

# **PRE-FEASIBILITY REPORT**

**FOR**

**PROPOSED GRAIN BASED DISTILLERY OF 250 KLD CAPACITY  
WITH 6.5 MW CO-GENERATION POWER PLANT**

**AT :**

**PLOT No. IV/A-10,  
BOKARO INDUSTRIAL AREA,  
PHASE-IV, PO- BALIDIH,  
BOKARO – 827014, JHARKHAND, INDIA**

**OF**

**M/s BOKARO SPIRITS & ALLIED INDUSTRIES PVT. LTD.  
HOUSE No 204, GROUND FLOOR,  
MADANPUR DABAS,  
NEW YOGITA OIL DEPOT, NEW DELHI-110081**

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## **1. EXECUTIVE SUMMARY :**

### **Location:**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. (BSAIPL), has proposed to establish a Grain Based Distillery alongwith cogeneration plant Project at Plot No. IV/A-10, Bokaro Industrial Area, Phase-IV, PO- Balidih, Bokaro – 827014, Jharkhand, India having Latitude 23°40'55.64"N & Longitude 86° 4'8.21"E at 230 m. above MSL. The Project Site is connected to NH-320 through RCC Road. It is about 1.5 kms. from district head quarter at Bokaro and is well connected by NH-320. BSAIPL is about 3 Km. (SE) from Bokaro Steel City Railway Station on main Line of SER.

### **ETHANOL BLENDED PETROL (EBP) PROGRAMME of Govt. of India**

1. Ethanol Blended Petrol (EBP) Programme is aimed at achieving multiple outcomes such as; addressing environmental concerns, reducing import dependency and providing boost to agriculture sector.
2. To increase indigenous production of ethanol, Government since 2014 took multiple interventions including, administered price mechanism, opening alternate route for ethanol production, amendment to Industries (Development & Regulation) Act, 1951 which legislates exclusive control of denatured ethanol by the Central Government, reduction in Goods & Service Tax (GST) from 18% to 5%, Notification of National Policy on Biofuels – 2018, increasing scope of raw material for ethanol procurement, interest subvention scheme for enhancement and augmentation of the ethanol production capacity and extension of EBP Programme to whole of India except islands of Andaman Nicobar & Lakshadweep wef 01st April, 2019.
3. Govt. of India has approved National Policy on Biofuels in the year 2018, and termed is as National Policy on Biofuels – 2018.
4. The National Policy on Biofuel (NPB) – 2018 provides an indicative target of 20% ethanol blending in petrol by 2030. As a step in this direction, OMCs are to procure ethanol derived from C heavy molasses, B heavy molasses, sugarcane Juice, sugar, sugar syrup, damaged food grains unfit for human consumption, surplus food grains as decided by National Biofuel Coordination Committee

(NBCC) under the ambit of NPB-2018, including fruit and vegetable wastes. Under the EBP Programme, OMCs procure and blend up to 10% ethanol in petrol.

5. NPB Policy categorises biofuels as "Basic Biofuels" viz. First Generation (1G) bioethanol & biodiesel and "Advanced Biofuels" - Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels, Third Generation (3G) biofuels, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
6. The Policy expands the scope of raw material for ethanol production by allowing use of Sugarcane Juice, Sugar containing materials like Sugar Beet, Sweet Sorghum, Starch containing materials like Corn, Cassava, Damaged food grains like wheat, broken rice, Rotten Potatoes, unfit for human consumption for ethanol production.
7. The Policy encourages setting up of supply chain mechanisms for biodiesel production from non-edible oilseeds, Used Cooking Oil, short gestation crops.

### **General Details of the Project :**

**M/s Bokaro Spirits & Allied Industries Pvt. Ltd.** proposes to set up an standalone **250 KLPD** (Ethanol) Grain based Distillery along with **6.5 MW** Power Generation and will be equipped with latest state of art technology "Multi Pressure Distillation" (MPR) and "Molecular Sieve Dehydration" (MSDH) for dehydration, to achieve good quality of ENA and Fuel grade Ethanol.

1. As per EIA Notification 2006 and amendments thereof, proposed Distillery Project is listed under Sl. No. 5(g) of Schedule I as 'A' category project.
2. 5.66 Ha. (14.0 Acres) of land has been acquired (under lease agreement from Jharkhand Industrial Area Development Authority JIADA) for establishment of proposed grain based distillery with cogeneration unit.
3. The product, ENA will be sold in open market & Ethanol, will be supplied to Oil Marketing Companies at a fixed rate under Ethanol Blending Programme of the Government of India policy.

