

Executive Summary

of

**Modernization of existing 15 MW (1 x 10 MW + 1 x 5 MW)
Captive Power Plant and installation of new 1 x 16 MW
WHRB based Captive Power Plant**

At

**Khasra No. 167,160,159,156, Village:Gadchandur,
Tahsil :Korpana District Chandrapur, Maharashtra**

Project Proponent:

Manikgarh Cement

**Post - Gadchandur, Tehsil: Korpana,
District: Chandrapur, Maharashtra.**

Prepared By

**Pollution & Ecology Control Services
Dhantoli, Nagpur.**

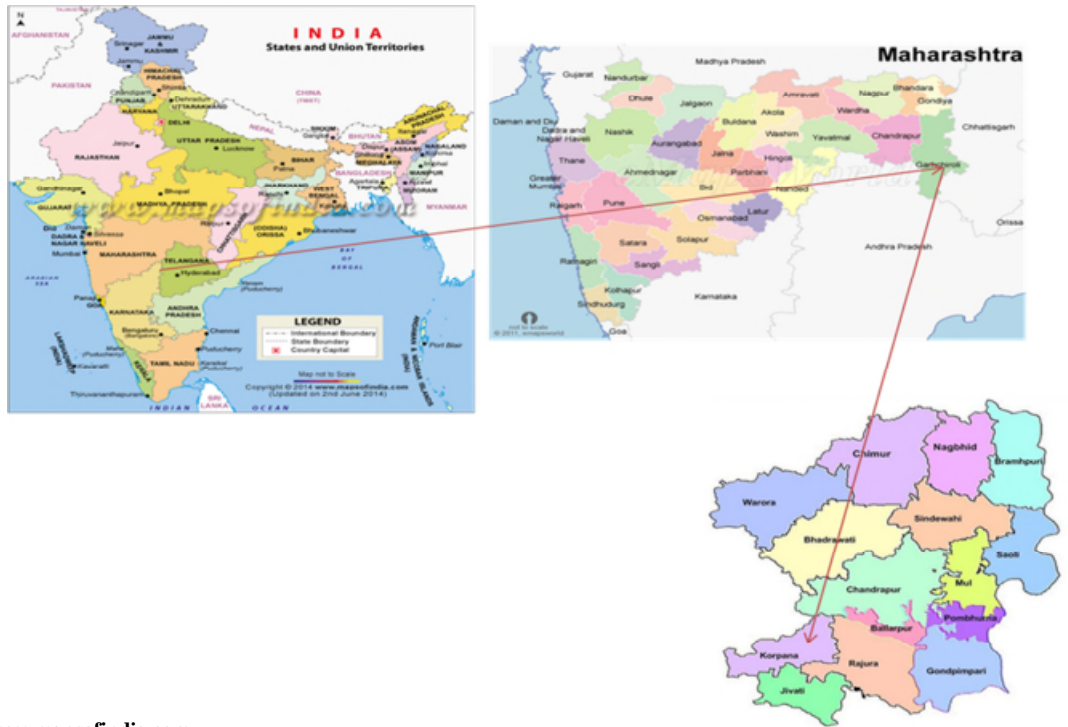
EXECUTIVE SUMMARY

PREAMBLE

Considering the present shortage in electricity supply, especially shortages in the Maharashtra state as well as projections that the power shortages are going to increase as the demand for power increases in this region. So, it is proposed to modernize the existing 15 MW (1 x 10 MW + 1 x 5 MW) captive power plant and installation of new 1 x 16 MW WHRB based captive power plant at Village : Gadchandur, Tehsil: Korpana, District: Chandrapur, Maharashtra.

