

## Chapter 1 – PROJECT DESCRIPTION

### 1 **Project Description**

M/s R.K.M. Powergen Private Limited is an registered company (herein after called as RKMPPL) with the main objective of Power Generation having its registered office at No.16, First Canal Cross road, Gandhi Nagar, Adyar, Chennai-600020, Tamilnadu. The company is a joint venture of M/s R.K. Powergen Private Limited, a leading Private Power generating company and M/s Mudajaya Corporation Berhad, a listed company with its Corporate Office at Kualalumpur, Malaysia.

**RKMPPL** proposes to install **4 x 350 MW Thermal Power Plant** in **phased** manner, at Village: Uchpinda, District: Janjgir – Champa, in the state of Chhattisgarh at an estimated capital outlay of Rs. 5950 Crores. Regarding this RKMPPL have already signed a memorandum of understanding (MOU) with Government of Chhattisgarh.

The proposed 4 X 350 MW coal fired Power project consists of a coal fired steam generator **connected** to a reheat type turbine generator along with all the required auxiliaries **for each unit**. Circulating cooling water is envisaged for the condenser cooling.

The technology proposed to be adopted is the conventional state of the art thermal power plant technology followed worldwide. The technology is incorporated with the latest developments in this field. Hence, no need arises to adopt an alternate technology

#### Salient Features of Proposed Thermal Power Plant

S.No	Features	
1	Capacity	1400 MW
2	Configuration	4 X 350MW
3	Type of Boiler	Pulverized coal fired – Natural circulation – Sub critical
4	Main Fuel	Coal
5	Source of coal	Unit – 1 coal linkage from S.E.C.L. Long term plan – Captive mining of Fatehpur East , Mond- Raigarh block
6	Coal Requirement	21950 TPD (Max)
7	Sulphur	0.45% (Max)
8	Ash content	48% (Max)
9	Fly ash generation	8429 TPD (Max)
10	Power Evacuation	At 220/400 kV to CSEB and P.T.C
11	ESP	99.95 % Efficiency
12	Stack	4 X 220 m height
13	Water source	Mahanadhi River
14	Water requirement	5116 M3/Hr including ash water recirculation

## Chapter 2 – ENVIRONMENT

### 2.1 Location and site

The site for the proposed Power Plant is located **1.0 km away from** Kharsiya – Dabhara State Highway. The plant site is approachable by an all weather Tar road. Hence proposed Plant at Village: Uchpinda, District: Janjgir – Champa, Chhattisgarh is in accordance with the MoEF guidelines.

Total 900 acres of land will be required for the proposed project. Out of which 300 acres of land is for Green Belt development, 300 acres of land is for ash disposal area, 50 acres of land is for township and 250 acres for main plant and auxiliary.

Required land is available in the proposed site. Out of the total requirement of 900 acres, 777 acres belong to private owners and 123 acres belong to government. Private land is being purchased offering attractive price. Also Government of Chhattisgarh had approved the transfer of its land to RKMPPPL. District collector had visited the site and it is likely to be transferred soon.

Salient features of the site is given in the tables 2.1.1

**Tables 2.1.1**

Coordinates of the Plant site

1	Latitude	21°53'22"N	1 <sup>st</sup> Corner (NE)
2	Longitude	83°07'41"E	
3	Latitude	21° 53'57"N	2 <sup>nd</sup> Corner (NW)
4	Longitude	83° 06'08"E	
5	Latitude	21°52'46"N	3 <sup>rd</sup> Corner (SW)
6	Longitude	83°06'08"E	
7	Latitude	21° 52'53"N	4 <sup>th</sup> Corner (SE)
8	Longitude	83° 07'42"E	

Coordinates of the Ash Pond

1	Latitude	21°53'15"N	1 <sup>st</sup> Corner (NE)
2	Longitude	83°06'50"E	
3	Latitude	21° 53'22"N	2 <sup>nd</sup> Corner (NW)
4	Longitude	83° 06'08"E	
5	Latitude	21°52'46"N	3 <sup>rd</sup> Corner (SW)
6	Longitude	83°06'08"E	
7	Latitude	21° 52'52"N	4 <sup>th</sup> Corner (SE)
8	Longitude	83° 07'29"E	

S.No	Particulars	Details
1	Site Elevation above MSL	+ 243 meter
2	Present land use pattern	Mainly un-irrigated and nonagricultural land. A small portion is cultivated with single crop in a year
3	Nearest Railway Station	Kharsiya – 12 km
4	Nearest High way	Kharsiya – Dabhara State Highway – more than 1.0 km
5	Nearest Airport	Raipur – 270 km
6	Hills, Valleys	Nil in 10 km radius
7	Topography	Fairly undulated terrain with rocky soil
8	Reserved Forest area	Nil in 7.0 km radius
9	National Parks/Wildlife sanctuaries	Nil in 15 km radius

