



NAVA BHARAT VENTURES LTD

EXECUTIVE SUMMARY

**FOR PROPOSED 1 X 64 MW COAL BASED
THERMAL POWER PLANT**

**AT- KHADAGPRASAD,
DIST: DHENKANAL, ORISSA**

Report Prepared by



S.S Environics (India) Pvt. Ltd

An ISO 9001: 2008 Certified Company

Plot No : 361/2314 "Sustenance"

At/P.O : Patrapada, Dist : Khurda, Bhubaneswar-751019

EXECUTIVE SUMMARY

1.0 INTRODUCTION

M/s Navabharat Ventures Limited (NBVL), Kharagprasad proposes to commission 64 MW coal based power plant at at Khadagprasad in Dhenkanal district of Orissa. The proposed project site has Latitude: 20 ° 48' 37" North and Longitude: 85° 17' 32" East. The nearest major town is Angul which is about 25 km from the project site.

M/s S.S. Environics (India) Pvt. Ltd., (SSE), Bhubaneswar, has been retained to carry out Environment Impact Assessment (EIA) study and to prepare Environment Management Plan (EMP) for the proposed coal based power plant The study has been carried out as per the guidelines of Ministry of Environment & Forests (MOEF) and Orissa Pollution Control Board (OPCB).

The proposed project is designated to be developed under the Environmental Impact Assessment (EIA) Notification and amendments under Environment (Protection) Act (EPA), 1986. Proposed project falls under "Category B" as per the notification issued on 14th September 2006 by MOEF. As the first step of the notification issued on 14th September 2006, SEAC, Orissa has issued terms of reference (TOR) for carrying out the EIA/EMP study vide letter No – 65/SEAC/27 dated 11th Sept' 2009 based on the duly filled Form 1 along with pre feasibility report submitted and subsequent presentation made to State Expert Appraisal committee (SEAC), Orissa.

2.0 PROJECT DESCRIPTION

□ Land Requirement

The details of land envisaged to be procured for the proposed project are as per given below:

Sl. No.	Particulars	Area in Acre			Total Plant after proposed expansion
		Existing		Proposed	
		Ferro Alloys Plant (2X22.5MVA)	Power Plant (1X30 MW + 1X64 MW)	Power Plant (1X64 MW)	
1.	Plant Built Up	7	24	09	40
2.	Raw Material Storage	3	17.3	08	28.3
3.	Water System	2	4.6	10	16.6
4.	Road	1.79	2.5	03	7.29
5.	Green belt	9.5	29.7	20	59.2
6.	Solid Waste Disposal	6	*	*	6
7.	Ash Handling System	--	12	10	22

Sub –Total	29.29	90.1	60	179.39
*Ash Disposal	--	47.49	36.90	84.39
Total	29.29	137.59	96.90	263.78

Proposed land is undulating with 60 m above mean sea level (MSL) and is predominantly agricultural land. The land proposed for the thermal power plant is an agricultural land; it is further converted to industrial land.

□ **Plant Details**

The main facilities/machinery envisaged for the proposed project is summarized hereunder:

- One number coal fired, Atmospheric Fluidised Bed Combustion type steam generator of capacity 260 TPH each, generating steam at 93 bar and 535±5⁰C.
- One Electrostatic Precipitators
- One Chimney
- Coal Handling Plant
- Ash Handling Plant
- One (1) no of extraction cum condensing steam turbine of capacity 64 MW. The regenerative cycle for the turbine will consist of two (02) nos. LP heaters, one (1) deaerator and two (2) HP heater.
- Closed Cycle Cooling Water System
- Water Cooled Condenser Type

□ **Raw Material**

The coal and water are the main raw material for the proposed project and details for the same are summarized hereunder:

Sn	Raw Material	Quantity	Source	Mode of Transport
1	Coal	1656 tpd	Talcher Coalfield	Road
2	Water	5700 m ³ /day	Brahmani River	Pipeline

□ **Manpower**

The total manpower envisaged for the proposed power plant is 81.

□ **Project Cost**

Total estimated cost of the project is Rs 253.44 crores.

3.0 DESCRIPTION OF THE ENVIRONMENT

Air Environment: Micrometeorological data were collected with respect to wind speed, wind direction, humidity, rainfall and temperature and ambient air quality monitoring was carried out at a total of 11 locations including one station at core zone. During the study period, the temperature varied from 18.7 to 44.9⁰C and relative humidity varied from 14 to 27%. The maximum wind speed observed during the study period was 17.1 m/s with average wind speed of 1.53 m/s & the predominant wind direction recorded was from South.