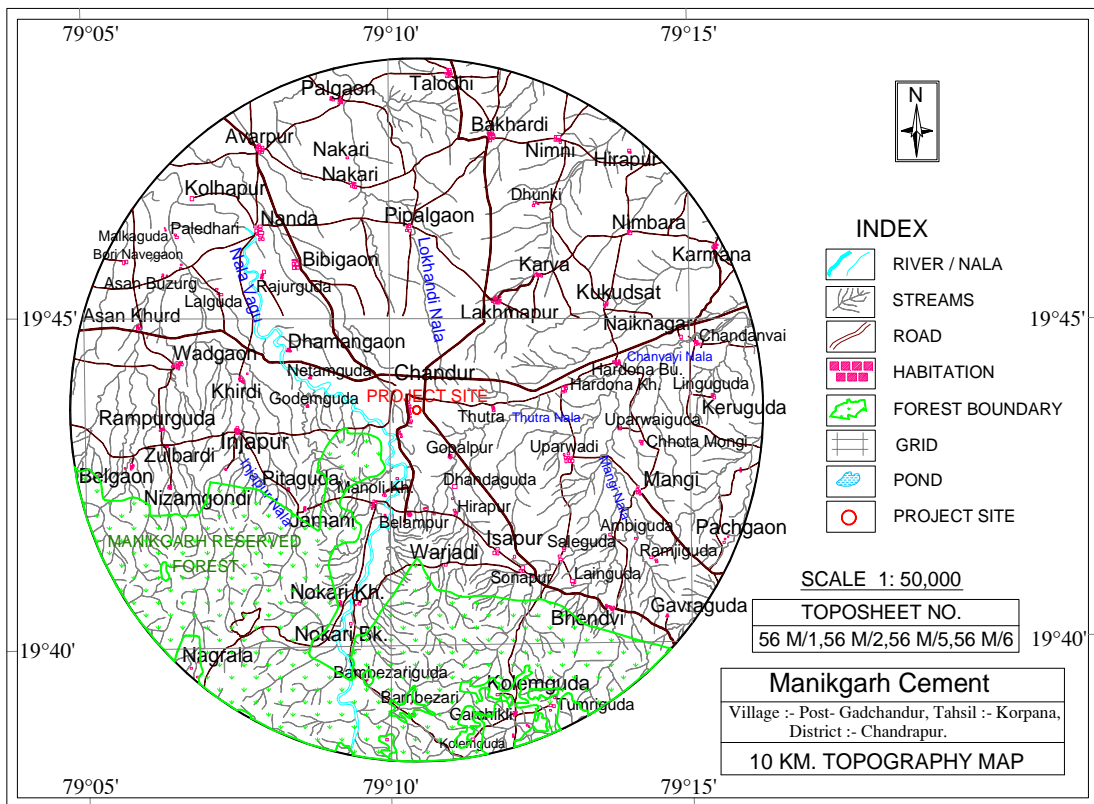
DETAILS OF THE PROJECT SITE (10km RADIUS)

Sr No	Particulars	Details
1	Project Site	Khasra No. 167,160,159,156, Village:Gadchandur, Tahsil : Korpana District Chandrapur, Maharashtra
2	Latitude	19°43',25.95"N
3	Longitude	79°10'34.64"E
4	Elevation above MSL	256 m
5	Toposheet	56 M/1, 56 M/2, 56 M/5, 56 M/ 6
6	Present landuse	Industrial land
7	Climatic conditions (Based on nearest IMD station data Nagpur)	Maximum Temperature : 33.9 Minimum Temperature : 21.3 Relative Humidity : 21-44% Rainfall : 1200 – 1300 mm
8	Nearest National Highway/State Highway	Nearest State Highway 264 is Chandrapur - Nagpur Highway 20 kms E
9	Nearest Airport/ Air Strip	Nagpur Airport: 150 Kms
10	Nearest town	Gadchandur : 0.5 Kms W
11	Forest	Manikgarh Reserved Forest : 1.5 km SW
12	Ecologically Sensitive Zones like wild life sanctuaries, national parks and biospheres	No
13	Water Bodies	Amal Nala Dam: 3.5 km SW Vagu Nala: L0 km SW Tutra Nala: 1.5 km SE Injapur Nala: 4.5 km SW Mangi Nala:5.5 km ESE Lokhandi Nala: 1.0 km NE



