EXECUTIVE SUMMARY

of

ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT

For

PROPOSED 60 KLPD MOLASSES BASED DISTILLERY AND 3 MW CO-GENERATION POWER PROJECT

Located at

VILLAGE YERAGAL, TALUKA - MUDDEBIHAL, DISTRICT - BIJAPUR, KARNATAKA

Submitted By

SHRI BALAJI SUGARS AND CHEMICALS PVT. LTD.

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

India, the fourth largest economy in the world, has been maintaining a GDP growth rate of more than 8 % for more than a decade. Analysts have projected that India has the potential to almost double her present rate of growth with labour and capital productivity improvements. Industrial development plays an essential supportive role in improving labour and capital productivity. Investment in industrial sector is also an indicator of economic growth in all market economies.

Ethanol is the basic raw material for the utilisation in chemical industry, for potable purposes and is now being used for mixing in the petrol as fuel. Keeping in view of the future requirements of ethanol, Shri Balaji Sugars and Chemicals Pvt. Ltd., Bijapur (Karnataka) are planning to setup an integrated project consisting of a sugar mills of 3500 TPD of cane crushing capacity, a power plant of 18 MW and a 60 KLPD molasses based distillery unit to be located at Village Yeragal, Taluka Muddebihal, District – Bijapur, Karnataka.

The industry has already got the EC of the Sugar mills of 3500 TCD capacity and 18 MW cogeneration power plant. Now, as per the notification of Ministry of Environment and Forests (MoEF), Government of India dated 14th September, 2006, the industry has to get the environmental clearance for the distillery project from the Ministry of Environment and Forests (MoEF), Government of India as the same is covered under Category 5 (g). Accordingly, the industry had applied to the EAC of MoEF for the approval of *Terms of Reference* for the Environmental Impact Assessment study and approved TOR was received from them.

1.1 Methodology

The methodology adopted for carrying out the EIA study is based on the guidelines and TOR issued by the EAC. The EIA report is based on data collected from primary and secondary sources that included;

- Collection of information on existing baseline conditions.

- Ambient air, water and soil quality and noise level monitoring
- Identification of environmentally sensitive locations (if any) in the impacted area
- Assess the adverse impacts on the environment and to avoid the impacts, suggest cost effective mitigation and management measures to mitigate the negative impacts
- Preparation of Environmental Management Plan, which will include associated costs for execution of mitigation and enhancement, works; development of an environmental monitoring program
- Addressing the derived issues involving occupational health and safety, and emergency/disaster management to limit/contain the adverse effects.

2.0 THE PROJECT

Shri Balaji Sugars and Chemicals Pvt. Ltd. would install the distillery project in 10 acres of land. The total cost of the project would be around Rs. 60 crores. After commissioning, the industry would generate direct employment to around 100 people. Local manpower would be employed in the industry and no residential premises would be set up within the industry. The industry would operate for 330 days in a year.

During operation, the industry would procure molasses from indigenous sources as well as from other states. The major raw material and inputs are molasses (@~ 4.0 MT/kL of alcohol). The chemical requirements include - enzymes (@130 kg/day), sodium hydroxide (@65 kg/day), urea (@300 kg/day), anti-foam agent (@35 kg/day), yeast (@100 kg/day).

The fuel requirement for the boiler furnace would include a maximum of 8.5 MT/hour of conc. spent wash/coal.

2.1 Plant process and equipment

The process will have following steps/operations;

Molasses Based Operation

a) Molasses storage and handling

b) Fermentation

c) Multi-pressure distillation

d) Multi-effect evaporation

e) Spirit storage

2.2 Utilities

Steam generator – 1 x 25 MT/hour : Process **s**team requirements of the industry would be around 295 MT/day. The industry would install an incinerator boiler of 25 T/hour of steam generation capacity at 45 kg/cm^2 with concentrated spent wash and coal as fuel in the ratio of 70 % : 30 : respectively. The boiler will be capable of peak generation of 110% of MCR generation for a period of half hour in a shift (of 8 hours). The operating excess air percentage at the outlet of the boiler furnace will be less than 30%.

