

**EXECUTIVE SUMMARY OF
RAPID
ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN**

For

PROPOSED INDEPENDENT POWER PLANT
(For 1260MW coal based Power Units)
In Sapnai Gram Panchayat
Raigarh, Chhattishgarh

Of

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1. PROJECT DESCRIPTION

M/s Topworth Steels & Power Private Limited with registered office at Nariman Point Mumbai has an integrated mini steel plant with captive power plant facility at Borai Industrial Growth Center, Durg, Chhattishgarh. Having an experience in executing and running a power plant and in order to bridge the supply-demand gap of power the company intends to set up a coal based independent power plant of 1260MW capacity in the name of M/s Topworth Energy Pvt. Ltd. in the coal rich state of Chhattishgarh.

The proposed project area is located under Sapnai Grampanchayat constituting five villages namely Sapnai, Balbhadrapur, Sarbahaal, Sikosimal and Navbahal of Raigarh district, Chhattishgarh. The proposed plant is featured in Survey of India Toposheet No. 64O/9 and Latitude 21°50' to 21°60' N and Longitude 83°30' to 83°35' E (Fig-1). Plant is located at a distance of 18kms (Aerial distance) from Raigarh City. The nearest railway station is at Jamga at a distance of 3km from project site. The nearest air port at Raipur. The river Mahanadi (35km) and Sapnai Nalla(adjacent) controls the drainage of the area.

The area is situated at 250 meter above MSL. The topography of the area is plain. Hence the area does not require any leveling of the site.

The total area required for the project is 1035acres Out of the total land about 950 acres of land has already been acquired and rest is under acquisition. About 79 acres of land has been earmarked for ash pond and dykes. About 326acres of land will be utilized for green belt development. About 100acres of land will be utilized for residential colony. (fig-2)

The proposed 2x300+1x660MW coal fired power project consists of two sets of coal fired steam generator connected to a reheat type steam turbine and generator with water cooled condenser and all other auxiliaries. The steam generator will be equipped with facilities for HFO/LDO firing for start up and flame stabilization at low loads.

For the operation of the plant about 6.867tonne of coal is required which will be met from Raigarh and Korba area coal mines of SECL located at a distance of 20 to 40km respectively from the plant site. Annually about 4468KL of HFO/LDO (For Phase-I) and 4914KL of HFO/LDO (For Phase-II) is also required. About 5000m³/hr of fresh water is required for cooling and other plant activities. The plant is based on zero discharge base technology. Hence the total water will be re-circulated within the plant.

It is estimated that about 2.7 million tonne/annum of ash will be generated from the power plant out of which about 70% of the ash is fly ash and 20% is bottom ash. Additional margin of ten (10) percent will be considered for designing the Ash handling plant over and above the anticipated ash generation rates. The bottom ash will be collected in slurry form and will be disposed to ash pond which will be utilized for land fill and road making. Fly ash will be collected in dry form and will be stored in RCC silos. M/s Topworth Steels and Power (P) Ltd. has proposed to set up a Cement manufacturing Plant namely M/s Topworth Cement Private Limited. The fly ash to be

generated in the proposed IPP of M/s Topworth Energy (P) Ltd. will be utilized in TCPL for manufacturing cement.

The project belongs to 'A' category of screening. The estimated project cost of the IPP is about Rs. 3499.25 Crores for Phase-I and about Rs 3101.95 Crores for Phase-II.

Due to the project about 850 people will be employed directly. Hence the project has got the TOR from MoEF, GOI for preparation of REIA/EMP and report being prepared for public hearing. This is the summary of the report.

2. DESCRIPTION OF THE ENVIRONMENT

The total area required for the project is 1035 acres. Out of the total land about 950 acres of land has already been acquired and rest is under acquisition. The area is located in Sapnai Grampanchayat constituting five villages namely Sapnai, Balbhadrapur, Sarbahaal, Sikosimal and Navbahal. The proposed project area belongs to shrub forest category.

