



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

Ref No. -JMB/115/ 001083 /2015

May 23, 2015


Re: Half Yearly Compliance Report of the conditions of Environmental Clearance issued by Ministry of Environment & Forest, New Delhi, for 6&7 PitsColliery, Tata Steel Limited, Dhanbadfor the period October'14 to March'15.

Dear Sir,

We are enclosing herewith compliance report for the EC granted vide letter no.-J-11015/373/2010-IA.II(M) dated- 3<sup>rd</sup> March 2014issued 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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Tel 91 326 2320263/2320265/2320267 Fax 91 326 2320268  
Regd. Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001  
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# **HALF YEARLY COMPLIANCE REPORT**

**(PERIOD: OCTOBER'14-MARCH'15)**

**OF**

## **6&7 PITS COLLIERY**



**TATA STEEL LIMITED, JHARIA DIVISION**

**P.O.- BHAGA, DIST. - DHANBAD,  
STATE- JHARKHAND, PIN CODE – 828301.**

**ENVIRONMENTAL CLEARANCE GRANTED  
VIDE LETTER NO. - J-11015/373/2010-IA.II(M) DATED- 03<sup>RD</sup> MARCH 2014  
ISSUED BY GOVT. OF INDIA, MINISTRY OF ENVIRONMENT & FOREST, NEW DELHI.**

## A. SPECIFIC CONDITIONS:

- (i) Adequate measures be taken so as to prevent and control of manifestation of health problems due to coal mining activities.
  - **The control measures implemented are-**
    - i. **Water spraying is carried out in underground workings**
    - ii. **Water sprinkling arrangements are present at all coal transfer points in underground**
    - iii. **Plantation within the mine lease area**
    - iv. **Trucks carrying sand are properly covered.**
    - v. **Underground working of the mine are well ventilated and meet the required standards prescribed by DGMS.**
- (ii) Adequate green belt shall be provided around coal handling and other areas.
  - **Adequate green belt development is taking place every year in the leasehold area.**
- (iii) Transportation of coal shall be by mechanically covered trucks.
  - **No coal transportation takes place by trucks. All coal is transported to the washery via underground conveyor belt system.**
- (iv) No dumping of fly ash in low lying areas and in mine voids are permitted.
  - **It will be strictly followed. No fly ash is used for stowing purpose. Fly ash is being dumped in abandoned open cast pits and also used for brick manufacturing.**
- (v) Utmost care be taken to prevent spillage of sand during transportation of sand.
  - **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.**
- (vi) No use of fly ash with sand will take place for stowing in underground mines.
  - **It will be strictly followed.**
- (vii) The maximum production from the mine at any given time shall not exceed the limit as prescribed in the EC.
  - **It will be strictly followed.**

- (viii) 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.**
- (ix) 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.**
- (x) Mining shall be carried out as per statuette at a safe distance from the river/nallah flowing adjacent to the lease boundary.
- **The Damodar River flows at an approx. aerial distance of 2.5 kms from the lease boundary. Since this is an underground mine, no impact on the surface water bodies is expected.**
- (xi) 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.**
- (xii) Coal Extraction shall also be optimised 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.**
- (xiii) 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.**

- (xiv) 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.**
- (xv) 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.**
- (xvi) 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.**
- (xvii) Coal transportation to washery shall be through a network of underground belt conveyor system and hence there is no surface transportation of coal. Transportation of men from surface to underground and back shall be via shaft. The material transport shall be through the shaft and by means of haulage in the underground.
- **It is already being followed and will continue in future too.**
- (xviii) 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, Accassia, 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.**

(xix) 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 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.**

(xx) Acid Water Treatment Plant, volume of water to be treated and disposal of brine should be provided.

- **Not applicable.**

(xxi) 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.