Water treatment plant – 500 m^3/day : It is proposed that the water to be used will be received from the river. The water quality will require pre-treatment to satisfy the quality required for boiler feed water, process requirements etc. Treatment will involve sand filtration, activated carbon filtration, softener and reverse osmoses treatment (if required) suitable for ultimate quality of water required (RO).

Cooling water – 1200 m^3/hour : The maximum process and power plant cooling water requirement will be 1200 m^3/hour. The cooling tower will be counter/cross flow induced draft cooling tower with total capacity of about 1200 m^3/hr capacity divided into cells of desired capacity.

Water Requirements : Total average fresh water consumption from the project can be summarized as under;

S. No.	Purpose	Molasses based operation
1.	Process & dilution water	300 m^3/day
2.	Boiler feed water	60 m^3/day
3.	Cooling water	185 m^3/day
4.	Washing	15 m^3/day
5.	Water treatment plant	30 m^3/day
6.	Domestic requirement	10 m^3/day
	Total	**600 m^3/day**

3.0 BASELINE ENVIRONMENTAL SETTING

This section describes existing environmental status in an area encompassed within 10 km radius around site of the proposed plant.

The environmental monitoring for the EIA study was conducted for the summer season. Initially, a reconnaissance survey of the study area was carried out and then field monitoring for measuring meteorological parameters, ambient air quality, water quality, soil quality and noise levels was carried out from 1st May, 2014 - 31st July 2014. In addition, certain aspects like land area, socio-economic status, past meteorological conditions, etc., have been analysed based on secondary information available from sources like district census reports, district gazetteers, Indian meteorological department, etc.

3.1 Meteorology

The project zone lies in the sub tropical region with four distinct seasons – Winter (December to February), Summer (March to May), Monsoon (June to September), Post Monsoon (October to November).

In the study area, annual minimum and maximum temperature range (of extreme variation) is 20.5 – 40.7 ºC during the study period. The average annual rainfall in Study area is about 550 mm.

Annual trend indicates mean wind speeds are highest in the months of March, April, May, June and July (15.4-21.8 km/hour). During the study period, the predominant wind direction remained towards *South-West*.

3.2 Air environment

To establish the existing baseline status of ambient air quality, 6 AAQM stations were selected. Various pollutants monitored were particulate matter ($PM_{10 \text{ and } 2.5}$), sulphur dioxide (SO_2) and oxides of nitrogen (NO_x). The ambient air quality monitoring was carried out twice a week for the summer season. During the study period, the baseline status of ambient air quality is as below;

Average Values of Ambient Air Quality

Location	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)
At Site	35.00	22.00	5.00	6.01
Village Kalur	35.44	22.44	4.97	5.80
Village Nerabenchi	34.63	22.96	4.93	5.80
Village Dhannur	45.89	31.41	6.08	10.68
Village Madari	35.22	23.04	5.06	6.06
Village Bangragund	34.04	24.04	4.83	5.90

98^{th} Percentile Values of Ambient Air Quality

Location	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)
At Site	38.00	24.00	5.75	7.20
Village Kalur	38.00	24.48	5.70	7.20
Village Nerabenchi	37.00	27.48	5.44	7.70
Village Dhannur	49.00	35.00	7.49	12.30
Village Madari	39.48	25.00	5.57	7.49
Village Bangragund	37.48	27.00	5.18	7.30

3.3 Noise

The study area of 10 km radius, with reference to the site, has been covered for noise environment. The three zones, viz., residential, highways and silent zones have been considered for noise monitoring.SH 133 and SH 60 has been covered to assess the noise due to traffic. Noise monitoring has been undertaken for 24 hours at each location. The noise survey involved the determination of noise levels at 6 locations. Noise level was recorded at every hour for 10 minutes continuously for 24 hours at 'A' response. The maximum day and night time values recorded were 51.2 dB (A) and 42.5 dB (A) respectively.

3.4 Water quality

Within the study area of 10 km radius, River Krishna flows towards South of the project site and is a major source for fresh water. Surface water sample of river Krishna was collected from upstream at Village Katagur. The downstream surface water sample was collected at Village Bijjur.