The buffer zone constitutes 34 villages covering an area of 314 sq. km. The land-use pattern is as follows.

Land-use Pattern Buffer Zone

Sl. No.	Type of Land	Area	
		in Sq.Km	%
1.	Settlement	1.3	0.414
2.	Agricultural Land	116.1	36.975
3.	Dense Forest	72.1	22.962
4.	Open Forest	40.7	12.962
5.	Scrub Forest	20.7	6.592
6.	Tree Clad Area	30.2	9.618
7.	Dense Scrub Land	23.1	7.357
8.	Open Scrub Land	6.6	2.102
9.	Eroded Land	0.5	0.159
10.	Water Bodies	1.6	0.510
11.	River	0.7	0.223
12.	Railway	0.4	0.127
Total		314.0	100.000

The district Raigarh enjoys a subtropical climate. The normal average rainfall of the district is 1584 mm. The annual temperature varies from 7°C (winter) to 46.2°C (summer). During the study period (from December 2009 to February 2010), temperature recorded was from 7.5°C to 37.1°C while the relative humidity varied from 23% to 94%. The predominant wind direction varied between NW-ENE directions. The predominant direction was from North. (fig.3)

For the environmental analysis, meteorological, air, noise, dust fall, water and soil qualities are analysed during the study period of winter season within 10 kms radius. Ten locations were fixed for each of air, noise and dust fall, five locations for each of ground water and surface water. For soil quality five locations were fixed. (Fig 4)

The CPCB value for rural and residential areas for PM₁₀, PM_{2.5}, SO₂, NO_x, CO and O₃ are 100, 60, 80, 80, 2000 and 100µg/cum respectively. From the study it is observed that PM₁₀ conc. varied from 34µg/cum. to 55µg/cum, PM_{2.5} conc. from 14µg/cum. to 24µg/cum, SO₂ from 7 µg/cum. to 14µg/cum and NO_x from 8 µg/cum. to 16µg/cum. The concentration of CO was less than 1000µg/cum and the concentration of Ozone (ground level) is below detection level. All the air quality parameters are well within the prescribed standards of CPCB are for residential / rural areas. The analysis results are presented below.

Air Sample Analysis Result

Station Codes	Stations		Microgram/ cubic meter			
			PM ₁₀	PM _{2.5}	SO ₂	NO _x
A ₁	Sarbahal Village	Max	53	22	11	15
		Min	36	14	8	9
		Average	43.1	18.2	9.4	11.7
		98Percentile	51.3	21.8	11.0	14.6
A ₂	Sapnai village	Max	54	21	11	14
		Min	35	14	8	8
		Average	43.4	18.0	9.0	10.6
		98Percentile	53.0	21.4	10.5	14.1
A ₃	Sikosimal Village	Max	53	21	12	15
		Min	42	16	8	9
		Average	45.9	18.5	9.8	11.6
		98Percentile	52.1	20.8	11.7	15.3
A ₄	Balbhadrapur	Max	49	20	11	13
		Min	35	15	7	8
		Average	41.4	17.4	9.4	10.2
		98Percentile	48.4	20.3	11.3	12.2
A ₅	Manuapali	Max	49	22	12	15
		Min	34	14	8	8
		Average	41.4	17.3	9.6	11.7
		98Percentile	48.7	20.6	11.9	15.1
A ₆	Jamga	Max	55	23	13	16
		Min	44	18	8	9
		Average	47.7	20.0	10.1	12.3
		98Percentile	53.3	23.0	12.7	15.8
A ₇	Banbahali	Max	47	20	10	11
		Min	38	16	8	9
		Average	42.8	18.2	8.9	9.9
		98Percentile	47.0	20.4	9.8	10.8
A ₈	Arbahal	Max	48	22	12	14
		Min	36	15	8	9
		Average	41.6	18.2	9.8	10.2
		98Percentile	47.2	21.3	12.0	13.7
A ₉	Deobahal	Max	50	24	12	12
		Min	37	16	8	9
		Average	43.7	19.4	10.2	10.5
		98Percentile	49.8	23.6	12.3	12.0

