

M/s. Nadahalli Ethanol and Allied Industries Limited

Executive Summary of Environment Impact Assessment and Environment Management Plan

FOR

ESTABLISHMENT OF 220 KLPD DISTILLERY UNIT TO MANUFACTURE RS/ETHANOL AND TO INSTALL CAPTIVE POWER PLANT OF 10 MW CAPACITY

[Project or Activity of Schedule 5(g) & 1(d) under Category 'A']

By



NADAHALLI

Ethanol & Allied Industries Ltd.

www.nadahalligroups.in

**M/s. Nadahalli Ethanol & Allied Industries Ltd.
Dasoha Nilaya, Bijapur Road, Muddebihal Taluk,
Bijapur District, Karnataka.**

Consultant



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CHAPTER 1 PROJECT DESCRIPTION

1.1 Preamble

M/s. Nadahalli Ethanol and Allied Industries Limited, has its Registered Office at Dasoha Nilaya, Bijapur Road, Muddebihal Taluk, Bijapur District, Karnataka. The company is registered under the Registrar of Companies Act 3013 on 28.08.2020.

Shri Bharat Aminappagouda Patil is appointed as the Managing Director of M/s. Nadahalli Ethanol & Allied Industries Ltd.,

M/s. Nadahalli Ethanol and Allied Industries Limited proposed to establish distillery unit at Survey No. 229/1, 230 Basarkod village, Muddebihal Taluk, Bijapur District, Karnataka. Total land area of the proposed project site is 39.11 acres land owned by the company. The estimated capital cost for the proposed project is Rs. 180 Crores. The proposed configuration of the project is as under;

Table 1.0 Proposed production details

Sl. No.	Description	Total	
		During sugarcane crushing	During off season
1	Sugarcane crushing to produce sugarcane syrup TCD	3000	-
2	Co-generation power plant MW	10	4
3	Distillery plant, RS / Ethanol in KLD	220 using sugarcane syrup	120 using grains
4	CO ₂ TPD	166	90.60

The proposed project activities of sugar plant, cogeneration plant and distillery are listed under serial No. 5(j) and 5(g) respectively, under Category-A in the schedule of the EIA Notification 2006.

Hence, prior Environmental Clearance (EC) and Consent to Establish under the Water Act & the Air Act are required for proposed project from Ministry of Environment, Forest & Climate Change (MoEF & CC) and Karnataka State Pollution Control Board respectively. However, the capacity of Sugar and power plant are less than the threshold limits to qualify for seeking EC. Whereas, the capacity of proposed distillery 220 KLPD and requires prior EC.

Application was submitted to MoEF & CC seeking prior EC vide proposal No. IA/KA/IND2/230639/2021 on 20.10.2021. The MoEF & CC issued Standard Terms of Reference (ToR) vide ToR No. IA-J-11011/394/2021-IA-II(I) dated 22.10.2021 for the purpose of carrying out EIA study and to prepare the EIA report to seek prior EC by undergoing Public consultation.

1.2 Brief Description of production Ethanol using Sugarcane syrup

1.2.1 Extraction of sugar syrup from sugarcane

Sugarcane is the raw material for manufacturing RS/Ethanol. Sugarcane syrup/Juice is extracted from sugarcane by milling, juice extraction, clarification, boiling and syrup extraction. During clarification mud is separated as press mud and taken to storage area. Bagasse, which is the left-out fibre material after extraction of juice

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from sugarcane is used as fuel in boiler to produce steam. Steam is used for generation of electric power and exhaust steam is used for evaporation of water in the juice.

1.2.2 Distillation Process

Distillation is carried out in five stages of process.

1. Dilution of sugar syrup by mixing water to the required consistency
2. The sugar juice/Syrup is inoculated with yeast for yeast activation
3. Fermentation of sugar syrup to take out alcohol
4. Distillation - to separate fermented wash and alcohol to get Rectified spirit
5. The rectified spirit is dehydrated using Molecular sieve to get ethanol

1.3. Brief Description of production Ethanol using grain

1.3.1 Preparation of grain for fermentation

Grains will be milled in to flour of desired quality and mesh size. Weighed quantity of flour is sent into liquefaction process, where the starch is liquefied completely.

