
M/s. The India Cements Ltd.,
Sankarnagar

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Narnamalpuram village
Tirunelveli Taluka
Tirunelveli District

Executive Summary of

48 MW Captive Thermal Power Plant

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EXECUTIVE SUMMARY

INTRODCUTION

M/s.India Cements Limited (ICL) a pioneer in cement manufacturing process, is involved in the captive power generation through the Coromandel Electric Company Limited (CECL) - a natural gas based power plant at Ramanathapuram district and wind turbines at Palladam and Thevarkulam. Still the power requirements of ICL plants are more than the present captive power generation arising from CECL and wind turbines. In order to fill the gap, ICL is proposed to set up a coal based power plant with the capacity of 48MW with in the existing premises of ICL Sankar Nagar cement manufacturing unit.

According to guidelines of the Ministry of Environment and Forest the present scenario of all aspects of environment within 10km radius of the study area of proposed power plant have been evaluated and incorporated in the Environmental Impact Assessment report.

The objectives of the study are:

- ❖ To establish the present environmental scenario
- ❖ To prepare a detailed action plan for implementation of mitigative measures.
- ❖ To suggest preventive-and mitigative measures to minimize adverse impacts and to maximize beneficial impacts.
- ❖ To suggest a monitoring programme to evaluate the effectiveness of mitigative measures
- ❖ To implement the environmental protective measures to eliminate the negative impacts.
- ❖ To suggest the formation of a core group responsible for implementation of environmental control and protective measures and monitoring of such implementation.
- ❖ To suggest a feedback mechanism enabling to make mid course corrections
- ❖ To prepare a capital cost for Environmental monitoring and Environmental Management Plan.

PROJECT DESCRIPTION

The salient features of the proposed 48 MW captive power plant are furnished hereunder.

Name of the project	:	M/s. The India Cements Ltd., (48 MW coal based captive power plant)
Location	:	Village : Narnamalpuram Taluka: Tirunelveli District:: Tirunelveli
Geographical location	:	Toposheet No. 58 H/9 Latitude - 8°47'05" Longitude- 77°43'50"
Total land required	:	10.99 acres
Altitude of the site	:	51 m
Connectivity		
Road	:	Kanyakumari – Chennai National Highway
Rail	:	Thalaiyuthu R.S
Airport	:	Tuticorin (55 km)
Sea port	:	Tuticorin (55 km)
Archaeological / Historically important site	:	None within 10 km radius study area.
Sanctuaries/ National parks/ Reserve Forest / Elephant/Tiger Reserve	:	Reserve Forest

Land requirement

The total area occupied by ICL Sankar Nagar cement manufacturing unit is 124.73 acres, out of which 10.99 acres is earmarked for the proposed power plant. The land use details of the proposed power plant is given below:

Land use	Area in acres
Building	3.58
Approach roads	0.54
Green belt	3.11
Other use	3.75
Total area in acres	10.99

Water requirement

The proposed captive power plant requires 792 KLD of raw water only which will be met from the allotted quantity of 2 Cusecs to ICL. Hence the total water consumption for ICL and proposed power project will be well with in the permitted quantity.

Raw material requirement

Coal / Petcoke	TPH	TPD
If Indian coal only	~55.0	~1320.0
If imported coal only	~22.0	~528.0
If pet coke and Indian coal (@ 50% + 50%)	~25.0	~600.0
If pet coke and Indian coal (@ 50% + 50%) limestone consumption will be	~28.0	~672.0

Power requirement

Out of the total power generation of 48 MW from the proposed power plant, the plant auxiliaries will consume 5.0 MW, and 24.0 MW will be supplied to ICL Sankar Nagar unit and the rest of 19.0 MW will be wheeled to the other ICL plants located in Tamil Nadu.

Process description

The proposed captive thermal power plant will be based on Circulating Fluidized Bed Combustion (CFBC) technology capable of burning a wide variety of solid fuels viz Imported / Indigenous coal.