A ₁₀	Ramalata	Max	55	24	13	12
		Min	38	16	7	8
		Average	44.4	18.8	10.5	10.4
		98Percentile	52.6	23.1	13.1	12.2
A ₁₁	Beheramunda	Max	53	22	14	13
		Min	40	17	8	9
		Average	45.6	19.3	11.0	10.7
		98Percentile	51.4	22.1	13.5	12.3
A ₁₂	Mahuapali	Max	54	23	14	12
		Min	40	16	8	9
		Average	46.2	19.5	11.2	10.4
		98Percentile	52.8	22.6	14.0	11.9

The vehicular movement and other plant operations are the main noise sources during the study period. The noise level ranges from 31dBA to 53.4dBA and 30.1dBA to 39.6dBA during the day night respectively which is within the prescribed limit.

Soil Sample Analysis Report Season: Winter

Parameters	Units	S ₁	S ₂	S ₃	S ₄	S ₅
pH	----	6.3	6.4	6.9	5.9	6.7
Specific Conductance	μS/cm	105	110	125	116	115
Nitrogen	ppm	20	14	19	20	13
Phosphrous	ppm	7	10	19	11	13
Potassium	ppm	14	10	16	24	11
Sulphur	ppm	5	7	10	8	9
Bulk density	gm/c.c	1.25	1.34	1.29	1.54	1.39
Organic matter	%	0.91	1.15	0.95	0.71	0.64
Texture	--	Clayey sand	Sandy clay	Sand-loam clay	Clayey sand	Sand-loam clay
Chloride	%	0.01	0.03	0.05	0.02	0.01
Sand	%	54.3	43.5	37.9	63.7	27.8
Silt	%	17.3	20.0	23.2	8.4	43.6
Clay	%	28.4	36.5	38.9	27.9	28.6
Porosity	%	54.4	50.4	48.8	39.6	50.5
Water holding	%	40.5	49.3	38.7	28.6	44.6
Organic carbon	%	0.53	0.67	0.55	0.41	0.37

Soil Analysis Station

S₁: Project area, S₂: Sapnai Village, S₃: Balabhadrapur, S₄: Kumbahal, S₅:Naubahal

Ground water samples were collected from tube wells and surface water samples were collected from streams, reservoir, pond and nala and analysed. The ground water samples were analysed with IS 10500 and surface water as per IS 2296 using IS code 3025 methodology. From the analysis results, it is observed that the water quality is safe for drinking, agriculture and other purposes. The analysis results are presented below.