Yeast seed material is prepared in pre-fermenter by inoculating sterilized mash with yeast and then fermented to convert the fermentable substrate into alcohol.

1.3.2 Distillation Process:

Pre-heated fermented wash is distilled in stages to get 95 % alcohol called rectified spirit.

1.3.3 Decantation & Recycle Section

Spent wash coming out of distillation plant is decanted for separation of suspended solids to get wet cake having 30-32% solids (w/w) called as Distillers Wet Grain with Soluble (DWGS) which can be sold directly in wet form as cattle feed (DWGS) or it will be concentrated by evaporation and dried to get Distillers Dry Grain Soluble (DDGS) which will be used as cattle feed.

Thereafter, the RS of 95 % alcohol content is dehydrated to get fuel Ethanol.

1.4 Carbon Di Oxide Generation & Recovery-

During the fermentation CO₂ will be released. About 167 TPD (w/w) of CO₂ is estimated to be released. The CO₂ will be scrubbed and liquified for commercial purpose in a separate CO₂ plant.

1.5 Resource requirement

1.5.1 Water requirement and source

The freshwater requirement to the industry will be 948 KLD, which will be supplied by the Krishna River. The industry has submitted application for seeking permission from the Karnataka state government to use river water.

1.6 Air pollution source and control measure

Proposed Air pollution sources and its control measures

Table 2.0 Air pollution sources and its control measures

Stack attached to	Fuel used	Fuel consumption	Stack/s height	Air pollution control unit	Predicted emissions	Emission standards
Boiler 60 TPH	Bagasse	27.27 TPD	48 m AGL	Electro static precipitators (ESP)	PM	150 mg/Nm ³

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Boiler 30 TPH	Bagasse / rice husk	13.63 TPD		Electro static precipitators (ESP)		
DG sets 650 kVA*	HSD	130 Kg/hr	8 m ARL	Stack	SO ₂	

1.7 Employment

The total number of employees from the proposed project will be 210 Nos.

1.8 Project Cost

The estimated capital cost for the proposed project is Rs. 180 Crores.

CHAPTER 2 DESCRIPTION OF ENVIRONMENT

2.1 Study Area and study period

For baseline study 10 km radius from the project site is considered as per the ToR. Baseline monitoring was carried out from October, November and December 2021 with respect to quality of ambient air, water (surface and ground), soil, ambient noise level, ecology and biodiversity, geology and hydrogeology, land use and land cover and socio-economic status.

2.2 Climate condition

The climate of the region is semi-arid. The maximum temperature during the year ranges from 29.7°C to 39.5°C and the minimum temperature is 15.4°C to 24.2°C. During the summer the daily maximum temperature is up to 38°C. Annual rainfall in the district is 591 mm.

2.3 Environmental Status Study Period - Baseline Monitoring

The present environmental status of the study area covering 10 km radial distance from the project site was assessed from October, November and December 2021 with respect to quality of ambient air, water (surface and ground), soil, ambient noise level, ecology and biodiversity, geology and hydrogeology, land use and land cover and socio-economic status. The study area is predominantly agriculture and rural.

2.3.1 Land use and land cover

The project site lies at the elevation range of 545 m above MSL. In the study area the physical details like land cover and land use by the human habitate details have been studied. In the study area the six main activities of Land use / land cover in 10 km area around the project site is given below;

Table 3.0 Land use and cover classes of the study area

Sl.	Land use and cover classes	Area (ha)	Area (%)
1	Tree cover outside forest	404.24	1.29
2	Agriculture / Agriculture Plantation	19,150.11	61.19
3	Open /Barren / Agricultural Fallow	11,078.33	35.40
4	Built up area	384.66	1.23
5	Water body	280.19	0.90

2.3.4 Air environment

Ambient air quality of the study area was monitored at eight different locations. The background concentration of pollutants PM₁₀, PM_{2.5}, SO₂, NO_x & CO is monitored. The monitored results is summarised as under;

Table 4.0 Ambient air quality status of the study area

Sl. no.	Parameter	Unit	Observed Values	NAAQ Std.
1	PM ₁₀	µg/m ³	32.47 - 81.35	100
2	PM _{2.5}	µg/m ³	16.22 - 40.21	60
3	SO ₂	µg/m ³	4.17 - 4.86	80
4	NO _x	µg/m ³	9.15 - 9.8	80
5	CO	mg/m ³	1.08 - 1.65	4

It could be seen that the observed results are within the standards prescribed in Environment protection Rules 1986.

