

# ENVIRONMENTAL APPRAISAL (MINING SECTOR PROJECTS)

Annexures in the form of annexures should be part of this file itself. Annexures as separate files will not be accepted.

**Note 2: Please enter x in appropriate box where answer is Yes/No**

## I. General Information

- A. Name of the project : Digwadih Colliery Underground expansion project
- B. Objective of the project : To produce coal and subsequent washing in order to meet the increased demand of steel grade coal in our steel plant at Jamshedpur
- C. Location of mine (s) :

| Village  | Tehsil | District | State     |
|----------|--------|----------|-----------|
| Digwadih | Jharia | Dhanbad  | Jharkhand |

D. Does the proposal relate to:

|                                    |     |                                 |    |                                 |
|------------------------------------|-----|---------------------------------|----|---------------------------------|
| 1. New mine                        | Yes | <input type="text"/>            | No | <input checked="" type="text"/> |
| 2. Expansion                       |     |                                 |    |                                 |
| (i) Increase in ML area            | Yes | <input type="text"/>            | No | <input checked="" type="text"/> |
| (ii) Increase in annual Production | Yes | <input checked="" type="text"/> | No | <input type="text"/>            |
| 3. Renewal of ML                   | Yes | <input type="text"/>            | No | <input checked="" type="text"/> |
| 4. Modernisation                   | Yes | <input checked="" type="text"/> | No | <input type="text"/>            |

## II. Site Information

A. Geographical Information :

|  |                            |
|--|----------------------------|
| 1. Latitude                                  | 23° 41'40" to 23° 43'00" N |
| 2. Longitude                                 | 86° 23'30" to 86° 24'30"   |
| 3. Survey of India Topo sheet No. (Optional) | 73 I/6                     |
| 4. Elevation above Mean Sea Level            | 142 m to 154 m             |

B. Total Lease Area (in ha.):

314.57

3. Hilly

4. Coastal

|     |                                 |    |                                 |
|-----|---------------------------------|----|---------------------------------|
| Yes | <input type="text"/>            | No | <input checked="" type="text"/> |
| Yes | <input checked="" type="text"/> | No | <input type="text"/>            |
| Yes | <input type="text"/>            | No | <input checked="" type="text"/> |
| Yes | <input type="text"/>            | No | <input checked="" type="text"/> |

### III. Land usage of the mining lease area (in ha.)

A. Agricultural (Private Land)

13.65

B. Forest

Nil

C. Waste land (Govt. land)

Nil

D. Grazing

Nil

F. Marshy

Nil

G. Surface water bodies

4.99

H. Other (Specify)  
(Tata Steel + Railways + Villages)

295.93

**Total**

**314.57**

### IV. Whether the mine lease area falls in seismically active zone ?

Yes  No  Zone No.

If yes, earth quakes in last 10 years

A. Severity (Scale) **Not Applicable**

B. Impact i.e. Damage to

|                  |     |                      |     |                      |
|------------------|-----|----------------------|-----|----------------------|
| 1. Life          | Yes | <input type="text"/> | No. | <input type="text"/> |
| 2. Property      | Yes | <input type="text"/> | No. | <input type="text"/> |
| 3. Existing mine | Yes | <input type="text"/> | No. | <input type="text"/> |

ect falls in landslide prone zone?

No

√

**VI. Break-up of the Land use proposed**

|     |  | (in hectares)         |
|-----|--|-----------------------|
| A.  | Mining Lease Area                                  |                       |
| 1.  | Area to be mined                                   | Not Applicable        |
| 2.  | Storage for top soil                               | Not Applicable        |
| 3.  | Overburden/Dumps                                   | Not Applicable        |
| 4.  | Mineral storage                                    | Not Applicable        |
| 5.  | Infrastructure (workshop, Administrative Building) | 8.17                  |
| 6.  | Roads  | 1.24                  |
| 7.  | Rails  | 46.76                 |
| 8.  | Green Belt   | 2.25                  |
| 9.  | Township   | 88.71                 |
| 10. | Tailing Pond                                       | Not Applicable        |
| 11. | Effluent treatment plant                           | -                     |
| 12. | Coal handling plant/ Mineral separation plant      | -                     |
| 13. | Other (Specify) (Water bodies & Villages)          | 13.65 +153.8 = 167.45 |
| 14. | Total Area   | 314.57                |
| B.  | Township (outside mine lease)                      | <b>Not Applicable</b> |
| 1.  | Total Area   | -                     |
| 2.  | No. of dwelling units                              | -                     |
| 3.  | Distance from mine site                            | -                     |



Km):

|                      | River Bank *                      | Other Water bodies*<br>Sea/creek/lake etc. (specify) |
|----------------------|-----------------------------------|--|
| Mine lease boundary  | 5000 m away from<br>Damodar River | Not Applicable                                       |
| Ancillary facilities | Not Applicable                    | Not Applicable                                       |

\*From highest flood line / high tide line

### VIII. For project falling within CRZ

**Not Applicable**

- A. Whether the mineral to be mined is of rare/ strategic nature and not available outside CRZ?

Yes

No

If so, annex a scaled location map duly certified\* by the Chief Hydrographer indicating low tide line\* (LTL), high tide line\* (HTL), mining lease area and its distance from LTL and HTL, sand dunes and settlements within 10 km.

### IX. Indicate aerial distance from the periphery of core zone / buffer zone of following (up to 10 km):

| S. No. | Areas  | Name                             | Aerial Distance from (inkm.)<br>CORE ZONE      BUFFER ZONE |
|--------|--|----------------------------------|--|
| 1      | National Park  | -                                | -  |
| 2      | Sanctuary/Tiger Reserve /<br>Elephant/any other<br>Reserve | -                                | -  |
| 3      | Core Zone of Biosphere<br>Reserve                          | -                                | -  |
| 4      | Habitat for migratory birds                                | -                                | -  |
| 5      | Archaeological sites<br>(i) Notified<br>(ii) Others        | -                                | -  |
| 6      | Defence Installation                                       | -                                | -  |
| 7      | Industries/Thermal Power<br>Plants                         | FBC power plant of<br>Tata Steel | 2 km   |
| 8      | Other Mines  | BCCL and Tata<br>Steel           | In vicinity  |
| 9      | Airports   | Ranchi                           | 160 kms  |
| 10     | Railway Lines  | Bhaga ó Adra line<br>(SE)        | 50 m   |
| 11     | National / State Highways                                  | State Highway                    | 20 kms   |

na in the core and buffer zones.

tion) Act, 1972 as amended subsequently and list  
(2) Scientific name and (3) under which schedule  
,1972 and as amended subsequently ,the identified  
species rail. Get the list authenticated by an Expert in the field / credible scientific  
institute / Chief Wildlife Warden office.]

| A. | Flora                                   | Core Zone | Buffer Zone                          |
|----|---|-----------|--------------------------------------|
| 1. | Agricultural crops                      | Paddy     | Paddy                                |
| 2. | Commercial crops                        | -         | Nil                                  |
| 3. | Plantation                              | 2.25      | -                                    |
| 4. | Natural vegetation / forest type        | -         | Mahua, Peepal, Bargad, Sisum, Palas. |
| 5. | Grass lands                             | -         | Nil                                  |
| 6. | Endangered species                      | -         | Nil                                  |
| 7. | Endemic species                         | -         | Nil                                  |
| 8. | Others (Specify)                        | -         | Annexure ó I                         |
| B. | Fauna                                   |           |                                      |
| 1. | Total listing of faunal elements        | -         | Annexure ó II                        |
| 2. | Endangered species                      | -         | Nil                                  |
| 3. | Endemic species                         | -         | Nil                                  |
| 4. | Migratory species                       | -         | Nil                                  |
| 5. | Route of migratory species              | -         | Nil                                  |
| 6. | Details of aquatic fauna, if applicable | -         | Nil                                  |

