

EXECUTIVE SUMMARY

1.0 Project Description

Introduction

Jamkhandi Sugars Ltd., is proposed to enhance from 2500 TCD to 3500 TCD of Sugar Unit and 15 MW to 27 MW of Cogeneration of power plant. The location of the project is at NAD KD village, Indi Taluka, Bijapur district of Karnataka. The estimated project cost is Rs.180 Crores.

The coordinates of plant site are 17°07'37.40"N,76°07'43.00"E; 17°07'36.95"N, 76°08'03.20"E; 17°07'12.08"N, 76°07'57.98"E; 17°07'12.19"N, 76°07'43.25"E with an elevation of 458 m above mean sea level. The road is adjacent to the site and State Highway-34 at a distance of 2.0 km and National Highway NH-13 at a distance of 13 km from the project site. The nearest railway station is Indi at distance of 24km. Airport is Belgaum, which is about 300 km from the site. The water bodies in the study area are Bhimariver at 9.0 km, Sattanalnadi at 1.5 km and Doddanallah is 5.2 km from the project site. There are no reserve forests, national parks/Sanctuaries and Archaeological/Historical Important sites in the 10 km radius study area.

Land Details of Proposed Plant

The estimated land requirement for the proposed power plant including green belt area is about 98.04 acres. The survey nos are 91,93,94 & 95. The land is barren and fairly leveled area.

Technical Details

The sugarcane is brought to the plant by carts/trucks, and crushed to extract the juice. The juice is boiled until it begins to thicken and sugar begins to crystallize. The crystals are spinned in a centrifuge to remove the syrup, producing raw sugar. The raw sugar is sent to a refinery where it is washed and filtered to remove remaining non-sugar ingredients and color. Crystallizing, drying and packaging the refined sugar.

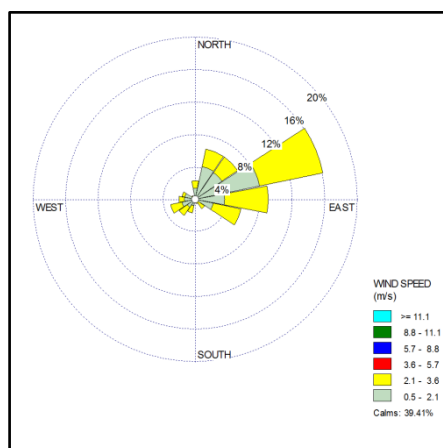
The material left after extracting the juice is called bagasse and is used as fuel in the boilers for steam generation. This steam generated is used in the turbine to generate power. Part of the steam from the turbine is used for process heating requirements.

The cogeneration power plant will be using bagasse as its prime fuel supported by the secondary fuel diesel for the station for flame support and start up. Excess power will be exported to the grid. The estimated raw water required for the plant is 2600 m³/day and will be met from Bhimariver.

2.0 Description of the Environment

Environmental Study was carried out during Post monsoon 2012. The predominant wind direction during the study period is from ENE.

Wind Rose Diagram



Air Environment

Ambient air quality monitoring was carried out at eight locations in 10 km study area. The air pollutants are suspended particulate matter (SPM), fine particulate matter (PM₁₀ & PM_{2.5}), Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x), Mercury (Hg) and Ozone (O₃) were monitored, analysed and compared with the NAAQ standards stipulated by CPCB.

The minimum level of SPM recorded in the study area was 101 µg/m³ at project site and the maximum level recorded was 121 µg/m³ at Shrisara and Hanchina

The minimum level of PM₁₀ recorded in the study area was 30.3 µg/m³ at project site and the maximum level recorded was 36.3 µg/m³ at Hanchina&Shrisara.

The minimum level of PM_{2.5} recorded in the study area was 8.0 µg/m³ at project site and the maximum level recorded was 12.0 µg/m³ at Marsanalli.

The minimum level of SO₂ recorded in the study area was 7.5 µg/m³ at Plant site and the maximum level recorded was 8.8 µg/m³ at Shrisara and Hanchina.

The minimum level of NO_x recorded in the study area was 9.1 µg/m³ at project site and the maximum level recorded was 10.6 µg/m³ at Shrisara and Hanchina.

HC values in the study area were found to be less <0.1 ppm at all locations.

CO values in the study area were in the range of 1.01 to 1.21 mg/m³.

