

EXECUTIVE SUMMARY
OF
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
(Including Environmental Management Plan)

FOR
EXPANSION OF DISTILLERY CAPACITY
(From the Existing 60 KLPD to 150 KLPD)

Project Location
Alaganchi Village, Nanjangud Taluk,
Mysore District, Karnataka State



Project Proponent
M/s BANNARI AMMAN SUGARS LIMITED
Alaganchi Village, Nanjangud Taluk,
Mysore District, Karnataka State

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Chapter-1

PROJECT DESCRIPTION

1.1 PROJECT BACKGROUND

M/s Bannari Amman Sugars Ltd., have established and operating 60 Kilo Litres Per Day (KLPD) Distillery located at Alaganchi Village, Nanjangud Taluk, Mysore District, Karnataka State from the year 2005. The distillery is operating in the existing Sugar Complex having 7500 TCD Sugar Mill and 36 MW Cogeneration unit. Considering the demand for the Alcohol in the country and availability of raw materials in the region, the unit has proposed to expand the capacity of the existing distillery from 60 KLPD to 150 KLPD Alcohol (RS/ENA/Ethanol(AA)).

1.2 JUSTIFICATION FOR EXPANSION OF DISTILLERY

The industry is already having adequate space in the existing Distillery Campus itself and therefore expansion of project will not require procurement of any additional land.

The existing industry is having permission to draw water from the River Kabini. The water permission currently available will be adequate to meet the requirement of proposed activities of the industry. Hence, permission to draw additional water is not required.

Over the last few years, various developments and improvements have been achieved in the Process & Technology of alcohol manufacture and environmental management. At this juncture, it is proposed to enhance the capacity of the existing distillery from 60 KLPD alcohol (RS/ENA) to 150 KLPD alcohol ([RS/ENA/Ethanol (AA)).

1.3 IMPORTANCE OF THE PROJECT

The use and importance of alcohol is well known as an ingredient in beverages. As an alternative to petroleum, alcohol is used as an industrial raw material for manufacture of a variety of organic chemicals including pharmaceuticals, cosmetics etc., also as a

potential fuel in the form of power alcohol when blended with petrol. The project is rural located, based on agricultural raw material and environmental friendly.

1.4 LOCATION

The present distillery of 60 KLPD is located adjacent to the existing sugar industrial complex located at Alaganchi village, Nanjangud Taluk, Mysore District, Karnataka State. The expansion of distillery from 60 KLPD to 150 KLPD is proposed in the premise of the existing distillery. The distillery site of 51 acres is situated on longitude 76⁰ 45'29" E latitude 12⁰ 06' 14"N at an altitude of 692 metre. The site is near to the road joining Nanjangud & Mysore. It is 2 km from the Alaganchi village and 10 km from Nanjangud town. Nearest water body is river kabini at 6 km from the site.

1.5 LAND UTILIZATION

Total land area already available with distillery is 51 Acres. The existing land area is adequate for expansion of the distillery capacity. Utilization for the project is given below.

Utilization of Land at Distillery

Land Utilization (in acres)	Present 60 KLPD	After Expansion 150 KLPD
Built up area	15	16
Green belt Area	15	17
Open vacant area for future development	21	18
Total	51	51

1.6 MAN POWER REQUIREMENT

The man power utilized in the existing 60 KLPD capacity distillery is having a total of 60 employees including office staff, skilled & unskilled workers. However, additional man power of 30 persons will be needed after expansion up to 150 KL/Day. More than 85% of the man power requirement will be met from local source.

1.7 RAW MATERIALS AND PRODUCT

Ethyl alcohol with a chemical formula $\text{CH}_3\text{CH}_2\text{OH}$ is commonly known as alcohol or spirit. Scientific nomenclature of ethyl alcohol is Ethanol. Molasses obtained as by-product from the adjacent sugar plant is the main raw material for manufacture of alcohol. Molasses is also obtained from associated sugar industry located at Kollegal. Microbial culture is used in the fermenter as bio-catalyst for production of alcohol.

1.8 WATER REQUIREMENT

Fresh water requirement to the industry is met from the Kabini River located at about 6 km from the site. The condensate water generated during evaporation is treated in ETP and polished in R.O, helps to reduce the intake of fresh water. The requirement of fresh water to the existing distillery of 60 KLPD is $599\text{m}^3/\text{d}$ and after expansion of distillery to 150 KLPD the total water requirement will be $1350\text{ m}^3/\text{d}$.