#### XI. Details of mineral reserves. (as per approved Mining Plan)

Quantity (in million tonnes)

|     |                   |       |
|-----|-------------------|-------|
| (1) | Proved            | 23.71 |
| (2) | Indicated         | 10.63 |
| (3) | Inferred          | 12.31 |
| (4) | Mineable reserves | 46.65 |

#### XII. Major geological formation / disturbances in the mine area

|     |  |     |                                     |    |                          |
|-----|--|-----|-------------------------------------|----|--------------------------|
| (A) | Geological & Structural maps submitted           | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| (B) | Geomorphological contour map / section submitted | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |

3. Shear Zone
4. Folds
5. Other weak zones






(D) Source of data

Geological exploration  
report generated by Tata  
Steel

### XIII. Production of mineral and life of mine

A. Rated capacity of mine (million tonne/annum)

0.6 TPA

B. Life of mine (Years)

20 YEARS

C. Lease period (Years)

999 YEARS

D. Date of expiry of lease (D /M /Y)

03.09.2901

E. In case of existing mines

1. Date of opening of mine

17.04.1918

2. Avg. production in the last five years  
( million tonnes/annum )

0.345

3. Avg./ Projected production for the next 10 years  
( million tonnes/annum )

0.6

F. Whether plans & sections provided? Yes

√

No.

### XIV. Type and method of mining operations

| S. No. | A. TYPE     |   | S. No. | B. METHOD       |   |
|--------|-------------|---|--------|-----------------|---|
| 1.     | Opencast    | - | 1.     | Manual          | - |
| 2.     | Underground | √ | 2.     | Semi-mechanised | - |
| 3.     | Both        | - | 3.     | Mechanised      | √ |



## General processing

TPA 6 Jamadoba Washery (captive) presently  
ing coal from Jamadoba Group of Collieries and  
ing clean coal to Jamshedpur Steel works.

B. Additional

Undergoing expansion to 2.0. MTPA

## XVI. Loading, transportation and unloading of mineral and waste rocks on surface:

A. Manual.

Not Applicable

B. Tubs, mine cars, etc.

Not Applicable

C. Scraper, shovels, dumpers/trucks.

Not Applicable

D. Conveyors (belt, chain, etc.)

Underground belt conveyor network system

E. Others (specify).

Not Applicable

## XVII. Mine Details

A. Open-cast mines

Not Applicable

1. Stripping ratio (mineral to over burden in tonne/ m<sup>3</sup>)

-

2. Thickness of top soil (in m.)

(i) Minimum

-

(ii) Maximum

-

(iii) Avg.

-

3. Thickness of overburden (in m.)

(i) Minimum

-

(ii) Maximum

-

(iii) Avg.

-

B. Underground mines

Depth (m)

Thickness (m)

1. Seam/  
Ore body

642

2.94 6 3.77

into the mine

√

-

-

(iii) Incline

3. Details of machinery to be used

- (i) On surface - Winder and Main mechanical Ventilator
- (ii) At Face - SDL/ Auxiliary Fan
- (iii) For transportation - Conveyor belt
- (iv) Others - Pump/ Motors/ Compressor/ Haulage

4. Method of stopping (metallic ferrous mines) **Not applicable**

- (i) Open
- (ii) Filled
- (iii) Shrinkage
- (iv) Caving
- (v) Combination of above
- (vi) Others (Specify)

5. Depillaring method

- (i) Caving 

-
- (ii) Stowing 

√
- (iii) Partial extraction 

-

6. Ventilation arrangement

- (i) Existing 

Fan House of capacity  
7200Cum/per minute of air
- (ii) Proposed 

Not Applicable

7. Subsidence

- (i) Anticipated subsidence (in m.) 

0.219
- (ii) Magnitude of surface strains 

1.86



change

5.5

ed possible subsidence areas

√

(v) Major impacts on natural drainage pattern, human habitat, water bodies, etc. None

(vi) Salient features of subsidence monitoring and control.

Regularly monitoring conducted by CIMFR, Dhanbad and ensure proper stowing.

### **XVIII. Surface drainage pattern at mine site**

A. What is the pre-mining surface drainage pattern at the site? **Not Applicable**

B. Do you propose any modification / diversion in the existing natural drainage pattern? Yes  No √

Provide location map indicating contours, direction of flow of water, and proposed route/changes, if any i.e. realignment of river/nallah/ any other water body falling within core zone.

### **XIX. Vehicular traffic density**

|   | <b>Type</b>   | <b>No. of vehicles per day</b>                                  |
|---|---|---|
| A. Existing                                       | Diesel / Petrol   | 450/400   |
| B. After the proposed activity                    | Diesel / Petrol   | 500/400   |
| C. Whether the existing road network is adequate? | Yes <span style="border: 1px solid black; padding: 2px;">√</span> | No <span style="border: 1px solid black; padding: 2px;"></span> |
| D. If no, provide details of alternative proposal |   |   |

### **XX. Mineral(s) transportation from the mine site**

|                    | <b>Qty. (in TPD)</b> | <b>Percentage (%)</b> |
|--------------------|----------------------|-----------------------|
| A. Road            | Not Applicable       | Not Applicable        |
| B. Rail            | Not Applicable       | Not Applicable        |
| C. Conveyors       | 2000                 | 100                   |
| D. Rope way        | Not Applicable       | Not Applicable        |
| E. Water ways      | Not Applicable       | Not Applicable        |
| F. Pipeline        | Not Applicable       | Not Applicable        |
| G. Other (Specify) | Not Applicable       | Not Applicable        |
| Total              | 2000                 | 100                   |

| S.<br>No. | Purpose   | Required (Mining Lease Area) |        |              |                            | Acquired |        |              |        | To be acquired |        |              |        |
|-----------|---|------------------------------|--------|--------------|----------------------------|----------|--------|--------------|--------|----------------|--------|--------------|--------|
|           |   | Govt.                        |        | Private      |                            | Govt.    |        | Private      |        | Govt.          |        | Private      |        |
|           |   | Forest                       | Others | Agricultural | Others                     | Forest   | Others | Agricultural | Others | Forest         | Others | Agricultural | Others |
| 1.        | Mining area   |                              |        |              | -                          |          |        |              |        |                |        |              |        |
| 2.        | Area for storage/dumps  |                              |        |              | -                          |          |        |              |        |                |        |              |        |
| 3.        | Ancillary facilities (processing plant etc.)  |                              |        |              | -                          |          |        |              |        |                |        |              |        |
| 4.        | Tailing dam/pond  |                              |        |              | -                          |          |        |              |        |                |        |              |        |
| 5.        | Township  |                              |        |              | 88.71                      |          |        |              |        |                |        |              |        |
| 6.        | Area for green belt development   |                              |        |              | 2.25                       |          |        |              |        |                |        |              |        |
| 7.        | Roads, Railways etc.  |                              |        |              | 1.24 (road)<br>46.76(rail) |          |        |              |        |                |        |              |        |
| 8.        | Other infrastructure (specify) Water bodies & Villages(Workshop, Administrative Building) |                              |        | 13.65        | 153.8<br><br>8.17          |          |        |              |        |                |        |              |        |
|           | Total   |                              |        | 13.65        | 300.93                     |          |        |              |        |                |        |              |        |

## Air Quality data

## Annexure -III

1. Data for full season except monsoon through autographic instrument)

2. Seasonal wind rose pattern (16 points of compass i.e. N, NNE, NE, ---)
  - Day time
  - Night time
  - 24 ó hours period
3. Site specific monitored data
4. Rainfall (in mm)
  - (i) Total (Annual)
  - (ii) 24 hr highest
5. Wind speed (kmph)
  - (i) Max.
  - (ii) Mean
  - (ii) % of Calm
6. Temperature (deg. Celsius)
  - (i) Min.
  - (ii) Max.
  - (iii) Mean
7. Relative Humidity (%) Mean

\* 24-Hours rainfall should be reported from 08:30 hrs. IST of previous day to 08:30 hrs IST of the day.