Ozone values in the study area were in the range of 20 – 24.5 µg/m³.

Noise Environment

The noise levels were carried out in eight locations. The minimum noise level during day time L_d 49.7 dB (A) at project site and maximum L_d was recorded 54.2 dB(A) at NAD KD while the minimum noise level during night time L_n 40.10 dB(A) at Golsara and maximum L_n 43.0 dB (A) was recorded at Shrisara.

Water Environment

A total of 12 water samples were collected; out of this 8 samples are from ground water sources and 4 samples from surface water.

- The pH values for all the samples collected in the study area during study period were from 7.54 to 8.22 which were well within the limits.
- The TDS of all the samples were between 52 to 2080 mg/l .
- The Chloride levels in the ground water samples collected in the study area were ranging from 178 mg/l to a maximum of 255 mg/l except one sample, all are within the desirable limits.
- In the ground water samples collected from the study area, the hardness is varying from 195 mg/l to 1050 mg/l.
- In the ground water samples of study area the fluoride value were in the range of 0.50 mg/l to 1.30 mg/l.

Overall all the ground water samples collected from the study area were found to be fit for human consumption, however the hardness, dissolved solids most of ground water samples seem to be above desirable limit but well within the permissible limits. The heavy metals in all samples are below detectable limits.

The water samples were analyzed as per Standard Methods IS 10500 and for analysis of water and wastewater, American Public Health Association (APHA) Publication.

All the ground water samples collected from the study area were found well within the permissible limits. Most of the heavy metals in all samples are below detectable limits.

Soil Quality

The pH values in the study area are varying from 7.96 to 8.44 indicating that the soils are falling in normal to saline class.

The electrical conductivity in the study area is varying from 98 to 150 $\mu\text{mhos/cm}$ indicating that soils falling under Normal category.

The organic carbon in the study area is varying from 0.28 to 0.68 %,

The Nitrates as N value in the study area is varying from 120 kg/ha to 380 kg/ha indicating that it requires addition of nitrates for proper growth.

In the study area Phosphorus is varying from 10 kg/ha to 45 kg/ha.

The Available Potassium in the study area is varying between 190 kg/ha to 390 kg/ha.

Biological Environment

An ecological survey of the study area was conducted particularly with reference to listing of flora and fauna. There is no reserved forest, national park and wild life sanctuary within study area.

The mitigation measures for air, water and solid waste management will be followed as a result of that, there would not be any significant impact on biodiversity in the 10 km study area.

Socio-economic Environment

The study area consists of 15 villages. Total population of the study area is 38266 with 19642 males and 18624 females. The sex ratio of the district as per 2001 census is 950.

The total literacy rate is 44.2 %. Relatively high level of literate population in the locality is an indicator of the development of the area. The total percent of main and marginal workers is 39.19 out of which 11.43 % is marginal workers and 27.7 % is main workers and 60.81 % is non-workers.

3.0 Anticipated Environmental Impacts & Mitigation Measures

Air Environment

Major sources of air pollution in power plant are boiler, and crushers. Fugitive dust emissions are also inevitable from raw material handling system as well as transportation.

The ground level concentrations (GLCs) are estimated due to the emissions from the proposed project, EPA approved Industrial Source Complex AERMOD View Model has been employed to predict ground level concentrations (GLCs) due to the stack emissions.

The predicted maximum GLCs for particulate matter (PM₁₀) are 0.51 µg/m³

The predicted maximum GLCs for Sulphur dioxide (SO₂) are 9.27 µg/m³

The predicted maximum GLCs for Oxides of Nitrogen (NO_x) are 13.12 µg/m³

Mitigation Measures

- ❖ Suitably designed ESPs with an efficiency of 99.9% will be placed downstream of the stacks which will separate out the incoming dust in flue gas and limit the dust concentration at its designed outlet concentration to less than 50 mg/Nm³

- ❖ Stack is proposed to the height of 90 m for an effective dispersion of the pollutants.
- ❖ Dust suppression system by water sprinkler at dump hopper.
- ❖ Control of fugitive emissions from the ash dyke through maintaining a permanent blanket of water cover over the deposited ash.
- ❖ Green belt development and afforestation in the plant and surroundings of ash disposal area.

Noise Environment

The major noise generating activities in the plant site are fans, blowers, compressors, pumps & motors etc.