The dependence on ground water is quiet considerable in the study area. Most of the irrigation is done through pumping of ground water. As per the Central Ground Water Board, The district has a total geographical area of 10,541 sq kms and is divided into five taluks for administrative convenience viz. Basavana Bagewadi, Bijapur, Indi, Muddebial and Sindagi taluks.

To assess the ground water quality of the study area, 6 no. of ground water samples were collected. The physical, chemical and biological characteristics of the ground water samples were found within the limits as specified in IS-10500:1991.

3.5 Land environment

3.5.1 Land use pattern

The study area is predominantly agriculture based area. Around 1354 sq. km is the net sown area. Most of the agriculture is practiced on rain water and tube wells. Forest cover in the district is around 1977 sq. km. 85.14 sq. km. of area belongs to land not available for cultivation. About 160 sq. km. land is classifiable as culturable waste.

3.5.2 Soil characteristics

The study area is predominantly an agricultural area with around 65 % of the land use is for agricultural purposes. The texture of the soil in the study area ranged between loamy sand. Bulk density of soil samples varies between 1.44 to 1.53 gm/cm^3. The soils of all the sites are moderately porous (porosities ranging between 47.8 to 49.7%)

pH of soil samples ranged between 7.8 to 8.3. The availability of nitrogen is of prime importance to grow plants since they are dependent on adequate supply of nitrates and ammonia. The potassium content in soil originates from the disintegration and decomposition of rocks containing potassium bearing minerals. Available potassium concentration ranged between 0.028 to 0.037 %.

Phosphorus has several essential functions in plant growth. The available phosphorus concentration in the study area has varied from 0.022 to 0.031%.

3.6 Biological environment

The soil of the area in general is fertile which adds to the floristic wealth of the area. Agriculture is dominant in the available area. The main crops grown in the area are ,

Bajra, Maize, Wheat, Pulses, Oil seeds and vegetables etc. Varieties of trees are available in the study area. Grazing lands are also found. There is no natural sanctuary in the neighbourhood of study area. Domestic animals in the vicinity include Bullock, Cow, Buffaloes, Cat, Dogs, Goats, etc.

3.7 Socio-economic environment

The socio-economic profile of the study area is given below;

- ***Settlement pattern***: Bijapur district theoretically covers an area of 10541 sq km. Altogether, there are around 660 villages in the district, out of which 147 villages fall in the Muddebial taluk and around 60 villages fall in the 10 km radius of the project site
- ***Post and telegraph***: There is a good network of post offices, post and telegraph offices in the study area.
- ***Medical and public health***: The study area is well connected with medical and public health facilities. There is no scarcity of drinking water in the study area.
- ***Education***: The district is quiet moderate in literacy. The district is having a literacy rate of 57.8 percent.
- ***Demography***: According to 2001 Census Report, district's total population is 18.06 lakhs. It constitutes 3.42 percent of the state's total population. Male and female population of the district is 9.26 lakhs and 8.80 lakhs respectively.. The study area has a population density of 214 persons per sq. km.

4.0 ENVIRONMENTAL IMPACT IDENTIFICATION AND ASSESSMENT

In the present study, the most probable impacts on various components of the surrounding environment due to the proposed development have been predicted.

4.1 Impact identification

4.1.1 Land alteration/regime modification

• Atmosphere	No significant impact on atmosphere due to the project.

• Water resources	Storm water management will have positive contribution to water scenario.

4.1.2 Resource extraction and consumption/renewal

• Atmosphere	During the construction phase, there would be some impact on the atmosphere. The effect is marginal and would be surrounding the site area only.
• Water resources	The ground water will not have any negative impact due to the proposed activity, but the ground water table condition would be improved due storm water management.
⊙ *Economic conditions*	The activity will generate extra job and business opportunities.

4.1.3 Processing/industrial activity

• Atmosphere	The industry would install appropriate APCD's for the flue gas treatment and development of green belt all along the boundary of the industry.
⊙ *Economic conditions*	The activity will generate extra employment and business opportunities.

4.2 Quantification of significant impacts

Flue gas emissions would be the only significant object that could have adverse impact on the environment. SPM and SO_2 are the main constituents of flue gas emissions that need to be modeled and quantified. Computer modeling has been carried out using **Gaussian Plume Dispersion Model** (**PTMTP**) to verify the impact of flue gas emissions into the atmosphere and their effect on ground level.