1.9 STEAM & POWER

Steam economy is achieved by employing multi pressure distillation, multi effect evaporator and heat recovery systems in the plant. The distillery is associated with co-gen power plant. High pressure steam from the boiler runs back pressure turbine to produce electric power for use. Exhaust steam from the turbine is utilized in distillation and evaporation plants.

The existing 60 KLPD distillery is provided with 23.4T/Hr multi fuel spent wash fired boiler and 2.0 MW co-gen power plant to meet its requirement of steam and power. During expansion, an additional co-gen power plant consisting of 23.4T/Hr boiler and 2.0 MW steam turbine will be installed to meet the requirement of additional steam and power. The proposed boiler will be fired with spent wash concentrate (SWC)/ bagasse/coal/bio mass as fuels. High pressure steam from the boiler will run the back pressure turbines to produce electric power. Back pressure steam at $4.0\text{ kg}/\text{cm}^2$ is used in distillation and evaporation section. The generated power is used in the plant to meet the needs.

1.10 MANUFACTURING PROCESS

Molasses is diluted with water and mixed with yeast culture and nutrients and then fermented in fermentation vessels. The fermented liquid (referred as fermented wash) consists of about 10 % alcohol, is clarified and then distilled in multi pressure distillation system to recover different grades of alcohol. Alcohol is stored in steel storage tanks. For the production of Ethanol, the Rectified Spirit produced will be passed through molecular sieve columns to get Ethanol (AA) at 99.8% Alcohol.

The liquid generated after separation of alcohol from fermented wash is called as spent wash. It contains organic and inorganic matter. Spent wash is treated under Zero Discharge Environmental Management System consisting of Concentration of spentwash in multiple effect evaporators and burning the concentrated spentwash in specially designed multi fuel boiler. Condensate water generated during evaporation of spent wash is dealt by Anaerobic-Aerobic-treatment System with RO polishing and utilized in the processing sections.

CHAPTER-2

DESCRIPTION OF ENVIRONMENT

Base line environmental data were collected primary and secondary sources for the study area of 10 km region from the site. The environmental parameters studied were climate, air, water, soil, ecology and socio-economical status.

2.1 CLIMATE

The region experiences dry climate with hot summer and moderate winter. Monthly maximum temperature during summer and minimum temperature during winter reach to 32.5 °C and 13.4 °C, respectively. Relative humidity is in the range of 20-40% during summer and 60-80% during monsoon. Average annual rain fall is 580-840 mm and most of the precipitation occurs during July to September.

2.2 AIR ENVIRONMENT

Ambient air quality of the study area was monitored at 6 different locations. The concentration of pollutants such as PM₁₀, SO₂ and NO_x were measured. Maximum concentration (µg/m³) of these pollutants is PM₁₀: 57, SO₂: 12.7 and NO_x: 25.3, respectively. Permissible limits of these parameters for rural area are PM₁₀: 100, SO₂: 80 and NO_x: 80, respectively. The quality of air in the region is good and with in the permissible limits for the rural area.

2.3 WATER ENVIRONMENT

The quality of ground water samples from 4 bore wells around the site and surface water samples from kabini River were monitored. The river water is suitable for drinking after conventional treatment and disinfection. The hardness and dissolved solids of some of the bore well waters is above the desirable limits and within the permissible limits for drinking water. In the absence of alternative source this water can be used for drinking purpose.

2.4 SOIL QUALITY

The quality of soil samples collected from 3 different locations in the study area was analyzed. Soil in the region is sandy loam and medium black cotton soil. It contains moderate organic matter with low nitrogen and potassium. The micro nutrients Mn, Cu and Zn are present in trace quantities. The soil is non-saline with low electric conductivity. The soil is fertile and suitable for agriculture.

2.5 SOCIO ECONOMICAL

The region is rural and economically backward. Infrastructure facilities including education, medical, road, transportation and job opportunity are limited. The region is basically agrarian and crops cultivated are ground nut, maize, sun flower, cotton and sugar cane. No protected forests or thick plantations in the region. There is no endangered flora or fauna species in the region.

CHAPTER-3

ANTICIPATED ENVIRONMENTAL IMPACTS

AND MITIGATION MEASURES

Waste water, gaseous emissions and solid wastes will be generated from the alcohol plant as listed below. These wastes will be effectively treated to avoid their adverse impact on environment.