- **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       |
| <b>Limits</b>      | <b>6.5-8.5</b> | <b>100</b> | <b>2100</b> | <b>30</b> | <b>250</b> | <b>10</b>  |
| <b>October'14</b>  | 8.0            | 34         | 682         | 3.7       | 47         | 1.14       |
| <b>November'14</b> | 7.69           | 30         | 622         | 4.2       | 39         | 0.98       |
| <b>December'14</b> | 7.3            | 27         | 618         | 4.7       | 32         | 0.84       |
| <b>January'15</b>  | 7.3            | 64         | 696         | 4.0       | 37         | 1.16       |
| <b>February'15</b> | 7.6            | 47         | 658         | 4.8       | 45         | 0.97       |
| <b>March'15</b>    | 7.8            | 38         | 597         | 4.0       | 38         | 1.3        |
| <b>Minimum</b>     | 7.3            | 27         | 597         | 3.7       | 32         | 0.84       |
| <b>Maximum</b>     | 8.0            | 64         | 696         | 4.8       | 47         | 1.16       |
| <b>Average</b>     | 7.62           | 40         | 645         | 4.2       | 40         | 1.06       |

(xxii) 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.**
- (xxiii) 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, Ahmadabad 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.**
- (xxiv) The mining in the existing mines should be phased out after expiry of the current mining lease and after reclamation of mined over area. The operating mines may be analysed and monitored for compliance of conditions, bearing with movement of wildlife and until such time they are closed/phased out.
- **It is not applicable in our case.**
- (xxv) Project specific CSR for an amount of Rs5/Tonne of coal production, as adjusted as per the annual inflation, should be provided for the CSR activities undertaken and the progress made thereon shall be uploaded annually on the company website. Monitoring of the impacts of activities under CSR shall be carried out periodically.
- **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.  
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.**
- (xxvi) 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.
- **It will be done.**

(xxvii) The commitment made by the Proponent to the issue raised during Public Hearing shall be implemented by the Proponent.

- **The commitment made by project proponent has been taken up and are being addressed gradually. Roads have been maintained in the colliery and along sand transportation routes. Subsidence studies are done every year. All the ash dumps have been reclaimed. Village ponds are cleaned as per requirement.**
- **Laying of drinking water pipeline network has been extended to more villages. 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. Health camps are regularly organized by TSRDS. Training to SHEs, women, youth and children are provided in various fields.**

(xxviii) 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. It is being strictly followed. Bord and Pillar method is being used for mining.**
- (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) **New Village Colony, Jamadoba**
    - (ii) **Jamadoba Office Area (CAAQMS)**
    - (iii) **Digwadih 12 No. Colony**
    - (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.
  - **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 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 January'15 is given below:**

| Sl. No. | Unit/Place | Equipment/ Location   | Leq (in dB "A") | Exposure Hours |
|---------|------------|---|-----------------|----------------|
| 1.      | 8 seam     | Compressor 2 Nos At 1 <sup>st</sup> drift rise/ 0L from 26 mts away | 84.0            | -              |
|         |            | Compressor At 0L0 level (S) /1 <sup>st</sup> drift from 22 mts away | 83.8            | -              |
|         |            | Belt conv. discharge skate 2 Nos dis to 803 Belt conv.              | 83.5            | 8 hrs          |
|         |            | Working face at 1D/2L TRF - 11                                      | 84.6            |                |
|         |            | Working face at 1L(S)/ 1D LHD - 01                                  | 83.6            |                |
| 2.      | Surface    | 6 pit winder-At operator's seat                                     | 82.5            | 8 hrs          |
|         |            | Fan House (main ventilator)- Operator's cabin                       | 76.4            |                |
|         |            | Nitrogen plant Room   | 84.0            |                |

(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 industrial wastewater is generated in 6&7 Pits 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 transporting the mineral shall be covered with tarpaulins and optimally loaded.