DESCRIPTION OF THE ENVIRONMENT

For base-line data collection, an area covering 10 km radius from the proposed captive thermal power project site as the centre has been considered as per EIA guidelines published by the MoEF, Govt. of India. The study has been carried out for the period of February to April 2010.

Micro Meteorology

For collecting the base line data during the study period a meteorological station was setup on the rooftop of administrative building of M/s. The India Cements Ltd., Sankarnagar wind speed, wind direction, temperature, relative humidity and rainfall were recorded throughout the study period in an automated data logger.

Summary of micro-meteorological data collected in the proposed Captive Power Plant for the study period of February – April 2010.

Month	Wind Speed (km/hr)		Temperature (°C)			Relative humidity (%)		
	Average	Max	Min	Max	Average	Min	Max	Average
February	9.3	12.0	24.0	38.0	30.5	44.0	73.0	62.5
March	7.0	13.0	24.0	39.0	32.0	24.0	89.0	51.4
April	9.7	13.0	26.0	40.0	32.7	28.0	89.0	57.2

Sl.No	Parameters	February – April 2010		
		Min	Max	Mean
1.	Temperature (°C)	24.0	40.0	31.7
2.	Wind speed (km/hr)	0.0	13.0	8.7
3.	Relative Humidity (%)	24.0	89.0	57.0
4.	Predominant wind direction	West Southwest		

Air Environment

In order to assess the Ambient Air Quality (AAQ), samples of ambient air were collected by installation of Ambient Fine Dust Sampler (PEM – ADS 2.5/10) at different locations in the study area during study period and analyzed for air pollutants to work out the existing status of air quality.

S. No	Name of Location / village	Distance w.r.t project site	Direction w.r.t project site
SA1	Factory Site	--	--
SA2	Sankar Nagar	2.4	SW
SA3	Kurichikulam	2.0	SW
SA4	Vannanpacheri	2.4	SE
SA5	Rajavallipuram	2.4	SE
SA6	Sundarapuram	3.5	SW
SA7	Vadakku Taliyuthu	2.6	NW
SA8	Sankar Nagar colony	1.5	NE

The study indicates that the recorded concentrations are well within the National Ambient Air Quality Standards as notified by CPCB.

Pollutants	Observed values range ($\mu\text{g}/\text{m}^3$)	Standard laid down by CPCB for
		Industrial, Residential, Rural and Other Area
PM2.5	45.5 – 56.6	60
PM10	64.3 – 88.1	100
SO2	19.6 – 26.6	80
NOx	32.9 – 42.6	80

Noise Environment

The Noise level measurements were also made at various locations in different intervals of time with the help of sound level meter in the study area to establish the baseline noise levels in the impact zone. The noise levels were monitored in the following locations.

Sl.No.	Location of noise monitoring Stations	Noise levels (Leq in dB(A))					
		Day			Night		
		Min	Max	Avg	Min	Max	Avg
SN1	Factory Site	54.8	60.3	57.6	50.6	58.1	54.4
SN2	Sankar Nagar	50.6	54.1	52.4	41.2	45.0	43.1
SN3	Kurichikulam	48.7	53.6	51.2	40.4	44.3	42.4
SN4	Vannanpacheri	46.3	50.4	48.4	38.4	42.5	40.5
SN5	Rajavallipuram	48.1	54.3	51.2	40.1	44.2	42.2
SN6	Sundarapuram	47.8	52.5	50.2	39.7	43.8	41.8
SN7	Vadakku Taliyuthu	48.9	53.6	51.3	38.1	42.0	40.1
SN8	Sankar Nagar colony	49.8	54.5	52.2	40.4	46.8	43.6

In all the locations noise level are well within the prescribed limits.

Water Environment

Surface water and ground water samples were collected during the study period from the existing wells in the study period. The samples are analyzed for parameters necessary to determine water quality (based on IS: 10500 criteria) and those that are relevant keeping a view of environmental impact due to the proposed captive thermal power plant.