## 2.2 Base Line study

Base line studies for air, water, noise, land, Biological and Socio- Economic Environment was carried out. Study period was from 20<sup>th</sup> Oct 2007 to 19<sup>th</sup> January 2008 which is considered as Post – Monsoon season. The study results are given below

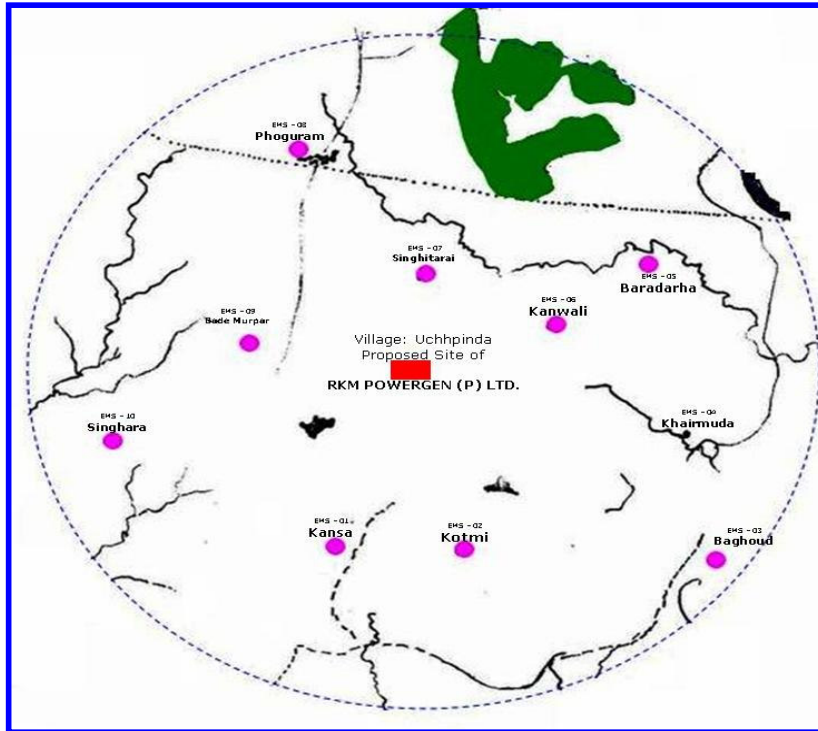
### 2.2.1 Air Environment

Ambient air quality monitoring was carried out with a frequency of twice a week at ten location spread all over a distance of 10 km radius from the proposed power project. The locations were selected complying TOR

S.No	Label	Location	Direction	Distance in km	Wind direction w.r.t. site
1	EMS 01	Kansa	SW	6	Cross wind
2	EMS 02	Kotmi	S	6	Cross wind
3	EMS 03	Bogboud	SE	7	Cross wind
4	EMS 04	Khaitmura	SE	7	Cross wind
5	EMS 05	Kawanli	E	4	Down wind
6	EMS 06	Baradarha	NE	6.5	Down wind
7	EMS 07	Singhitarai	N	3	Downwind
8	EMS 08	Phoguram	NW	7.0	Cross wind
9	EMS 09	Bare Murpar	W	6	Cross wind
10	EMS 10	Singhra	SW	8.5	Cross wind

## STUDY AREA PROJECT SITE

Location map of RKM Powergen Private Limited and base line study area



### 2.2.1.1 Study Results

Base line data monitored for ambient air quality studies

**Suspended Particulate Matter:** Maximum was  $146.03 \mu\text{g}/\text{m}^3$  at Singhtarai and minimum was  $78.85 \mu\text{g}/\text{m}^3$  at Kansa. 24 hours average varied between 107.37 to  $124.06 \mu\text{g}/\text{m}^3$ . 98<sup>th</sup> percentile concentration varied between 123.73 to  $144.40 \mu\text{g}/\text{m}^3$

**Respirable Suspended Particulate Matter:** Maximum was  $62.25 \mu\text{g}/\text{m}^3$  at Kansa and minimum was  $22.97 \mu\text{g}/\text{m}^3$  at Phoguram. 24 hours average varied between 40.89 to  $53.95 \mu\text{g}/\text{m}^3$ . 98<sup>th</sup> percentile concentration varied between 53.61 to  $62.18 \mu\text{g}/\text{m}^3$

**Sulphur Dioxide:** Maximum was  $11.4 \mu\text{g}/\text{m}^3$  at Singhara and minimum was  $4.25 \mu\text{g}/\text{m}^3$  at Bogboud. 24 hours average varied between 6.35 to  $7.96 \mu\text{g}/\text{m}^3$ . 98<sup>th</sup> percentile concentration varied between 7.24 to  $11.3 \mu\text{g}/\text{m}^3$