4. The Distillery will produce DDGS as bye-product which will be sold as cattle feed @ Rs. 21000 per ton.
5. The cost of the project will be around Rs. 340 crores with a return on investment within 5 years.
6. Broken Rice 650 MT/ Day or Maize 675 MT per day will be the raw material for production of ENA/Ethanol.
7. The Distillery is expected to run 350 days a year.
8. The Distillery will be environment friendly with Zero Liquid Discharge.

### **Manufacturing & Production Details;**

Manufacturing Facilities	Product	Production Capacity
Distillery	Ethanol (80%) / ENA (20 %)	<b>250 KLPD</b>
Power Co-generation	Power	<b>6.5 MW</b>
Distiller's Wet Grain with Soluble (DWGS) / Distilleries Dry Grain with Solubles (DDGS), CO <sub>2</sub> and Fusel Oil will be generated at by-product.		

### **Raw Material Requirement ;**

Item	Raw Material Requirement
Broken Rice / Maize	650 / 675 MT per day
No. Of Days Operation / Annum	350 days

### **Pollution Control Measures:**

The proposed Grain based distillery will be based on "Zero Liquid Discharge". Fresh water requirement of the project will be met by Ground Water. Efforts will be made to conserve as much water as possible by recycling and reuse. Spent wash generated during Grain operation, would be decanted by centrifuge decanter to obtain Distiller's Wet Grains with Soluble (DWGS), and the concentrate (Thin Slop) is concentrated (DGSS) in Multi-effect evaporator and then mixed with DWGS and dried in Rotary Dryer to form Dried Distiller's Grain with Soluble (DDGS) and used as Cattle feed/Poultry/Fish. Process condensate from MEE will be treated and recycled back in the process. Closed water recycle system and plant process is designed to minimize fresh water requirement by recycling various effluents after treatment.

## **Waste Water Generation & Treatment ;**

The spent wash 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 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.

## **Air Pollution :**

To minimize air pollution load due to operation of proposed boilers of BSAIPL, ESP with stack of adequate height will be installed with the boiler to control the particulate and gaseous emissions due to combustion of fuel. CO<sub>2</sub> 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 1.86 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.

## **Solid Waste Management:**

<b>Solid waste</b>	<b>Quantity</b>	<b>Disposal</b>
ETP sludge	125 kg/day	Used as manure
Boiler ash	75 TPD maxm.	Coal ash will be sent to cement manufacturing unit Rice Husk Ash will be sold to cement manufactures/ceramic industry. Ash of Biomass Briquette from agri waste will be sold to fly ash bricks manufacturing unit.
DDGS	155 TPD	Will be sold as cattle / fish feed.

## **Project Cost :**

Total cost of the proposed BSAIPL project is estimated to be Rs. 340.0 Crores,

## **PROJECT DETAILS**

### **2. INTRODUCTION OF THE PROJECT/BACKGROUND INFORMATION :**

#### **(i) Identification of Project & Project Proponent**

**Rohit Arora**

Director

**232, BHERA ENCLAVE**

**PASCHIM VIHAR**

**WEST DELHI**

**DELHI**

#### **Location of the Project :**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. (BSAIPL), has proposed to establish a Grain Based Distillery alongwith cogeneration plant Project at Plot No. IV/A-10, Bokaro Industrial Area, Phase-IV, PO- Balidih, Bokaro – 827014, Jharkhand, India having Latitude 23°40'55.64"N & Longitude 86° 4'8.21"E at 230 m. above MSL. The Project Site is connected to NH-320 through RCC Road. It is about 1.5 kms. from district head quarter at Bokaro and is well connected by NH-320. BSAIPL is about 3 Km. (SE) from Bokaro Steel City Railway Station on main Line of SER.

## PROJECT LOCATION MAP



**(ii) Brief description of nature of project :**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. proposed to set up an Greenfield Grain based distillery of 250 KLD capacity along with 6.5 MW Power plant with latest technology of Multi Pressure Distillation and MSDH for dehydration to achieve good quality of Fuel grade Ethanol.

Proposed production of 250 KLPD distillery with 6.5 MW captive Power Generation plant will be based on grain such as Maize, Broken rice and the Spoiled Grain as basic raw materials. Other inputs will be water, antifoam agents, Urea, H<sub>2</sub>SO<sub>4</sub> and enzymes. Rice husk/Biomass/Bagasse/Coal will be used as fuel in Boiler.