Mitigation Measures

To achieve the noise limitations around the equipment, the following mitigation measures will be implemented:

- ❖ Provision of Acoustic enclosures
- ❖ Small units like condensate and vacuum pumps, will be designed so as to limit noise emission,
- ❖ Provision of silencers
- ❖ Noise generating items such as fans, blowers, compressors, pumps, motors etc. are so specified as to limit their speeds and reduce noise levels

Water Environment & Wastewater Management

The plant area will be designed with a network of drains to channel runoff during the rainy season. Surface drainage would be either open RCC rectangular drains or brick lined drains with trapezoidal shape. All drains will be covered in the proposed plant and building areas. The surface water run-off from the cane yard will be led to a sump for settling and the overflow will be discharged to storm water drain after treatment.

The major impact on ground/surface water quality is insignificant as all the wastewater generated from the proposed power plant will be treated in effluent treatment plant and reused for ash management, dust suppression and green belt development. Treated effluent will be used for greenbelt development. The treated water quantity will be used for dust suppression.

Solid waste Management

Solid wastes generated during operation phase from the power plant operations will be:

- Fly ash & Bottom Ash
- Sludge from Water Treatment Plant/ Pre Treatment Plant.
- Press Mud
- Molasses (liquid)

The disposal of the above wastes will be as follows:

- ❖ Fly-ash will be utilized in cements plants and for manufacturing other construction materials like bricks, paver blocks, filling low laying areas etc. Unutilized fly-ash will be disposed as slurry into ash pond.
- ❖ Bottom-ash will be disposed off for land fill.
- ❖ Effluent treatment plant will be set up to treat all the liquid effluents generated in the plant area. The effluents generated in the proposed thermal plant will be mainly inorganic in nature and the treated effluents will be used for secondary usages. Sludge from the treatment plant will be disposed off suitably.
- ❖ Press mud will be sold to farmers as a manure
- ❖ The Molasses will be sent to distillery for manufacture of alcohol

4.0 Environmental Monitoring Program

Environment Management Cell will handle the environmental management system in the unit. The environmental management cell will be headed by Head of Safety (Safety, Health & Environment). HOS will be responsible to HOD (Technical Services). The HOS will be assisted by officers to look after the safety and environmental factors round the clock.

Environmental Laboratory Equipment

The industry has an in-house environmental laboratory for the routine monitoring of air, water, noise, and soil quality. For all non-routine analysis, the plant may utilize the services of external laboratories and facilities.

Monitoring System:

Online stack monitoring system will be installed in the plant premises. Ambient monitoring stations will be suitably located, preferably in the vicinity of Boiler, Steam Generator, Steam turbine, Cane yard, and Ash disposal area.

- ❖ The equipment / instruments of the monitoring station will be housed in suitable enclosure / room

- ❖ Power supply to the station will be made from the central UPS system for all plant instrumentation / emergency shutdown systems for process plants
- ❖ The monitoring stations will include sampling & analysis provisions for NO_x, SO₂, Particulate Matter (PM₁₀& PM_{2.5})

Environmental Budget

Jamkhandi Sugars Ltd has proposed to take adequate measures to mitigate all possible adverse impacts at the plant premises. JSL has earmarked an amount of Rs. 7.5 Crores towards Environmental Protection.

5.0 Additional Studies

Risk assessment for power plant has been carried out with the objective to identify the potential hazards from the proposed project and proposed storage facilities and appropriate disaster management Plan has been designed.

6.0 Project Benefits

- ❖ Direct and Indirect employment opportunities to local people in contractual works like housing construction, transportations, sanitation, for supply of goods and services to the project and other community services;
- ❖ Additional housing demand for rental accommodation will be increased;
- ❖ Market and business establishment facilities will be increased;
- ❖ Improvement in communication, transport, education, community development and medical facilities.

7.0 Environmental Management Plan

Air Quality Management

- ❖ Suitably designed ESP with efficiency of 99.9% will be placed downstream of the stacks which will separate out the incoming dust in flue gas and limit the dust concentration at its designed outlet concentration of less than 50 mg/Nm³.
- ❖ For the effective dispersion of the pollutants stack height is proposed about 90 m.
- ❖ The dust generated from cane handling area will be minimized by adequate water spray system;
- ❖ Complete combustion takes place in the bed itself. Hence formation of carbon monoxide cannot be traced.
- ❖ A well-designed burner system, will limit the temperature to a reasonably low value of NO_x.