**Oxides of Nitrogen:** Maximum was  $14.2 \mu\text{g}/\text{m}^3$  at Singhara and minimum was  $4.46 \mu\text{g}/\text{m}^3$  at Khaimura. 24 hours average varied between 7.79 to  $10.35 \mu\text{g}/\text{m}^3$ . 98<sup>th</sup> percentile concentration varied between 10.06 to  $11.91 \mu\text{g}/\text{m}^3$

### 2.2.2 Water Environment

Total water requirement for all the four units will be 5116 M3/Hr. Water will be drawn from Mahanadhi. Water was already allocated by Government of Chhattisgarh from its own share of Mahanadhi river water

**Water Requirement per unit**

Sr. No	Area	Quantity	
1.	Cooling tower make up	922.00	M <sup>3</sup> / Hr
2.	Service water	37.00	M <sup>3</sup> / Hr
3.	Drinking Water for township	0.75	M <sup>3</sup> / Hr
4.	Boiler make up	36.00	M <sup>3</sup> / Hr
5.	Coal handling Equip sealing	131.25	M <sup>3</sup> / Hr
6.	Ash slurry disposal	59.75	M <sup>3</sup> / Hr
7.	HVAC system	12.50	M <sup>3</sup> / Hr
8.	Ash seal water system	50.00	M <sup>3</sup> / Hr
9.	Rejects	29.25	M <sup>3</sup> / Hr
	<b>TOTAL</b>	<b>1279.00</b>	<b>M<sup>3</sup>/ Hr</b>

**2.2.2.1 Surface water**

Surface water samples were collected from river Mahanadhi River, river Mond and river Borai which are flowing 20 km south, 12 km east and 18 km west of the proposed site respectively.

**2.2.2.1.1 Study Results**

			River Borai	River Mahanadi	River Mand
1	Odour	---	Un objectionable		
2	Taste	--	Agreeable		
3	Colour	Hazen units	< 5	< 5	< 5
4	pH	--	7.45	7.80	7.10
5	Turbidity	NTU	6	6	5
6	Total hardness as CaCO <sub>3</sub>	Mhos/cm	45	60	65
7	Mineral oil,	mg/l	Nil	Nil	Nil
8	Iron as Fe	mg/l	0.10	0.12	0.18
9	Chloride as Cl <sub>1</sub> ,	mg/l	16	12	14
10	Dissolved solids	mg/l	223	214	196
11	Calcium as Ca	mg/l	29	32	35
12	Magnesium as Mg	mg/l	23	28	30
13	Copper as Cu	mg/l	BDL	BDL	BDL
14	Manganese as Mn	mg/l	BDL	BDL	BDL
15	Sulphate as SO <sub>4</sub>	mg/l	36	31	25
16	Nitrate as NO <sub>3</sub>	mg/l	4	5	5
17	Fluoride as F	mg/l	0.4	0.4	0.4
18	Mercury as (Hg)	mg/l	BDL	BDL	BDL
19	Cadmium as (Cd)	mg/l	BDL	BDL	BDL
20	Selenium as Se	mg/l	BDL	BDL	BDL

			River Borai	River Mahanadi	River Mand
21	Arsenic as As	mg/l	BDL	BDL	BDL
22	Cyanide as Cn	mg/l	BDL	BDL	BDL
23	Lead Pb	mg/l	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL
25	Chromium as Cr <sup>6</sup>	mg/l	BDL	BDL	BDL
26	pesticides	mg/l	Absent	Absent	Absent
27	Alkanity as CaCO <sub>3</sub>	mg/l	121	110	100
28	Boron as B,	mg/l	BDL	0.03	0.06
29	Arsenic as As,	mg/l	BDL	BDL	BDL
30	Coliform count, MPN/100 ml	Per 100 ml.	159	168	171

#### 2.2.2.1.2 Water flow Details

The monthly / Yearly inflow data of Mahanadhi river from where water for the power plant will be drawn is given in the table 2.2.2.1.2.1

Table 2.2.2.1.2.1

#### Water Flow details (1995 – 2000) of River Mahanadi- From S.D.O. CWC Lower Mahanadi sub division-Raipur

	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	mar	Apr	May	Yearly Average
1995-96	112.12	2075.8	2168.2	1459.7	556.63	235.5	129.9	93.86	62.54	52.23	47.47	39.54	<b>586.12</b>
1996-97	77.53	468.53	1218.9	1282.5	262.60	243.3	101.8	85.72	106.1	71.94	41.43	20.81	<b>331.77</b>
1997-98	51.73	715.20	3196.7	1583.3	347.85	248.9	266.7	286.5	192.8	107.6	131.4	178.7	<b>608.95</b>
1998-99	2024.7	709.20	755.65	2549.5	876.15	711.8	372.6	206.8	64.05	76.52	53.18	43.28	<b>703.61</b>
1999-2000	53.18	450.74	2008.1	2749.9	1360.6	480.1	230.3	161.5	140.4	77.58	56.95	51.28	<b>651.72</b>
Month Ave	<b>463.84</b>	<b>883.89</b>	<b>1869.5</b>	<b>1924.9</b>	<b>680.76</b>	<b>383.9</b>	<b>220.3</b>	<b>166.9</b>	<b>113.2</b>	<b>77.17</b>	<b>66.09</b>	<b>66.73</b>	

