ENVIRONMENTAL STATEMENT
IN
FORM-V

(Under Rule-14, Environmental (Protection) Rules, 1986)

(2018 – 2019)

FOR
CHITRA (EAST) OCP
(OPENCAST PROJECT**)**
S. P. Mines Area
Eastern Coalfields Limited

Prepared at

Regional Institute – I

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CMPDI

ISO 9001:2015 Company

ENVIRONMENTAL STATEMENT FOR CHITRA (EAST) OPENCAST PROJECT

FOR THE YEAR: 2018-2019

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CHAPTER – I
INTRODUCTION

1.1 GENESIS:

The Gazette Notification vide G.S.R No. 329 (E) dated 13th March, 1992 and subsequently renamed to 'Environmental Statement' vide Ministry of Environment & Forests (MOEF), Govt. of India gazette notification No. G.S.R No. 386 (E) dated 22nd April'93 reads as follows:

"Every person carrying on an industry, operation or process requiring consent under section 25 of the Water Act, 1974 or under section 21 of the Air Act, 1981 or both or authorisation under the Hazardous Waste Rules, 1989 issued under the Environmental Protection Act, 1986 shall submit an Environmental Audit Report for the year ending 31st March in Form V to the concerned State Pollution Control Board on or before the 30th day of September every year."

In compliance with the above, the work of preparation of Environmental Statement (Form – V) for Chitra (East) Opencast Project was entrusted to CMPDI by GM (Environment & Forest), Eastern Coalfields Limited.

1.2 PROJECT DESCRIPTION :

A number of coal seams of Karharbari and Barakar formations occur in the form of a basin in Saharjuri coalfield. A large number of small quarries and underground workings, mostly worked by erstwhile owners exist over the entire coalfield. After nationalization of these collieries in 1975, ECL formed the reorganized Chitra colliery by combining all these taken over mines. Two quarries namely, Chitra A & Chitra B quarries were working in the eastern part of Chitra block. The present project, renamed as Chitra (East) OCP envisage amalgamation of the existing mine workings and thereby augmenting the production level from 1.20 MTY to 2.50 MTY. The total mineable reserve of the proposed OCP is 60.40 MT in three different quarries with an average stripping ratio of 3.0 m^3/te. The life of the project is 26 years. The environmental clearance for Chitra (East) OCP (2.50 MTY) has been obtained vide letter no. - J11015/652/2007-IA.II(M) dated 04th March 2010 from MoEF&CC, New Delhi for an ML area of 780.80 Ha.

The Project is situated at a distance of about 80 km. from Asansol. The Opencast project is within the leasehold area of SP Mines of ECL. The nearest Railway Station Jamtara of Eastern Railway is 26 km. away from the project. The Project is under the administrative control of GM, SP Mines Area.

The location map of Chitra East Opencast Project is given as Plate – I.

In year 2018-19, total coal production from the mine was 2.03 MT and overburden produced was 5.85 Mm^3. Present manpower of the project as on 31st March, 2019 was 1064. Total no. of working days was 365.

1.2.2 **SALIENT FEATURES AS PER EMP :**

1	Rated capacity per annum	2.50 MT
2	Total Block Area	780.80 Ha
3	Forest land required	155.60 Ha
4	Mineable reserve	60.40 MT
5	Life of mine	26 Years

1.3 **ENVIRONMENTAL SCENARIO:**

After the grant of EC, routine environment monitoring is being carried out quarterly as per the guidelines of Ministry of Environment and Forests (MoEF) by CMPDI, RI-I. Accordingly, ambient air quality monitoring and noise level measurement stations has been fixed at four stations. However, from the first fortnight of September'16 onwards, monitoring schedule has changed from quarterly to fortnightly basis at the designated four stations. Since the first fortnight of March'19, two more ambient air quality and noise level measurement stations have been added in the project. The details of the sampling stations are given below:

Area	Project	Station code	Monitoring Station	Industrial Category
SP Mines	Chitra (East) OCP	13A1	Attendance Room Near Store	Industrial
SP Mines	Chitra (East) OCP	13A2	Weigh Bridge Near Sales Office	Industrial
SP Mines	Chitra (East) OCP	13A3	Chitra Guest House	Residential
SP Mines	Chitra (East) OCP	13A4	Jamtara Railway Siding	Industrial
SP Mines	Chitra (East) OCP	13A5	Weigh Bridge Near Jamtara Railway Siding	Industrial
SP Mines	Chitra (East) OCP	13A6	Railway substation Near Jamtara Railway Siding	Industrial

Water quality is being monitored according to effluent discharge at one location from Chitra A OCP. 5 parameters namely, pH, TSS, TDS, O&G and COD is being monitored at every fortnight and 29 parameters is being monitored twice in a year during September & March and compared with MoEF Schedule VI (General Standards for Discharge of Effluents). Noise levels were recorded at four locations (13A1, 13A2, 13A3 and 13A4) earmarked for ambient air sampling as shown in the above table. Groundwater level were recorded once every quarter at five dugwells located in and around core and buffer zone. Groundwater quality is being analysed during May every year at these five earmarked locations. Drinking water quality is analysed at one location once every quarter.

Location of these dugwells are given below:

Project	Station code	Name of the Station
Chitra(East) OCP	13GWL1	Dugwell at Dukhiababa mandir of Chitra Village
Chitra(East) OCP	13GWL2	Dugwell of west side Barmaria Village
Chitra(East) OCP	13GWL3	Dugwell of Jamnitand Village near Transformer
Chitra(East) OCP	13GWL4	Dugwell of Patrika Village
Chitra(East) OCP	13GWL5	Dugwell of Murgabari near J.p. Mahato's House
Chitra(East) OCP	13DW1	Outlet from water treatment plant.

The Environmental monitoring result for the year ending March'19 is appended as Annexure- I, II, III and IV. The environmental monitoring result for the year 2018-19 can be concluded as given below:

AMBIENT AIR QUALITY

The PM_{10} concentration levels were found in the range of 80.4 to 179.8 µg/m^3 and was well within the standards. The $PM_{2.5}$ concentration levels were found in the range of 29.8 to 56.7 µg/m^3 and was within the limits as per NAAQS, 2009. The SO_2 concentration remained <10.0 µg/m^3 and NO_X concentration levels were in the range of 12.8 to 24.6 µg/m^3 and were well within the standards.