Surface Water Analysis Results

Season: Winter

Standard : IS 2296, Class – A, Inland Surface Water

Sl. No	Parameters	Units	Standards	SW ₁	SW ₂	SW ₃	SW ₄	SW ₅
1	pH	---	6.5 - 8.5	7.01	7.13	7.09	7.55	7.11
2	Colour	---	Colour less	Colourless	Colourless	Colourless	Colourless	Colourless
3	Odour	---	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
4	Total suspended solids	mg/l	----	2.1	3.6	2.0	2.4	2.2
5	Total dissolved solids	mg/l	1500	221.3	255.9	282.3	261.3	257.3
6	Total residual chlorine	mg/l	0.2	BDL	BDL	BDL	BDL	BDL
7	Total Kjeldahl nitrogen as N.	mg/l	----	2.7	2.5	2.0	1.5	2.0
8	Free ammonia as NH ₃	mg/l	50	0.1	0.11	0.23	0.69	0.34
9	COD	mg/l	----	2.13	2.42	4.31	3.12	3.74
10	BOD (5 days as 20°C)	mg/l	3 (max)	0.5	0.3	0.1	0.2	0.1
11	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL
12	Mercury as Hg	mg/l	----	BDL	BDL	BDL	BDL	BDL
13	Lead as pb	mg/l	0.1	BDL	BDL	BDL	BDL	BDL
14	Total chromium as Cr.	mg/l	2.0	BDL	BDL	BDL	BDL	BDL
15	Hexavalent Chromium as Cr ⁺⁶ .	mg/l	0.05	BDL	BDL	BDL	BDL	BDL
16	Copper as Cu.	mg/l	3.0	BDL	BDL	BDL	BDL	BDL
17	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL
18	Zinc as Zn.	mg/l	15	BDL	BDL	BDL	BDL	BDL
19	Selenium as Se.	mg/l	0.05	BDL	BDL	BDL	BDL	BDL
20	Nickel as Ni.	mg/l	----	BDL	BDL	BDL	BDL	BDL
21	Boron as B.	mg/l	2.0	BDL	BDL	BDL	BDL	BDL
22	Cyanides as CN.	mg/l	0.05	BDL	BDL	BDL	BDL	BDL
23	Chlorides as Cl.	mg/l	600	6.30	9.03	19.13	9.16	8.32
24	Nitrates as NO ₃	mg/l	50	0.45	1.1	0.7	0.8	0.6
25	Fluorides as F.	mg/l	1.5	0.3	0.2	0.5	0.3	0.3
26	Dissolved phosphates as PO ₄	mg/l	5.0	0.1	0.1	0.6	0.1	0.4
27	Sulphate as SO ₄	mg/l	400	7.2	6.6	8.3	7.6	8.5
28	Sulphides as S	mg/l	2.0	BDL	BDL	BDL	0.1	0.3
29	Iron as Fe.	mg/l	5.0	0.26	0.30	0.17	0.25	0.12
30	Silica as SiO ₂	mg/l	----	1.23	1.39	2.10	1.97	2.41
31	Phenolic compounds	mg/l	0.005	BDL	BDL	BDL	BDL	BDL
32	Residual pesticides	mg/l	Absent	BDL	BDL	BDL	BDL	BDL
33	Percent Sodium	mg/l	60(Max)	5	6	23	5	6
34	Calcium as Ca.	mg/l	75	13	8	6	7	8
35	Magnesium as Mg.	mg/l	30	8	5	7	5	10

BDL refers to “Below Detection Level”

Surface Water Sampling Locations

SW1 : Sappnai Nalla up stream

SW2 : Sappnainalla Down Stream

SW3 : Bagjharan Nalla

SW4 : Balabhadrapur Pond

SW5 : Kur Nalla

Ground Water Analysis Results

Season : Winter

Standard : IS 10500

Sl. No	Parameters	Units	Standards	GW ₁	GW ₂	GW ₃	GW ₄	GW ₅
1	Colour	----	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless
2	Odour	----	Odourless	Odourless	Odourless	Odourless	Odourless	Odourless
3	pH	----	6.5-8.5	7.05	7.06	7.10	7.04	7.06
4	Dissolved oxygen	mg/l	3.0 (min)	4.26	5.69	4.69	5.67	6.34
5	T.D.S	mg/l	500	40.96	55.22	51.36	50.67	78.94
6	Suspended solid	mg/l	----	2.36	6.24	2.37	2.54	4.31
7	Chloride as Cl	mg/l	250	6.5	5.2	8.9	5.6	6.2
8	Sulphate as SO ₄	mg/l	200	7.2	6.3	8.1	6.4	7.1
9	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL
10	Fluoride as F	mg/l	1.0	BDL	BDL	BDL	BDL	BDL
11	Phosphate as PO ₄	mg/l	----	0.35	0.74	0.09	0.15	0.24
12	Amonia as NH ₃	mg/l	----	BDL	BDL	BDL	BDL	BDL
13	Boron as B	mg/l	1.0	BDL	BDL	BDL	BDL	BDL
14	Calcium as Ca	mg/l	75	5.2	4.0	5.1	7.3	3.1
15	Magnesium as Mg	mg/l	30	14.3	12.6	11.9	14.6	12.3
16	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL
17	Barium as Ba	mg/l	----	BDL	BDL	BDL	BDL	BDL
18	Cadmium as Cd	mg/l	----	BDL	BDL	BDL	BDL	BDL
19	Total Chromium	mg/l	----	BDL	BDL	BDL	BDL	BDL
20	Hexavalent Chromium	mg/l	----	BDL	BDL	BDL	BDL	BDL
21	Copper as Cu	mg/l	0.05	BDL	BDL	BDL	BDL	BDL
22	Iron as Fe	mg/l	0.3	0.06	0.12	0.08	0.07	0.05
23	Selenium as Se	mg/l	0.01	BDL	BDL	BDL	BDL	BDL
24	Silver as Ag	mg/l	----	BDL	BDL	BDL	BDL	BDL
25	Zinc as Zn	mg/l	5.0	BDL	BDL	BDL	BDL	BDL
26	Phenol	mg/l	0.001	BDL	BDL	BDL	BDL	BDL
27	Pesticides	mg/l	Absent	BDL	BDL	BDL	BDL	BDL
28	Radioactive substance	mg/l	----	BDL	BDL	BDL	BDL	BDL

