

EXECUTIVE SUMMARY OF EIA/EMP STUDY

FOR

**Proposed Grain Based Distillery Project (100 KLPD)
& Power Co-Generation (2.5 MW) Project
at, Tarchandpur, Telmar Road, Bakhtiyarpur, Dist. Patna, Bihar**

by

**NEWGEN BIOFUEL PVT. LTD.
M-3, Kashi Palace
Dak Bunglow Road
PATNA – 800001 (Bihar)**

SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT

1.0 Introduction

Newgen Biofuel Pvt. Ltd. (NBPL), has proposed to establish a Grain Based Distillery Project at Tarachandppur, Telmar Road, Block Bakhtiyarpur in District Patna, Bihar.

Project Promoters:

Harshit Krishna

Director

Newgen Biofuel Pvt. Ltd.

M-3, Kashi Palace

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The Project involves set up an standalone 100 KLPD (Ethanol) Grain based Distillery along with 2.5 MW Power Generation and equipped with latest state of art technology “Multi Pressure Distillation” (MPR) and “Molecular Sieve Dehydration” (MSDH) for dehydration, to achieve good quality of Fuel grade Ethanol.

NBPL owns a total land of 5.9 Ha. (14.6 Acres) which has been acquired under lease agreement at Mauza : Tarachandpur, Khata No. 33, 6, 29 & Khesra No. 29, 8 for 21 years for establishment of proposed grain based distillery with cogeneration unit.

2.0 Project Location and Environmental Sensitivity

<i>PARTICULARS</i>	<i>DETAILS</i>
• Location	Mauza Tarachandpur, Telmar Road Block Bakhtiyarpur, Dist. PATNA, Bihar

• Latitude	25°27'14.47"N
• Longitude	85°26'30.51"E
• Elevation above mean sea level	45 m.
• Total Plant Area	5.9 Ha. (14.6 Acres) of land has been acquired under lease agreement for 21 years for establishment of proposed grain based distillery with cogeneration unit
• Nearest Railway Station	Bakhtiyarpur Railway Station (12 Km.)
• Nearest Highway	NH – 30
• Nearest Airport	LNJPN Airport Patna, 40 km
• Nearest Major City	Patna District Head quarter (35 Km.)
• Nearest River	River Ganga, 4 Km. North River Dhowa, 0.2 Km., South
• National Park, Reserve Forest	<i>Not exist within 10 km. radius</i>
• Wildlife Sanctuary	
• Biosphere Reserve, Hill & Valleys	

3.0 Salient Features of the Project

a) Production Capacity	:	Distillery : Ethanol (100 KL/Day) Power Co-generation : 2.5 MW
b) Raw Material	:	Broken Rice : 230 TPD Maize : 260 TPD
c) Power	:	2.5 MW
d) Source of Water	:	Own Borewell
e) Water Requirement	:	Fresh water Requirement is 639 KLD (6.39 KL/KL of Product). Water requirement for first run would be 1622 KLD, of which 1068 KLD (~ 65 %) will be Recycled. Water requirement of 639 KLD will be fulfilled through proposed borewells inside premises. The permission for withdrawal of water will be taken the CGWA / CGWB.
f) Total Cost of Project	:	Rs. 122.6 Crores

4.0 Process Description

I. Milling and flour handling

The incoming grain is first cleaned with the help of de-stoner and magnetic separator store move stones and other material which may damage the hammers during milling. The grain is fed to hammer mill in controlled manner. In milling grains are crushed to flour of uniform size. Oversized screening rejects are segregated with the help of vibratory screen. These are taken to coarse bin before sending it to mill again. Intermediate hopper is provided for buffer capacity for flour storage. The flour gets transferred to the mixing tank for slurry preparation process.

II. Slurry preparation/liquefaction

Slurry from pre-masher is taken to slurry cum liquefaction tank where both steam & liquefying enzyme are added. The mixture of slurry and steam is then provided with the desired retention time at a given flow rate. The cooking process, accomplished in the above manner, converts the slurry into a hydrated, sterilized suspension and is therefore susceptible to enzyme for liquefaction. Liquefied mash is cooled in slurry cooler and transferred to fermentation section.

III. Saccharification and fermentation

A. YEST PROPOGATION

Yeast Propagation Yeast seed material is prepared in water cooled vessels by inoculating sterilized mash with active dry yeast. Optimum temperature is maintained by cooling water. The contents of the yeast vessel are then transferred to pre-fermentors. The pre-fermentors are filled with mash and loaded with contents of the yeast. The pre-fermentor contents are transferred to the main fermentor.