ENVIRONMENTAL STANDARDS:

Environmental Standards for Ambient air quality (AAQ):

Station Category	*Environmental standard for Raniganj Coalfield vide MOEF, Govt. of India, Gazette Notification No. GSR 742 (E) dated 25.09.2000 for 24 hourly samples at 500 meters from dust generating point*			*National Ambient Air Quality Standards (NAAQS), 2009 for industrial, residential and rural areas for 24 hours samples*
	Pollutant Concentration (µg/m^3)			
	PM_{10}	**SO_2**	**NO_x**	**$PM_{2.5}$**
Industrial	300.0	120.0	120.0	60.0
Residential	100.00	80.0	80.0	

WATER QUALITY

Ground water percolates into working area from the surrounding aquifers which have been exposed due to opencast mining. The mine is dewatered regularly to maintain dry working conditions. This mine discharge water is partly utilized for dust suppression by sprinkling at coal faces and on haul roads and the remainder is discharged onto adjoining cultivable lands for irrigation purposes. Part-B of the Environmental Statement proforma contains the detailed break-up of water consumption.

The analysis results reveal that most of the parameters are below permissible limits prescribed by Ministry of Environment & Forests (MOEF) as General Standards for Class-'A' effluent (Effluent discharged into inland surface water) and IS-10500:2012 standards for drinking water & groundwater.

Mine water, ground water and Drinking water analysis results are given in Annexure-III.

Well water level results are given in Annexure – IV.

NOISE LEVEL

The monitoring schedule for day time noise level measurement has been changed from fortnight to quarter since August'18 at all monitoring stations. Day time noise level was found in the range of 50.4 to 70.9 dB

(A). The noise level recorded is below permissible limit prescribed by Ministry of Environment and Forest & Climate Change (MoEF&CC).

Noise Pollution (Regulation and Control) Rules, 2000 defines the limit of noise during day and night time as given below:

Station Category	**Limits for noise (Leq dB (A))**	
	Day Time (6am-10pm)	Night Time (10pm-6am)
Industrial	75.0	70.0
Commercial	65.0	55.0
Residential	55.0	45.0
Silence Zone	50.0	40.0

CHAPTER - II
ENVIRONMENTAL STATEMENT FORM – V

Environmental statement for the financial year ending March, 2019

PART – A

SL. NO.	HEADING	PARTICULARS
(I)	**NAME AND ADDRESS OF THE PROJECT**	Chitra (East) OCP, Agent, S.P. Mines Area, Chitra, Deogarh, Jharkhand
(II)	**INDUSTRY CATEGORY**	Red
(III)	**PRODUCTION CAPACITY**	2.50 MTY
	PRODUCTION DURING 2016 – 17	2.03 MTY
(IV)	**YEAR OF ESTABLISHMENT**	1975
(V)	**DATE OF THE LAST ENVIRONMENTAL STATEMENT SUBMITTED**	30th September, 2018

PART – B
WATER AND RAW MATERIAL CONSUMPTION
(I) WATER CONSUMPTION (Cu.m/day)

Mine water

a. Total quantity of mine pumping during 2018 – 19 : 4300 m^3/day
b. Quantity of mine water utilized along with purpose : 4300* m^3/day
   *(water is supplied to local village pond, agricultural use, domestic use and industrial use)
c. Quantity of mine water discharged outside : Nil

Sl. No.	Particulars	2017-18	2018-19
	A. MINING (Dust suppression, Firefighting and Others)	377	377
	B. COOLING (in radiators of trucks/HEMM & workshop)	100	100
	C. DOMESTIC		
i	Colony (Mine water)	700	700
	TOTAL	**1177.0**	**1177.0**

Name of Product	Process water consumption per unit of product output (l/day/te)	
	2017-18	**2018-19**
Coal	0.30	0.24

(II) RAW MATERIAL CONSUMPTION:

Name of raw material	Name of products	Consumption of raw material (per unit of output)	
		During current financial year (2017-2018)	During current financial year (2018-2019)
1. Explosive	Coal	0.42 kg/te	0.98 kg/te
2. Diesel		2.04 l/te	0.95 l/te
3. Lubricants		0.135 l/te	0.12 l/te

PART – C
POLLUTION GENERATED

Pollution	Quantity of pollutants discharged (mass/day)	Concentrations of pollutants discharged (mass/volume)	Percentage variation from prescribed standards with reasons
WATER	-	1. Mine water discharge Analysis results are given in Annexure-III. 2. The main air pollutant is suspended PM_{10} and $PM_{2.5}$. The air quality results are appended as Annexure-I.	1. The analysis results reveal that most of the parameters are below permissible limits prescribed by MOEF as General Standards for class 'A' effluent (Effluent discharged into inland surface water). 2. Ambient air quality results show that the values of $PM_{2.5}$, SO_2 and NO_x are within the prescribed standards as per NAAQS, 2009.
AIR*	Total pollutant load of PM_{10} is 4536.10 kg/day while it is 952.58 kg/day for $PM_{2.5}$.		

*PM_{10} and $PM_{2.5}$ estimation has been done using empirical formula which includes Emission Factors derived from S&T studies done by CMPDI.

PART – D
HAZARDOUS WASTE
(As specified under Hazardous waste management and handling Rules, 1989)

Hazardous waste	Total quantity		Disposal Method
	During current financial year (2017-2018)	During current financial year (2018-2019)	
A. From process Used oil	16510 litres	10920 litres	Dealt in Part – F
B. Lead-Acid Batteries			
i. Automobile Batteries	48 nos.	48 nos.	
ii. Cap-lamp batteries	Nil	Nil	
C. Used Cotton waste	2700 kg	2000 kg	
D. Metal Scrap	168 MT	Nil	

PART – E
SOLID WASTE

Particulars	Total quantity (In Million Cu.m)	
	During current financial year (2017-2018)	During current financial year (2018-2019)
a) From process (Mining)	4.68	5.95
b) From pollution control facilities	-	-
c) Quantity recycled or reutilized (back filled)	4.68	5.86

PART – F

PLEASE SPECIFY THE CHARACTERISTICS (IN TERMS OF CONCENTRATION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTE AND INDICATE THE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTE.

Hazardous waste generated is given in the table PART-D which has been deposited at area store disposal stock yard.

Used oil is kept in suitable container and is sent to others for further use as lubricants in other mines.

Batteries after use are sent to the manufacturer. Cotton waste is being dumped along with OB during backfilling.

HEMM / Automobile batteries are exchanged for new batteries under buyback scheme.

Metal scraps are declared and report is sent to HQ. The scraps are then auctioned and sold through HQ.