\* Rainy day is considered when 24 hrs rainfall is  $\geq 2.5$  mm.

\*\* Visual observations of cloud cover should be recorded four times a day at regular intervals.

## B. Ambient air quality data\* (RPM, SPM, SO<sub>2</sub>, NO<sub>x</sub>, CO) - Annexure -IV

\*Frequency of monitoring should be as per guidelines of CPCB and monitoring should cover one full season except monsoon.

1. Season & period for which monitoring has been carried out
2. Frequency of sampling
3. No. of samples collected at each monitoring station

| Day Time and Location | Wind Speed and Direction | 24-hr. Concentrations as monitored (in µg/ m <sup>3</sup> ) |     |                 |     |    |      | Permissible AAQ Standards |      | Name of instruments used and sensitivity |
|-----------------------|--------------------------|---|-----|-----------------|-----|----|------|---------------------------|------|--|
|                       |                          | SPM   | RPM | SO <sub>2</sub> | NOX | CO | Pb** | EPA*                      | SPCB |  |
|                       |                          |   |     |                 |     |    |      |                           |      |  |
|                       |                          |   |     |                 |     |    |      |                           |      |  |
|                       |                          |   |     |                 |     |    |      |                           |      |  |
|                       |                          |   |     |                 |     |    |      |                           |      |  |
|                       |                          |   |     |                 |     |    |      |                           |      |  |
|                       |                          |   |     |                 |     |    |      |                           |      |  |
|                       |                          |   |     |                 |     |    |      |                           |      |  |

\* EPA ó As notified under the Environment (protection) Act , 1986

|                      | SO <sub>2</sub> | NOX | CO | Pb** |
|----------------------|-----------------|-----|----|------|
|                      |                 |     |    |      |
|                      |                 |     |    |      |
| <b>Mean</b>          |                 |     |    |      |
| <b>98 percentile</b> |                 |     |    |      |

\*\* For mineral specific site only

# Annex a location map indicating location of AAQ stations, their direction & distance w.r.t. project site.

# Attach additional sheets as required to provide complete data as monitored for one season.

**XXIII. Stack emission detail , if any** **Not applicable**  
(Frequency of stack monitoring should be as per CPCB guidelines)

| Sl. No. | Process / unit of operation (e.g. DG Set, Boiler) | Height of stack (m) | Internal top dia. (m) | Flue gas exit velocity (m/sec) | Emission rate (kg/hr) |                 |                 |    | Heat emission rate from top of stack (K.cal/hr) | Exhaust / Flue Gas Temperature in degrees celcius. |
|---------|---|---------------------|-----------------------|--------------------------------|-----------------------|-----------------|-----------------|----|---|--|
|         |   |                     |                       |                                | SPM                   | NO <sub>x</sub> | SO <sub>2</sub> | CO |   |  |
|         |   |                     |                       |                                |                       |                 |                 |    |   |  |
|         |   |                     |                       |                                |                       |                 |                 |    |   |  |

A Equipment used for stack monitoring

**XXIV. Details of fugitive emissions during mining operations** **Not applicable**

**XXV. Air Quality Impact Prediction (AQIP)** **Not applicable**

- A.
1. Details of model(s) used for AQIP including grid size, terrain features, and input meteorological data
  2. Maximum incremental GLC values of pollutants based on prediction exercise

(in ug/m<sup>3</sup>)

| Sl. No. | Pollutants      | Incremental Value | Ambient Air Quality | Resultant Air Quality |
|---------|-----------------|-------------------|---------------------|-----------------------|
| 1.      | SPM             |                   |                     |                       |
| 2.      | RPM             |                   |                     |                       |
| 3.      | SO <sub>2</sub> |                   |                     |                       |
| 4.      | NOX             |                   |                     |                       |
| 5.      | CO              |                   |                     |                       |



ement (m<sup>3</sup>/day)

|                        | Avg. Demand    | Peak Demand |
|------------------------|----------------|-------------|
| 1. Mine operation      | 3432           | -           |
| 2. Land reclamation    | Not Applicable | -           |
| 3. Dust suppression    | 10             | -           |
| 4. Drinking            | 1100           | -           |
| 5. Green Belt          | 5              | -           |
| 6. Beneficiation       | Not applicable | -           |
| 7. Washeries           | Not applicable | -           |
| 8. Fire Service        | Not applicable | -           |
| 9. Others (irrigation) | 1689           | -           |
| <b>B. Township</b>     |                |             |
| 1. Green Belt          | Not applicable | -           |
| 2. Domestic            | 1035           | -           |
| 3. Other (specify)     | Not applicable | -           |
| <b>Total</b>           | <b>7255</b>    |             |

**XXVII. Source of water supply\***

| S. No. | Source                                   | m <sup>3</sup> /day |
|--------|--|---------------------|
| 1      | River (name)                             | Nil                 |
| 2      | Ground water                             | Nil                 |
| 3.     | Mine water (sump/pit)                    | 7255                |
| 4      | Other surface water bodies (pl. specify) | Not Applicable      |

\*Annex a copy of sanction letter from the concerned authority for drawing water

**XXVIII. Lean season flow in case of river (cumecs) Not Applicable**

**XXIX. Ground water potential of the area**

**A. Average water table (metres) below ground level**

1. Pre-monsoon

7.98

2. Post-monsoon

2.78

**B. Annual recharge rate (cubic metres)**

-

**C. Avg. withdrawal rate (cubic metres)**

-

analysis\* of water at intake point (\*All parameters as standards) - Annexure -V

the water source

The water consumption pattern will remain the same even after the expansion of project.

| Sl. No. | Usage            | Present Consumption Including pumping (m <sup>3</sup> /day) |         | Additional proposed as per local plan (m <sup>3</sup> /day) |        | Total (m <sup>3</sup> /day) |        |
|---------|------------------|---|---------|---|--------|-----------------------------|--------|
|         |                  | Surface   | Ground/ | Surface   | Ground | Surface                     | Ground |
| 1.      | Irrigation       |   |         |   |        |                             |        |
| 2.      | Industry         |   |         |   |        |                             |        |
| 3.      | Mining           |   |         |   |        |                             |        |
| 4.      | Others (Specify) |   |         |   |        |                             |        |
| Total   |                  |   |         |   |        |                             |        |

#### XXXII. Waste Water Management

A. Daily discharge (m<sup>3</sup>/day) from different sources

|    |                  |      |
|----|------------------|------|
| 1. | Mine discharge   | 7255 |
| 2. | Workshop         | Nil  |
| 3. | Domestic         | 1130 |
| 4. | Beneficiation    | Nil  |
| 5. | Washeries        | Nil  |
| 6. | Others (Specify) | -    |
| 7. | Total            | -    |

B. Are you planning to provide waste water treatment plant? Yes

☐

No

☒

If yes, provide a flow sheet for treatment.