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

**(iii) Need for the project and its importance to the country and or region**

The production capacity of ethanol in the country will be more than double of 710 crore litres contracted by the manufacturers/sugar mills with oil marketing companies (OMCs) for ethanol blending programme (EBP) in 2019-20.

However, the Government of India is targeting an ethanol production and supply target of 300-350 crore litres in 2020-21, and achieve 7.5-8 per cent ethanol blend levels with petrol, the ISMA said in a statement.

"As laid down in the National Biofuels Policy, 2018, the government intends to achieve ethanol with petrol blend levels of 10 per cent by 2022 and 20 per cent by 2030, and therefore, efforts are being made to achieve the targets," the statement said.

Against this, 92.5 crore litres of ethanol have already been supplied to the OMCs between December 1 2019 and June 22, 2020, achieving an average all-India blending of 5.09 per cent with petrol. The blending levels achieved in some

states like UP, Haryana, Punjab, Uttarakhand, Bihar and Karnataka is much higher at 8.5 per cent to 9.8 per cent with petrol.

B-heavy molasses and sugarcane juice have been diverted away from sugar, to manufacture and supply 58 crore litres of ethanol to OMCs from in the current ESY up to June 20. As per the contracts entered into by the sugar mills across the country, another 23 crore litres of ethanol will be manufactured from B-molasses and cane juice for supply in the balance period up to November 30, 2020.

This use of B-molasses and cane juice in production of ethanol, and not for sugar production, will result in a diversion of sugar of around 8 lakh tonnes, the ISMA said.

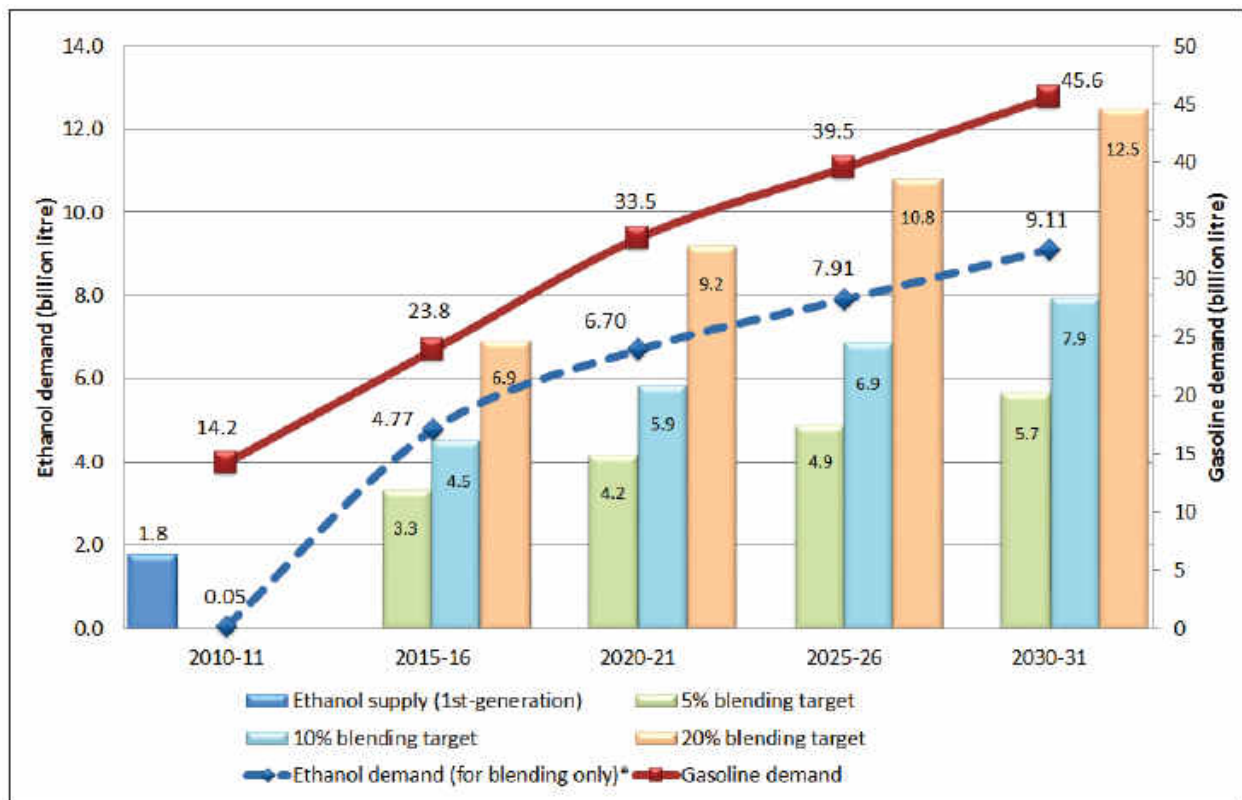
The diversion will not only reduce surplus sugar availability in the country, but also reduce the carrying costs for the sugar mills. It will also give better returns to the mills because ethanol prices fixed by the government are more remunerative than sugar currently, besides giving them better cash flows because of immediate sale of ethanol as compared to delays in the sale of sugar, which could be stuck in the godowns for more than 10-12 months.