#### Flow in million cubic meters

#### 2.2.2.2 Ground water study

Water samples were collected from the bore wells situated in the following five villages around the proposed site in order to assess the existing water quality. Survey report of ground water level obtained from Senior Hydrogeologist and attached as annexure

#### 2.2.2.2.1 Locations

S.No	Label	Location	Direction	Distance in km
1	-	Uchpinda	Site	Near Proposed ash Pond
2	EMS 02	Kotmi	S	6
3	EMS 05	Kawanli	E	4
4	EMS 06	Baradarha	NE	7
5	EMS 07	Singhtarai	N	3
6	EMS 09	Bare Murpar	W	6

### 2.2.2.2.2 Study Results

Sr. No.	Parameters	Unit	Uchpinda	EMS 02	EMS 05	EMS 06	EMS 07	EMS 09
1	Odour	--	Un objectionable					
2	Taste	--	Agreeable					
3	Colour	Hazen units	<5	< 5	< 5	< 5	< 5	< 5
4	pH	--	7.62	7.10	7.3	7.7	7.4	7.10
5	Turbidity	NTU	5	3	2	3	2	2
6	E.Conductivity	µS/cm	261	420	440	940	990	540
7	Mineral oil,	mg/l	Nil	Nil	Nil	Nil	Nil	Nil
8	Iron as Fe	mg/l	0.12	0.16	0.14	0.16	0.14	0.15
9	Chloride as Cl,	mg/l	12	64	71	153	170	60
10	Dissolved solids	mg/l	140	240	250	520	540	342
11	Calcium as Ca	mg/l	57	150	160	315	320	160
12	Magnesium as Mg	mg/l	8	90	90	205	235	115
13	Copper as Cu	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
14	Manganese as Mn	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
15	Sulphate as SO <sub>4</sub>	mg/l	8.0	48	67	125	110	108
16	Nitrate as No <sub>3</sub>	mg/l	5	18	12	25	19	22
17	Fluoride as F	mg/l	0.2	0.4	0.5	0.8	0.5	0.25
18	Mercury as (Hg)	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
19	Cadmium as (Cd)	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
20	Selenium as Se	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
21	Arsenic as As	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
22	Cyanide as Cn	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
23	Lead Pb	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
25	Chromium as Cr <sup>+6</sup>	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
26	pesticides	mg/l	Absent	Absent	Absent	Absent	Absent	Absent
27	Alkanity as CaCo <sub>3</sub>	mg/l	100	155	150	340	380	160
28	Boron as B,	mg/l	BVDL	0.04	0.06	0.06	0.04	0.03
29	Arsenic as As,	mg/l	BDL	BDL	BDL	BDL	BDL	BDL
30	Coliform count, MPN/100 ml	Per 100 ml.	Nil	Nil	Nil	Nil	Nil	Nil

### 2.2.2.3 Cooling water

- It consists of
- i) Circulating water and Auxiliary cooling water system
  - ii) Closed cycle cooling water system

Cooling tower makeup is from Clarified water storage tank. Cycle of concentration 4 will be maintained in the cooling water system

Closed cycle cooling water system make is from demineralized water tank.

#### **2.2.2.4 Rain water Harvesting**

Rain water harvesting structures for all the roof tops in the main plant and colony have been proposed to recharge the ground water. A ground water tank is propose within the plant premise and the runoff water during rain will be stored for further use like cooling tower make up, ash wetting, etc.,

#### **2.2.2.5 Effluent treatment system**

All the trade effluents will be collected in Central Effluent Monitoring Station, neutralized to the prescribed norms and used for horticulture.

Ash water will be recovered and reused.

Zero discharge will be strictly implemented

#### **2.2.3. Noise Environment**

Noise level survey was carried out around the proposed site to assess the present level of noise. The study area was selected in the 10 km radius of the proposed site and given in the table 2.2.3.1

Table 2.2.3.1

S.NoI	Label	Location	Direction	Distance in km
1	EMS 01	Kansa	SW	6
2	EMS 02	Kotmi	S	6
3	EMS 03	Bogboud	SE	7
4	EMS 04	Khaitmura	SE	7
5	EMS 05	Kawanli	E	4
6	EMS 06	Baradarha	NE	6.5
7	EMS 07	Singhitarai	N	3
8	EMS 08	Phoguram	NW	7.0
9	EMS 09	Bare Murpar	W	6
10	EMS 10	Singhra	SW	8.5

#### **2.2.3.2 Study Result**

It is observed that noise levels and noise equivalent of study area varied in the range 44-53 dB (A) during day time and 30-36 dB (A) during night time. These observations indicate that the ambient noise levels are within impact zone complying prescribed standards.