C. Quantity of water recycled / reused/

to be recycled in

|    |                     |   |
|----|---------------------|---|
| 1. | Percentage          | - |
| 2. | M <sup>3</sup> /day | - |



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Discharge

| Point  | Quantity discharged (in m <sup>3</sup> /day) |
|--|--|
| 1. Surface<br>(i) Agricultural land<br>(ii) Waste land<br>(iii) Forest land<br>(iv) Green belt |  |
| 2. River   | -  |
| 3. Lake  | -  |
| 4. Estuary   | -  |
| 5. Sea   | -  |
| Total  | <b>7255</b>                                  |

E. Users of discharge water

|                    |  |                                     |    |                          |
|--------------------|--|-------------------------------------|----|--------------------------|
| 1. Human           | Yes  | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 2. Livestock       | Yes  | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 3. Irrigation      | Yes  | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 4. Industry        | Yes  | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 5. Others (specify | <input type="text" value="Villages and township"/> |                                     |    |                          |

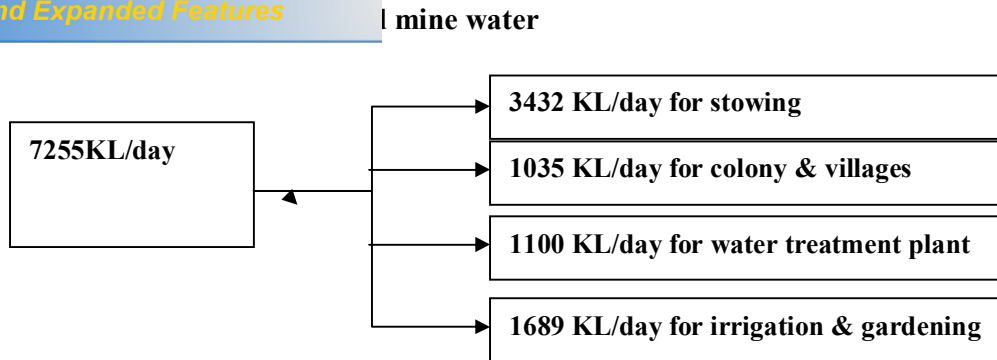
F. Details of the Water body where final effluent is/will be discharged :

**Not Applicable**

**Cumecs**

|  |                      |
|--|----------------------|
| 1. Average flow rate   | <input type="text"/> |
| 2. Lean season flow rate   | <input type="text"/> |
| 3. Aquatic life  | <input type="text"/> |
| 4. Analysis of river water 100 meters upstream and 100 meters downstream of discharge point. |                      |

ment in the form of flow diagram indicating  
on (section-wise) and output.



#### XXXIV. Solid Waste : Not Applicable

##### A. Solid waste quantity and quality

| Name<br>(Lump/fines/slurry/<br>Sludge/others)                                       | Composition | Quantity<br>(m <sup>3</sup> /month) | Method of disposal |
|---|-------------|-------------------------------------|--------------------|
| <b>Mining activity*</b><br><br>a. Top Soil<br>b. Over burden<br>c. Others (specify) |             |                                     |                    |
| <b>Effluent Treatment Plant (sludge)</b>  |             |                                     |                    |
| <b>Total</b>  |             |                                     |                    |

Annex layout plan indicating the dump sites

B. 1. Does waste (s) contain any hazardous/toxic substance/ radioactive materials or heavy metals?

Yes ☐ No ☐

2. If yes, provide details and precautionary measures.

C. Recovery and recycling possibilities

D. Possible user (s) of the solid waste

E. 1. Is the solid waste suitable for backfilling  
2. If yes, when do you propose to start backfilling.

Yes ☐ No ☐

| Solid waste (s)  | Accumulated<br>(A) | To be generated<br>(B) | % of A & B to be backfilled |   |
|------------------|--------------------|------------------------|-----------------------------|---|
|                  |                    |                        | A                           | B |
| Over burden      |                    |                        |                             |   |
| Others (specify) |                    |                        |                             |   |



rehabilitation plan

to be dumped on the ground, indicate

ated environmental problems : Nil

(2) Number & type of waste dumps:

(i) Height of dumps (in m)

(ii) Slope of dump (angle)

(iii) Proposed bio-engg mitigation measures

### XXXV. Noise level (dB) : Annexure - VI

A. Source

| Sl. No. | Source | Noise Level (dB) |     |      |
|---------|--------|------------------|-----|------|
|         |        | Max              | Min | Mean |
|         |        |                  |     |      |

B. Abatement measures : Provision of Ear Plug & Ear Muff

### XXXVI. Fuel / Energy requirements

(A) Total power requirement (in MW)

| S. No. |                       | Mine Site | Township | Others (specify) | Total |
|--------|-----------------------|-----------|----------|------------------|-------|
| 1      | Present               | 1.0       | 2        | -                | 3.0   |
| 2      | Proposed / additional | 1.5       | 2        | -                | 3.5   |
| Total  |                       | -         | -        | -                | -     |

(B) Source of power (in MW)

| S. No. |          | SEB/Grid* | Captive power plant       | DG Sets |
|--------|----------|-----------|---------------------------|---------|
| 1      | Present  |           | DVC / Captive Power Plant | NO      |
| 2      | Proposed |           | DVC / Captive Power Plant | NO      |
| Total  |          |           |                           |         |

[\* Annex a copy of the sanction letter from the concerned authority]

(C) Details of fuels : **Not Applicable**

| S.No. | Fuel            | Daily Consumption (TPD) |          | Calorific value (Kcals/kg) | % Ash | % Sulphur |
|-------|-----------------|-------------------------|----------|----------------------------|-------|-----------|
|       |                 | Existing                | Proposed |                            |       |           |
| 1     | HSD             |                         |          |                            |       |           |
| 2     | LSHS            |                         |          |                            |       |           |
| 3     | Other (specify) |                         |          |                            |       |           |



## ole / explosive materials

|   |                    | Number of Storages | Consumption<br>(in TPD) | Maximum Quantity at<br>any point of time |
|---|--------------------|--------------------|-------------------------|--|
|   |                    | -                  | -                       | -  |
| 2 | Fuel Oil           | Not applicable     | -                       | -  |
| 3 | Explosives         | One Magazine       | 450 Kg/day              | 2600 Kgs                                 |
| 4 | Other (pl specify) | -                  | -                       | -  |

### XXXVIII. Occupational and community health, safety and hygiene

- A. What major occupational and community health and safety hazards (surface and U/g fire, inundation, explosion, etc.) are anticipated?

#### Dust pollution

- B. What provisions have been made/ proposed to be made to conform to health and safety requirements?

#### Water spraying measures to suppress the dust.

- C. In case of an existing mine, furnish a comprehensive report on health status of the workers. **Annexure-VII**
- D. Mineralogical composition of RPM (dust)

**Free silica : 1.65 to 2.82%**

- E. Details of PPEs provided/ to be provided to the workers

**Ear Muff, Ear Plugs, Dust Mask, Safety Shoe, Safety Helmet, First Aid Box etc.**

- F. Information on radiation protection measures, if applicable.

**Not applicable**

### XXXIX. Plantation

- A. Lease area (in ha.)

|                      | <u>Existing mine</u> | <u>New mine</u> |
|----------------------|----------------------|-----------------|
| (i) Area broken up   | -                    | -               |
| (ii) To be broken up | -                    | -               |
| (iii) Unbroken area  | -                    | -               |

- B. Total Township area (in ha.)

88.71

Proposed (in ha.)

|            |       |       |          |        |
|------------|-------|-------|----------|--------|
| Peripheral | Dumps | Roads | Township | Others |
|            |       |       |          | 2.25   |
|            |       |       |          | 10.0   |

(ii) Proposed

D. No. and type of trees planted and proposed?

(1) Existing

(i) When plantation was started?

Year

-

(ii) No.

0.5 Lacs

(iii) Survival rate %

30 %

(iv) Type of species

Sisam, Gamahar, Teak etc.

(v) Avg. Height (in m)

5mtr.