BDL refers to "Below Detection Level"

Ground Water Sampling Locations

GW1 : Sarnai Village dug well GW2 : Balbhadrapur bore well

GW3 : Niranjanpur dug well GW4 : Sikosimal dug well

GW5 : Naubahal bore well

Trees like Khaira, Hiwar, Haldu, Bela, Maharukh, Kala Sirisa, Chichwa, Karahi, Pasi, Dhaora, Kardhai, Kandamba, Neem, Amti, keolar, Asta, Kachnar, Semal, Tad, Kasai, Salai, Chiraonji, Palasa etc., shrubs such as Gunja, Chil Badi, Chil Choti, Shatoori, Mahul, Nasbel, Palasbel, Bet, Waghoti, bushes namely Chirchira, Akol, Bhui Neem,

Khatua, Shatosi, Banakpas, Aak, karonda, Panwar, Takhad etc flora species are predominantly found in the study area. Among faunas species like Chuchundar, Chuha, Gilhari, Jangli Billi, Khargosh, Siyar, Lomri, Newala , Sahi, Suar etc are found in the study area. There is no rare and endangered flora and fauna species found in the study area.

3. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The biodiversity of the area will not be affected to a large extent. Plantation shall be carried out with the selected local species. Project operations can cause more beneficial impacts than adverse impacts on the environment. The adverse impacts are proposed to mitigate. The expected beneficial impacts on the society are Health, Population/Migration, Employment, Literacy, Services and Aesthetic sense. Communication, education, medical, power and employment facilities will be improved.

Plant operations will generate dust, ash and gaseous pollutants. It is anticipated that increment impact will be within the prescribed limit. Further mitigation measures like water sprinkling and plantation will reduce the pollution level in the area.

The proposed power plant will be designed to recycle most of the water. Thus effective discharge from plant to outside will be negligible. Therefore, it will not affect the water quality of the region. It is estimated that, about 5000cum/hr of water will be required and 18,500m³/hr of water shall be recycled per day. The domestic and sanitary waste water from plant site will be treated in septic tank and soak pit to make it eligible for gardening.

It is estimated that about 2.7 million tonne/annum of ash will be generated from the plant. Out of which 70% is fly ash and 20% is bottom ash.

The bottom ash proposed to be generated from the power plant will be disposed in wet slurry form to the ash dyke. About 79acres of land has been indentified near the plant site for ash disposal area and ash dykes. It is proposed to handle the fly ash separately by collected them in dry form and it will be collected in RCC silos. It could be transported to cement manufacturing company in closed trucks for commercial utilization. Fly ash being a high temperature product has pozzolonic properties and forms cement like material. M/s Topworth Steels & Power (P) Ltd. has proposes to establish a cement plant in which the ash generated in the power plant will be utilized.