2.3.5 Noise environment

Observed ambient noise levels are monitored at eight different locations during day & night.

Table: 5.0 observed Noise levels in the study area

Location	Noise level in dB(A) Leq Day 6 am to 10 pm Night 10pm to 6 am	Limits as per Env. Protection Rules, 1986 in dB(A)Leq	Remarks
Project site	50.3 during day time 42.3 during night	75 - Day time 70 - Night time	Industrial area limits
Other location	47.6 - 55.9 during day 40.3 - 46.2 during night time	55 - Day time 45 - Night time	Residential area limits

The maximum noise level at all the locations is slightly higher than the limits stipulated in the Environmental (protection) Rules 1986 and the Noise Rules 2000 for residential area. The increase is attributed to movement of vehicles and other farming activity in the villages.

2.3.6 Water environment

People in the study area are depending on ground water for domestic purpose and also irrigation. Krishan river water is also supplied in parts of the area.

There are four agricultural bore wells and open well in the proposed Plant area. The depth of these bore well are ranging from 60 to 70 m bgl.

The ground water and surface water monitoring indicate that;

- 1) All the parameters of the groundwater samples analysed are meeting maximum permissible limits in the absence of alternate source as per IS:10500-2012 standards.
- 2) Based on the comparative analysis with the Central Pollution Control Boards classification of the surface water samples with the Designated Best Use, it is observed that the water of all the surface water falls under “category C” i.e. “the water could be used as a drinking water source with conventional treatment”.

2.2.7 Soil quality

In the study area at eight locations the soil samples are analysed. The soil is predominantly of three types of soils viz. Black soils, Red sandy soils and mixed soils. The infiltration rates of these soils range from 2.6 to 3.8 cm/hr. Summary of soil analytical results indicate that;

- The pH of the soil samples ranged from 7.25 to 8.8 i.e. moderately alkaline.
- Nitrogen content ranged from 216.8 to 273.98 kg/ha i.e. good to better.
- Phosphorous from 82.29 to 98.1 kg/ha i.e. more than sufficient.
- Potassium content ranges from 49.25 to 93.11 kg/ha i.e. is slight low.
- Conductivity ranges from 0.351 to 0.905 μ S/cm i.e., Normal soil with respect to soluble salts

2.3.7 Socio-economics

The proposed project has positive impact on the socio-economic conditions of the people in the study area i.e., growth of industrial sectors and infrastructure development in and around the agricultural area i.e. villages and semi-urban settings and towns is bound to create certain positive socio-economic impacts on the local populace as the proposed project is based on agriculture produce in the area.

The M/s. Nadahalli Ethanol & Allied Industries Ltd., has a positive response from the public. The willingness to pay and the willingness to accept the project has positive outcome. The ratio between this is around 2:1. It means the benefits are two times greater than the loss. The losses due to the polluting agents can be diluted through various methods. The social

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and cultural vulnerability index responds a very less and level of resilience is at the higher side.

2.3.8 Ecology and Biodiversity

Study area is predominantly agriculture and the open land is with grass and shrubs. The vegetation and fauna in the study area is not expected to be affected by the proposed project.

The impact on the environment is considered insignificant as the scale of operation is small and all the pollution mitigation measures to be provided by the industry. It is also open to improve the environmental conditions by proactive participation with the local people around the industry.

CHAPTER 3 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

3.1 Water requirement and source

The total fresh water requirement of the industry will be 950 KLD and sourced from Krishna River or nearby Basarkod lake.

The condensate from sugar plant and distillery process will be recycled back to process like cooling and washing thereby freshwater consumption will be reduced. Distillery will work on the principle of Zero Liquid Discharge (ZLD) System. Hence there will be no discharge of treated effluent in to environment.