B. FERMENTATION

Fermentation The purpose of fermentation is to convert the fermentable substrate into alcohol. To prepare the mash for fermentation, it may have to be diluted with water. The pH of the mash is adjusted to about 5.0 accomplished primarily by recycled slops (which also provides for nutrients) and by the addition of acid. Yeast is available in

sufficient quantity to initiate fermentation rapidly and complete it in 54 to 60 hours. Significant heat release takes place during fermentation. This is removed by forced circulation cooling in external heat exchangers to maintain an optimum temperature of 32⁰C. The re-circulating pumps also serve to empty the fermentors. After the fermentors are emptied, they are cleaned with water and caustic solutions and sterilized for the next batch. The carbon dioxide evolved during the process is scrubbed to prevent ethanol emissions by process water.

IV. Distillation

Fermented wash to Rectified Spirit:

Multi-pressure vacuum distillation system for production of Rectified Spirit consists of distillation columns namely-

1. Degasifying-cum-analyzer column- Operation under vacuum
2. Rectifier-cum- Exhaust column- Operated under pressure
3. Recovery/Fusel Oil Column- Operated atmospheric

Pre-heated fermented wash is fed at the top of the Degasifier column. Analyzer Column is provided with reboiler. Top vapours of Analyzer column containing all the alcohol in the wash are sent to Rectifier column and are taken out as spent wash from Analyzer column bottom. Low strength alcohol is concentrated in Recovery column and Fusel Oil is separated. The vapour from Analyser is sent to Rectifier-cum-Exhaust column. The Rectifier/Exhaust Column concentrates the alcohol to 96% v/v. The high- grade spirit is drawn from upper trays of the rectification column. Fusel oil build up is avoided in the Rectifier-cum exhaust column by withdrawing side stream (Fusel Oil). Degasifier condensates and Fusel Oil drawn from Rectifier/Exhaust column are sent to Recovery column where these fusel oil is concentrated and then sent to Fusel Oil decanter where Alcohol and Fusel Oil mix are diluted with water to separate fusel oil.

Washings are sent back to the column to recover alcohol. The high spirit draw from the Rectifier column is sent to the MSDH Plant to produce Fuel Grade Ethanol.

Benefits of pressure vacuum distillation:

Following are the advantages of pressure vacuum distillation

- a. Since the analyzer column operates under vacuum, the formation of by-products such as Acetal may minimize there by improvement in quality of alcohol.
- b. The chances of scaling due to invert solubility of certain precipitating inorganic salts are minimized in vacuum distillation.
- c. Vacuum distillation requires low steam consumption with Reboiler i.e. 1.8 Kg/lit. of Rectified Spirit.

V. Distillation with integrated evaporation system:

Integrated evaporation or standalone evaporation systems are also use an intension to concentrate the spent wash as per their requirement. It helps to reduce the final quantity of spent wash generation. Integrated evaporation system uses alcohol vapours as heating media for heating the spent wash. Thus, good amount of steam saving can also be achieved in integrated evaporation systems. Integrated evaporation is expected to concentrate the spent wash to about 22-30% solids concentration depending on the type of fermentation system used and final alcohol concentration in wash.

Dehydration of alcohol

As by simple distillation only 96.48% v/v alcohol strength is achievable, so for Ethanol production either Azeotropic distillation (using Benzene or Cyclohexane) or Molecular Sieve Dehydration is being used. However, at present the Molecular Sieve Dehydration is the Industry standard and by adopting this technology a better quality and strength of product i.e. Ethanol is maintained with comfort and confidence. It is require very little operator interface and can tolerate reasonable variations in feed rate or quality.

5.0 Existing Baseline Environment Scenario :

Baseline environment data for all the components has been collected during the period March - May '2021. The detail findings are here as under ;

[i] Meteorology :

The daily average temperature was recorded to be in the range of 16.3 – 42.1 °C during the study period. The maximum reading was found to be 42.1 °C

during Apr.'21 and the minimum was found to be 16.3 °C during Mar.'21. The average value of temperature was computed to be 29.7 °C.

During the study period 77 mm. of rainfall was observed in May'2021.

The wind is predominantly blowing from WNW to SE. The wind speeds are of the range of 0.58 – 8.7 m/sec. and the calm condition is 13.3 %.

[ii] *Demographic Profile*

Total population in the Bakhtiyarpur CD Block in accordance to the 2011 census data is 227382 persons, in 34535 number of households. The total male population is 120760 and total female population is 106622. It is mainly dominated by the rural population.