Despite the fall in petrol consumption/sales during the lockdown period, the supplies of ethanol were not too badly affected, and sugar mills have been able to supply as per the contracts during the lockdown too, said ISMA.

Accordingly, the blend levels have been maintained at an all-India average of 5 per cent for the country. This could happen because of the good understanding and cooperation between the OMCs and the sugar mills/ethanol manufacturers, when they together agreed to relocate ethanol supplies from depots that were full to other depots and even to distant states, where there was hardly any ethanol being supplied, and therefore there was tankage capacity to take the reallocated ethanol supplies, said the statement.

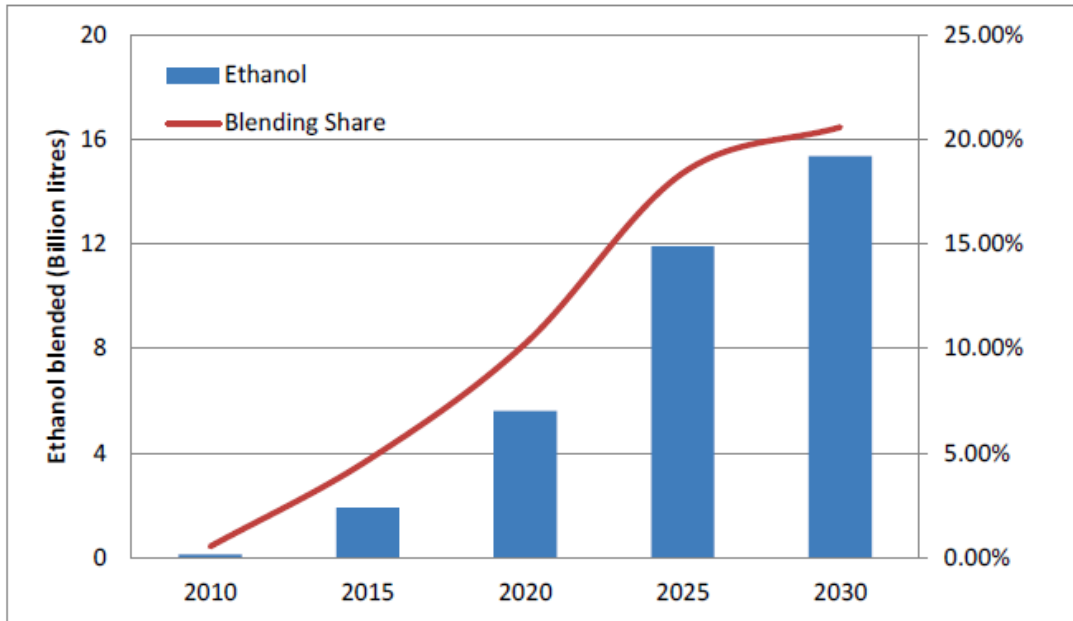
(iv) **Demand Supply Gap :**

Total ethanol consumption in 2010 was 1.8 billion litres of molasses-derived ethanol, out of which only 50 million litres was used for blending (USDA, 2015). If India is to achieve the 20 percent blending targets set out in the NPB, the country will need to produce 6.7 billion litres of ethanol by 2020 and 9.1 billion litres by 2030. For 2017 alone, the year in which the 20 percent blending regime would start, over 7 billion litres of ethanol would be required to reach the target. Chart below shows the overall ethanol demand (including potable, industry, and other applications) with different blending targets.