4. ENVIRONMENT MONITORING PROGRAMME

An environmental monitoring cell will be formed for regular environmental assessment on air, water, noise and soil qualities at nearby area around the plant. Four permanent Air quality stations will be fixed as per the SPCB guidance to monitor the AAQ in quarterly basis. Quarterly water samples of ground water and surface water shall be collected and analyzed. Noise level monitoring at Noise generating points and AAQ locations shall be done in quarterly basis.

5. ADDITIONAL STUDIES

Additional studies on public consultation, risk assessment with disaster management plan and social impact assessment are done and will be monitored at regular intervals. Special attention will be given on the identification of hazardous processes and preventive measures for the disaster supposed to occur by them.

6. PROJECT BENEFITS

Due to industrialization, the consumption of power has been increased. By installing the proposed project, cheap, adequate and uninterrupted power supply will be done which will help in development of industrial, agricultural & private sectors as well. The process of development will have maximum impact on the lifestyle of the local people. The project and the consequent peripheral industrial economy will generate income to the local and migrating people, which will increase the aggregate demand. This demand will get realized in the market and will finally, lead to the market expansion in the locality of the project. Market expansion supported by expected infrastructural developments e.g. roads, electricity, water supply etc. is expected to foster the economic development in the entire area.

7. ENVIRONMENT MANAGEMENT PLAN

The Environmental Management Cell will be responsible for statutory body liaisoning and environmental monitoring and analysis. On line monitoring facilities will be provided for each stack. Due to the proposed IPP of M/s Topworth Energy (P) Ltd., the following impacts may be felt. In order to minimize the impact on air environment the following measures shall be adopted

Air and noise quality might be affected during several processes, emission, increase of vehicular traffic, loading, unloading, storing and handling. Effluent water may affect ground and surface water. Due to erection of the plant some more land shall utilized. Up-coming of the plant in a barren land the impact on land is marginal. Employment facility with infrastructural facility shall improve both directly and indirectly.

Following measures will be undertaken to mitigate the impact on the environment.

Green belt development

A green belt of 100 meter will be developed all along the plant boundary. About 326 acres i.e. 131.93ha of land shall be used for plantation purpose. The Following attributes shall be considered for selection of plant species.(fig 5)

- Locally available
- Fast growing and deep rooted
- Wind firm and dense canopy
- drought resistance and long life
- Tolerance to Particulate matter, SO₂ and NO_x

Air

- The stack height will be kept at 275m, to minimize the impact on ground level
- Rotating Fixed sprinkler at dust generating point

- Maintenance of machineries at regular intervals
- Black topped service road

Water

- It will be recycled after proper treatment to minimize the water loss and requirement of fresh water.
- No waste water shall be discharged to the natural drainage

Noise

- All the service roads shall be black topped to control noise pollution
- Providing ear muff to the workers
- Provision of green belt

Solid waste

The main solid waste from the thermal power plant is ash. It has been proposed that fly ash will be collected dry, stored in silos and will be used for brick making, cement manufacturing, road making and repairing etc. Bottom ash removed hydraulically will be disposed in the ash pond surrounded by plantation and there will be a cover of water to prevent any dispersion of ash from ash pond. Coal mill wastes will be stored inside the plant. Metallic junks, hazardous wastes like spent oil etc. will be sold to dealers. No direct disposal of solid wastes will be done.

Land

- Plantation shall be carried out around the plant site to over come land degradation

Socio-Economic

- Care shall be taken to minimize any adverse socio-economic impact on the near by people
- Care shall be taken to improve the educational level of the people.
- Employment priority shall be given to the local people.
- Health check-up camps shall be done by the plant authority

It can be seen from the submission of the facts that the proposed project will have negligible negative through sustainable impact on the environment of the area.. However as discussed in comprehensively in order to ensure that these are either eliminated or reduced to the minimum.

The proposed IPP with an investment of about Rs. 3499.25 Crores for Phase-I and about Rs 3101.95 Crores for Phase-II is envisaged giving a major economic boost to the area in the socio-economic development and fulfilling the power requirement of the country. The infrastructural and other public amenities in the region also develop. This development will further generate employment and elevation of socio-economic status of the local population.