3.1 WASTE WATER

Source treatment & disposal of waste water for the proposed 150 KLPD capacity unit is given below

Sl. No.	Source	Quantity m3/d	Disposal
1	Spent wash from distillery plant.	997 or 1216 T/d	Concentrated in evaporator and then used as fuel in boiler. Condensate water from evaporator will be reused as cooling water make up and other plant needs.
2	Waste water from cooling tower & plant washings	1008	Treated in anaerobic cum activated sludge process and the treated effluent used in irrigation application.
3	Domestic	6	Septic tank and soak pit

As the spent wash is concentrated and completely utilized as fuel in the boiler and other waste water is treated in Effluent treatment Plant, the environment will not be affected by the waste water generated from the plant.

3.2 GASEOUS EMISSIONS

The sources, air pollution control measures and disposal of gaseous emissions are given below.

Sources of Flue Gases and APC Measures

SL No.	Source of Flue gases	Fuel consumption	Flue gas flow rate	Stack Height	APC measure
1	Existing boiler, 23.4 T/h in 60 KLPD distillery unit	i. CSW (Concentrated Spent wash), 148 T/d	66,200 Nm ³ /h	58 m, AGL	Bag filter & Stack
		ii. Coal (as support fuel), 45 T/d			
2	Proposed additional boiler, 23.4T/hr for 150 KLPD distillery unit	i. CSW (Concentrated spent wash, 361 T/d	66,200 Nm ³ /h	58 m, AGL	Bag filter & Stack
		ii. Coal, (as support fuel), 124 T/d			
		iii. Bagasse (as alternative coal), 236 T/d			

PM₁₀ and SO₂ are the major gaseous pollutants from the industry. Presently, the maximum concentration of PM₁₀ and SO₂ in ambient air is 57 µg/m³ and 12.7 µg/m³, respectively. This is well within the permissible limits. In view of air pollution control measures adopted in the industry the impact of proposed project activities is not likely to cause significant impact on the existing ambient air quality in the region.

FUGITIVE EMISSIONS

Handling boiler fuel (bio-mass) and boiler ash and the movement of vehicles is the source of fugitive emission in the plant premises. The impact of fugitive emissions in the industry are controlled by following measures

- Green belt and greenery development around storage yards, around plants, either side of roads and around the periphery of the industry.
- Water spray and sprinkling is practiced at roads and near loading unloading locations. The roads will be sprayed with water through tractor tankers.
- The conveyors of fuel are suitably covered with hood or enclosures to control fugitive emissions.
- All internal roads in the premise will be paved / tarred.

3.3 SOLID WASTES AND ITS DISPOSAL

Fermenter sludge of 6 T/d and boiler ash of 80 T/d is produced from the industry. Fermenter sludge contains plant nutrients such as nitrogen, potash, phosphate and organic carbon. This will be dried and then disposed to farmers for its use as bio-manure or cattle feed. Boiler ash contains soil nutrients such as phosphate and potash. This is also disposed to farmers for its use as soil nutrient.

CHAPTER-4

ENVIRONMENTAL MONITORING PROGRAMME

An Environmental Cell is established in the industry to implement and monitor environmental policy and programme. Environmental management

4.1 Environmental Cell

Environmental cell consisting of General Manager and departmental heads is created to effectively manage the environmental activities in the distillery.

4.2 Environmental Department

Environmental department will be formed with environmental Chemist, laboratory chemists and operators to implement and operate pollution control and environmental protection measures.

4.3 Environmental Monitoring Plan

Self monitoring system consisting of well equipped laboratory and manpower is established in the industry with man power and facilities to analyze waste water, soil, stack emission, ambient air etc. to ascertain the compliances of environmental norms and standards..

4.4 Environmental Records

Environmental department is maintaining log sheets and records for operation and maintenance of pollution control and related facilities.

4.5 Budgets for Environmental Monitoring

The existing distillery is already having facilities for environmental monitoring. However, additional investment of Rs 30 lakhs will be made for up gradation of the environmental monitoring system.

CHAPTER-5

ADDITIONAL STUDIES

5.1 PUBLIC CONSULTATION

The Public hearing and Public consultation as per the guidelines will be conducted

5.2 RISK ASSESSMENT

Risk assessment studies for the industry are being conducted to ensure safety and reliability of plant through a systematic and scientific methods to identify possible failures and prevent their occurrences before they actually cause disasters and production loss.