Total fresh water requirement is 950 KLD and the treated waste water recycled in the process is 2550 KLD.

3.2 Waste water generation and Management

During the process of production of sugar syrup condensate will be generated it will be treated and reused for cooling and for hot requirement. The quantity of condensate water for reuse is 1227 KLD

Distillery spent wash from the sugar syrup stream will be concentrated in respect of spent wash and spray dried to get Potash, it can be used as manure supplement. The lean effluents will be treated and reused in the process and for cooling tower. The plant will work on the principle of ZLD. The distillery spent wash quantity is 1320 KLD and other lean effluents will be 1520 KLD.

Similarly, when the plant is operated with grain as raw material. The concentrated stream is Disposed as DDGS. About 64 TPD of DDGS will be generated. The lean effluent streams of about 875 will be recycled in the process and for cooling tower water makeup.

For sewage of 10 KLD septic tank and soak pit is proposed.

3.3 Environment Management Cost

Capital cost towards the environmental management plan is Rs. 2230 lakhs. and the recurring cost is 244 lakhs.

CHAPTER 4 ENVIRONMENTAL MONITORING PROGRAMME

4.1 ENVIRONMENTAL CELL

An Environmental Cell will be established in the industry to implement and monitor environmental policy and program.

4.2 ENVIRONMENTAL MONITORING SCHEDULE

Ambient air, stacks emission, ambient noise level, water and wastewater will be monitored on regular basis. Monitoring of all environmental attributes, frequency and parameters will be done as per the clearances and consents issued by the regulatory agencies viz., MoEF & CC/SPCB. In this system, online monitoring of the pollutants will be installed.

A budget of Rs.35.5 Lakhs is made for environmental monitoring,

CHAPTER 5 ADDITIONAL STUDIES

5.1 Public Hearing and Consultation

M/s. Nadahalli Ethanol & Allied Industries Ltd., with the help of KSPCB has scheduled the public consultation. The proceedings of the public consultation will be included in the final EIA report and submitted to the MoEF and CC.

5.2 Risk Assessment

Detailed risk assessment study is carried out to evaluate the risks involved due to storage of Ethanol in distillery. Precautionary measures are suggested in the EIA report for prevention/management of any risks that is suggested will be implemented.

A prediction study is carried out for any leaking occurring due to storage of Ethanol in to the atmosphere. The impact will be within the factory in 13 to 17 m radius from the storage area.

The Petroleum and Explosive Safety Organisation (PESO) guidelines/norms will be followed for construction and storage of Ethanol. An approval will also be taken from PESO.

5.3 On-Site Emergency Plan

On-site emergency plan will be developed by describing in detail the action to be taken during emergency situations. Also, safety mock drills will be conducted frequently to ensure prompt and safe response during emergencies.

5.4 Occupational Health and Safety of the Employees

Annual health check-up will be conducted for all employees. Health reports will be maintained for any future use. Industry will ensure that employees working in safe condition and EHS team will be monitoring that usage of right PPEs by the working during operation. There will be no health impact on the workers working in the plant.

CHAPTER 6 PROJECT BENEFITS

Any project coming up in an area will bring in improvements in physical infrastructure, social infrastructure, employments for the skilled and unskilled people besides other tangible benefits.

6.1 Improvements in the Physical and Social Infrastructure

Due to the proposed project, there will be improvements in the region like infrastructural developments and road connectivity between the villages and to the industry, increase in green cover, drinking water facilities along with sanitation etc.,

6.2 Tangible Benefits

The proposed project has potential to generate employment opportunities for unskilled, semiskilled, skilled workforce during construction and operation phase as well. For the employees the following facilities will be provided;

- ✓ Periodical health checkup.
- ✓ Transport facilities
- ✓ Residential facility
- ✓ There will be upliftment of villagers as the economic conditions will be improved
- ✓ Infrastructure facilities will be strengthened and improved

6.3 Intangible Benefits

There will be an overall socio-economic development in the area around the project. The production of Ethanol will support Government of India's fuel blending programme with renewable energy like Ethanol and help downsize the nation's carbon footprint.