Source: mapsofindia.com

Location Map of the Proposed Project Site



Source: SOI Toposheet

Topographical Map (10 km Radius)

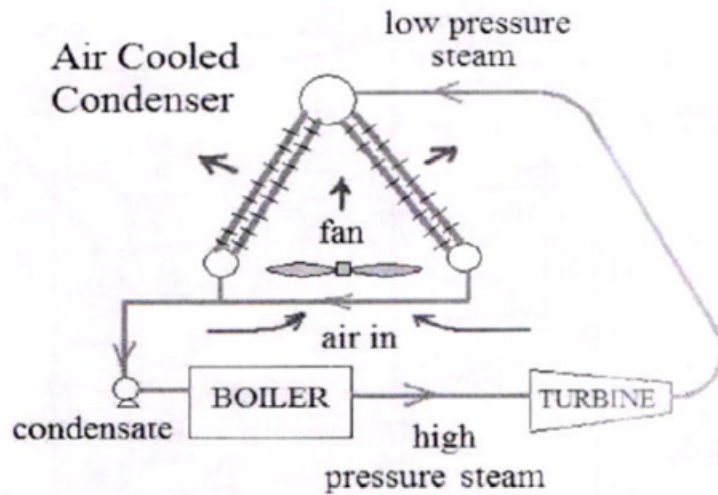
PROCESS DETAILS

Process of the Coal Based Thermal Power Plant

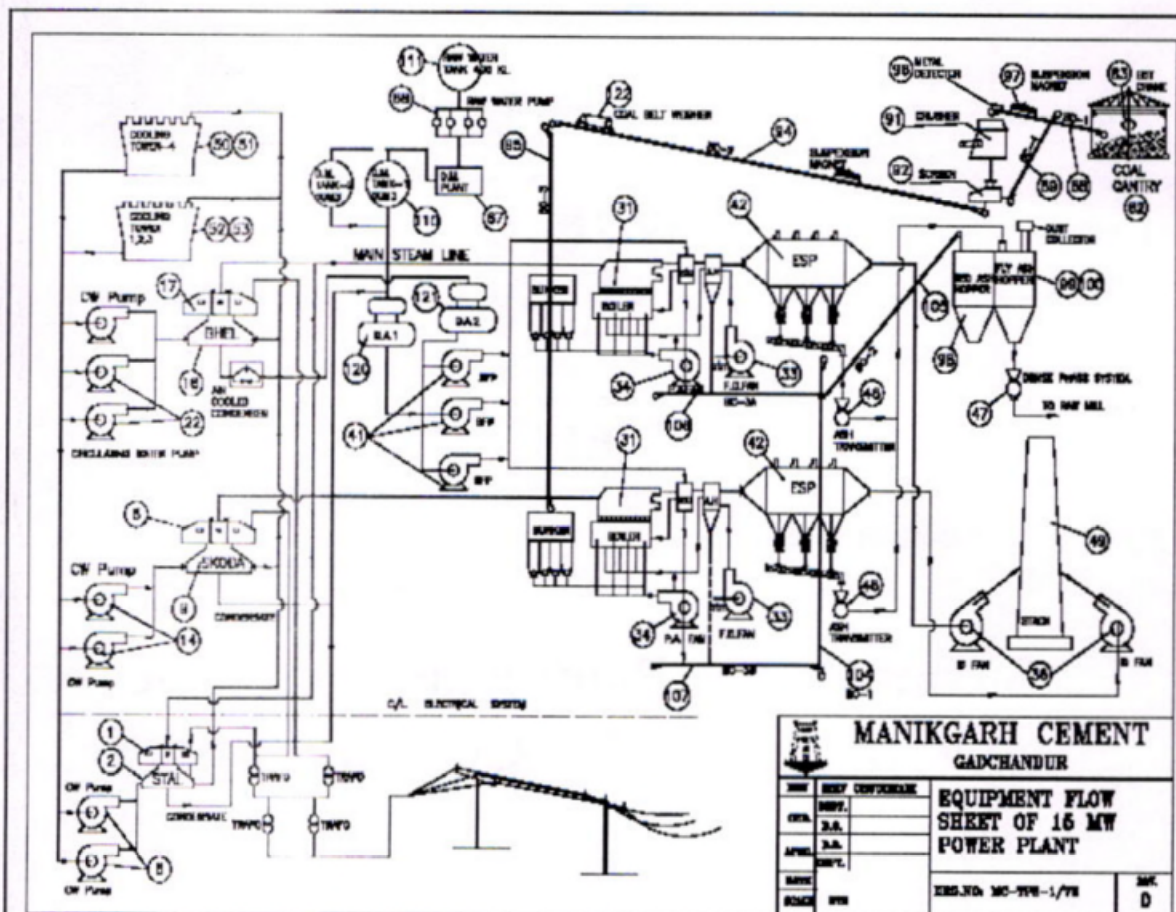
Coal from the coal handling plant will be transported to the boiler bunkers through conveyors belts. There on, the coal of size <6 mm will be fed to the boiler furnace with the help of heated air driven by primary air (PA) fans. Forced draught (FD) fans will provide additional controllable air to assist desirable combustion. The heat released by the burning coal is absorbed by the demineralized boiler feed water passing through the boiler wall tubing to produce high-pressure steam. The steam will then be discharged onto the turbine blades which will make the turbine to rotate. The generators coupled to the turbines will also rotate and produce electricity. The electricity will pass to the transformer which will increase the voltage to the desired level of the transmission grid system.