(2) Proposed

| Type of species                | Number (per ha.) |
|--------------------------------|------------------|
| Legostromia, neem, Karanj etc. | 2500 per ha      |

## **XL. Human Settlement**

|                      | Core Zone | Buffer Zone |
|----------------------|-----------|-------------|
| Population*          | -         | 333625      |
| Number of households | -         | 65661       |

[\* As per latest available census record or actual survey]

## **XLI. Rehabilitation & Resettlement (R&R) Plan\* : Not Applicable**

A. Name and no. of villages falling within

- Core zone
- 500m from the blasting site(s)
- Township site

B. Village(s) affected by the project

| S. No. | Village name (within mine lease) | Population |        | Occupation | Average Annual Income |
|--------|----------------------------------|------------|--------|------------|-----------------------|
|        |                                  | Tribal     | Others |            |                       |
|        |                                  |            |        |            |                       |



aced/ land oustees

| Main          | Number of oustees |                  |                           |
|---------------|-------------------|------------------|---------------------------|
|               | Land (only)       | Homestead (only) | Land and Homestead (both) |
| Mining Lease  |                   |                  |                           |
| 1.            |                   |                  |                           |
| 2.            |                   |                  |                           |
| Township Site |                   |                  |                           |
| 1.            |                   |                  |                           |
| 2.            |                   |                  |                           |

- D. Whether R&R plan has been finalised? If yes, salient features of R&R plan for oustees.
- Site where the people are proposed to be resettled & facilities to be provided.
  - Compensation package including funds earmarked
  - Agency /Authority responsible for their resettlement.
  - Period by which resettlement of Project Affected People (PAP) will be over

## XLII. Pollution Control

- A. Details of pollution control measures

| S. No. |                    | Existing  | Proposed  |
|--------|--------------------|---|---|
| 1      | <b>Air</b>         | Dust suppression measures through water sprinkling.   | Will continue for future                          |
| 2      | <b>Water</b>       | Effluent management system in central workshop. Mine water being settled in settling tanks. | Additional Mine water will be utilized internally |
| 3.     | <b>Noise</b>       | Use of Ear plug for worker  | Plantation around fanhouse, use of ear muffs      |
| 4.     | <b>Solid waste</b> | Not applicable  | Not applicable                                    |

- B. For existing units :

- Difficulties encountered in implementing pollution control measures/ Environmental management plan. None
- Efficiency of each of the pollution control equipment/ system installed

| S.No. | Name of the system/ equipment | Design efficiency % | Present working efficiency % |
|-------|-------------------------------|---------------------|------------------------------|
|       | Not Applicable                |                     |                              |

|                       |                     |
|-----------------------|---------------------|
| the system/ equipment | Design efficiency % |
| Not Applicable        |                     |

**XLIII. Capital cost of the project (in Rs. Lakh) 2500 Lakhs**

(As proposed to the funding agency/ financial institution)

**XLIV. Cost of environmental protection measures in Rs. Lakh**

| S No | Description  | Total Capital<br>(in lakhs) | Phasing in years |          |           |           |           |   |
|------|--|-----------------------------|------------------|----------|-----------|-----------|-----------|---|
|      |  |                             | PS-1             | 1        | 2         | 3         | 4         | 5 |
| A    | Env. Baseline data generation and EMP preparation, fees to consultants, etc. | 20.0                        | 20               |          |           |           |           |   |
| B    | Green belt development around fan house, service buildings, etc.             | 15.0                        |                  | 5        | 5         | 5         |           |   |
| C    | Pollution and monitoring equipment/ scientific studies                       | 15.0                        |                  |          | 10        | 5         |           |   |
| D    | Pollution abatement facilities   | 15.0                        |                  |          |           | 10        | 5         |   |
| E    | Effluent Treatment Plant   | 20.0                        |                  |          |           | 10        | 10        |   |
|      | <b>Total</b>   | <b>85.0 lakhs</b>           | <b>20</b>        | <b>5</b> | <b>15</b> | <b>30</b> | <b>15</b> |   |

**XLV. Amount earmarked for socio-economic welfare measures for the nearby villages other than R&R plans.**

A. Villages (name) to be adopted, if any

Already 26 villages adopted by Tata Steel Jharia Division through CSR Cell , TSRDS.

B. Socio-economic package

-

C. Amount earmarked (in Rs. Lakh)

Rs. 4 crores approx. for the entire Jharia Division

**XLVI. Public Hearing**

A. Date of Advertisement:

19.08.2012

B. Newspapers in which the advertisement appeared :

Hindustan Times & Prabhat Khabar (Dhanbad).

C. Date of public hearing (DD/MM/YYYY)

21.09.2012

chaired by & members present:

3. Shri K.K.Pathak JEE JSPCB Dhanbad
4. Shri Jagdish Mahto, JEE, JSPCB Ranchi.
5. Shri S.K.Singh, Dy. General Manager, Jharia
6. Shri Manish Mishra, Chief Jamadoba Group,
7. Shri S.S.Hota, Chief HR/IR,
8. Shri R.K.Jain, Head Safety and Environment
9. Shri Jasbir Singh, Head Digwadih Colliery,
10. Captain Manish Sinha, Head Administration
11. Shri Manoj Kumar Gupta, Head Environment

E. No. of people attended the public hearing meeting  
and number of people from the lease area.

244

244

F. Summary/details of public hearing in tabular form.

| Issues raised by the Public   | Response/Commitment of Project Proponents  | Suggestions made by the Public Hearing Panel            |
|---|--|---|
| Drinking water facility for villagers.                                      | Laying down of pipe network for supply of drinking water. Supply of water through tanker.  | Admitted by the panel members.                          |
| Repair and cleaning of drains and roads and removal of garbage regularly.   | Maintenance of drains will be done regularly. In case of roads, small repair works will be taken up.   | Admitted and suggestion for frequent monitoring.        |
| Maximum Nos. of tree Plantation   | Regular tree plantation is carried out already. Distribution of trees to the villagers on demand.  | Admitted by the panel members.                          |
| Medical facilities for villagers  | A mobile clinic consisting of one Doctor and three paramedical personnel is already functioning on preventive measures on weekly basis in all surrounding villagers. | Admitted with the suggestion to increase the frequency. |
| Free Electricity and water to be provided to the villages.                  | Water is already provided. Transformers, bulbs, switches, etc will be given but no free electricity will be given.   | Admitted by the panel members.                          |
| Free coaching to small children   | Coaching facilities are already available for the children and all can avail it from the nearby villages.  | Admitted by the panel members.                          |
| Cleaning of parks and ponds as well as heightening of wall around sand yard | Parks and ponds will be maintained through our CSR wing TSRDS. Wall around sand yard to be increased in height.  | Admitted by the panel members.                          |

approvals\* (wherever applicable) have been obtained?

|    |   |    |     |                                     |    |                                     |
|----|---|----|-----|-------------------------------------|----|-------------------------------------|
|    | oEF   | NA | Yes | <input type="checkbox"/>            | No | <input type="checkbox"/>            |
| B. | NOC from SPCB   |    | Yes | <input type="checkbox"/>            | No | <input checked="" type="checkbox"/> |
| C. | NOC from Atomic Energy Division   | NA | Yes | <input type="checkbox"/>            | No | <input type="checkbox"/>            |
| D. | Mining plan approval from IBM /<br>Ministry of Coal   |    | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/>            |
| E. | Forestry clearance under FCA, 1980  | NA | Yes | <input type="checkbox"/>            | No | <input type="checkbox"/>            |
| F. | NOC from Chief Controller of<br>Explosives  |    | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/>            |
| G. | Commitment regarding availability<br>of water and power from the concerned<br>State Authorities | NA | Yes | <input type="checkbox"/>            | No | <input type="checkbox"/>            |

[\* Annex copies]

**XLVIII. Was / Is there any court case relating to the project or related activities?  
If so, details thereof.**

None

The data and information given in this proforma are true to the best of my knowledge and belief.