6.3 Corporate Environment Responsibility (CER)

The Company will be undertaking and implementing CSR activities by giving donations to promote various social, cultural and philanthropic activities.

- The total capital cost of the proposed project is Rs.180 crores. An amount of Budget of Rupees 2.7 Crores earmarked for shouldering the CER for carrying out the activities in the field of education in Basarkod, Gudabinni and Siddapur P Talikoti village.
- RO drinking water supply is planned for the villages Gonal village, Rudagi village, Siddapur P. Talikoti village, Jettagi village and Koppa village
- Solar street lighting facility to Basarkod village and Gundakarjagi

M/s. Nadahalli Ethanol & Allied Industries Ltd. believes in the concept of sustainable development and is committed to industrial operations without giving room for any adverse impacts on the environment.

Baseline environmental survey was carried out to analyze the present status of environmental attributes. Baseline studies of ambient air quality, ground water, soil, Noise, biodiversity and socio-economic environment indicate that there is no/marginal impact.

However, the beneficial impacts far outweigh any marginal impacts and are anticipated in terms of the employment opportunities during the operation of the industry and society at large. Also, there will be economic growth at the regional level.

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The industry will be provided with Environmental Management Cell in its organization to monitor and implement programs to improve its environmental status from time to time and will strive to adopt all such technological advances to reduce the impact due to its operation on the environment.

CHAPTER 7

ENVIRONMENT MANAGEMENT PLAN

The Environment Management Plan (EMP) is required to ensure sustainable development in the area of the proposed project. EMP aims at not only the regulatory requirements to meet the norms prescribed in the Environment Protection Act and Rules but also to ensure the conservation measures with respect to use of natural resources.

7.0 Environmental Cell

For effective implementation of the system an Environmental Management Cell (EMC) will be established for implementation and monitoring of EMP. It consists of Head of the Unit, Technical Head, Production Head, EMC Head under which Chemists, ETP Operators & Environmental Engineers report to him with clearly defined responsibilities and authorities for effective implementation of EMP.

7.1 Environment Management Plan

7.1.1 During Construction Stage

The Environment Management action plan aims at controlling pollution at the source level to the extent possible. The contractor is responsible for the implementation and compliance with recommendations and conditions of the EMP.

- Periodic check and regular maintenance of construction machinery for emissions.
- Clean fuel will be used in equipments.
- Use of water sprays to prevent dust from being air borne.
- Periodical noise monitoring
- Ambient air quality monitoring during earthwork at wind word direction for 24 hours during the activity at peak.
- Compilation with inspection observations to be verified to ensure corrective actions
- Monthly review meetings

7.1.2 During Operation Stage

The impacts on the various environmental attributes are mitigated using appropriate pollution control equipment. Monitoring scheduled details is given in Chapter 6 of EIA report and budget provision for Environmental Management Plan will be made.

7.1.2.1 Air Environment

The pollutants mainly due to Boilers, DG set process, storage and transportation of raw materials and finished products.

The following measures will be adopted for the control of emissions in industry;

- The emissions from bagasse fired Boiler will be controlled by providing ESP as APC equipment and stack 48 m height.
- The ash collection system at the APC equipment is designed to avoid the fugitive dust.
- DG set will be used as stand-by unit.
- Periodic monitoring of stack emissions and ambient air quality apart from online monitoring system will be provided and regular monitoring through NABL accredited labs to ascertain the performance of the air pollution control equipments and water quality, noise level and effluents characteristic.
- Covered conveyer belts for bagasse feeding to boiler and ash collection silos.
- The online monitoring system to be calibrated as per the schedule given by the supplier and it shall be in continuous operation and lock down to KSPCB and CPCB server.

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- Regular maintenance of vehicles and machinery's in order to control emission.