PART – G

IMPACT OF POLLUTION CONTROL MEASURES ON CONSERVATION OF NATURAL RESOURCES AND CONSEQUENTLY ON COST OF PRODUCTION

In order to carry out mining in an eco-friendly manner, following pollution control measures have been implemented:

1.0 AIR POLLUTION CONTROL MEASURES:

The following measures have been taken to control air pollution.

i) Drills used in overburden removal and coal production have been fitted with dust control devices.

ii) Water sprinkling is being done regularly on haul roads, colony roads, railway siding and nearby villages during mining operations.

iii) Coal is being transported by trucks covered with tarpaulin.

iv) Regular water sprinkling with the help of tankers is being done within the mine and plantation have been done at railway siding and other areas within mine lease.

v) Fixed sprinklers have been installed at coal crusher plant for dust suppression.

2.0 WATER POLLUTION CONTROL MEASURES:

The following measures have been taken to control water pollution from the mine:

i) Most of the parameters of mine water conform to General Standard of MoEF for Class- A effluent as mentioned earlier.
ii) The septic tanks & soak pits are provided in residential quarters of mine colony. Proposal for STP in Colony has been initiated from Area to HQ.
iii) There is a treatment plant for treatment of mine water. Mainly settling, filtration & chlorination process is used to treat the water. Filtered water is being supplied to local residents.
iv) A settling tank has been provided to facilitate the settling of the inorganic particles present in the mine water discharge.
v) Regular monitoring of mine water and ground water quality is being done.
vi) Proposal for ETP in Central Excavation Workshop has been initiated from Area to HQ.

3.0 NOISE & VIBRATION CONTROL MEASURES:

i) Regular maintenance of machines and other equipment.
ii) Afforestation on OB dump, colony, road side and around mine area.
iii) Controlled blasting is practiced for winning of coal at OCP.
iv) HEMM & dumpers are fitted with silencers to reduce noise level.

4.0 LAND RESOURCE MANAGEMENT:

i) Quarried area have been backfilled and technically reclaimed with OB dump during 2018-19 accommodating 5.85 Mm^3 of OB.

PART – H

ADDITIONAL INVESTMENT PROPOSAL FOR ENVIRONMENAL PROTECTION INCLUDING ABATEMENT OF POLLUTION

The following are the additional investment proposals for environmental protection:

a) Proposed plantation to be carried out in next five years (Total no. of saplings, Area to be planted, estimated cost)

Year of plantation	Area to be planted (Ha)	Species selected
2019-20	1.0	Local species having 65-70% survival rate
2020-21	1.0	Local species having 65-70% survival rate
2021-22	1.0	Local species having 65-70% survival rate
2022-23	1.0	Local species having 65-70% survival rate
2023-24	1.0	Local species having 65-70% survival rate

b) The Environmental monitoring of the project will be continued fortnightly as per the guidelines of Ministry of Environment and Forest & Climate Change (MoEF&CC).
c) Necessary Consent for discharge taken from Competent Authority.

d) Rain water harvesting pond has been constructed at Jamtara Railway Siding.
e) Different activities are being carried out under CSR like construction of cycle shed, cultural stage and toilet, free medicine distribution camp, etc.

PART – I

ANY OTHER PARTICULARS IN RESPECT OF ENVIRONMENTAL PROTECTION AND ABATEMENT OF POLLUTION

i) The Environmental Monitoring is carried out fortnightly for the colliery by CMPDI, RI-I as per the guideline of Ministry of Environment and Forest & Climate Change (MoEF&CC) and based on the result thereof, colliery take necessary action if needed.
ii) 0.54 Ha has been covered under plantation within mine lease of Chitra Colliery and future plantation work will be carried out as per the proposed plan.
iii) Various activities have been carried out under CSR such as Swachh Bharat Cleaning at Swachhta and cleanliness service for Deoghar, drive to spread awareness regarding cleanliness and sanitation in the surrounding, medical camps and mobile ambulance services etc. with total expenditure of ₹ 62.35 Lakhs in FY 2018-19.
iv) Plastic Waste Cleaning Drive under "Beat Plastic Pollution" theme on occasion of World Environment Day, 2018 in Jamtara and Deoghar Towns to create awareness among local people.
v) Annual Mine Closure Fund is being deposited in the Escrow Account as per the approved Mine Closure Plan.