The concentrations (µg/m³) of suspended particulate matter (SPM). Respirable SPM (RSPM), SO₂, NO_x & Mercury (Hg) in the core zone as well as buffer zone on a 24 hourly basis are in the range of 49 - 231 µg/m³, 18 - 89 µg/m³, BDL – 8.60 µg/m³, BDL-20.10 µg/m³ & Not

detectable respectively. These values are well below stipulated standards of CPCB. Dust fall rate in the study area ranged from 0.18- 0.23 gm/m²/day.

Water Environment: To assess the water quality, water samples were collected from 8 locations with 4 locations from surface water and 4 locations from ground water. Water samples were analysed for physio-chemical, bacteriological and biological characteristics. Values of physico-chemical parameters for surface and ground water were observed to be below the stipulated standards. In surface water, the density of total coliforms (470-2200 MPN/100 ml) was comparable to any normal water quality with slight organic contamination in surface water near villages. The surface water resources are compared with the standard for drinking water standard (IS: 10500).

Noise Environment: Ambient noise monitoring was carried out in the study region at five locations. The noise levels in residential area are in the range of 51.6 – 56.6 dBA at day time and 41.6 – 44.2 dBA at night time respectively. The noise levels in Industrial area like NBVL plant is 66.7 dBA during Day time and 55.3 dBA during night time.

Land Environment: Soil samples were collected from 4 locations from study area and analysed for physico-chemical status, nutrient status. Texture of soil: sandy loam t two locations and loam at rest two locations, Bulk density- 1.33 – 1.51 g/cm³, porosity – 16.7- 18.9 %, Normal soil: Moderately acidic soils (pH 6.2 -6.8), total nitrogen, sulphate and potassium were found to be in the range of 0.060 -0.081 %, 0.11 – 0.15 %, 0.02 -0.08%. Using satellite imagery, the land use pattern of the study area have been studied and discussed in detail in chapter 3 of EIA/EMP Report.

Biological Environment: A detailed survey has been carried out to assess the floral and faunal species present in the study area. The list of flora and fauna observed during the field visit is presented in chapter 3 of EIA/EMP Report. It is observed that primarily semi-evergreen type with predominant tree species are Amba (*Mangifera indica*), Sisso (*Dalbergia sisso*), Babool (*Acacia nilotica*), Bara (*Ficus bengalensis*), Bel (*Aegle marmelos*), Eucalyptus (*Eucalyptus globules*) etc. In addition there are patchy Sal forest, teak plantation, thorny bamboo brakes (*Bambusa bambos*) and scrub vegetation dominated. In settlement areas there are number of Orchard species and plantations.

Among the mammals Barha, Bilua, Badudi, Gunduchimusa, Mankada, Neula & Thekua are common in the study area. The reptiles like Endua, benga, chiti, champeineula, dhandu, dhamana and rana are commonly found. And the birds like baga, baya, bani, dhamarakau, gharachatia, koili, kopata, kajalapati and damarakua are found in the study area.

Socio-economic Environment: Demographic Structure of Study Area: Population: 81217, Sex ratio: 975 females/1000 males, Literacy rate: 60.56%, Scheduled caste: 21.72%, schedule tribe : 1.91%. Infrastructure: moderately good.

4.0 ANTICIPATED ENVIRONMENT IMPACTS & MITIGATION MEASURES

□ Land Use Pattern

About 60 acres of total land proposed for thermal power plant; which is already been acquired is unirrigated agriculture land for single crop only.

□ Ecology

The overall impact on the terrestrial ecology can be considered positive, as green belt, will be developed and maintained by NBVL in the area. Out of total area of 60 acres an area of about 33% area has been kept for green belt development/plantation within the proposed plant premises.

□ **Air Quality**

The details of air pollution generation and its management during operation are given hereunder:

Sn	Particulars	Sources	Parameter	Control/Treatment
1	Stack emission	Boilers	SPM, SO ₂ , NOX & CO	1. ESP with designed outlet dust concentration of 100 mg/Nm ³ ; 2. Stack height is 100 m which is larger than the value as per $14Q^{0.3}$, where Q is the SO ₂ generation in Kg/hr; 3. A well-designed AFBC system to limit the core flame temperature to keep the NOx concentration equal to less than 750 mg/Nm ³ ; 4. Keeping a positive oxygen balance; and
		DG sets		1. Stack height as prescribed by MoEF
2	Fugitive Emission	Crushers and ash storage in silo	SPM	1. Bag filters with designed outlet dust concentration of 100 mg/Nm ³
		Transfer points during collection and transportation of coal and ash		1. Bag filters with designed outlet dust concentration of 100 mg/Nm ³ 2. Pneumatic conveying system for fly ash transportation 3. Water sprinklers and spray system
		Storage of Coal & Ash		1. Water sprinklers and spray system
3	Thermal Emission	Boilers and pipelines used for steam	Heat	1. Adequate thickness of insulating material with proper fastening shall be provided