The Scheduled Caste (SC) population is 41170, out of which 21804 are males and 19366 females. The Scheduled Tribe (ST) population is 151, out of which 71 are males and 80 females. The total Scheduled Tribes population is very less. The prevailing sex ratio in the study area is 882 females per 1000 males.

[iii] *Socio Economic Profile*

Agriculture is the one of the main sources of income in the study area. About 22.09 % of the total population are cultivators. 42.22 % of the total population has been found to be working as agricultural labourers. 5.09 % are industrial workers and about 30 % of the total population has been in to trade and commerce.

[iv] *Topography and Land Use*

Topography of the study area is plain. The average height of the ground surface at the proposed plant site is about 51 m. above mean sea level (MSL).

[v] *Water Quality*

8 ground water samples & 2 surface water samples were collected & analyzed from the study area.

Ground Water Quality

The water samples were found to be free from contaminations due to Fluoride & Boron. The dissolved solids level in the water samples were found in the range of 384- 428 mg/l., which is very much in the permissible limits. The water sample from Vill. Ghoswari was having the minimum TDS while maximum dissolved solids were found at Sudhari.

The chlorides were found to be in the range of 12 – 32 mg/l. The Sulphates were found in the range of 16 – 32 mg/l. Total hardness values in the range of 208 – 256 mg/l. It is within the permissible limits of IS 10500:2012. Total Alkalinity values were in the range of 176 – 208 mg/l.

Values of Iron are in range of 0.32 – 0.56 mg/l. & values for Zinc are in range of 0.16 – 0.24 mg/l.

All other parameters have been found to be within the permissible limits prescribed under the IS : 10500 :2012 for drinking water.

Surface Water Quality

The surface water can be best used for Irrigation and domestic purposes.

[vi] Ambient Air Quality :

To ascertain the baseline Ambient Air Quality status of the study area, monitoring of AAQ was conducted at 8 locations around the project area. Summary results are as under ;

Stn. No.	Location Name	24-hourly average concentration ($\mu\text{g}/\text{m}^3$)									
		PM ₁₀		PM _{2.5}		SO ₂		NO ₂		CO (mg/m ³)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
A 1	Tarachandpur (Project Site)	43.9	66.2	23.8	37.7	7.8	16.2	19.7	36.7	0.10	0.16
A 2	Amarpuri	48.4	63.1	31.2	41.8	8.4	17.5	16.8	39.6	0.10	0.18
A 3	Ghoswari	45.4	63.8	31.1	40.4	6.4	22.1	22.8	40.1	0.10	0.26
A 4	Bakhtiarpur	63.5	79.8	37.0	48.2	7.4	23.4	24.7	46.9	0.18	0.65

A 5	Karauta	52.7	71.9	29.1	40.2	5.4	10.8	15.4	30.2	0.10	0.16
A 6	Phulwaria	48.7	68.0	33.6	46.9	8.2	19.8	23.9	42.8	0.11	0.19
A 7	Parasdiha	38.4	74.2	20.6	37.5	5.7	11.4	16.7	33.4	0.10	0.17
A 8	Sudhari	27.1	52.4	14.8	26.9	6.0	12.1	13.6	27.2	0.11	0.18

It can be observed from the above table the AAQ status around the project area is within the limits of NAAQS, 2009.

6.0 ENVIRONMENTAL IMPACTS OF PROPOSED PROJECT ;

There are two sources from which the environment of the area can be affected if suitable control measures are not strictly applied. These are, discharge of waste water either on land or in surface water bodies and emissions from the stack. Both these two aspects have been taken into consideration while envisaging the proposed grain based distillery project of NBPL.

Waste Water Treatment & Disposal ;

The spent wash (waste water) from proposed grain based distillery will be subjected to decantation to separate out wet cake and 6-7% w/w solid thin slop will be fed to MEE (Multi Effect Evaporator). The thick syrup @ 35-40 % solids after the evaporation would then fed to DWGS drier to produce DDGS at 88-90% w/w solids which will be sold as Cattle feed. The boiler blow down, DM plant, softener regeneration water will be treated in a neutralization tank and after treatment it will be used as cooling water makeup water.

Process condensate from evaporation section will be partly recycled and balance will be treated in process condensate treatment plant, treated water will be used as dilution water in slurry preparation and as cooling water makeup water and steam condensate will be recycled back to the boiler.