Annexure-I

Air Quality Monitoring Report

Station No	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
13A1	Attendance Room Near Store	April	First	10-Apr-18	98.6	43.8	<10.0	17.2
13A1	Attendance Room Near Store	April	Second	27-Apr-18	98.4	43.6	<10.0	17
13A1	Attendance Room Near Store	May	First	15-May-18	99.3	45.2	<10.0	17.6
13A1	Attendance Room Near Store	May	Second	31-May-18	99.5	45.8	<10.0	17.8
13A1	Attendance Room Near Store	June	First	06-Jun-18	97.4	44.3	<10.0	17
13A1	Attendance Room Near Store	June	Second	21-Jun-18	96.3	43.2	<10.0	16.8
13A1	Attendance Room Near Store	July	First	09-Jul-18	94.2	41.3	<10.0	16.3
13A1	Attendance Room Near Store	July	Second	30-Jul-18	93.2	40.6	<10.0	16
13A1	Attendance Room Near Store	August	First	14-Aug-18	90.5	41.3	<10.0	16.3
13A1	Attendance Room Near Store	August	Second	27-Aug-18	90.3	34.2	<10.0	13.9
13A1	Attendance Room Near Store	September	First	12-Sep-18	91.2	33.7	<10.0	13.4
13A1	Attendance Room Near Store	September	Second	24-Sep-18	91.4	33.6	<10.0	13.2
13A1	Attendance Room Near Store	October	First	06-Oct-18	93.5	35.1	<10.0	15.4
13A1	Attendance Room Near Store	October	Second	24-Oct-18	94.1	35.4	<10.0	15.6
13A1	Attendance Room Near Store	November	First	08-Nov-18	94.2	35.5	<10.0	15.5
13A1	Attendance Room Near Store	November	Second	24-Nov-18	94.6	35.7	<10.0	15.7
13A1	Attendance Room Near Store	December	First	10-Dec-18	95.2	35.7	<10.0	16.6
13A1	Attendance Room Near Store	December	Second	22-Dec-18	95.4	36.2	<10.0	16.9
13A1	Attendance Room Near Store	January	First	10-Jan-19	95.8	41.8	<10.0	19.4
13A1	Attendance Room Near Store	January	Second	16-Jan-19	95.9	42.7	<10.0	19.7
13A1	Attendance Room Near Store	February	First	07-Feb-19	96.3	42.8	<10.0	21.6
13A1	Attendance Room Near Store	February	Second	22-Feb-19	96.2	42.1	<10.0	20.8
13A1	Attendance Room Near Store	March	First	5-Mar-19	98.4	55.9	<10.0	23.8
13A1	Attendance Room Near Store	March	Second	29-Mar-19	102.5	54.3	<10.0	22.8
13A2	Weigh Bridge Near Sales Office	April	First	10-Apr-18	99.1	43.6	<10.0	17.4
13A2	Weigh Bridge Near Sales Office	April	Second	27-Apr-18	99.3	43.8	<10.0	17.2
13A2	Weigh Bridge Near Sales Office	May	First	15-May-18	99.5	45.4	<10.0	17.9
13A2	Weigh Bridge Near Sales Office	May	Second	31-May-18	99.8	46.2	<10.0	18.1
13A2	Weigh Bridge Near Sales Office	June	First	06-Jun-18	97.7	44.5	<10.0	17.3
13A2	Weigh Bridge Near Sales Office	June	Second	21-Jun-18	96.6	43.4	<10.0	16.5
13A2	Weigh Bridge Near Sales Office	July	First	09-Jul-18	94.4	41.6	<10.0	14.4
13A2	Weigh Bridge Near Sales Office	July	Second	30-Jul-18	94.1	40.9	<10.0	16.1
13A2	Weigh Bridge Near Sales Office	August	First	14-Aug-18	91.2	41.6	<10.0	14.4
13A2	Weigh Bridge Near Sales Office	August	Second	27-Aug-18	90.8	34.4	<10.0	14
13A2	Weigh Bridge Near Sales Office	September	First	12-Sep-18	91.6	33.8	<10.0	13.8
13A2	Weigh Bridge Near Sales Office	September	Second	24-Sep-18	91.5	33.7	<10.0	13.4
13A2	Weigh Bridge Near Sales Office	October	First	06-Oct-18	93.8	35.5	<10.0	15.6
13A2	Weigh Bridge Near Sales Office	October	Second	24-Oct-18	94.5	35.2	<10.0	15.2
13A2	Weigh Bridge Near Sales Office	November	First	08-Nov-18	94.9	36.2	<10.0	15.8
13A2	Weigh Bridge Near Sales Office	November	Second	24-Nov-18	94.8	36.1	<10.0	15.6
13A2	Weigh Bridge Near Sales Office	December	First	10-Dec-18	95.5	36.4	<10.0	16.1
13A2	Weigh Bridge Near Sales Office	December	Second	22-Dec-18	95.6	36.6	<10.0	17.3
13A2	Weigh Bridge Near Sales Office	January	First	10-Jan-19	96.1	42.6	<10.0	18.7
13A2	Weigh Bridge Near Sales Office	January	Second	16-Jan-19	96.3	41.6	<10.0	18.6
13A2	Weigh Bridge Near Sales Office	February	First	07-Feb-19	96.6	41.6	<10.0	22.4
13A2	Weigh Bridge Near Sales Office	February	Second	22-Feb-19	96.4	42.6	<10.0	22.7
13A2	Weigh Bridge Near Sales Office	March	First	5-Mar-19	99.2	56.2	<10.0	24.6
13A2	Weigh Bridge Near Sales Office	March	Second	29-Mar-19	103.8	53.8	<10.0	21.3
13A3	Chitra Guest House	April	First	10-Apr-18	85.8	36.2	<10.0	15.2
13A3	Chitra Guest House	April	Second	27-Apr-18	86.4	36.7	<10.0	15.4
13A3	Chitra Guest House	May	First	15-May-18	88.2	36.9	<10.0	15.4
13A3	Chitra Guest House	May	Second	31-May-18	88.4	37.3	<10.0	16
13A3	Chitra Guest House	June	First	06-Jun-18	86.5	35.8	<10.0	15
13A3	Chitra Guest House	June	Second	21-Jun-18	85.8	35.2	<10.0	14.8
13A3	Chitra Guest House	July	First	09-Jul-18	83.2	33.2	<10.0	14.6
13A3	Chitra Guest House	July	Second	30-Jul-18	82.5	32.8	<10.0	14.3

