Station	Latitude/ Longitude	Date of Sampling	Weather Condition	PM ₁₀ (µg/M ³)	PM _{2.5} (µg/M ³)	SO ₂ (µg/M ³)	NO _x (µg/M ³)
Jamadoba Office Area (CAAQMS)	23°42'26.0"N/ 86°23'59.4"E	18.01.15	Clear	106.2	48.0	18.1	43.7
Jamadoba Colliery Mine Office Area	23°41'42.2" N/ 86°24'45.3" E	14.01.15	Clear	112.5	58.8	19.5	22.6
New Village Colony, Jamadoba	23°41'51.1" N/ 86°23'19.9" E	06.01.15	Clear	105.7	59.2	17.5	21.8
6&7 Pits Colliery Mine Office Area	23°43'15.5" N/ 86°24'12.1" E	12.01.15	Clear	98.5	58.5	19.2	22.6

Ambient Air Analysis Report For The Month Of February'2015

Sampling Station	Latitude/ Longitude	Date of Sampling	Weather Condition	PM ₁₀ (µg/M ³)	PM _{2.5} (µg/M ³)	SO ₂ (µg/M ³)	NO _x (µg/M ³)
Jamadoba Office Area (CAAQMS)	23°42'26.0"N/ 86°23'59.4"E	05.02.15	Clear	104.2	52.3	53.9	62.9
Jamadoba Colliery Mine Office Area	23°41'42.2" N/ 86°24'45.3" E	17.02.15	Clear	105.5	56.8	23.5	27.7
New Village Colony, Jamadoba	23°41'51.1" N/ 86°23'19.9" E	27.02.15	Clear	102.8	58.2	21.5	26.5
6&7 Pits Colliery Mine Office Area	23°43'15.5" N/ 86°24'12.1" E	26.02.15	Clear	97.5	57.5	23.5	27.5

Ambient Air Analysis Report For The Month Of March'2015

Sampling Station	Latitude/ Longitude	Date of Sampling	Weather Condition	PM ₁₀ (µg/M ³)	PM _{2.5} (µg/M ³)	SO ₂ (µg/M ³)	NO _x (µg/M ³)
Jamadoba Office Area (CAAQMS)	23°42'26.0"N/ 86°23'59.4"E	15.03.15	Clear	112.0	33.2	24.3	28.8
Jamadoba Colliery Mine Office Area	23°41'42.2" N/ 86°24'45.3" E	26.03.15	Clear	109.5	58.7	22.5	26.5
New Village Colony, Jamadoba	23°41'51.1" N/ 86°23'19.9" E	04.03.15	Clear	107.5	59.0	19.5	25.5
6&7 Pits Colliery Mine Office Area	23°43'15.5" N/ 86°24'12.1" E	30.03.15	Clear	98.5	58.0	20.5	26.0

Ground Water Quality Analysis (Hand Pump & Dugwell)

Winter Season-January'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)	08.01.15	7	25	461	300	7.94
2	Upper Dungri Basti(well)	08.01.15	7.2	24	396	310	2.96
3	Jamadoba (Well)	08.01.15	6.7	24	407	306	3
4	Jorapokhar (Tube Well)	08.01.15	7.1	24	795	345	3.5
5	Jorapokhar (well)	08.01.15	6.2	26	499	272	5.25
6	Purnadih Basti (well)	08.01.15	6.5	24	830	365	5.25
7	Bhowra 13 No. (well)	08.01.15	7.3	26	594	404	7.35
8	Trilok Nath Madhya Vidyalaya (Tube well)	08.01.15	7.2	27	490	385	6.35
9	Mahulbani (Tube well)	08.01.15	7	24	455	320	7.6
10	Mahulbani Basti (well)	08.01.15	7.4	22	482	388	7.46
11	Digwadih 12 No. Officers Coloney (well)	08.01.15	7.3	27	246	312	7.36
12	Digwadih 10 No. F&J School (well)	08.01.15	7.9	24	790	411	7.9
13	Bhaga Anil Talkies (Hand Pump)	08.01.15	7.5	26	582	455	3.25
14	6 & 7 Pit Ayodhya Nagri (well)	08.01.15	6.8	24	572	398	3.45
15	Kendnadih Basti (well)	08.01.15	7.3	21	808	372	0.81
16	Kendnadih Basti (Tube well)	08.01.15	7.2	24	645	370	1.5
17	Pattiya Basti (well)	08.01.15	6.9	25	496	288	2.7

Ground Water Quality Analysis (Hand Pump & Dugwell)

Post-Monsoon Season-November'2014

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)	15.11.14	7	25	461	300	7.72
2	Upper Dungri Basti(well)	15.11.14	7.2	24	396	310	3.04
3	Jamadoba (Well)	15.11.14	7.2	27	650	395	3.2
4	Jorapokhar (Tube Well)	15.11.14	6.8	26	475	385	4.5
5	Jorapokhar (well)	15.11.14	6.5	26	750	360	6
6	Purnadih Basti (well)	15.11.14	7.8	25	845	498	5.85
7	Bhowra 13 No. (well)	15.11.14	6.5	26	482	396	7.65
8	Trilok Nath Madhya Vidyalaya (Tube well)	15.11.14	6.5	25	485	375	6.55
9	Mahulbani (Tube well)	15.11.14	7.5	26	382	339	7.9
10	Mahulbani Basti (well)	15.11.14	6.4	29	510	398	7.58
11	Digwadih 12 No. Officers Colony (well)	15.11.14	6.3	27	490	508	7.65
12	Digwadih 10 No. F&J School (well)	15.11.14	6.3	29	530	420	8.4
13	Bhaga Anil Talkies (Hand Pump)	15.11.14	7.2	27	582	455	3.45
14	6 & 7 Pit Ayodhya Nagri (well)	15.11.14	6.4	26	498	396	3.85
15	Kendnadih Basti (well)	15.11.14	7.5	27	750	375	2.2
16	Kendnadih Basti (Tube well)	15.11.14	6.5	25	615	352	2.5
17	Pattiya Basti (well)	15.11.14	6.8	25	450	355	2.51