#### **2.2.4 Land Environment**

A number of villages situated in different directions and distances within the study area were selected for assessment of baseline quality environment. Representative surface soil samples (0-20 cm depth) were collected



for determination of Soil characteristics within the region that facilitates the prediction of impact of pollution. The names of the villages are given in the table No 2.2.4.1

Table 2.2.4.1

S.No.	Label	Location	Direction	Distance in km	Environmental Nature
1	-	Uchpinda	Nearest to site	-	Barren
2	EMS 02	Kotmi	S	6	Agricultural
3	EMS 05	Kawanli	E	4	Agricultural
4	EMS 07	Singhitarai	N	3	Agricultural
5	EMS 09	Bare Murpar	W	6	Barren

#### 2.2.4.2 Soil Study Result

pH is an important parameter indicative of alkaline or acidic nature of soil. It greatly affects the microbial population as well as solubility of metal ions and regulates nutrient availability. Variations in the pH of the soil in the study area are presented and it is found to be 7.1 to 7.9 thus conducive for growth of plant. It is observed that calcium and magnesium concentrations are in the range 148 to 179 and 66 to 81 mg/ 100 gm respectively and Chlorides are in the range of 2.6 to 3.8 mg/ 100 gm. Organic matter of soil is found in the range 3.26%. The presence of organic matter enhances the metabolic activities of soil affecting the nitrogen and potash content of soil. The fertility status with respect to P<sub>2</sub>O<sub>5</sub> & k<sub>2</sub>O shows moderate level of fertility, which indicate the supplementations of these fertilizers are required. It shows that soil in the study area is moderately fertile in organic and nutrient contents.

#### 2.2.4.3 Impact and mitigation

ESPs will be provided for Boiler to bring down the SPM level in the exhaust to less than 50 mg/Nm<sup>3</sup>. To control the fugitive emissions dust extraction system and dust suppression system will be installed at all the dust emanating areas. Hence it will not have any impact on nearby topsoil. The effluent generated will be treated in the ETP and will be utilized for ash conditioning, dust suppression and for greenbelt development. Zero discharge will be strictly implemented. Ash dykes will be suitably lined. Fly ash will be fully utilized for commercial purposes as per Fly Ash notification.

The drainage is mostly dendritic in nature and takes south westerly course in the south and north western course in the north. The surface drainage is controlled mainly by surface slope and finally discharges into River Mahanadi. The drainage is well developed too. Hence there will not be any impact on drainage system due to the project

Greenbelt is considered essential for maintaining the stability of the environment of the area. 33% of total acquired land will be covered by extensive greenbelt & will be developed, in consultation with forest department.

## 2.2.5 Biological environment

### 2.2.5.1 Study area

Sr. No.	Sampling Location
1.	Uchpinda
2.	Kharsiya
3.	Sukhda
4.	Foguran
5.	Dhurkot
6.	Bhata
7.	Kawanli
8.	Deverghata
9.	Baradarha
10.	Bare Marpar
11.	Singhitara
12.	Pharsawani

### 2.2.5.2 Study Result

There is no forest in the proposed site. So no need arises for the felling of the trees. There is no scheduled fauna in the study area. Data on flora and fauna was collected and collated from the information available with forest department. There are no National Parks, wild life sanctuaries, bird sanctuaries, water bodies, etc. within 10 km radius of the project site. Hence there will not be any impact of SPM, SO<sub>2</sub> & NO<sub>x</sub> on flora & fauna due to the proposed project.

## 2.2.6 Socio Economic Environment

The socio-economic component of environment with reference to human interest, aesthetics and cultural attributes needs to be studied. In order to carry out such studies information on issues such as land acquisition, compensation effect on income and employment etc. have been considered to evaluate quality of life. Baseline data on socio-economic parameters such as demography is generated based on Census Record available as on 2001.

### 2.2.6.1 Study Result

#### *Estimated Basic Statistics of the Study Area*

1.	Households	25567
2.	Population	122881
a.	Male	60795
b.	Female	62086
c.	Schedule Caste	32852
d.	Schedule Tribe	18155
3.	Literacy Rate	53.62%
4.	Occupational Pattern:	
	Total Working Population (% of total population )	44.64%

	Cultivators (% of total working population)	49.66%
	Agricultural Labors (% of total working population)	35.49%
	House Hold Labors (% of total working population)	2.39%
	Other Workers (% of total working population)	12.46%
	Main workers (% of total working population )	71.76%
	Marginal Workers (% of total working population )	28.24%
	Total non working population (% of total population)	55.36%