Station No	Station Name	Month	Fortnight	Date of Sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_X
13A3	Chitra Guest House	August	First	14-Aug-18	81.8	33.2	<10.0	14.6
13A3	Chitra Guest House	August	Second	27-Aug-18	81.6	30.1	<10.0	13.1
13A3	Chitra Guest House	September	First	12-Sep-18	80.7	30	<10.0	13
13A3	Chitra Guest House	September	Second	24-Sep-18	80.4	29.8	<10.0	12.8
13A3	Chitra Guest House	October	First	06-Oct-18	84.5	30.6	<10.0	13.1
13A3	Chitra Guest House	October	Second	24-Oct-18	84.7	30.4	<10.0	13.1
13A3	Chitra Guest House	November	First	08-Nov-18	87.3	31.2	<10.0	13.7
13A3	Chitra Guest House	November	Second	24-Nov-18	87.5	31.6	<10.0	13.8
13A3	Chitra Guest House	December	First	10-Dec-18	88.3	32.1	<10.0	14.5
13A3	Chitra Guest House	December	Second	22-Dec-18	88.5	33.3	<10.0	15.7
13A3	Chitra Guest House	January	First	10-Jan-19	89.3	39.7	<10.0	17.6
13A3	Chitra Guest House	January	Second	16-Jan-19	89.5	39.4	<10.0	17.5
13A3	Chitra Guest House	February	First	07-Feb-19	89.7	38.4	<10.0	19.8
13A3	Chitra Guest House	February	Second	22-Feb-19	89.8	40.8	<10.0	19.8
13A3	Chitra Guest House	March	First	5-Mar-19	90.3	42.3	<10.0	19.7
13A3	Chitra Guest House	March	Second	30-Mar-19	91.5	43.7	<10.0	20.6
13A4	Jamtara Railway Siding	April	First	10-Apr-18	103.8	46.2	<10.0	17.4
13A4	Jamtara Railway Siding	April	Second	27-Apr-18	104.5	46.5	<10.0	17.5
13A4	Jamtara Railway Siding	May	First	15-May-18	105.6	49.6	<10.0	18.2
13A4	Jamtara Railway Siding	May	Second	31-May-18	106.5	50.1	<10.0	18.3
13A4	Jamtara Railway Siding	June	First	06-Jun-18	102.3	46.6	<10.0	17.5
13A4	Jamtara Railway Siding	June	Second	21-Jun-18	98.5	44.3	<10.0	16.8
13A4	Jamtara Railway Siding	July	First	09-Jul-18	96.2	42.8	<10.0	16.8
13A4	Jamtara Railway Siding	July	Second	30-Jul-18	95.1	41.6	<10.0	16.2
13A4	Jamtara Railway Siding	August	First	14-Aug-18	91.9	42.8	<10.0	16.8
13A4	Jamtara Railway Siding	August	Second	27-Aug-18	90.9	34.8	<10.0	14
13A4	Jamtara Railway Siding	September	First	12-Sep-18	91.8	34.2	<10.0	13.7
13A4	Jamtara Railway Siding	September	Second	24-Sep-18	91.6	33.8	<10.0	13.5
13A4	Jamtara Railway Siding	October	First	06-Oct-18	94.6	35.8	<10.0	15.8
13A4	Jamtara Railway Siding	October	Second	24-Oct-18	95.3	36.1	<10.0	15.6
13A4	Jamtara Railway Siding	November	First	08-Nov-18	95.1	36.4	<10.0	16.1
13A4	Jamtara Railway Siding	November	Second	24-Nov-18	95.7	36.2	<10.0	16
13A4	Jamtara Railway Siding	December	First	10-Dec-18	96.4	36.8	<10.0	16.5
13A4	Jamtara Railway Siding	December	Second	22-Dec-18	96.8	36.9	<10.0	18.6
13A4	Jamtara Railway Siding	January	First	10-Jan-19	97.2	37.4	<10.0	18.4
13A4	Jamtara Railway Siding	January	Second	16-Jan-19	87.3	41.8	<10.0	19.3
13A4	Jamtara Railway Siding	February	First	07-Feb-19	97.5	41.8	<10.0	20.4
13A4	Jamtara Railway Siding	February	Second	22-Feb-19	97.4	39.4	<10.0	17.8
13A4	Jamtara Railway Siding	March	First	1-Mar-19	131.4	56	<10.0	22.8
13A4	Jamtara Railway Siding	March	Second	29-Mar-19	128.9	56.7	<10.0	24
13A5	Weigh Bridge Near Jamtara Railway Siding	March	First	1-Mar-19	158	53	<10.0	21.7
13A5	Weigh Bridge Near Jamtara Railway Siding	March	Second	30-Mar-19	138.6	52.4	<10.0	22
13A6	Railway Substation Near Jamtara Railway Siding	March	First	1-Mar-19	174	52.8	<10.0	20.4
13A6	Railway substation Near Jamtara Railway Siding	March	Second	30-Mar-19	179.8	54.8	<10.0	21.5

Analysis of Heavy Metals in Air

Station No	Station Name	Month	Fortnight	Date of Sampling	Arsenic (ng/m^3)	Cadmium (µg/m^3)	Chromium (µg/m^3)	Mercury (µg/m^3)	Nickel (ng/m^3)	Lead (µg/m^3)
13A1	Attendence Room Near Store	Sept	First	12-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A1	Attendence Room Near Store	Sept	Second	24-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A1	Attendance Room Near Store	March	First	5-Mar-19	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A2	Weigh Bridge Near Sales Office	Sept	First	12-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A2	Weigh Bridge Near Sales Office	Sept	Second	24-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A2	Weigh Bridge Near Sales Office	March	First	1-Mar-19	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A3	Chitra Guest House	Sept	First	12-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A3	Chitra Guest House	Sept	Second	24-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A3	Chitra Guest House	March	First	5-Mar-19	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A4	Jamtara Railway Siding	Sept	First	12-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A4	Jamtara Railway Siding	Sept	Second	24-Sep-18	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A4	Jamtara Railway Siding	March	First	5-Mar-19	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A5	Weigh Bridge Near Jamtara Railway Siding	March	First	1-Mar-19	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005
13A6	Railway substation Near Jamtara Railway Siding	March	First	1-Mar-19	<1.0	<0.001	<0.01	<0.001	<0.10	<0.005

Environmental standards:

National Ambient Air Quality Standards (NAAQS), 2009 for residential, industrial and rural areas for 24 hourly/yearly samples:

Heavy Metal	Arsenic (As) (ng/m^3)	Cadmium (Cd) (µg/m^3)	Chromium (Cr) (µg/m^3)	Mercury (Hg) (µg/m^3)	Nickel (Ni) (ng/m^3)	Lead (Pb) (µg/m^3)
Concentration	6	Not specified	Not specified	Not specified	20	0.5

Annexure-II

NOISE LEVEL

Project	Station No	Station Name	Month	Fortnight	Date of Sampling	Noise Level dB(A)
Chitra(East) OCP	13N1	Attendance Room Near Store	April	First	10-Apr-18	62.4
	13N1	Attendance Room Near Store	April	Second	27-Apr-18	62.9
	13N1	Attendance Room Near Store	August	First	14-Aug-18	63.4
	13N1	Attendance Room Near Store	November	First	08-Nov-18	65.1
	13N1	Attendance Room Near Store	February	First	07-Feb-19	67.8
	13N2	Weigh Bridge Near Sales Office	April	First	10-Apr-18	60.9
	13N2	Weigh Bridge Near Sales Office	April	Second	27-Apr-18	60.2
	13N2	Weigh Bridge Near Sales Office	August	First	14-Aug-18	61.6
	13N2	Weigh Bridge Near Sales Office	November	First	08-Nov-18	62.8
	13N2	Weigh Bridge Near Sales Office	February	First	07-Feb-19	68.9
	13N3	Chitra Guest House	April	First	10-Apr-18	51.2
	13N3	Chitra Guest House	April	Second	27-Apr-18	50.4
	13N3	Chitra Guest House	August	First	14-Aug-18	60.8
	13N3	Chitra Guest House	November	First	08-Nov-18	63.8
	13N3	Chitra Guest House	February	First	07-Feb-19	63.4
	13N4	Jamtara Railway Siding	April	First	10-Apr-18	59.7
	13N4	Jamtara Railway Siding	April	Second	27-Apr-18	59.3
	13N4	Jamtara Railway Siding	August	First	14-Aug-18	58.7
	13N4	Jamtara Railway Siding	November	First	08-Nov-18	60.4
	13N4	Jamtara Railway Siding	February	First	07-Feb-19	70.9

Annexure-III

EFFLUENT WATER QUALITY (5 PARAMETERS)