Accordingly to the modeling, increase in SPM and SO_2 level due to the project would be less than 8 µg/m^3 for SPM and less than 3.5 µg/m^3 for SO_2. The overall SPM and SO_2 concentration in the atmosphere would be within the permissible limits.

5.0 ENVIRONMENTAL MANAGEMENT PLAN

5.1 Mitigation Measures

5.1.1 Wastewater generation and treatment

a) The operation of the project will result in wastewater generation of three types of effluent – spent wash, process condensates and effluent from misc. streams. Spent wash @ 530 m^3/day would be generated during the production of alcohol @ 60 KL/day. The spent wash would be treated in multi-effect evaporation system. The multi-effect evaporation system would be designed to handle spent wash @ 530 KL/day. During the operation, spent lees would be generated @ 60 m^3/day and MEE condensate @ 390 m^3/day would be generated. A part of the condensates would be used in the process for slurry preparation and the remaining after treatment would be used for makeup water of cooling towers. Besides the above mentioned streams, effluent would be generated from misc. other streams such as – washing effluent @ 15 m^3/day, cooling towers blow down @ 45 m^3/day, domestic effluent @ 9 m^3/day, D.M. plant reject @ 30 m^3/day and boiler blowdown @ 20 m^3/day. This effluent would be moderately polluted and after treatment would be used on land for irrigation purposes.

5.1.2 Air pollution

Boiler emissions from 25 TPH boiler would be the only source of air pollution. The industry would install an electro-static precipitator (ESP), where the polluted emissions will get cleaned (removal of SPM) before being discharged into the atmosphere, through a stack of adequate height.

The air pollution control system, for the combustion emissions from boiler furnace, will comprise of;

a) ducting arrangement to transport emissions to the APCD,

b) an APCD – electro-static precipitator

c) an ID fan, and

d) a stack to discharge the cleaned flue gas at adequate height.

5.1.3 Solid waste

The plant facility will generate a maximum of 20 MT/day of ash. Ash collected will be taken to an ash silo through a pneumatic conveying system. Ash silo will have the capacity of storage for 1 day of ash. The industrial unit will commit about 2000 m^2, exclusively to be developed for ash storage. This ash will be used for the production of fly ash based bricks.

5.1.4 Green Belt Development

The industry would develop 33 % of the distillery area as green area consisting of parks, plantation etc. The green belt around the proposed plant shall help to arrest the effects of particulate matter and gaseous pollutants in the area besides playing a major role in environmental conservation efforts.

5.2 Environmental monitoring

The industry would have either their own environmental monitoring laboratory or it would get the various parameters of environment monitored from external laboratories as per the requirements of KPCB/CPCB.

5.3 Rain Water Harvesting

The industry would install rain water harvesting wells to control storm water during the rainy season. The complex will be provided with 6 recharge wells. The average rainfall in the area is about 550 mm/year. 7000 m^3 of water will be recharged in an year into the ground water.

5.4 Occupational Health and Safety

Production of Ethanol involves storage handling and use of several chemicals. Some of these chemicals are toxic and hazardous in nature. Information about these chemicals is therefore important for the safety of the employees and the plant. Besides, the health status of the employees is also important which may be affected due to exposure to these chemicals. The exposures may be sudden and accidental or for a long period. In both of the cases there will be different health effects. Therefore safety measures dealing with these chemicals are of vital importance and will be followed judiciously. In order to ensure good health of workers, regular health check-up of the plant workers would be carried out. Occupational health surveillance

programme would be taken as a regular exercise for all the employees and their records maintained.

5.5 Management, staffing and capacity development

The industry shall have an environmental, health and safety committee (from amongst the regular staff of the industry), headed by a co-ordinator, who will be adequately trained.

Suitable training programs will be arranged for the manpower, which are directly responsible for the pollution control systems and emergency response planning, in their respective field/area of responsibility.

An estimated 12.25 % of the project cost, i.e., about Rs. 7.35 crores, has been earmarked for implementation of environmental management plan.