In the medium-term (by 2030), it would be possible to achieve the 20 percent blending target using both first- and second-generation biofuels. However, in the short-term (by 2020), achieving the 20 percent blending target would be difficult. The amount of ethanol required for a 20 percent blend in 2030 would be around 12.5 billion litres, almost equivalent to the current demand for gasoline. The bulk of this demand would be met through second-generation biofuels derived from

agricultural residues. Demand for ethanol for blending and share in blending is show as under ;



(v) **Imports vs. Indigenous Production:**

Indian market could not meet required ethanol demand. So they import ethanol 5-7% of total demand. As far as ENA production is concerned, Indian market play a vital role at both domestic & international level. So they require produce the more alcohol to meet the demand.

(vi) **Export Possibility:**

There is no export possibility of ethanol produced, as, the indigenous demand is very high.

(vii) **Domestic/Export Market:**

Domestic/Export market depends on policy of government.

(viii) **Employment Generation (Direct & Indirect)**

The proposed project will generate employment opportunities both in direct and indirect manner. In direct mode people will get jobs in proposed distillery project and as well as in indirect mode in various forms.

### **3. Project Description:**

#### **(i) Type of project including interlinked and inter dependent project:**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. proposed to set up an Greenfield Grain based distillery of 250 KLD capacity along with 6.5 MW Power plant with latest technology of Multi Pressure Distillation and MSDH for dehydration to achieve good quality of Fuel grade Ethanol.

Proposed production of 250 KLPD distillery with 6.5 MW captive Power Generation plant will be based on grain such as Maize, Broken rice and the Spoiled Grain as basic raw materials. Other inputs will be water, antifoam agents, Urea, H<sub>2</sub>SO<sub>4</sub> and enzymes. Rice husk/Biomass/Bagasse/Coal will be used as fuel in Boiler.

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#### **(ii) Location:**

**Village** : Gorabali  
**Block** : Jaridih  
**District** : Bokaro  
**State** : Jharkhand

#### **(iii) Details of alternate sites Considered and the basis of selecting the proposed site, particularly the environment consideration gone into should be highlighted.**

No alternate sites have been considered for the proposed distillery project as present land is available in very reasonable price and availability of water, raw materials and transportation facilities are adequate near and around present site.

#### **(iv) Size or magnitude of operation:**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. proposed to set up an Greenfield 250 KLD Grain based Distillery along with 6.5 MW Power plant with latest technology of Multi Pressure Distillation and MSDH for dehydration to achieve

good quality of Fuel grade Ethanol. Distiller's Wet Grain with Soluble (DWGS) / Distilleries Dry Grain with Solubles (DDGS), CO<sub>2</sub> and Fusel Oil will be generated as by-product.

In view of rapid increase in the demand of Fuel Ethanol and Electricity from year to year and availability of main raw materials i.e. maize and broken rice within adjoining areas, the project proponent has decided to establish the proposed distillery project.

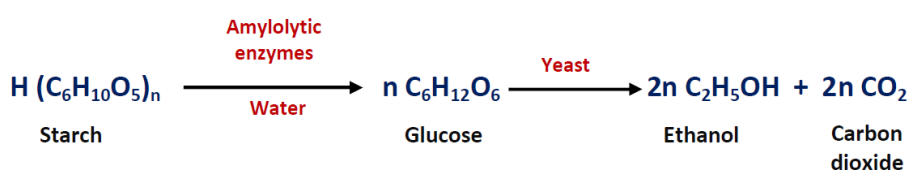
**(v) Project description with process details: (a schematic diagram/flowchart layout, components of the project)**

**I. Milling and flour handling**

The incoming grain is first cleaned with the help of de-stoner and magnetic separator to remove 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. Chemical reactions during conversion of starch into ethanol is shown as under ;



### **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 300 °C. 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. Process Flow is as under ;



#### **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.

(vi) **Raw Material required along with estimated Quantity, likely source, marketing area of final products, mode of Transport of raw material & finished product.**

S. No.	Particular	Requirements
1.	Grain (MT/day)	535
2.	Fresh Water (KLPD)	1560
3.	Electricity	6000 kW
4.	Fuel (Bagasse, Rice husk, Coal) MT/day	300, 300, 250
5.	Steam	55 TPH
6.	<b>Enzymes</b>	
	-Alpha Amylase (1-4)	0.5 Kg/KL
	-Amyloglucosidase (1-6)	0.5 Kg/KL
7.	<b>Chemicals</b>	<b>Quantity (kg/d)</b>
	Sulphuric Acid	0.25 Kg/KL
	Sodium Hydroxide (Caustic)	1 Kg/KL
	NH <sub>2</sub> -CO- NH <sub>2</sub> (Nutrients)	0.5 Kg/KL
	Antifoam Agent	0.25 Kg/KL
	Dry Yeast	0.5 Kg/KL

**(vii) Resources optimization/recycling and reuse envisaged in the project, if any, should be briefly outlined.**

Water as a resource is recycled at each possible step of the process and latest technology and methodology will be adopted to conserve and reuse the resources.