7.1.2.2 Water Environment

The following measures shall be adopted;

- a. Sugar plant effluent management;
 - Water conservation measures are encouraged
 - Process effluent is being treated in ETP and reuse it in distillery process.
 - Operation and maintenance of ETP.
 - Separate flow meter for inlet and outlet of effluents through ETP.
 - The effluent drain is to be kept in good condition with regular cleaning
 - The storm water drain is to be kept separate from effluent drain
 - Ensure continuous maintenance and operation of ETPs.
 - Ensure that the online monitoring systems viz., flow measuring device and treated effluent monitored are kept in operating condition all the time and connected to KSPCB and CPCB server.
 - Maintenance of log books and review by top management
- b. Distillery plant effluent management;
 - Distillery effluent is being treated in Process Condensate Treatment Plant and treated spent lees and condensate water will be reused back to the process for reducing the fresh water consumption.
 - Spent wash is treated in MEE. Concentrated spent wash to be used drier to produce potash rich powder.
 - The distillery unit should be work on the principle of 'Zero Liquid Discharge'
 - The continuous operation and maintenance of the MEE and boilers.
 - Operation and maintenance of online flow meters
 - Connectivity of online monitoring systems to CPCB and KSPCB servers.
 - Corrective actions with respect to mal functioning of MEE, boilers, performance of PCTP.
 - No effluent treated or untreated are discharged on land or outside the factory.
 - Effluent and storm water drain inspection

7.1.2.3 Solid Waste and Hazardous Waste Management

The bagasse and press mud are the two major solid waste that are generated from the sugar plant. Bagasse is completely used in the boilers for steam generation. The other solid waste is from ETP sludge.

Press mud, ETP sludge, ash from distillery will be mixed and given to farmers for composting and application on land for agriculture. Fly ash will be given to brick manufacturers.

Used oil and cotton waste from the DG set are the only hazardous waste from the industry and the same will be disposed to authorized recyclers.

7.1.2.4 Land Environment

The project is planned within the company owned land. The topography of the area will be affected due to industrial activities. The land where the construction is planned in vacant land. Barricades will be provided around the project site to control the dispersion of dust emission and water sprinkling regularly to suppress the dust. The movement of construction vehicles are on already developed roads.

7.1.2.5 Noise Environment

The major sources of noise during the construction phase are vehicles and construction equipment like dozers, scrapers, concrete mixers, cranes, pumps, compressors, pneumatic tools, saws, vibrators etc.

The increase in noise levels during the construction is the Impact. It will be temporary during the day time when being operated hence will not have any significant impact on surrounding community.

There is bound to be some residual effect during the operation stage from Boilers, DG set. Boilers will be operated in separate place and control of noise is attempted at source by proper lubrication of moving equipment, providing acoustic enclosures/rooms for DG set, and TG sets, keeping compressors and the pumps in good condition to make the noise minimal.

Vehicular movement will be on the tarr road both inside and outside. The human settlement is not affected due to the industrial operation. Movement of vehicles during the peak time. Personnel working near noisy areas will be provided with adequate PPEs such as earplugs and earmuffs, use of which strictly enforced. Boundary walls and dense greenery in and around the industry to act as acoustic barriers.

7.1.2.6 Socio Economic Environment

Socio-Economic benefits

The construction phase provides employment opportunities for the local people. In addition to the opportunity of getting employment in construction work, the local population would also have employment opportunities in related activities like petty commercial establishments, small contracts and supply of construction materials etc.,

The present total number of employment both direct and indirect will be 210. Indirect job opportunities like raw material suppliers, transportation and security system. Thereby local infrastructure facility will be improved. Development of social facilities like, temple, educational facilities to the local etc.,

M/s. Nadahalli Ethanol & Allied Industries Ltd. has positive impact on the socio-economic conditions of the people in the study area.

7.2 Greenbelt Management Plan

Total land area is 39.11 acres (15.82 hectares). For green belt and area of 33.23 % of the total plot area i.e., 13 acres is earmarked. In the existing agricultural land various species like Teak, Neem, Gul mohar, Mango etc., are available. This tree plantation will not be disturbed. These plants also support the faunal diversity in the premises as food source to them. Keeping in view of the soil and water quality available in and around the industry and the topography of land, tree species are selected and planted for development of greenbelt.

7.3 Rainwater Harvesting

The proposed project will be provided with rain water harvesting system. Rainwater harvesting and storing rooftop rainwater and stormwater in separate structures would suffice the water requirement of the plant for 46 days in a year.