Sample	pH	TDS in mg/l	Chloride in mg/l	Sulphate in mg/l	Total Hardness in mg/l
Surface water	6.9	62.0	16.0	12.0	29.0
Ground water	6.8 -7.5	243 -805	67 – 290	44 – 163	94 -356

All the samples are within the prescribed limits as per IS 10500: 1991. Heavy metals are within the prescribed limits.

Socio economic Environment

Socio-economic data was collected from secondary sources like Census of India 2001.

Population & Communities

In the study area 33 villages have been studied. As per the census data, the total population is 82573 over an area of 78.5 sq.km, having a population density of 669 per sq.km. The main workers constitute 38.0%, marginal workers 6.8% and non workers 55.2% of the total population. Out of the main workers cultivators and agricultural labour constitute 41.58%, while only 9.88% are in house hold industry. This shows that the major source of income of local population is agriculture.

District	Taluk	Total Population	Male	%	Female	%
TIRUNELVELI	Tirunelveli	74596	36847	49.4	37749	50.6
	Palayamkottai	7977	3922	49.1	4055	50.9
	Total	82573	40769		41804	100

OCCUPATION	POPULATION	%
Marginal workers	5659	6.8
Non workers	45522	55.2
Main workers	31392	38.0
Total	82573	100.0
Break-up of main workers		
Cultivators	3840	12.23
Agriculture labour	9212	29.35
Household industry	3103	9.88
Others	15237	48.54
Total	31392	100.0
Others Details		
SC	25628	31.0
ST	86	0.14
Total SC & ST	25714	31.14

Out of 33 villages in the buffer zone, 30 have medical facilities. The adequate medical facilities and specialized hospitals are available at Tirunelveli, district head quarters. People are very much acquainted with the national and international news. They have a good access to media by way of Newspaper, Radio and Television. Various industries such as, three spinning mills, flour mill at Gangaikondan, Wolckem lime industry, asbestos plant and Coca cola bottling unit are located in the at Gangaikondan sipcot industrial complex.

Amenities

The core zone falls within the existing premises of Sankar Nagar cement manufacturing unit. Within the buffer zone villages, quite a few amenities/facilities are available viz. educational, medical, electricity, communication etc.

ANTICIPATED ENVIRONMENTAL IMPACTS

Environmental impacts both direct and indirect on various environmental attributes due to proposed project activity in the surrounding environment, during pre-operational and operational phase are discussed in the subsequent section. The nature and extent of the impacts may be varying throughout the stages of project development.

Impact on Topography

The project site has a plain topography and there is no requirement for any cutting or leveling works involved in this proposed project. A thick canopy of trees will be planted at a width of 2.5 mts. along the periphery of the core zone so as to up grade and preserve the topography. Due to the proposed project, there will not be any impact on the topography of the buffer zone.

Impact on Air Environment

The air quality impacts of a stack or collection of point sources is evaluated by use of mathematical models. Mathematical modeling procedures were employed in computer

aided simulation techniques to examine the worst air pollution situations that might arise under various combinations of atmospheric stability categories and wind speeds.

Anticipated SPM increase in the Ground Level Concentration

S. No.	Location	Ambient Air Quality Average Conc. $\mu\text{g}/\text{m}^3$ 24 hrs	Predicted value $\mu\text{g}/\text{m}^3$ (Max)	Future AAQ Conc. $\mu\text{g}/\text{m}^3$ 24 hrs	CPCB Standards for Rural and Other Areas (24 hrs)
1.	Factory Site	131.00	2.81	133.81	200
2.	Sankar Nagar	132.70	2.81	135.50	
3.	Kurichikulam	114.00	2.81	116.81	
4.	Vannanpacheri	147.00	2.81	149.81	
5.	Rajavallipuram	106.00	2.81	108.81	
6.	Sundarapuram	128.60	2.81	131.41	
7.	Vadakku Taliyuthu	108.00	2.81	110.81	
8.	Sankar Nagar colony	134.30	2.81	137.11	

Impact on Water Environment

Operation of the thermal power project may have an impact on water quality due to any discharge of effluents. In this proposed captive power plant there is no letting out of water into the environment. In addition to this it is proposed to install air cooled condensers which requires minimum quantity of water as against the water cooling condensers so as to minimize the water requirement for the project as well as to minimize the quantity of effluents generated from the plant.