Waste water generated from the process goes to MEE and condensate water is used back again into the various processes and remaining is used for the horticulture purposes.

**(viii) Availability of Water its source, Energy/Power requirement and source should be given**

**d. Water Requirement for Proposed Distillery Project**

During 01st run of project 4075 m<sup>3</sup>/day of fresh water (4055 Industrial and 20 Domestic) will be required, then after fresh water requirement will be of 1560 KLD (1540 KLD Industrial + 20 KLD Domestic) for process, cooling & domestic purposes. 2515 m<sup>3</sup>/day of treated water will be recycle and reuse for various activities within premises. Fresh Water will be sourced partially (50%) from JIADA and 50% through borewells after obtaining NOC from CGWA. Water requirement details for are as under ;

TOTAL WATER INPUT (KL)		TOTAL WATER OUTPUT (KL)	
Process water in fermentation	1493	Steam condensate	568
DM water for boiler feed	1165	Water in Spent wash	1455
Soft water for vaccum pump and others	200	Thin Slope	963
Soft water makeup for cooling tower	1102	CT evaporation and drift losses	807
Water in Grain	45	Boiler (Deaerator, Blowdown, drain) Losses	162
Miscellaneous Washing (Provisional)	50	Vaccum pump sealing / purge	50
<b>TOTAL</b>	<b>4055</b>	Miscellaneous Washing (Provisional)	50
		<b>TOTAL</b>	<b>4055</b>

RECYCLE and UTILIZATION STREAMS (KL)	
Steam Condensate recycle for boiler	567
Thin slop recycle Slurry preparation and Liquefaction section	347
Process condensate recycle to process and CT	308

Vaccum pump water recirculation	190
Steam Condensate	323
Treated WW	935
Total Recycling/ re-utilization of water per day	2670
<b>FRESH WATER REQUIREMENT (Distillery)</b>	<b>1540</b>
Domestic Use	20 KLD
<b>Overall Fresh Water Requirement</b>	<b>1560 KLD</b>

Hence, fresh water Requirement is **1540 KLD (6.16 KL/KL of Product Alcohol)**.

**(b) Power Requirement and Source :**

The Unit's own Power cogeneration will be 6.5 MW generation out of which 6 MW will be used for captive power requirement. DG sets will be used in case of emergency.

**(c) Steam Requirement :**

Steam requirement is 52 TPH, which will be sourced from proposed 55 TPH AFBC Boiler.

<b>Steam Consumption (Dry Saturated)</b>	<b>Proposed Scheme</b>
1. Cooking and Liquefaction	0.6 Kg/lit of TS
2. Distillation	1.7 Kg/lit of TS
3. Ethanol	0.6 Kg/lit of TS
4. DWGS Dryer	1.6 Kg/lit of TS
5. Total Steam Requirement	4.5 Kg/lit of TS (With Multi Effect Evaporator and dryer)

**(d) Boiler Details**

AFBC Boiler of 55 TPH capacity alongwith ESP as Air Pollution Control Equipment followed by adequate Stack height will be installed as per CPCB & BSPCB guidelines. Details regarding proposed boiler are mentioned in the table given below :

**PROPOSED BOILER DETAILS**

<b>S. No.</b>		<b>Details</b>
1.	Type of Fuel	Coal/Rice Husk/Biomass
2.	Capacity of Boiler	<b>55 TPH</b>
3.	Stack Height	<b>75 m</b>
4.	Pollution Control Equipment Measures	ESP