This combustion will produce ash, out of which the bottom ash will fall to the bottom of the boiler. The fly ash carried in the flue gases will travel through the electrostatic precipitators (ESP) where it will be precipitated on the high voltage electrodes. The relatively clear flue gas will pass through the stacks with the help of induced draught (ID) fans. Bottom ash will be collected in dry form and disposed in ash disposal area. The dry fly ash, stored in the silos will be transported through pneumatic dense phase system to fly ash silo Cement plant for cement manufacturing.

The waste heat produced in the thermal process of the plant will be transferred to the atmosphere by using adequate cooling system. Environmental concern and climatic condition are the main factors in the selection of the most suitable power station process. Since water availability is concern as such to save natural resources and to have sustained generation Air cooled condenser is considered. With Air cooled condenser approx.90% of the water is saved. The basic configuration of Air cooled Condenser is as follows:



Steam Power Plant Rankine Cycle with Air Cooled Condenser



Process Flow Chart of the 15 MW Thermal Power Plant

Process of the WHRB based Thermal Power Plant

The high temperature hot gases from kiln pass into the boiler through the inlet duct. The flue gases will be taken to kiln exhaust to the inlet of Waste Heat Recovery Boiler where the heat of waste gases will be absorbed by the water and steam will be generated. The flue gases will be emitted from chimney through ESP, Bag filters of Cement Plant. The efficiency of the existing ESP will be increased to meet the present emission standards.

DESCRIPTION OF ENVIRONMENT

Air Environment

The baseline environmental quality for the September, October, November and December 2017 was assessed in an area of 10 km radius around the proposed project site.

During the study period, the wind speed measured at the site varied from 1.0 to 11.1 kmph. The predominant wind directions are from E and NE.