5.3 SAFETY MANAGEMENT AND PERSONNEL HEALTH CARE PROGRAMME

Environmental & Safety officer in the industry is managing safety and occupational health care programme.

- Safety training is given to the existing employees.
- Safety appliances, first aid medical kits and Personnel protective are maintained.
- Health and safety related displays are provided in the work place and premise.
- Fire fighting facility including Fire hydrants, fire extinguishers and fire protective appliances is provided.
- Medical Checkups and health records of employees is maintained.

CHAPTER-6

PROJECT BENEFITS

- 1.The use and importance of alcohol is well known as an ingredient in alcoholic beverages and industrial raw material for manufacture of a variety of organic chemicals including pharmaceuticals, cosmetics, potable alcohol etc. also as a potential fuel in the form of power alcohol when blended with petrol. Further the project is based on agricultural raw material and rural location.
- 2.Alcohol is produced from molasses which is a renewable source and a by-product of the sugar industry. Alcohol is an eco-friendly product.
- 3.With enhancement in sugar cane cultivation in the country, the production of molasses from the sugar industry has greatly increased. The sugar industries are facing the problem for storage and disposal of molasses. It is necessary to create additional capacity for utilization of molasses. This will enable sugar factories to give better prices to the farmers supplying sugar cane.
- 4.The plant nutrients present in spent wash are recovered in compost or boiler ash. These products are rich in micro and other nutrients and therefore useful to the farmers to enhance the nutrient values of the soil.
5. The industry is established in the rural region of the state. The presence of the industry helps to develop road, transportation, communication and related facility in the region. The industry is providing direct and indirect employment to more than 500 local rural persons.
- 6.Greenery development in the premise gives green look to the region and it encourages the locals to develop greenery in their premises.
- 7.The distillery is agro based and has a national priority to overcome the shortage of energy and to save foreign exchange.

CHAPTER-7

ENVIRONMENT MANAGEMENT PLAN

A comprehensive environmental management plan is adopted consisting of environmental protection measures as indicated below.

- i. Establishment of pollution control facilities to manage gaseous emissions, waste water and solid wastes.
- ii. Operation and Maintenance of pollution control facilities.
- iii. Green belt and greenery development in and around the factory site
- iv. Storm water management & Rain water harvesting
- v. Paving and lining of roads, fuel and solid storage yards.
- vi. The solid storage yard and spent wash storage tanks is suitably lined to prevent percolation.
- vii. Personal health care programme, emergency management plan and safety management systems is implemented in the distillery.
- viii. Establishment of Environmental Cell, Environmental department and self monitoring systems in the industry.

CHAPTER 8

CONCLUSIONS

M/s Bannari Amman Sugars Ltd., have proposed to expand the distillery from 60 KLPD to 150 KLPD in the available infrastructure to make better use of the resources and make the unit economically viable and sustainable.

1. Total Fresh water requirement to the proposed expansion is 1350 m³/d. The existing industry has the permission to draw water from the Kabini River.
2. Spent wash generated from the distillery is concentrated in evaporator. The concentrated spent wash is admixed with bagasse or coal and will be burnt in the boiler as fuel. Zero spent wash discharge technology will be adopted in the distillery. The boiler is provided with bag filter & chimney height of 58 m to control the emissions.
3. Solid waste boiler ash (80T/d) contains plant nutrients. This is mixed with press mud & supplied to the farmers for use in sugar cane lands as soil conditioner cum nutrient
4. Effluent generated from the distillery is treated in the ETP.
5. The distillery is associated with co-gen power plant of 23.4T/h boiler capacity and the total requirement of electric power will be met from captive source.
6. The industry is located in the rural backward region of the district. In the vicinity of the factory there are no protected forests, sanctuary, archaeological important structures and sensitive locations. Therefore, the proposed expansion will not have any adverse effect on the environment or the eco system.

7. The concept of Recycle, Reuse and Reduce is practiced in the unit in line with the eco-policy of Govt. of India.
8. This industry does not produce any toxic products and does not have significant adverse effect on the quality of land, water and air. The industry has taken all the necessary preventive measures to mitigate even the small effects which may be caused by industrial activities.
9. The industry adopted an effective environment management system and environment management plan to protect the environment. Due priority is given for greenery development and rain harvesting in the factory premises and around. Environmental management plan and suggested measures for pollution control are adequate for protection of environment and to seek environmental clearance to the project.

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