Sanjay Kumar Singh  
General Manager (Jharia)  
Tata Steel Ltd., Jharia Division

**Date:**

**Signature of the applicant with  
full name & address**

**Place:**

**Given under the seal of organization  
on behalf of whom the applicant is  
signing**



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## Annexure - I

### dominant Floral Species

| S.N.                           | Local Name  | Hindi Name           | Botanical Name                  |
|--------------------------------|-------------|----------------------|---------------------------------|
| <b>I. LARGE TREE</b>           |             |                      |                                 |
| 1.                             | Arjun       | Arjun, Koha          | <i>Terminalia arjuna</i>        |
| 2.                             | Aam         | Aam                  | <i>Mangifera indica</i>         |
| 3.                             | Imli        | Imli                 | <i>Tamarindus indica</i>        |
| 4.                             | Kathgular   | Kathumar             | <i>Ficus hispida</i>            |
| 5.                             | Kala Siris  | Kala Siras           | <i>Albizzia lebbek</i>          |
| 6.                             | Kem(mundi)  | Mundi                | <i>Mitragyna parviflora</i>     |
| 7.                             | Kher        | Kher                 | <i>Acacia catechu</i>           |
| 8.                             | Gamari      | Khamhar, Khamher     | <i>Gmelina arborea</i>          |
| 9.                             | Gular       | Dumar                | <i>Ficus glomerata</i>          |
| 10.                            | Chichwa     | Chichwa              | <i>Albizzia odoratissima</i>    |
| 11.                            | Jamun       | Jamun, Jam           | <i>Syzygium cumini</i>          |
| 12.                            | Dhaman      | Dhaman, Dhankoot     | <i>Grewia tiliaefolia</i>       |
| 13.                            | Neem        | Neem                 | <i>Azadirachta indica</i>       |
| 14.                            | Palas       | Chhawla              | <i>Butea monosperma</i>         |
| 15.                            | Pakar       | Pakar                | <i>Ficus infectoria</i>         |
| 16.                            | Pangara     | Hadua                | <i>Erythrina Suberosa</i>       |
| 17.                            | Pipal       | Pipal                | <i>Ficus religiosa</i>          |
| 18.                            | Pula        | Baranga              | <i>Kydia Calycina</i>           |
| 19.                            | Bar         | Bargad, Bar          | <i>Ficus bengalensis</i>        |
| 20.                            | Bahera      | Bahera               | <i>Terminalia belerica</i>      |
| 21.                            | Bijasal     | Bija, Murga          | <i>Pterocarpus marsupium</i>    |
| 22.                            | Bel         | Bel                  | <i>Aegle marmelos</i>           |
| 23.                            | Mahua       | Mahua                | <i>Madhuca indica</i>           |
| 24.                            | Shisum      | Kala Shisum          | <i>Daibergia latifolia</i>      |
| 25.                            | Safed Siris | Karhi                | <i>Albizzia procera</i>         |
| 26.                            | Sagaun      | Sagaun               | <i>Tectona grandis</i>          |
| 27.                            | Sal         | Sarai                | <i>Shorea robusta</i>           |
| 28.                            | Salai       | Salai, Salenh        | <i>Boswellia serrata</i>        |
| 29.                            | Semal       | Semra                | <i>Salmalia malabarica</i>      |
| 30.                            | Sonpaker    | Karhber              | <i>Ficus tomentosa</i>          |
| 31.                            | Hari        | Hari, Harar          | <i>Terminalia Chebula</i>       |
| 32.                            | Haldu       | Haldu, Kalmi         | <i>Adina Cardifolia</i>         |
| <b>SMALL TREES</b>             |             |                      |                                 |
| 33.                            | Agaltara    | Dhanbaheer, Karkacha | <i>Cassia fistula</i>           |
| 34.                            | Kachnar     | Kachnar              | <i>Bauhinia variegata</i>       |
| 35.                            | Kathjamun   | Kathjamun            | <i>Syzygium heyneacum</i>       |
| 36.                            | Keblar      | Keblar               | <i>Bauhinia purpuraca</i>       |
| 37.                            | Galgai      | Gabandi              | <i>Cochlospermum religiosum</i> |
| 38.                            | Gilchi      | Barri                | <i>Casearia elliptica</i>       |
| 39.                            | Ghont       | Ghonthar             | <i>Zizyphus xylopyra</i>        |
| 40.                            | Ber         | Ber                  | <i>Zizyphus jujuba</i>          |
| 41.                            | Bhilma      | Bhilma               | <i>Scenecarpus anacardium</i>   |
| <b>SHRUBS AND UNDER SHRUBS</b> |             |                      |                                 |
| 42.                            | Aapamarg    | Chirchita            | <i>Achyranthes aspera</i>       |
| 43.                            | Arandi      | Arandi               | <i>Ricinus Communis</i>         |
| 44.                            | Aak         | Aak                  | <i>Calotropis gigantea</i>      |
| 45.                            | Karonda     | Karonda              | <i>Carissa opaca</i>            |





|                 |            |                        |                                  |
|-----------------|------------|------------------------|----------------------------------|
|                 | hi, Keria  |                        | <i>Holarrhena antidysentrica</i> |
|                 | li kela    |                        | <i>Musa sapientum</i>            |
|                 | ru         |                        | <i>Tribulus terrestris</i>       |
|                 | masuri     |                        | <i>Antidesma ghassembilla</i>    |
|                 | heri       |                        | <i>Zizyphus nummularia</i>       |
| 51.             | Iulsi      | Iulsi                  | <i>Ocimum sanctum</i>            |
| 51.             | Thuar      | Thuar                  | <i>Euphorbia nerifolia</i>       |
| 52.             | Nirguri    | Nirguri                | <i>Vitex negundo</i>             |
| 53.             | Nil        | Birhul                 | <i>Indigofera pulchella</i>      |
| 54.             | Panar      | Chrot, Chkora          | <i>Cassia tora</i>               |
| 55.             | Baibirang  | Baibirang              | <i>Embelia robusta</i>           |
| 56.             | Besharam   | Besharam               | <i>Ipomoea pes-caparae</i>       |
| 57.             | Bhatkaya   | Bhatkatya              | <i>Solanum nigrum</i>            |
| 58.             | Mohaty     | Mohaty                 | <i>Vernonia divergens</i>        |
| 59.             | Raimuniya  | Raimuniya              | <i>Lantana camara</i>            |
| 60.             | Sitafal    | Sitafal                | <i>Anona squamosa</i>            |
| 61.             | Harsingar  | Sehrua                 | <i>Nyctanthes arbortristis</i>   |
| 62.             | Bantulsi   | Bantulsi               | <i>Daedalacanthus purpurians</i> |
| 63.             | Makor      | Makor                  | <i>Zizyphus oenobia</i>          |
| 64.             | Ratanjot   | Ratanjot               | <i>Jatropha curacas</i>          |
| 65.             | Raimuniya  | Raimuniya              | <i>Latana acovleata</i>          |
| <b>CLIMBERS</b> |            |                        |                                  |
| 66.             | Nagbel     | Dudhi                  | <i>Cryptolepis buchanani</i>     |
| 67.             | Roni       | Ael                    | <i>Acacia pennata</i>            |
| 68.             | Kiwach     | Kewach                 | <i>Mucuna prurita</i>            |
| 69.             | Mahul      | Mohlain                | <i>Bauhinia vahlii</i>           |
| 70.             | Gouj       | Gurar, Gurari, Gohrani | <i>Milletia auriculata</i>       |
| 71.             | Amarbel    | Amarbel                | <i>Cuscuta reflexa</i>           |
| <b>GRASSES</b>  |            |                        |                                  |
| 72.             | Dub        | Dub                    | <i>Cynodon dactylon</i>          |
| 73.             | Kash       | Kash                   | <i>Saccharum spontaneum</i>      |
| 74.             | Khash      | Urai                   | <i>Vetivaria zizanioides</i>     |
| 75.             | Bharbel    | Kail                   | <i>Dichanthium annulatum</i>     |
| 76.             | Munj       | Munj                   | <i>Erianthus munja</i>           |
| 77.             | Rusha      | Rusha                  | <i>Cymbopogon martini</i>        |
| 78.             | Bhurbhushi | Bhurbhushi             | <i>Eragrostis tenella</i>        |
| 79.             | Kush       | Kusha                  | <i>Desmostachya bipinnata</i>    |
| 80.             | Kusul      | Kusul, Lampa           | <i>Heteropogon contortus</i>     |
| 81.             | Bans       | Bans                   | <i>Dendrocalamus strictus</i>    |