The ambient air quality monitored at 8 locations selected based on predominant wind direction, indicated the following ranges;

PM ₁₀	-	41.8 to 70.3 µg/m ³ .
PM _{2.5}	-	21.9 to 39.6 µg/m ³
SO ₂	-	6.9 to 31.9 µg/m ³
NO _x	-	11.5 to 43.7 µg/m ³

Industrial Area Residential, Rural Area (CPCB Norms)	100 µg/m ³	60 µg/m ³	80 µg/m ³	80 µg/m ³
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The concentrations of PM₁₀, PM_{2.5}, SO₂ and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

A total 9 samples including five surface & four ground water samples were collected and analyzed. The water samples were analyzed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (IS 10500 – 1993 except high concentration of total coli form in surface water, which may be due to the human activities.

Noise Environment

Noise levels measured at eight stations are within limit of 55.0 dB (A) for Residential Area or 75.0 dB (A) for Industrial Area as given in MoEF Gazette notification for National Ambient Noise Level Standard.

Area Code	Category of Area	Limits in dB(A) Leq	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone**	50	40

** Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones

Land Environment

The characteristics of the soil sample were compared with different depths for respective parameters.

The observations of soil characteristics are discussed parameter wise below;

- (a) Texture of soil samples from agriculture lands and waste land are silty clay loam and Sandy loam.
- (b) Colour of soil samples from agriculture and waste lands are black.

- (c) The bulk density of soil samples from waste land are in the range of 1.48 to 1.48 g/cc and sample from agriculture land (S-2) are in the range of 1.42 to 1.47 g/cc and sample from agricultural land (S-3) are in the range of 1.61 to 1.64 g/cc.
- (d) Soil samples from waste land have pH values between 7.3 to 8.0 and sample from agriculture land (S-2) have 8.0 to 8.2 and sample from agricultural land (S-3) have 8.2 to 8.6 ranges of pH values. The pH values are indicating nature of soil samples is neutral to alkaline.
- (e) Soil samples from waste land have conductivities between 0.385 to 0.478mmhos/cm and conductivities of soil sample from agriculture land (S-2) ranges between 0.198 to 0.277 mmhos/cm and conductivities of soil sample from agricultural land(S-3) ranges between 0.188 to 0.221 mmhos/cm.
- (f) Soil samples from waste land have Organic Matter between 0.90 to 1.23 % and sample from agriculture land(S-2) have between 1.23 to 1.76 % Organic Matter and sample from agricultural land(S-3) have between 0.62 to 1.33%. These values represent moderate fertility of soils.
- (g) Soil samples from waste land have concentration of Available Nitrogen values ranged between 366.1 to 500.9 kg/ha and samples from agriculture land (S-2) range between 500.9 to 712.9 kg/ha and samples from agricultural land (S-3) range between 250.5 to 539.4 kg/ha Available Nitrogen value.
- (h) Soil sample from waste land have concentration of Available Phosphorous values ranged between 37.7 to 44.6 kg/ha and soil samples from agriculture land (S-2) have concentration values ranges from 24.6 to 66.2 kg/ha and samples from agricultural land (S-3) have concentration values ranges from 25.4 to 81.6 kg/ha.
- (i) Soil sample from waste land have concentration of Available Potassium values range between 672.9 to 764.3 kg/ha and sample from agriculture land (S-2) concentration of Available Potassium as its values range between 1070.9 to 1176.3 kg/ha and sample from agricultural land (S-3) have values range between 1380.6 to 2822.4 kg/ha.
- (j) Characteristic of Waste land soil is a little deficient in nutrients concentration. Whereas, agricultural land soils are suitable for cultivation of climatic crops and have average fertility.

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

Impact on Air Quality

The impacts on air quality due to source of the air pollutant in the proposed facilities have been identified.

Sources of Emissions

Emissions released from the stack during operation phase will get dispersed in the atmosphere and finally reach the ground at a specified distance from the sources. From the proposed activities the possible environmental impact on air quality has been envisaged due to the following sources.

Raw Material Handling / Transport System

The possible pollutants are fugitive dust emissions from raw materials handling areas viz. loading / unloading, fuel stockyard, crushing units etc.