Station No	Station Name	Month	Fortnight	Date of Sampling	pH	TSS	TDS	O&G	COD
13MW1	Mine discharge water from Chitra OC	April	First	10-Apr-18	8.18	18	302	<2.0	24
		April	Second	27-Apr-18	8.63	10	314	<2.0	28
		May	First	15-May-18	8.46	24	306	<2.0	36
		May	Second	31-May-18	8.32	22	326	<2.0	40
		June	First	06-Jun-18	8.35	26	818	<2.0	32
		June	Second	21-Jun-18	8.32	14	780	<2.0	16
		July	First	09-Jul-18	8.30	18	750	<2.0	24
		July	Second	30-Jul-18	8.15	16	730	<2.0	32
		August	First	14-Aug-18	8.23	18	718	<2.0	16
		August	Second	27-Aug-18	8.03	12	700	<2.0	16
		September	Second	24-Sep-18	8.29	20	694	<2.0	20
		October	First	06-Oct-18	8.16	22	690	<2.0	32
		October	Second	24-Oct-18	8.31	24	668	<2.0	28
		November	First	02-Nov-18	8.27	16	642	<2.0	12
		November	Second	24-Nov-18	8.29	32	628	<2.0	16
		December	First	10-Dec-18	7.92	24	660	<2.0	12
		December	Second	22-Dec-18	8.84	26	620	<2.0	20
		January	First	10-Jan-19	7.67	16	648	<2.0	20
		January	Second	16-Jan-19	8.52	18	620	<2.0	16
		February	First	07-Feb-19	8.65	22	590	<2.0	24
		February	Second	22-Feb-19	8.44	26	618	<2.0	32
		March	Second	20-Mar-19	8.34	28	648	<2.0	16

Note: All parameters are in mg/l unless otherwise specified

Effluent Water Quality Standards (MoEF Schedule – VI Standards)

Parameters	pH	TSS	TDS	Oil & Grease	COD
Limit	5.5-9.0	100	Not Specified	10	250

EFFLUENT QUALITY STANDARDS (29 PARAMETERS)

Cluster	Chitra (East) OCP	Chitra (East) OCP	General Standards for Discharge of Effluent (Schedule VI)	Method of Detection	Detection Limit
Station No	13MW1	13MW1			
Station Name	Mine discharge water from Chitra OC	Mine discharge water from Chitra OC			
Month	September	March			
Fortnight	First	First			
Date of Sampling	12-Sep-18	06-Mar-19			
Colour	4	5	Unobjectionable	Platinum Cobalt	1.0
Odour	Unobjectionable	Unobjectionable	Unobjectionable	Physical	-
TSS	20	34	100	Gravimetric	10
pH	8.29	8.14	5.5-9.0	Electrometric	0.01
Temperature (Deg C)	28.9	29.6	Shall not exceed 5 ^{0}C above the receiving water temperature	Thermometric	0.1
Oil & Grease	<2.0	<2.0	10	Partition Gravimetric	2.0
Total Residual Chlorine	<0.02	<0.02	1.0	Colorimetric	0.02
Ammonical Nitrogen	0.54	0.72	50	Nesslerization	0.01
Total Kjeldahi Nitrogen	1.43	1.46	100	Macro Kjeldahl	1.0
Free Amonia	<0.4	<0.02	5.0	Spectrophotometric	0.02
BOD	10	2	30	Bioassay	2.0
COD	28	24	250	Closed Reflux	4.0
Arsenic	<0.005	<0.002	0.2	AAS-VGA	0.002
Lead	<0.005	<0.005	0.1	AAS-GTA	0.005
Hexavalent Chromium	0.04	0.04	0.1	Colorimetric	0.01
Total Chromium	0.08	0.07	2.0	AAS-Flame	0.04
Copper	0.04	0.04	3.0	AAS-Flame	0.03
Zinc	0.05	0.03	5.0	AAS-Flame	0.01
Selenium	<0.005	<0.002	0.05	AAS-GTA	0.002
Nickel	<0.10	<0.01	3.0	AAS-Flame	0.01
Fluoride	0.24	0.30	2.0	SPADNS	0.02
Dissolved Phosphate	1.38	1.28	5.0	Molybdovanadate	0.30
Sulphide	0.016	0.009	2.0	Methylene Blue	0.005
Phenolics	<0.001	<0.001	1.0	Chloroform Extraction	0.001
Manganese	0.26	0.28	2.0	AAS-Flame	0.02
Iron	0.13	0.14	3.0	AAS-Flame	0.06
Nitrate Nitrogen	3.2	3.1	10	Spectrophotometric	0.5
Cadmium	<0.001	<0.0005	2.0	AAS-GTA	0.0005
Total Dissolved Solids	668	636	Not Specified	Gravimetric	25.0

Note: All parameters are in mg/l unless otherwise specified

GROUND WATER QUALITY

Sl.No.	Parameters	Sample code & Date					Indian Standard Drinking Water (IS-10500 :2012)	
		13GW1	13GW2	13GW3	13GW4	13GW5		
		15.05.18	15.05.18	15.05.18	15.05.18	15.05.18	Desirable Limit	Permissible Limit
1	Colour, Hazen unit Max	3	4	4	3	3	5.0	15.0
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	
3	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	
4	Turbidity,NTU Max	2	1	1	1	2	1.0	5.0
5	pH	8.24	8.24	8.22	8.07	8.18	6.5-8.5	No relaxation
6	Total Hardness	284	68	132	68	244	200.0	600.0
7	Iron	0.06	<0.06	<0.06	<0.06	<0.06	0.30	No relaxation
8	Chlorides	98	08	64	10	42	250.0	1000.0
9	Free Residual Chlorine	0.04	0.05	0.04	0.04	0.06	0.20	1.0
10	Dissolved Solids	518	120	268	136	506	500.0	2000.0
11	Calcium	124	32	68	36	108	75.0	200.0
12	Copper	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	1.5
13	Manganese	<0.02	<0.02	<0.02	<0.02	<0.02	0.1	0.3
14	Sulphate	28	04	22	04	70	200.0	400.0
15	Nitrate	10.25	9.0	10.70	9.90	8.40	45.0	No relaxation
16	Fluoride	0.49	0.50	<0.02	0.29	0.94	1.0	1.5
17	Selenium	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	No relaxation
18	Arsenic	<0.002	<0.002	<0.002	<0.002	<0.002	0.01	0.05
19	Lead	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	No relaxation
20	Zinc	0.04	0.04	0.02	0.02	0.02	5.0	15.0
21	Hex Chromium	<0.01	<0.01	<0.01	<0.01	<0.01	0.05	0.05
22	Boron	<0.20	<0.20	<0.20	<0.20	<0.20	0.5	1.0
23	Phenolics	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002
24	Alkalinity	160	100	116	136	220	200.0	600.0
25	MPN	NIL	NIL	NIL	NIL	NIL	Not Specified	
26	Cadmium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	No relaxation