## Annexure – II

### Different Species of Fauna in buffer zones

| Sl. No. | Scientific Name                     | Schedule | Local Name   | English Name                  |
|---------|-------------------------------------|----------|--------------|-------------------------------|
| 1       | <i>Hemiechinus auritus collaris</i> | IV (4-A) | --           | Hedgehog                      |
| 2       | <i>Suncus murinus</i>               | --       | Chhachhundar | Musk-Shrew                    |
| 3       | <i>Cynopterus sphinx</i>            | V (3)    | Chamgadar    | Short nosed fruit bat         |
| 4       | <i>Hyaena</i>                       | III (12) | Lakarbagha   | Striped hyaena                |
| 5       | <i>Herpestes edwardsi</i>           | IV (6-A) | Newla        | Common Mongoose               |
| 6       | <i>Funambulus Pennanti</i>          |          | Gilhari      | Common five Stripped Squirrel |
| 7       | <i>Bandicota bengalensis</i>        | V (6)    | Chuha        | Field rat                     |



|    |                                  |           |                     |  |
|----|----------------------------------|-----------|---------------------|--|
|    |                                  | V (6)     | Chuha               | Common house rat                           |
|    |                                  | V (6)     | Chuha               | The Indian bush rat                        |
|    |                                  | III (19)  | Suar                | Indian wild Boar                           |
|    |                                  | IV (22)   | Gai Bagla           | Cattle egret                               |
|    |                                  |           | Bara Bagla          | Large Egret                                |
| 13 | <i>Elanus caeruleus</i>          |           | Kapasi              | Blackwinged kite                           |
| 14 | <i>Milvus migrans</i>            |           | Chil                | Common pariah kite                         |
| 15 | <i>Francolinus fromcolinus</i>   | IV (51)   | Kala Titar          | Black partridge                            |
| 16 | <i>Francolinus pondicerianus</i> | IV (51)   | Safed Titar         | Gray partridge                             |
| 17 | <i>Cotuenix coturnix</i>         | IV (51)   | Bater               | Common or gray quail                       |
| 18 | <i>Francolinus pictus</i>        | IV (51)   | Kala Titar          | Painted Partridge                          |
| 19 | <i>Galloperdix spondica</i>      |           | Chhoti jangli murgi | Red spur fowl                              |
| 20 | <i>Gallus gallus</i>             |           | Jangli murgi        | Red jangle fowl                            |
| 21 | <i>Grus grus</i>                 | IV (16)   | Bagla saras         | Common crane                               |
| 22 | <i>Hydrophasianus chirurgus</i>  | V (36)    | Pihua               | Pheasant tailed Jacana                     |
| 23 | <i>Treron phoenicoptera</i>      | IV (54)   | Harial              | Common green pigeon                        |
| 24 | <i>Columba livia</i>             | IV (54)   | Kabutar             | Blue rock pigeon                           |
| 25 | <i>Psittacula krameri</i>        | IV (50)   | Tota                | Rose ringed parakeet                       |
| 26 | <i>Cuculus varius</i>            | IV (17)   | Papiha              | Cuckoo, Brain fever bira                   |
| 27 | <i>Eudynamys scolopceae</i>      |           | Koel                | Koel                                       |
| 28 | <i>Clamator jacobinus</i>        | IV (17)   | Papiha chatak       | Pied crested Cuckoo                        |
| 29 | <i>Bubo bubo</i>                 | IV (48)   | Uloo                | Owl  |
| 30 | <i>Glaucidium radiatum</i>       |           | Janglee Chogharh    | Owlet                                      |
| 31 | <i>Alcedo atthis</i>             | IV (37)   | Chotta Kilkila      | Small blue kingfisher or Common kingfisher |
| 32 | <i>Haleyan pileata</i>           | IV (37)   | Korila              | Black capped kingfisher                    |
| 33 | <i>Merops superciliosus</i>      |           | Bada patringa       | Blue cheeked bee eater                     |
| 34 | <i>Merops orientalis</i>         |           | Patringa            | Green bee eater                            |
| 35 | <i>Coracias bengalensis</i>      | IV (59)   | Nilkanth            | Indian roller Blue jay                     |
| 36 | <i>Upupa epops</i>               |           | Hudhud              | Indian Hoopoe                              |
| 37 | <i>Dinopim bengalense</i>        | IV (79)   | Kathfora            | Golden backed woodpecker                   |
| 38 | <i>Pitta brachura</i>            | IV (55-A) | Navrang             | Indian Pitta                               |
| 39 | <i>Oriolus oriolus</i>           | IV (47)   | Pilak               | Golden Oriole                              |
| 40 | <i>Dicrurus adsimilis</i>        | IV (20)   | Bhujang             | King crow; Black Drongo                    |
| 41 | <i>Dicrurus caerulescens</i>     | IV (20)   | Pahari Bhujang      | White bellied drango                       |
| 42 | <i>Dicrurus paradiseus</i>       | IV        | Bhimraj             | Large Racket tailed drango                 |
| 43 | <i>Aerodotheres tristis</i>      | IV (45)   | Maina               | Common Maina                               |
| 44 | <i>Corvus macrorhynchos</i>      |           | Junglee Koua        | Junglee crow                               |
| 45 | <i>Pericrocotus cinnamomus</i>   | IV (8)    | Bulal               | Small minivet                              |
| 46 | <i>Pycnonotus jocosus</i>        | IV (8)    | Pahari Bulbul       | Red whisked Bulbul                         |
| 47 | <i>Pycnonotus cafer</i>          | IV (8)    | Bulbul              | Red vented Bulbul                          |



## Annexure – III

### Biological Data for the Study Area

|            |      |      | Relative Humidity (%) |     | Wind Speed (km/hr) |     | Dominant Wind Direction | Rainfall (mm) |
|------------|------|------|-----------------------|-----|--------------------|-----|-------------------------|---------------|
| Month      | Max  | Min  | Max.                  | Min | Max                | Min |                         |               |
| April 2011 | 38.8 | 22.1 | 83                    | 36  | 4.7                | 0.1 | SE                      | 5.8           |
| May 2011   | 42.3 | 20.0 | 84                    | 48  | 3.9                | 0.1 | WSW                     | 4.6           |
| June 2011  | 40.3 | 22.3 | 94                    | 49  | 4.5                | 0.1 | SW                      | 139.1         |

## Annexure – IIV

### Air Quality Data of Digwadih Colliery

| Stn. Code                   | Monitoring Stations  | Statistical Parameters | Concentration (µg/m³) |                  |                 |                 |
|-----------------------------|----------------------|------------------------|-----------------------|------------------|-----------------|-----------------|
|                             |                      |                        | PM <sub>2.5</sub>     | PM <sub>10</sub> | SO <sub>2</sub> | NO <sub>x</sub> |
| Core Zone (Industrial Area) |                      |                        |                       |                  |                 |                 |
| (A <sub>1</sub> )           | Digwadih office area | Minimum                | 36.0                  | 71.2             | 21.9            | 23.9            |
|                             |                      | Maximum                | 55.5                  | 117.2            | 29.5            | 51.7            |
|                             |                      | Average                | 45.8                  | 94.8             | 27.1            | 42.9            |
|                             |                      | Std. Deviation         | 6.4                   | 13.8             | 2.0             | 8.2             |
|                             |                      | Percentile             | 55.4                  | 117.0            | 29.4            | 51.0            |
| Buffer Zone                 |                      |                        |                       |                  |                 |                 |
| (A <sub>2</sub> )           | Digwadih Colony      | Minimum                | 43.5                  | 70.2             | 19.4            | 28.6            |
|                             |                      | Maximum                | 66.2                  | 114.1            | 30.9            | 50.9            |
|                             |                      | Average                | 53.9                  | 92.2             | 25.8            | 41.6            |
|                             |                      | Std. Deviation         | 7.0                   | 13.3             | 3.1             | 7.3             |
|                             |                      | Percentile             | 64.8                  | 112.7            | 30.7            | 50.2            |
| (A <sub>3</sub> )           | Joraphokhar          | Minimum                | 40.5                  | 69.9             | 20.6            | 30.1            |
|                             |                      | Maximum                | 67.1                  | 117.7            | 35.2            | 48.3            |
|                             |                      | Average                | 53.0                  | 92.4             | 30.4            | 40.2            |
|                             |                      | Std. Deviation         | 7.6                   | 13.7             | 4.0             | 5.7             |
|                             |                      | Percentile             | 65.1                  | 114.7            | 34.5            | 48.0            |
| (A <sub>4</sub> )           | Bhaga R.S            | Minimum                | 42.3                  | 72.9             | 24.5            | 39.8            |
|                             |                      | Maximum                | 63.6                  | 109.6            | 33.8            | 50.8            |
|                             |                      | Average                | 51.3                  | 88.9             | 28.5            | 45.0            |
|                             |                      | Std. Deviation         | 6.2                   | 10.9             | 2.5             | 3.1             |
|                             |                      | Percentile             | 63.1                  | 109.2            | 33.3            | 50.3            |
| (A <sub>5</sub> )           | Dungri               | Minimum                | 29.3                  | 53.7             | 20.8            | 24.8            |
|                             |                      | Maximum                | 51.9                  | 100.1            | 30.9            | 45.9            |
|                             |                      | Average                | 40.6                  | 78.6             | 27.8            | 36.6            |
|                             |                      | Std. Deviation         | 7.2                   | 13.3             | 3.2             | 7.2             |
|                             |                      | Percentile             | 51.7                  | 99.6             | 30.8            | 45.2            |