Prediction of Incremental Ground Level Concentrations (GLCs) of particulate matter and SO₂ is made by using Industrial Source Complex Short Term Model Version-3 (ISCST 3) software developed by US Environmental Protection Agency (USEPA). The findings of the same are summarized in the table as given hereunder:

Sn	Pollutants	Predicted ground level Concentration due to Operation of proposed Plant (µg/m³)
1	SPM	0.06907
2	SO ₂	1.32611

□ **Water Resources**

During the operation of proposed project, the total water requirement shall be 5700 m³/day. River Brahmani is considered to be the source of fresh water for the proposed

project. The water shall be withdrawn through an intake pump house and transported through pipeline from Brahmani River i.e. at about 3.0 km from the plant site.

Investigations (refer chapter 3) indicate that plenty of surface water is available in the study area. The permission for withdrawal of water is in the process. The withdrawal of water resources during the operation phase will not have significant impact on the water resources of the area.

□ **Water Quality**

The waste water treatment and management plan is developed with zero discharge concepts. The salient features of the envisaged waste water management are as follows:

Sl. No.	Particulars	Generation Rate in m³/day
1	Cooling Blow Down	1526.0
2	Boiler Blow Down	169.0
3	Raw water treatment (Filtration back wash)	120.0
4	Softener effluent	624.0
5	DM Plant effluent	18.0
6	Service	140.0
7.	Domestic	20.0
Total		2617.0

The demineralizing process would generate alternatively acidic and alkaline effluents during regeneration of exchangers. These effluents would be neutralized in a neutralization basin and neutralized effluent water would be discharged into an equalization basin termed as guard pond.

□ **Solid Waste**

The details of main solid waste generation and management are summarized hereunder:

Sn	Type of Waste	Source	Quantity	Disposal
1	Fly Ash	AFBC	240000 TPA (@ 365 days per annum)	<ul style="list-style-type: none"> • Manufacturing of cement, bricks / blocks for captive use and sale. • Disposed off both in dry and conditioned format ash mound at Nimidha and Abandoned quarry at South Bolanda

2	Bottom ash		60,000 TPA (@ 365 days per annum)	Disposed off for own brick making plant
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□ **Occupational Health & Safety**

During operation phase, dust causes the main health hazard. Other health hazards are due to gas cutting, welding, noise and high temperature and micro ambient conditions especially near the furnace doors and platforms which may lead to adverse effects (Heat cramps, heat exhaustion and heat stress reaction) leading to local and systemic disorders. Injuries in industries are usually of minor nature like bruises, cuts, and abrasions because of manual handling. However, serious accidents due to common reasons like fall from height and entrapment of limbs in machinery are also possible. The following measures are envisaged:

- Adequate arrangements are made for preventing the generation of dust by modifying the chutes at transfer points for reducing the falling height of material, preventing spillage of material by maintaining the handling equipment, isolating the high dust generating areas by enclosing them in appropriate housing and appropriately dedusting through high efficiency bag filters;
- Almost all material handling systems are automatic i.e. unmanned. The workers engaged in material handling system are provided with personal protective equipment like dust masks, respirators, helmets, face shields, etc.;
- Any worker found to develop symptoms of dust related diseases is changed over to other jobs in cleaner areas;
- **General Health Measures**
 - a) Sanitary facilities shall be well equipped with supplies (e.g., protective creams) and employees shall be encouraged to wash frequently, particularly those exposed to dust, chemicals or pathogens;
 - b) Ventilation systems shall be provided to control work area temperatures and humidity;
 - c) Pre-employment and periodic medical examinations shall be conducted for all personnel, and specific surveillance programs instituted for personnel potentially exposed to health hazards.
- **General Safety Measures**
 - a) Conveyors and similar machinery shall be provided with a means for stopping them at any point;
 - b) Shield guards or guard railings shall be installed at all belts, pulleys, gears and other moving parts;
 - c) Elevated platforms and walkways, and stairways and ramps shall be equipped with handrails, toeboards and non-slip surfaces;
 - d) Electrical equipment shall be grounded, well insulated and conform with applicable codes;
 - e) Employees shall be provided with hard hats, safety boots, eye and ear protection, and snug fitting gloves as appropriate;
 - f) Masks and dust-proof clothing shall be provided to personnel working in areas with high dust levels; and

- g) Procedures shall be strictly enforced for the storage, handling, and transport of explosives, flammable and hazardous materials.