### Chapter 3 – ANTICIPATED IMPACTS AND MITIGATION MEASURES

#### 3.0 *Anticipated Impacts and Mitigation measures*

##### 3.1 *During Construction period*

Impacts developed during construction period are mainly land acquisition, fugitive dust emission, Noise and sanitation of workers colony. Only four families are living in the government land propose to be acquired. They will be rehabilitated as per the Chhattisgarh government R.R. policy. To contain noise level state of the art equipment will be used in every area. Ear plugs will be provided to the workers. Majority of the workers will be from the local area. They do not need to be accommodated at the project site. Only 50 departmental staff and about 400 workers only will stay at site during construction. They will be provided with Toilets at place of stay and work to avoid environmental degradation

##### 3.2 *During operation*

##### 3.2.1 *Air Environment*

Air pollution modeling carried out for the proposed thermal power plant showed that the incremental concentration of SO<sub>2</sub>, NO<sub>x</sub> and SPM as detailed in the table.

#### **Net resultant maximum concentrations due to the project**

Particulars	SPM (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NO <sub>x</sub> (µg/m <sup>3</sup> )
Maximum baseline conc. in the study area	146.03	11.40	14.20
Maximum predicted incremental rise in concentration	22.27	7.24	11.89
<b>Net resultant concentration</b>	<b>168.3</b>	<b>18.64</b>	<b>26.09</b>

They are all well within the NAAQ norms. Consequently the proposed power plant is unlikely to will not have any adverse impact on the air quality.

##### 3.2.2 *Water Environment*

Entire water for the power plant will be drawn from Mahanadhi River. Ash water will be recycled and reused. Trade effluent will be treated and reused. Sewage water will be treated and used for horticulture. Rain water harvesting structures will be constructed for all the roof tops. Zero discharge will be strictly implemented

So there will not be any adverse impact on water environment

### 3.2.3 **Noise Environment**

Major noise generating sources are Steam Turbine, Boiler and Fans. Silencer and acoustic enclosure will be provided wherever possible. The predicted noise impact were calculated using wave divergence model and found to be 35 to 55 considering the noise generating sources from the plant. Noise level up to 85 dB (A) is acceptable for 8 hour working shift per day as per OSHA norms. Plant authorities will provide earplugs to the employees and will be enforced to be used by the employees and erect caution sign board near the high noise generating equipment

Also appropriate measures will be taken at the design stage of the equipment to contain the noise level. Moreover, provision would be made within the power plant to insulate areas such as the control rooms from the turbine hall noise.

- ❖ The impact will be reduced by adopting shock-absorbing techniques.
- ❖ The Noise absorption will improve by using hollow concrete blocks in the construction of expansion project.
- ❖ By making use of absorbing material on roof walls and floors, the noise reflection will be reduced.
- ❖ All the steam safety valves, which are likely to be operated, would be provided with silencers to reduce the noise level during steam release.
- ❖ Earplugs shall be provided to the workers and this shall be enforced strictly.
- ❖ Increase the distance between source and receiver, by altering the relative orientation of receiver and the source.
- ❖ Extensive greenbelt shall be developed in addition to the existing greenbelt for further attenuating the noise levels.
- ❖ Sign boards will be installed wherever the sound level is more than the norm like STG floor, etc

The generated noise would be controlled to reduce it to an acceptable level at the project site boundary by means of isolation and as a further mitigation measure planting of trees along the plant boundary as well as within the plant premises would be done to form a sound barrier.

These measures will ensure that no adverse impact on community and employee.

### 3.2.4 **Land Environment**

The total land required for the proposed industrial activity is 900 Acres.

99.95% efficient ESPs will be provided. Stack of 220 m height will be constructed. SPM emission will be controlled less than 50mg/Nm<sup>3</sup>. To control the fugitive emissions dust extraction system and dust suppression system will be installed Hence it will not have any impact on nearby topsoil.

The effluent generated will be treated in the ETP and taken to the central effluent monitoring plant (CEMP). From CEMP effluent will be utilized for ash conditioning, dust suppression and for greenbelt development. Zero discharge will be strictly implemented. Ash dykes will be suitably lined. Fly ash will be fully utilized for commercial purposes. Arrangements and the plan have been evolved to achieve 100% Fly ash utilization within 9 years.

The land prices in the area will increase and will benefit the local people due to the project. This project may attract some ancillary works and support services also. This will help to improve the land use pattern of the area.

### **3.2.5. Ecological Environment**

There are no National Parks, wild life sanctuaries, bird sanctuaries, water bodies, etc. within 10 km radius of the project site. Hence there will not be any impact of SPM, SO<sub>2</sub> & NO<sub>x</sub> on flora & fauna due to the proposed project. Greenbelt is considered essential for maintaining the stability of the environment of the area. Green belt will improve the aesthetic beauty, control noise level and act as a dust arrester

More than 33% of total acquired land will be covered by extensive greenbelt & will be developed as per the norms of MoEF

Hence there will not be any adverse impact on land environment

### **3.2.6 Socio Economic Environment**

The impacts on socio-economic status of the project area are predominantly positive and no adverse changes are expected.