Characteristics of effluent (mine water)

| S.N. | Parameter   | Digwadih  | Inland Surface<br>water IS:2490                                     |
|------|---|-----------|---|
| 1.   | Colour and odour  | Colorless | Of Annexure-1   |
| 2.   | Suspended solids mg/l, max.   | 39.8      | 100   |
| 3.   | pH value  | 7.7       | 5.5 to 9.0  |
| 4.   | Temperature (°C)  | 26.4      | Shall not exceed<br>5°C above the<br>receiving water<br>temperature |
| 5.   | Total Dissolved Solids mg/l   | 502       | 2100  |
| 6.   | Oil and grease, mg/l max.   | 2.87      | 10  |
| 7.   | Total residual chlorine, mg/l max.  | 0.28      | 1.0   |
| 8.   | Ammonical nitrogen (as N), mg/l<br>max.   | 6.76      | 50  |
| 9.   | Total nitrogen (as N), mg/l max.  | 8.56      | 100   |
| 10.  | Free ammonia (as NH <sub>3</sub> ), mg/l max.   | 4.23      | 5.0   |
| 11.  | Biochemical oxygen demand, BOD<br>(3 days at 27°C), mg/l max.                                     | 5.67      | 30  |
| 12.  | Chemical oxygen demand, mg/l<br>max.  | 67.8      | 250   |
| 13.  | Arsenic (as As), mg/l max.  | 0.012     | 0.2   |
| 14.  | Mercury (as Hg), mg/l max.  | 0.008     | 0.01  |
| 15.  | Lead (as Pb), mg/l max.   | 0.034     | 0.1   |
| 16.  | Cadmium (as Cd), mg/l max.  | 0.012     | 2.0   |
| 17.  | Hexavalent chromium (as Cr <sup>+6</sup> ),<br>mg/l max.  | 0.037     | 0.1   |
| 18.  | Total Chromium (as Cr), mg/l max.   | 0.065     | 2.0   |
| 19.  | Copper (as Cu), mg/l max.   | 0.032     | 3.0   |
| 20.  | Zinc (as Zn), mg/l max.   | 0.098     | 5.0   |
| 21.  | Selenium (as Se), mg/l max.   | 0.009     | 0.05  |
| 22.  | Nickel (as Ni), mg/l max.   | 0.025     | 3.0   |
| 23.  | Cyanide (as CN), mg/l max.  | 0.009     | 0.2   |
| 24.  | Fluoride (as F), mg/l max.  | 1.67      | 2.0   |
| 25.  | Dissolved phosphates (as P), mg/l<br>max.   | 0.67      | 5.0   |
| 26.  | Sulphide (as S), mg/l max.  | 0.95      | 2.0   |
| 27.  | Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH),<br>mg/l max.                            | 0.072     | 1.0   |
| 28.  | Radioactive materials<br>a. emitters micro cure, mg/l max.<br>b. β emitters micro cure, mg/l max. | ND        | 10 <sup>-7</sup><br>10 <sup>-6</sup>                                |
| 29.  | Manganese (as Mn)   | 0.097     | 2 mg/l  |
| 30.  | Iron (as Fe)  | 0.314     | 3 mg/l  |
| 31.  | Vanadium (as V)   | 0.116     | 0.2 mg/l  |
| 32.  | Nitrate Nitrogen  | 93.05     | 10 mg/l   |

ND=Not Detected, BDL: Below detection limit

## ANNEXURE – VI

### Noise Level of the Study Area

| Stn. Code                  | Monitoring Station        | Instantaneous SPL, dB (A) (max | Average Leq in dB(A) |       |
|----------------------------|---------------------------|--------------------------------|----------------------|-------|
|                            |                           |                                | Day                  | Night |
| Residential Area           |                           |                                |                      |       |
| N1                         | Digwadih Colony           | 52.0                           | 40.00                | 35.00 |
| N2                         | Supervisor's Flat         | 53.0                           | 38.20                | 33.00 |
| T. L. V. of Noise in dB(A) |                           |                                | 55.00                | 45    |
| Sensitive Area             |                           |                                |                      |       |
| N3                         | Central Hospital          | 42.0                           | 37.10                | 30.00 |
| N4                         | D.A.V. School             | 43.0                           | 38.00                | 25.00 |
| N5                         | Digwadih Club             | 41.0                           | 37.00                | 24.00 |
| T. L. V. of Noise in dB(A) |                           |                                | 50.00                | 40.00 |
| Commercial Area            |                           |                                |                      |       |
| N6                         | Security Gate             | 52.00                          | 60.00                | 54.00 |
| N7                         | Agent Office complex      | 51.60                          | 65.00                | 55.00 |
| N8                         | Jamadoba colliery Canteen | 46.00                          | 69.00                | 56.00 |
| N9                         | Near W.T.P. Gate          | 51.23                          | 70.00                | 65.00 |
| T. L. V. of Noise in dB(A) |                           |                                | 75.00                | 70.00 |

## ANNEXURE – VII

### STATUS OF THE WORKERS

| Activities  |                                      | Status                                       |
|---|--------------------------------------|--|
| Total no. of persons to be covered for Medical Examination.   |                                      | 6000   |
| Total no. of persons covered with % compliance.   |                                      | 98.90%                                       |
| Status of Abnormalities - 4 Parameters (Diabetes, Hypertension, High Cholesterol, Obesity/Overweight)   | No of diabetecs (High risk)          | 115  |
|   | No of High B P Cases (High risk)     | 1523   |
|   | No of HighCholesterol (High risk)    | 112  |
|   | No of Obesity cases                  | 231  |
|   | No of Overweight cases               | 654  |
| % of abnormal cases covered under Wellness@Workplace program (Individual counseling / group counseling / treatment / follow up / yoga, pranayam, physical activity) | Individual counselling               | 12%  |
|   | Group counselling                    | 45%  |
|   | Follow up                            | 10%  |
| Base line Health Index  |                                      | 12.9   |
| Improvement in Health Index   |                                      | 13.01  |
| Status of distribution of Health Card   |                                      | 100%   |
| No. of awareness classes  |                                      | 12   |
| Other activities  | 1. Ergonomics                        | 12 Sessions                                  |
|   | 2. Stress Management                 | 4 Sessions                                   |
|   | 3. Physical Exercise                 | 4 Sessions                                   |
|   | 4. Hb% Estimation                    | 100%   |
|   | 5. Display of Health Related Posters | In all Canteens, Departments and Collieries. |