- ❖ All vehicles and their exhausts would be well maintained and regularly tested for emission concentration;
- ❖ Adequate thickness of insulating material with proper fastening will be provided to control the thermal pollution;
- ❖ Provision of regular preventive maintenance of pollution control equipment; and
- ❖ Stack emissions will be regularly monitored by JSL / external agencies on periodic basis.

Fugitive Emission Management

The following measures will be adopted:-

- ❖ Dust suppression system by water sprinkler at dump hoppers
- ❖ Regular dust suppression with water sprinkler at transfer points;
- ❖ Control of fugitive emissions from the ash dyke through maintaining a permanent blanket of water cover over the deposited ash.
- ❖ Green belt development and afforestation in the plant and surroundings of ash disposal area.
- ❖ Dust suppression/extraction system at Cane handling area to control fugitive emissions.

Water Quality Management

- ❖ Continuous attempt to optimize/reduce the use of water in plant.
- ❖ Regular record of level and flow of surface water sources;
- ❖ Raw water quality will be checked on regular basis for essential parameters under BIS: 10500 before and after treatment;
- ❖ All the treated effluents 432 m³/day would be monitored regularly for the flow rate and quality to identify any deviations in performance of effluent treatment plants.

Storm Water Management

Based on the rainfall intensity of the proposed area, storm water drainage system will be designed and connected to the storm water networks. Storm water drainage system consists of well-designed network of open surface drains and rainwater harvesting pits along the drains so that all the storm water is efficiently drained off without any water logging.

Rain Water harvesting System

The rain (storm) water from the building roofs, non-process area and grade level surfaces will be directed through the open drains to the storm drainage system. All drains will be lined and will be arranged to provide the shortest possible drainage path for efficient drainage.

Green Belt & Afforestation

Green belt development will be done in about 33% of the total plat area i.e. in 32.35 acres of project area. The afforestation will be taken up around cane handling area, ash disposal area and along roadside and pathways. Local species have been selected for plantation. Approximately 2500 trees per hectare will be planted in consultation with the local Forest Department.

Socio-economic Environment

For the benefit of the community in the vicinity of the project, JSL will take up appropriate measures to develop various amenities in an effort to improve living standards of the people.

Fire Protection System

- ❖ The plant proposes adequate number of wall/column mounted type portable fire extinguishers in various strategic areas of the plant including the control room, administration building, stores, pump house etc. These portable fire extinguishers are basically of carbon dioxide and dry powder type.
- ❖ Fire Hydrants at suitable locations for TG building, boiler area, Fuel handling & Storage area.
- ❖ Medium velocity water spray system for the cable gallery.
- ❖ Necessary electric driven, diesel driven, Jockey pumps with piping valves & instrumentation for safe operation.

Occupational Health & Safety

The precautionary measures, which will be followed to reduce the risk due to dust on the workers, engaged in and around the material handling areas are as under:-

- ❖ Adequate arrangements will be made for preventing the generation of dust by providing the chutes at transfer points to reduce 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 de-dusting through high efficiency bag filters;
- ❖ Due care will be taken to maintain continuous water supply in the water spraying system and all efforts would be made to suppress the dust generated by Cane handling area by water spraying at appropriate points;
- ❖ Almost all material handling systems will be automatic. The workers engaged in material handling system will be provided with personal protective equipment like dust masks, respirators, helmets, face shields etc;

- ❖ All workers engaged in material handling system will be regularly examined for lung diseases such as PFT (Pulmonary Function Test) tests;
- ❖ Any worker found to develop symptoms of dust related diseases will be changed over to other jobs in cleaner areas; and
- ❖ Thermal insulation will be provided wherever necessary to minimize heat radiation from the equipment, piping, etc. to ensure protection of workers.

Conclusion

The potential environmental, social and economic impacts have been assessed. The proposed power plant has certain level of marginal impacts on the local environment. With effective implementation of proposed environment management plan, these effects will get marginalized. Implementation of the project will have beneficial impacts in terms of providing direct and indirect employment opportunities. There will be a positive socio-economic development in the region. The standard of living of the people will be enhanced.