Note: All parameters are in mg/l unless otherwise specified

DRINKING WATER QUALITY

Cluster No	Chitra(East) OCP	Chitra(East) OCP	Indian Drinking Water Standard (IS-10500:2012)	
Station No	13DW1	13DW1		
Station Name	Outlet from water treatment plant	Outlet from water treatment plant		
Month	Sept'18	Mar'19		
Fortnight	First	First		
Date of sampling	12-Sep-18	06-Mar-19	Acceptable Limit	Permissible Limit
Colour, Hazen unit Max	3	3	5.0	15.0
Odour	Unobjectionable	Unobjectionable	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity, NTU Max	1	2	1.0	5.0
pH	8.20	8.3	6.5-8.5	No relaxation
Total Hardness	168	174	200.0	600.0
Iron	0.07	0.06	0.30	No relaxation
Chlorides	47	42	250.0	1000.0
Res Free chlorine	0.04	0.03	0.20	1.0
Dissolved Solids	288	290	500.0	2000.0
Calcium	67	58	75.0	200.0
Copper	0.03	0.04	0.05	1.5
Manganese	0.02	0.04	0.1	0.3
Sulphate	53	51	200.0	400.0
Nitrate	15.20	15.32	45.0	No relaxation
Fluoride	0.32	0.32	1.0	1.5
Selenium	<0.005	<0.005	0.01	No relaxation
Arsenic	<0.005	<0.005	0.01	0.05
Lead	<0.005	<0.005	0.01	No relaxation
Zinc	0.03	0.04	5.0	15.0
Total Chromium	<0.01	<0.01	0.05	No relaxation
Boron	<0.01	<0.01	0.5	1.0
Coliforms (MPN)	Nil	Nil	Shall not be detectable in any 100 ml sample	
Phenolics	<0.001	<0.001	0.001	0.002
Alkalinity	120	112	200.0	600.0
Cadmium	<0.001	<0.001	0.003	No relaxation

Note: All parameters are in mg/l unless otherwise specified

Annexure-IV

Groundwater Level

Station No	Station Name	Month	Fortnight	Date of Sampling	Ground Water Level BGL (mtr)
13GWL1	Dugwell at Dukhiababa mandir of Chitra Village	May	First	15-May-18	10.1
13GWL1	Dugwell at Dukhiababa mandir of Chitra Village	August	First	14-Aug-18	2.9
13GWL1	Dugwell at Dukhiababa mandir of Chitra Village	November	First	08-Nov-18	5.3
13GWL1	Dugwell at Dukhiababa mandir of Chitra Village	January	First	10-Jan-19	7.50
13GWL2	Dugwell of west side Barmaria Village	May	First	15-May-18	11.3
13GWL2	Dugwell of west side Barmaria Village	August	First	14-Aug-18	6.1
13GWL2	Dugwell of west side Barmaria Village	November	First	08-Nov-18	8.3
13GWL2	Dugwell of west side Barmaria Village	January	First	10-Jan-19	6.30
13GWL3	Dugwell of Jamnitand Village near Transformer	May	First	15-May-18	7.35
13GWL3	Dugwell of Jamnitand Village near Transformer	August	First	14-Aug-18	1.8
13GWL3	Dugwell of Jamnitand Village near Transformer	November	First	08-Nov-18	5.6
13GWL3	Dugwell of Jamnitand Village near Transformer	January	First	10-Jan-19	7.80
13GWL4	Dugwell of Patrika Village	May	First	15-May-18	5.8
13GWL4	Dugwell of Patrika Village	August	First	14-Aug-18	1.4
13GWL4	Dugwell of Patrika Village	November	First	08-Nov-18	6.8
13GWL4	Dugwell of Patrika Village	January	First	10-Jan-19	8.60
13GWL5	Dugwell of Murgabari near J.p. Mahato's House	May	First	15-May-18	5.9
13GWL5	Dugwell of Murgabari near J.p. Mahato's House	August	First	14-Aug-18	1.6
13GWL5	Dugwell of Murgabari near J.p. Mahato's House	November	First	08-Nov-18	4.3
13GWL5	Dugwell of Murgabari near J.p. Mahato's House	January	First	10-Jan-19	6.45