Mitigation Measures

M/s. Manikgarh Cement shall provide dust suction system which will control fugitive emission due to material handling. Dust suppression system will be provided in the form of water sprinklers. All vibrating screens and weigh feeders below the hopper; day bins etc are totally covered to prevent leakages of dust. The entire length of conveyors is covered to prevent dust pollution. All bins are totally packed and covered so that there is no chance of dust leakage. All discharge and feed points wherever the possibility of dust generation is there is provided with dust suppression system. All material transfer points are connected with dust suppression water nozzles to avoid air pollution.

Mitigation Measures

- The efficiency of the existing ESP will be increased
- ESP followed by Stack of 66 m height.
- Providing high efficiency pulsejet bag filters at material transfer points including mill feed hoppers.
- Providing concrete roads inside the plant.
- Efficient cleaning of the plant and roads by vaccum cleaners.

- Providing high efficiency pulsejet bag filters at material transfer point including mill feed hoppers.
- Covering the belt conveyors including the walkways.

Prediction of Air quality

Ground Level Concentration (GLC) of SPM has been calculated for multi-stack dispersion modelling using double Gaussian diffusion equation : IS 8829-1978 and as per 'Assessment of Impact to Air Environment : Guidelines for Conducting Air Quality Modelling' by CPCB, Delhi, (PROBES/70/1997-98). The predicted values in respect to PM₁₀, and NO_x were found to be below the Ambient Air Quality Standard of CPCB.

Impact on Water Environment

Operation phase

The total water requirement for the proposed activities is 700 m³/day.

The major sources of liquid effluents, which may induce water pollution. are as follows;

- Blow down water from boiler
- DM Plant washing
- Cooling tower blow down

Above effluent will be treated in the settling tank before leading the same to guard pond for recycle & reuse. The plant is based on the zero discharge system.

Impact on Noise Environment

Operation phase

During operation, the major noise generating sources are crushing mill, auto loading section, electric motors etc. These sources will be located far off from each other. Under any circumstances the noise level from each of these sources will not exceed 85 dB (A).

Noise levels generated in the project site will be confined to the noise generating plant units hence the impact of noise levels on surroundings will be insignificant.

Mitigation Measures

The noise levels stipulated by Central Pollution Control Board at any point of time will not exceed the standards. The equipments will have inbuilt noise control devices. The measured noise level produced by any equipment will not exceed 85 dB(A) at a distance of 1.0-m from its boundary in any direction under any load condition. The noise produced in valves and piping associated with handling compressible and incompressible fluids will be attenuated to 75 dB(A) at a distance of 1.0 m from the source by the use of low noise trims, baffle plate silencers/line silencers, acoustic lagging (insulation), thick-walled pipe work as and where necessary. The general mitigation for the attenuation of the noise are given below:

- ❖ By providing padding at various locations to avoid sharp noise due to vibration.
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- ❖ Encasement of noise generating equipment where otherwise noise cannot be controlled
- ❖ Providing noise proof cabins to operators where remote control for operating noise generating equipment is feasible.
- ❖ In all the design/installation precautions are taken as specified by the manufacturers with respect to noise control will be strictly adhered to;
- ❖ High noise generating sources will be insulated adequately by providing suitable enclosures;
- ❖ Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment
- ❖ Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- ❖ All the openings like covers, partitions will be designed properly
- ❖ Inlet and outlet mufflers will be provided which are easy to design and construct.
- ❖ All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Extensive vibration monitoring system will

be provided to check and reduce vibrations. Vibration isolators will be provided to reduce vibration and noise wherever possible;

- ❖ The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Impact on Terrestrial ecology

The reserved forest in the study area is in patches. There is no designated ecological park or Bio Reserve/Wild life sanctuary in the 10 km radius of the proposed plant site. The impact on terrestrial ecology will be negligible and shall be insignificant.

SOLID WASTE

Operation phase

The fly ash from the proposed modernization unit will be sent to the Cement Plant by using Dense Phase Pneumatic Conveying System.