5.0 ENVIRONMENT MONITORING PLAN

The recommended frequency and parameter of environment monitoring for the proposed project is given below during construction and operation. However, proposed monitoring programme shall be modified as stipulated by MOEF/OPCB:

Monitoring Plan during Construction

Sn	Component	Parameter	Locations	Frequency
1		TSPM, RSPM, SO ₂ , NO _x , CO	3-4 locations at the boundary of premises	12 hourly samples, twice in a week
2	Waste Water	pH, TDS, SS, BOD ₃ , COD, Oil & grease and Heavy metals	Storm water at various collection point	Once in a month
3	Noise Level	Hourly Leq	3-4 locations within the premises	Continuously during working hour, twice in a week

Monitoring Plan during Operation

Sn	Component	Parameter	Locations	Frequency
1	Ambient Air	TSPM, RSPM, SO ₂ , NO _x , CO	3-4 locations at the boundary of premises	12 hourly samples, twice in a week
2	Fugitive emission	TSPM, RSPM	8-10 locations dust processing units	8 hourly samples, twice in a month
3	Stack	TSPM, SO ₂ , NO _x , CO	All stacks attached to units where combustion take place	Once in three month
		TSPM	All stacks attached to dust generating units	Once in three month
4	Noise Level	Hourly Leq	At the boundary of the plant premises	Once in two week for 24 hours
5	Waste Water	pH, Temperature, TDS, SS BOD ₃ , COD, Oil & grease & heavy metals	At outlet of ETP	Once in three months
		As per GSR 422 (E) for inland surface water	At outlet of STP	Once in three months

NBVL shall developed in-house monitoring & testing facility to the possible extent, otherwise, shall hire the external agency for the same. Proposed monitoring and testing shall be carried out as per the methods recommended by CPCB/OPCB.

6.0 ADDITIONAL STUDIES

The following additional studies have been carried out with respect to the proposed power plant.

- Risk Assessment & Mitigation measures
- Rain water harvesting structures

7.0 BENEFITS OF PROJECT

□ Economic Growth

Increased power generation shall in general result in overall industrial growth, which in turn would generate direct and indirect opportunities of employment and business in the region. Increase in industrial growth would result in payment of applicable various types of taxes to the Government that will have positive regional impacts.

□ Employment

Establishment or expansion of any industrial activities, results in industrial growth, which in turn would generate direct and indirect opportunities of employment. As per estimate, total manpower envisaged during the operation of the proposed power plant shall be 81.

In addition to above, casual labour shall also be required during operation phase on regular basis. The unskilled labour shall be by and large recruited from the local area and for others and preference shall be given to locals on the basis of availability of skill.

In addition to direct employment, proposed project shall generate a number of indirect job opportunities on local and regional basis. The indirect employment opportunities mainly includes more industrial growth, transportation of coal, supply of essential commodities, feeding to families migrated from outsides, casual labour etc.

8.0 ENVIRONMENT MANAGEMENT PLAN

□ Environment Management Cell

It is necessary to have a permanent organizational set up charged with the task of ensuring effective implementation of all identified mitigation measures. Conscious of this, **NBVL** has created a Cell consisting of officers from various disciplines to coordinate the activities concerned with the management and implementation of the environmental control measures during construction and operation phase of the proposed power project and it will develop a well-documented system to monitor and control pollution.

Basically, this department shall undertake monitoring and auditing of the environmental pollution levels by measuring fugitive emissions, ambient air quality, water and effluent quality, noise level etc. and safety issues, either departmentally or by appointing external agencies wherever necessary. In case, the monitored results of environmental pollution shall be found exceeding the allowable values, the Environmental Management Cell suggests remedial actions and gets these suggestions implemented through the concerned plant authorities. The Environmental Management Cell shall also co-ordinates all the related activities such as collection of statistics w.r.t health of workers and population of the region, afforestation and green belt development.

□ **Cost of Environment Management Plan**

The details of estimated capital and recurring cost of the proposed environmental management plan are as per given hereunder:

Sl. No	Particulars	Capital Investment (Rs. in lacs)	Recurring Investment (Rs. in lacs)/Annum
1	Air Pollution Control	8500	280
2	Water Pollution Control	1500	138
3	Noise Pollution Control	750	01
4	Solid Waste Management	400	92
5	Environment Monitoring & Management	110	10
6	Occupational Health	225	04
7	Green Belt	510	50
Total		11995	575