All the effluents from this proposed power plant will be collected in a common collection tank hence it is predicted there will not be any increase in temperature and the suspended solids. Effluents arising from all the units will be treated before letting out in to the environment.

Impact on Noise Environment

In a coal based thermal power plant major noise generating sources are steam turbine and generator, blow-off valves and discharge pipes. All the equipments would be designed to have a noise level not exceeding 85 to 90 dB(A).

Impact on Ecological Environment

The impact on the ecosystem due to operation of the project would mainly occur from emission of air pollutants and deposition of the same on leaves. Deposition of fly ash on the soil may alter soil's physical and chemical characteristics. However, as the project would have high efficiency Electrostatic Precipitators, the concentration of particulate matter in the flue gas emitted shall be negligible. The flue gases shall be further discharged through a 110 m high stack, resulting in wider dispersion of flue gases. Therefore, there is absolutely no likelihood of any impact on the ecological system.

Although the proposed green belt development along the boundary of the project site will prevent the soil erosion and improve the soil stabilization.

ENVIRONMENTAL MANAGEMENT PLAN

Based on the predictions of the impact on environment, the following proposed measures will eliminate, offset, or reduce adverse impacts to acceptable levels and enhance the beneficial ones.

Air pollution control measures

- Furnaces and boilers should be operated with minimum excess air so that fuel consumption is reduced and NOX emissions are minimized.
- The stack should have sufficient capacity to take care of emergency release conditions, for additional load of flue gas under boiler start up and shutdown periods.
- All the internal roads shall be asphalted / concreted to reduce dust emission due to vehicular movement.

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- The combustion units shall be maintained properly for obtaining optimum efficiency and to ensure that the emission rates remain within estimated levels.
 - The fugitive emissions of coal dust from storage facilities, from crushers and at coal transfer points should be reduced by adopting appropriate measures like cyclones/bag filters/water sprinklers/fog system.

Water pollution control measures

No discharge of liquid effluent to the other public boundaries for the proposed captive power plant. It is proposed to install air cooled condensers which require minimum amount of water instead of water cooled condensers. Hence the quantity of effluent generation also will be minimal.

- In-plant control measures should be implemented to minimize the quantity of waste water generation.
- Evaluating the effluent treatment and regular monitoring of effluent quality is recommended.
- Trained personnel should be engaged for effluent treatment plant.

Noise pollution control measures

- To reduce the impact of noise, shock absorbing techniques may be adopted
- All opening like covers, partitions may be acoustically sealed
- The operator's cabin (control rooms) should be properly insulated with special doors and observation windows
- The operators working in the high-noise areas would be strictly instructed to use earmuffs/ear plugs
- There will be thick vegetation in the plant premises to attenuate continuous noise.

Rain Water Harvesting

Rain water from surface run-off will be directed towards recharging the ground water aquifer directly through the percolation pits so as to recharge the ground water level.

Green Belt Development

With a view to attenuate air pollutants, to absorb noise and to care of uptake of water pollutants if any, it is recommended to develop a greenbelt all around the boundary and at several locations within the proposed power plant premises.

Socio-economic condition

As no habitation is going to be effected by this proposed project, no rehabilitation package is necessary for resettlement of people. Job opportunities will be much limited with in the project but avenues for marketing of day-to-day material for the project employees, service industries, and various other activities around the project will tend to raise the standards of living of local population.