Fly ash and Bed ash collected from various points of Boilers/ESPs will be pneumatically transported to independent Steel hoppers for storage. These hoppers will be provided with separate/ independent ash transmitters / dense phase system for transporting of fly ash, bed ash to cement plant so that fugitive emissions can be eliminated to the maximum extent.

SOCIO-ECONOMIC ENVIRONMENT

Operation phase

The impacts of the proposed project, during its operation, on demography and socio-economic condition can be identified as follows.

- Negative impacts can be depletion of natural resources like water and land, depletion in air quality if proper mitigative measures are not taken.
- Increase in employment opportunities and Reduction in migrants to outside for employment.
- Growth in service sectors.
- During operation phase 60 technical and nontechnical people will be employed.
- Increase in consumer prices of indigenous produce and services, land prices, house rent rates and Labour prices.

- Improvement in socio-economic environment of the study area.
- Improvement in transport, communication, health and educational services.
- Increase in employment due to increased business, trade commerce and service sector.
- The overall impact on the socio economic environment will be significant.

The management of M/s Manikgarh Cement has proposed to give preference to local people for recruitment in semi skilled and unskilled categories.

ENVIRONMENT MONITORING PROGRAMME

The environmental monitoring is important to assess performance of pollution control equipment installed in the power plant project of M/s. Manikgarh Cement. The proposed project is modernization of existing 15 MW (1 x 10 MW + 1 x5 MW) Captive Power Plant and installation of new 1 x 16 MW WHRB based Captive Power Plant at Khasra No. 167, 160, 159, 156 Village: Gadchandur, Tehsil: Korpana, Chandrapur, Maharashtra. The sampling and analysis of environmental attributes including monitoring locations will be as per the guidelines of the Central Pollution Control Board/ State Pollution Control Board.

Environmental monitoring will be conducted on regular basis by M/s. Manikgarh Cement to assess the pollution level in the proposed plant as well in the surrounding area. Therefore, regular monitoring program of the environmental parameters is essential to take into account the environmental pollutant of the study area. The objective of monitoring is:

- To verify the result of the impact assessment study in particular with regards to new developments;
- To follow the trend of parameters which have been identified as critical;
- To check or assess the efficiency of the controlling measures;
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical due to the commissioning of proposed facilities;

- To check assumptions made with regard to the development and to detect deviations in order to initiate necessary measures;
- To establish a database for future Impact Assessment Studies for new projects.

The attributes, which needs regular monitoring, are specified below:

- Air quality
- Water and wastewater quality;
- Noise levels;
- Soil quality;
- Ecological preservation and afforestation; and
- Socio Economic aspects and community development

ENVIRONMENT MANAGEMENT PLAN

Air Environment

The sources of air pollution are raw material handling system, materials transportation, raw materials feeding to the operating equipments. Stacks of adequate height of 66m is proposed for proper dispersion of gases. The following Environmental Management Plan will be implemented to control air emissions. Stack of 66 m height for Boiler of 15 MW CPP for proper dispersion of pollutants is installed.

Action Plan to Control of Fugitive Emission

- The efficiency of the existing ESP will be increased
- The dust generated from coal handling plant will be suppressed by providing adequate water spraying systems
- Periodic checking of vehicles and machinery to ensure compliance to emission standards
- Jet Pulse bag filters will be provided at all the points like material conveying and transfer points;

- The control of the airborne fugitive emissions from the ash pond will be achieved through maintaining a permanent blanket of water cover on the ash pond
- Attenuation of pollution/protection of receptor through green belts/green cover
- Avenue plantation and green belt development will be undertaken in the operation phase.

Stack Gas Monitoring

The emissions from the stack will be monitored continuously for exit concentration of the PM₁₀ and PM_{2.5}, SO_x and NO_x. The probes will indicate if the concentration of the pollutants if exceeds the limits, necessary control measures will be taken by management. Sampling ports will be provided in the stacks as per CPCB guidelines.