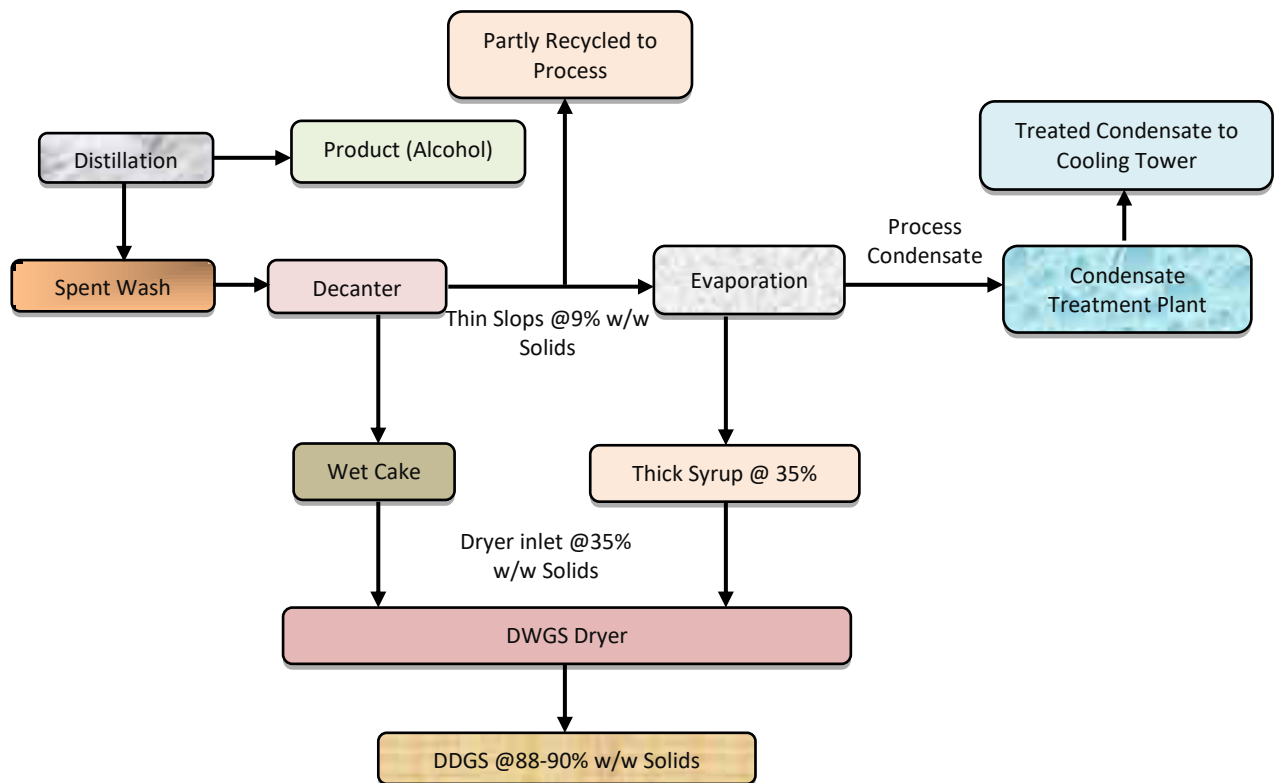
**(ix) Quantity of waste to be generated (Liquid and solid) and scheme for their management.**

The major sources of pollution in proposed Distillery project are Waste Water - **Spent Wash** and Boiler Emissions from Stack.

**Waste Water Generation & Treatment :**

The spent wash 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 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.



### **Air Pollution :**

To minimize air pollution load due to operation of proposed boilers of BSAIPL Bag Filters with stack of adequate height will be installed with the boiler to control the particulate and gaseous emissions due to combustion of fuel. CO<sub>2</sub> 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 2.54 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.

### **Solid Waste Management:**

<b>Solid waste</b>	<b>Quantity</b>	<b>Disposal</b>
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Boiler ash	75 TPD maxm.	Coal ash will be sent to cement manufacturing unit Rice Husk Ash will be sold to cement manufactures/ceramic industry. Ash of Biomass Briquette from agri waste will be sold to fly ash bricks manufacturing unit.
DDGS	155 TPD	Will be sold as cattle / fish feed.

#### **4. Site Analysis:**

##### **(i) Connectivity:**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. (BSAIPL), has proposed to establish a Grain Based Distillery alongwith cogeneration plant Project at Plot No. IV/A-10, Bokaro Industrial Area, Phase-IV, PO- Balidih, Bokaro – 827014, Jharkhand, India having Latitude 23°40'55.64"N & Longitude 86° 4'8.21"E at 230 m. above MSL. The Project Site is connected to NH-320 through RCC Road. It is about 1.5 kms. from district head quarter at Bokaro and is well connected by NH-320. BSAIPL is about 3 Km. (SE) from Bokaro Steel City Railway Station on main Line of SER.