The proposed project will generate more employment opportunities. The additional power generated would lead to availability of power to the area and state and will improve the scope of industrial development in the region.

An increase in sanitation, education and transportation facilities is expected due to proposed power project. The economic output to proposed power project will be positive besides enhancement of community services.

Therefore there will be a certain enhancement of educational and medical standards of people in the area.

## **CHAPTER 4 – ENVIRONMENTAL MONITORING PROGRAMME**

### **4.1 Monitoring**

Regular monitoring of air and water samples will be carried out in the post operational phase to evaluate the effectiveness of the pollution control equipments

On line continuous stack monitoring for SPM, SO<sub>2</sub> and NO<sub>x</sub> will be installed and hooked to Central Control Room DCS system

Ambient Air Quality will be monitored weekly twice on 24 hrs basis for SPM, RSPM, SO<sub>2</sub> and NO<sub>x</sub>.

Locations and number of permanent AAQ monitoring stations will be decided as per the guidelines of MoEF and State Pollution Control Board.

Ground water and Surface water will be tested every month. Trade effluents and Sewage samples will be tested every 15 days

Various meteorological parameters will be monitored on round the clock basis.

### **4.2 Reports**

Returns of the Environmental monitoring will be submitted regularly to State Pollution Control Board, Central Control Board, Advisor- Fly ash utilization, MoEF, New Delhi and Regional office MoEF

## **Chapter 5 – ADDITIONAL STUDIES**

### **5.1 Risk Management**

Risk, due to different nature of failures like mechanical failure, electrical failure, fire, chemical storage tanks leak, etc. during construction and operation phase were assessed. Required protection system, annunciation system, water sprinkling system and fire fighting system will be incorporated in the project to ensure the safety of the human, plant and auxiliaries. Care will be taken in material selection of pipe lines and vessels and insulation at the design stage itself.

## **5.2 Disaster management Plan**

Disaster will put the people in a sudden helplessness. Disaster management plan will define the procedure to ensure the safety of life, protection of environment and installation, restoration of production and salvage of operation. Disaster management Plan will widely be circulated and proper training will be given to every stakeholder.

An emergency cell will be formed. The head of the plant will take control of the activities during a disaster till the normalcy is restored. Emergency control centre will be formed with all the necessary equipments. A Diesel Generator, connected in auto mode will be provided for handling emergency situation. Fire fighting system to tackle the emergency situation will be provided.

Occupational health centre will be maintained with all the facilities. Names and the contact numbers of the medical personnel and the facilities at Raigarh town will be provided, updated and maintained

## **5.3 R.R. Action Plans**

Total land requirement for the project is 900 acres. Out of which 777 acres belong to private parties. They will be purchased directly from the land owners offering attractive price. 123 acres belong to government. Only 4 families are living in the government land in temporary hutments. No other inhabitants are in the government land. Also these lands are barren and no agricultural activities were taken up

R.R. Action plan had been prepared in line with the Rehabilitation Policy 2007, Government of Chhattisgarh and had already been submitted to Director, Directorate of Industries, Government of Chhattisgarh. For the total land looser permanent employment will be provided

## **Chapter 6 – PROJECT BENEFITS**

### **6.0 Project Benefits**

The mega project in this economically backward area will lay a foundation stone for the larger development in all the fields. Electricity is the basic necessity for all other developments in the present day world. RKMPPPL will make sure that quality and continuous power is evacuated into the grid. Uninterrupted availability of power will encourage the entrepreneurs to establish various small and large scale industries in this area. RKMPPPL.....

- ❖ Will develop a neighbourhood benefit scheme.
- ❖ Will help to maintain the public health centres.
- ❖ Will aid the local government schools to maintain the infrastructure and provide quality education
- ❖ Will adopt local village – Uchpinda and undertake various development projects.
- ❖ Will improve direct and indirect job opportunities of the local people – 500 skilled and 2000 unskilled employment
- ❖ Will enhance proper training to the illiterate population of the land losers and give job opportunities like green belt development and other contractual labours.
- ❖ Will arrange regular free health camps for the people around the project site. This improves the health status of the local people.

- ❖ Will improve the educational status of the area, providing libraries, text books and local school accessories.
- ❖ Will provide regular water supply to the local village to improve the sanitation status.
- ❖ Will improve the transport facilities in and around the area and maintain the local roads.
- ❖ Land price will go up benefiting the local people
- ❖ Will improve the social standard of the local people mingling with multiracial staff of the project
- ❖ Will improve the national integrity of the area
- ❖ Socio economic policy will be derived after implementation of the project and separate fund will be created for the community development programmes which will not diverted for other use.
- ❖ Will try to improve the living standards of the land owners.
- ❖ Permanent employment to the total land losers due to the power project.
- ❖ Proper compensation will be provided to the land losers as per the market rate.
- ❖ Women self help group will be developed and aided.
- ❖ Co-operative system will be developed for the benefit of the local people.