- **Only the vehicles having valid Emissions Test 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 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. The details have been provided earlier.**
- (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 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. We are doing similar medical examination for our contractor workers in Tata central hospital.**
- (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 it is also uploaded on the company website as well as sent to MOEF by email.**

## Annexure- I

## Ambient Air &amp; Groundwater Analysis Report

| TATA STEEL LIMITED, Jamadoba Group                        |                                 |                     |                      |  |   |   |                                      |
|---|---------------------------------|---------------------|----------------------|--|---|---|--------------------------------------|
| Ambient Air Analysis Report For The Month Of October'2014 |                                 |                     |                      |  |   |   |                                      |
| Sampling Station  | Latitude/<br>Longitude          | Date of<br>Sampling | Weather<br>Condition | PM <sub>10</sub><br>(µg/M <sup>3</sup> ) | PM <sub>2.5</sub><br>(µg/M <sup>3</sup> ) | SO <sub>2</sub><br>(µg/M <sup>3</sup> ) | NO <sub>x</sub> (µg/M <sup>3</sup> ) |
| Jamadoba Office Area (CAAQMS)                             | 23°42'15.8" N/<br>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/<br>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/<br>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/<br>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/<br>Longitude          | Date of<br>Sampling | Weather<br>Condition | PM <sub>10</sub><br>(µg/M <sup>3</sup> ) | PM <sub>2.5</sub><br>(µg/M <sup>3</sup> ) | SO <sub>2</sub><br>(µg/M <sup>3</sup> ) | NO <sub>x</sub> (µg/M <sup>3</sup> ) |
| Jamadoba Office Area (CAAQMS)                              | 23°42'26.0"N/<br>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/<br>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/<br>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/<br>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/<br>Longitude          | Date of<br>Sampling | Weather<br>Condition | PM <sub>10</sub><br>(µg/M <sup>3</sup> ) | PM <sub>2.5</sub><br>(µg/M <sup>3</sup> ) | SO <sub>2</sub><br>(µg/M <sup>3</sup> ) | NO <sub>x</sub> (µg/M <sup>3</sup> ) |
| Jamadoba Office Area (CAAQMS)                              | 23°42'26.0"N/<br>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/<br>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/<br>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/<br>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/<br>Longitude          | Date of<br>Sampling | Weather<br>Condition | PM <sub>10</sub><br>(µg/M <sup>3</sup> ) | PM <sub>2.5</sub><br>(µg/M <sup>3</sup> ) | SO <sub>2</sub><br>(µg/M3) | NO <sub>x</sub> (µg/M3) |
|------------------------------------|---------------------------------|---------------------|----------------------|--|---|----------------------------|-------------------------|
| Jamadoba Office Area (CAAQMS)      | 23°42'26.0"N/<br>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/<br>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/<br>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/<br>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/<br>Longitude          | Date of<br>Sampling | Weather<br>Condition | PM <sub>10</sub><br>(µg/M <sup>3</sup> ) | PM <sub>2.5</sub><br>(µg/M <sup>3</sup> ) | SO <sub>2</sub><br>(µg/M3) | NO <sub>x</sub> (µg/M3) |
|------------------------------------|---------------------------------|---------------------|----------------------|--|---|----------------------------|-------------------------|
| Jamadoba Office Area (CAAQMS)      | 23°42'26.0"N/<br>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/<br>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/<br>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/<br>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/<br>Longitude          | Date of<br>Sampling | Weather<br>Condition | PM <sub>10</sub><br>(µg/M <sup>3</sup> ) | PM <sub>2.5</sub><br>(µg/M <sup>3</sup> ) | SO <sub>2</sub><br>(µg/M3) | NO <sub>x</sub> (µg/M3) |
|------------------------------------|---------------------------------|---------------------|----------------------|--|---|----------------------------|-------------------------|
| Jamadoba Office Area (CAAQMS)      | 23°42'26.0"N/<br>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/<br>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/<br>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/<br>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 <sub>3</sub> ), 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 Colony (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 <sub>3</sub> ), 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 Coloney (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                      |