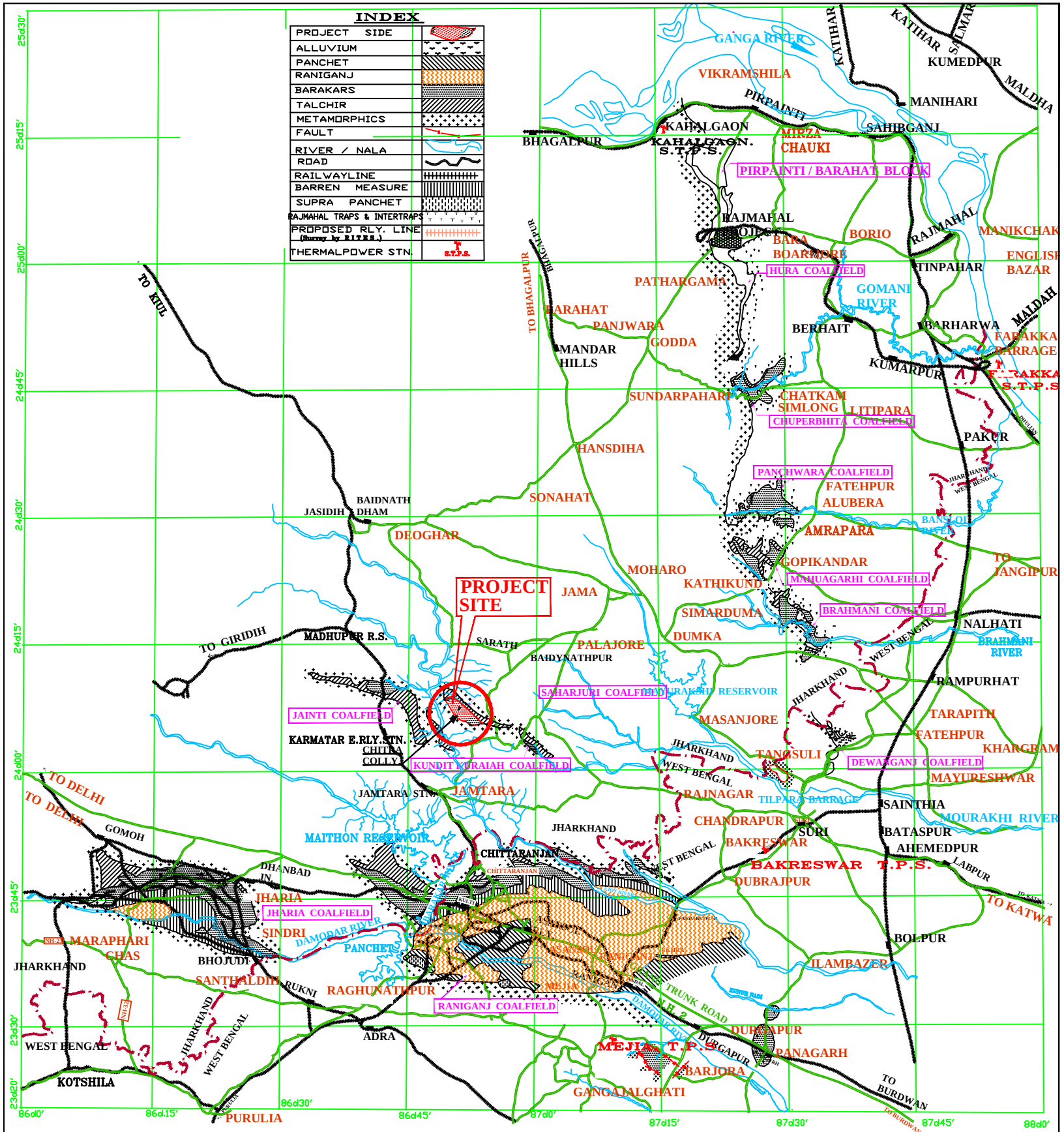

PLATE-I

Customer	EASTERN COALFIELDS LTD.
Job Title	ENVIRONMENTAL STATEMENT CHITRA EAST O.C.P
Job No.	111653
Subject	LOCATION MAP
Checked / Approved	
Scale	SCALE NTS
Sheet	
Drg. No.	CMPDI RI-IIASANSOL

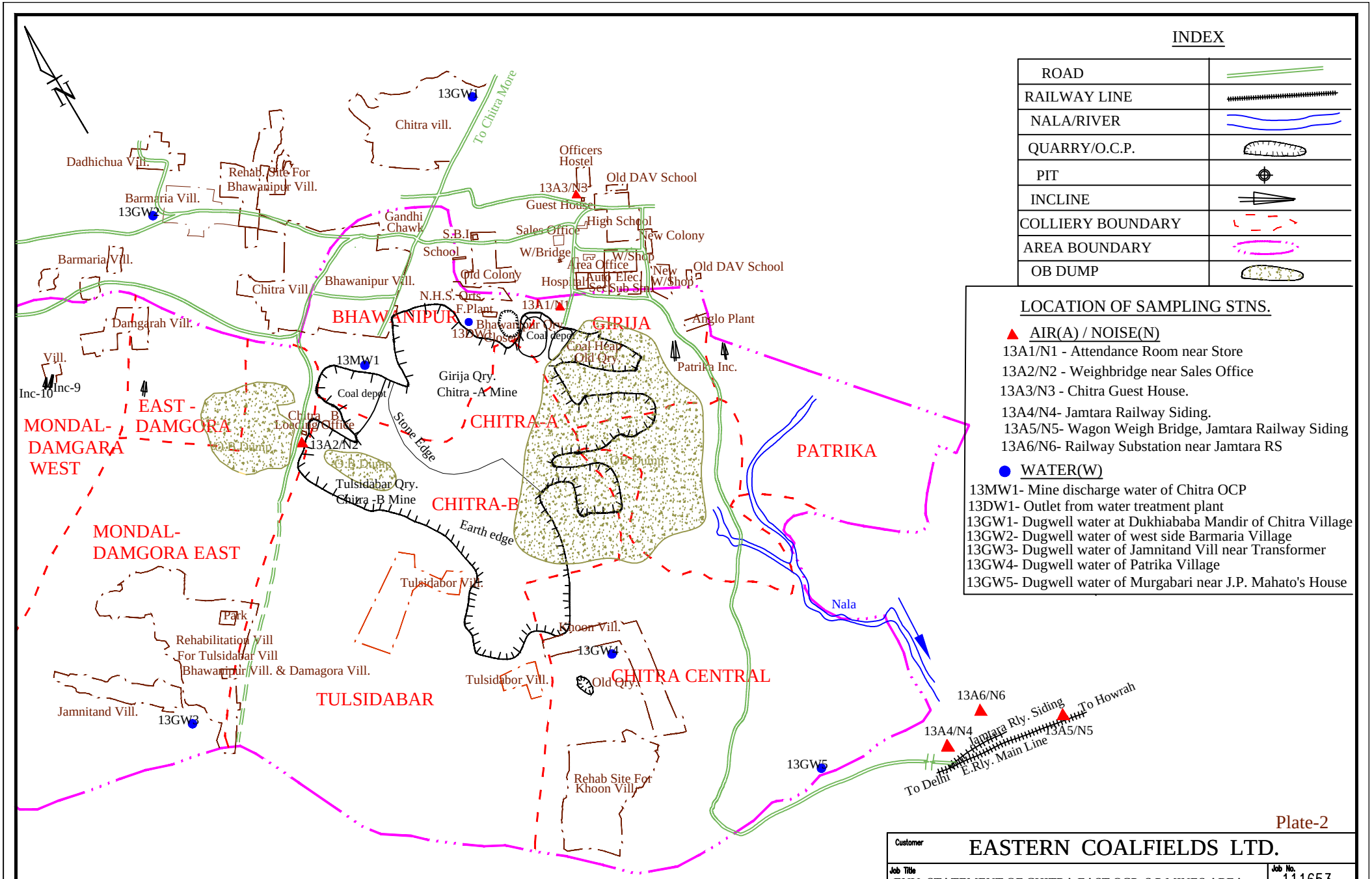

Plate-2

Customer	EASTERN COALFIELDS LTD.				
Job Title: ENV. STATEMENT OF CHITRA EAST OCP, S.P.MINES AREA.				Job No. 111653	
Subject: LOCATION OF MONITORING STATIONS.	Activity	Name	Designation	Signature	Date
	Checked				
	Approved				
CMPDI ISO 9001 Company	Scale 0 100 400M			Sheet	
	Drg.No. RI ENV 0010			REV.No.	