## Chapter 7 – ENVIRONMENTAL MANAGEMENT PLAN

### 7.0 *Environmental Management Plan*

The **Environmental** Management Plan aims at controlling pollution at the source level to the possible extent with the available and affordable technology followed by treatment measures before they are discharged in to environment.

### 7.1 *During Construction Phase*

#### 7.1.1 *Air quality Management*

Activities like site preparation, grading and leveling can cause air pollution. Water sprinkling and asphaltting the main approach road will be carried out to mitigate the pollution. The disturbed slopes will be stabilized before them onset of monsoon

#### 7.1.2 *Water Quality Management*

The proposed site will be provided with proper and sufficient toilet and sanitation facilities. The facilities will be connected to septic tanks and soak pits. So that the impact will be very negligible

#### 7.1.3 *Noise Quality Management*

Noise pollution on the nearest inhabitation due to construction activities is negligible. However noise pollution on onsite staff is expected. The same will be mitigated maintaining quality equipment and maintenance. Using of equipment that generates substantial noise will be restricted to day time only

#### **7.1.4 Land Environment**

The proposed Power Plant will not create any major impact on land environment. As soon as the construction activity is over, the surplus excavated material will be utilized to fill up low lying areas, the rubbish will be cleared and all in **disturbed** surfaces will be reinstated. Appropriate vegetation will then be planned and all such areas shall be landscaped.

#### **7.1.5 Maintenance of vehicles**

Both diesel and petrol engine vehicles will be maintained properly. Spillage will be restricted. Unauthorized dumping of waste oil will be prohibited. Wastes should be disposed off in an approved dump.

#### **7.1.6 Waste**

The solid waste shall be collected, segregated and all the combustible waste shall **be** burnt in a controlled manner.

#### **7.1.7 Storage of Hazardous Material**

The following hazardous materials need to be stored at the site during construction.

- a. Gas for welding **and cutting** purpose
- b. LDO **and HFO**
- c. Painting materials, **acids and alkalis**

All these materials would be stored as per international safety norms.

### **7.2 During operation Phase**

#### **7.2.1 Air Pollution**

99.95% efficient ESP, 220 meter height Stack, Dust suppression system, Dust extraction system will be installed and operated to the satisfactory level. Low NO<sub>x</sub> burners will be used. Space will be provided for retrofitting FGDS if necessary in future. On line continuous stack monitoring system for SPM, SO<sub>2</sub> and NO<sub>x</sub> will be installed.

#### **7.2.2 Water Pollution**

All the effluents generated will be neutralized in the neutralization tank. Then the effluent will be taken to Central Effluent Monitoring Station from where it will be used for ash wetting, green belt development  
Sewage will be treated in an anaerobic filter and then utilized for green belt development

#### **7.2.3 Noise pollution**

Noise pollution will be mitigated by adopting shock absorbing techniques –silencers, acoustic enclosures, etc. Thick green belt will be developed to attenuate the noise level. Ear plugs and earmuffs will be provided to the staff working inside the plant

#### **7.2.4 Land Pollution**

##### **7.2.4.1 Pollution due to solid waste**

Main solid waste generated is fly ash. To utilize the fly ash

- ❖ Fly ash brick manufacturing unit will be established
- ❖ Brick kiln owners around the site will be educated on manufacturing fly ash utilization

Ash ponds will be constructed with suitable impervious lining. Action plan had been evaluated for 100 % utilization of fly ash within a period of 9 years.

##### **7.2.4.2 Zero discharge**

Zero discharge will be maintained.

##### **7.2.4.3 Storm water drain**

Separate storm water drain will be constructed and maintained



## Chapter 8 - CONCLUSION

### **8.0 Conclusion**

The location of the proposed power plant was so selected based on its socio, techno economical suitability. The land required is mostly undeveloped Government & Private owners land. No major eviction of the people is expected as there are only four families are inhabited in the government land proposed for the power plant. Land proposed to be acquired from the private party directly is mainly of single crop pattern only.

The technology proposed to be adopted in the project is the conventional and reliable coal based thermal power generation followed world wide and in India

However there will be minimum environmental impact due to the project during construction and operation.

Suitable mitigation measures have already been decided based on the basis of base line study. They will be installed / commissioned prior to the plant commissioning.

The assessment indicated that negative impact will be very less with the suitable mitigation measures as proposed and are well within the national standards in terms of air, water and land environments

Hence it can be concluded that the proposed 4 X 350 MW Thermal power Plant at Uchpinda, District: Janjgir – Champa will be an environmental friendly.