The Distillery proposes to achieve Zero Liquid Discharge by Decantation, Multi Effect Evaporation (MEE) followed by dryer to form Distillers Dried Grains with Solubles (DDGS), which will be used as cattle feed/fish. The entire spent wash shall be used to achieve Zero Liquid Discharge.

No industrial waste water will be discharged outside premises. NBPL will implement ZLD methodology as per CPCB Guidelines.

Air Pollution Management

Multi Fuel HP Boiler of 25 TPH capacity alongwith Bag Filter as Air Pollution Control Equipment followed by adequate Stack height will be installed as per CPCB & BSPCB guidelines.

To minimize air pollution load due to operation of proposed boiler of NBPL Bag Filter with stack of adequate height will be installed with the boiler to control the particulate and gaseous emissions due to combustion of fuel. CO₂ produced during the fermentation process will be collected and utilized as an industrial gas. Diesel Generator (DG) Sets with acoustic enclosures will also have adequate stack height as per Central Pollution Control Board (CPCB) Guidelines. All the internal roads will be asphalted. Development of Green Belt (in 1.95 Ha. 33 % of total project area) around the periphery and within the premises of the plant will help in attenuating the pollutants emitted by the plant.

7.0 SOLID WASTE GENERATION AND MANAGEMENT

Solid waste	Quantity	Disposal
ETP sludge	50 kg/day	Used as manure
Boiler ash	30 - 35 TPD from coal or 25 - 30 TPD from Rice husk	Coal ash will be sent to cement manufacturing unit Rice Husk Ash generated will be sold to brick manufacturers
DDGS	50-60 TPD	Will be sold as cattle / fish feed.

8.0 IMPACT ON SOCIO ECONOMIC STATUS

Proposed distillery project will change socio economic condition of the nearby areas. As there will be flow of financial and material resources, there remains a large possibility of growth of population in the business, trade, commerce and service sector. The large inflow of financial and material resources would contribute towards changing the socioeconomic environment of the areas as this would introduce a mixed

culture emphasizing urban traits in place of traditional, prevalent rural customs. The economic, cultural and technological changes are likely to induce social stress and ethical changes. All these would change the local life style.

Newgen Biofuels Pvt. Ltd., has allocated an amount of Rs. 1.8 Crores (180 Lakhs) (1.5 % of total project cost i.e. Rs. 122.6 Crores) towards Corporate Environmental Responsibility (CER). All the above amount will be spend in phase wise manner for welfare of local population and upliftment of socio economic status of the study area.

9.0 ENVIRONMENTAL MANAGEMENT PLAN

A comprehensive Environmental Management Plan has been prepared under which the unit will be adopting measures in preserving the environment from degradation. Important among those are Green Belt Development Plan which would act as Noise damper also. The environmental monitoring program on all components of environment has been drawn and indicated in the EMP in detail which is a part of EIA.

NBPL will adopted all measures for better environmental management. To control Air Pollution from boiler, bag filter will be installed for minimizing air pollution due to operation of boilers followed by a 60 m. high stack for wider dispersion of pollutants. NBPL will develop & maintain green belt all around the project premises for better environmental management.

An amount of Rs. 965 lakhs has been allocated for Environment Management of proposed distillery project of NBPL.

10.0 OCCUPATIONAL HEALTH AND SAFETY

NBPL will adopt all precautionary measures to reduce the risk of exposure of employees to occupational safety and health hazards. Pre & post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee.

11.0 RAINWATER HARVESTING

Keeping in mind the importance of water, it is proposed to conserve water by rainwater harvesting by which the subsoil water condition / moisture content is maintained / improved to a great extent. Also it is proposed to harness rainwater from

the roof area by collecting the same in a rainwater collection tank of suitable capacity and will be recharged to ground water aquifers.

12.0 CONCLUSION

- No Industrial Waste water will be discharged to surface or water bodies outside the premises.
- Ground water characteristics are within the limits of IS 10500:2012.
- Emissions from Stacks of proposed boiler will be within the limits of E(P) Rules.
- Average Ambient Air Quality within the study area are within the National Ambient Air Quality Standards (Nov.'2009).
- Ambient Noise Level of the project area is also well within the limits for Industrial Area.
- Generated solid wastes from project operation will be reused at the source end.
- Good green belt & landscaping will be developed and maintained within the premises.
- The proposed distillery project will generate employment opportunities both in direct and indirect manner. In director mode people will get jobs in distillery project and in indirect mode people will get jobs in the form of ancillary activities.
- The establishment of proposed distillery and cogeneration project will also add to the state govt. treasury in terms of revenue generated in form of taxes and duties