Noise Environment

- By providing padding at various locations to avoid sharp noise due to vibration.
- Other than the regular maintenance of the various equipment, ear plugs/muffs are recommended for the personnel working close to the noise generating units;
- All the openings like covers, partitions will be designed properly
- Inlet and outlet mufflers will be provided which are easy to design and construct.
- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission.
- The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Water Environment

The total water requirement for the proposed activities will be 500 KLD for 15 MW CPP and 200 KLD for 16 MW WHRB. Water will be sourced from Amal Nalla Dam and Wardha River. Because of the technology of electricity production the degree of water pollution caused by waste water is relatively low. The major pollutants are lubricating oil, grease and dust in the water. Care will therefore, be exercised to design feeding and draining of water for all machinery on close circuit basis so that no waste water is

discharged from the plant during normal operation and the same is recirculated after proper treatment

The major sources of liquid effluents, which may induce water pollution are as follows:

- Blow down water from boiler
- DM Plant washing
- Cooling tower blow down

Above effluent will be treated separately before leading the same to Guard pond for recycle & reuse.

Land Environment

Green belt

S. No	Particulars	Factory & Colony	Mines	Mines Colony	Total
1	Total Trees Planted up to 31.12.2017	229168	140359	27995	397522
2	Total No. of plants planted in 2017-2018 (Nos.)	1234	4500	180	5914
3	Total No. of Living Trees As on 31.12.2017	213126	127827	26226	367179

Land is already used for industrial purpose. The existing cement plant is in operation. The proposed project will be constructed within the existing project and there is a well developed green belt all around the boundary of the plots as well as all around the various units.

Total land of the proposed project is 269.13 Ha. Out of this 4.65 Ha will be used for WHRB and CPP during plantation landscaping pattern will be considered. The plantation scheme covers the plantation of ornamentals plants and some local fruit bearing species.

Suitable plant species will be planted all along the internal road, raw material storage & handling, ash/dust prone areas. It is planned to plant saplings considering the parameters as type, height, leaf area, crown area, growing nature, water requirement etc. Green belt will be progressively developed on land earmarked for the purpose. 90000sqmt area is

proposed for green belt development. Target of plantation in the year 2018-19 is about 10000 and upto December 2017 already 7789 number of trees are planted.

Management Plan of Solid waste

The fly ash generated from the proposed modernization unit will be sent to the Cement Plant using dense phase pneumatic conveying system.

Ash Handling System

Fly ash and bed ash collected from various points of Boilers/ESPs will be pneumatically transported to independent steel hoppers for storage. These hoppers will be provided with separate/ independent ash transmitters / dense phase system for transporting fly ash, bed ash to Cement Plant so that fugitive emissions can be eliminated to the maximum extent.

SOCIO-ECONOMIC ENVIRONMENT

M/s. Manikgarh Cement would aid in the overall social and economic development of the region. The plant will give direct employment to about it will require over 60 including direct & indirect employees of local area. In order to mitigate the adverse impacts likely to arise in the proposed project activities and also to minimize the apprehensions to the local people, it is necessary to formulate an affective EMP for smooth initiation and functioning of the project. The suggestions are given below:

- Communication with the local people will be established regular basis by project authority to provide an opportunity for local youth.
- Project authorities will undertake regular environmental awareness program on environmental management.
- Job opportunities are the most demanding factor, the local people as per their education will be employed.
- For social welfare activities to be undertaken by the project authorities, collaboration should be sought with the local administration, gram panchayat, block development office etc for better coordination.

Occupational Safety & Health Management

M/s. Manikgarh Cement will provide all necessary provisions under Factory Act. In addition a Safety officer will be appointed as per Factory Act. All personal protect equipments like Safety shoes, helmet & uniform will be issued to each employee based on the nature of job involved.