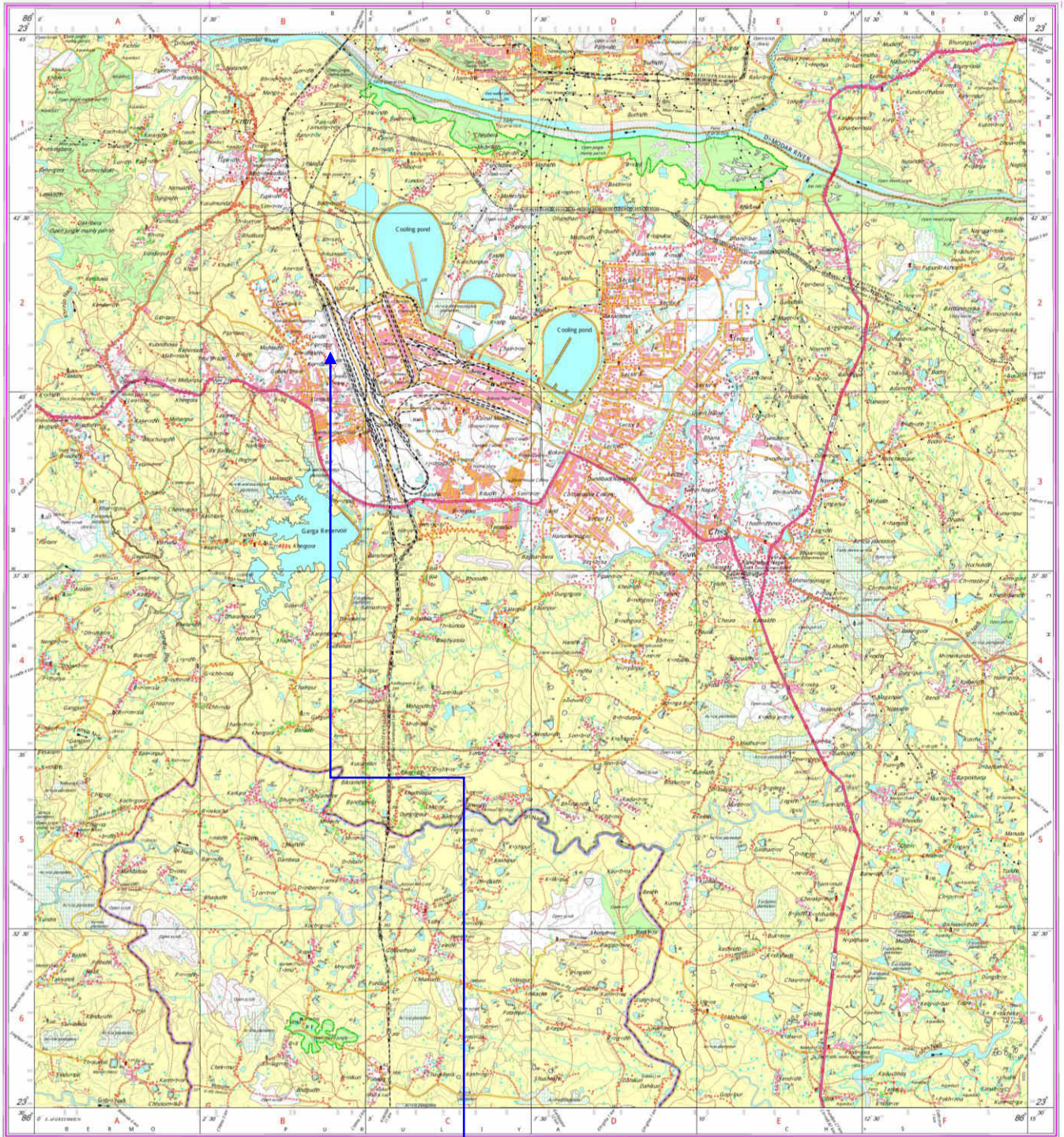
ii) **Land Form, Land use & Land ownership:**

<b>Within 10 Km. Area</b>	<b>Sensitive targets are safe away</b>
<ul style="list-style-type: none"><li>• There is no reserved forest area</li><li>• There is no biosphere reserve</li><li>• There is no national park</li><li>• There is no wildlife sanctuary</li></ul>	<ul style="list-style-type: none"><li>• NH 320 approx. 1.5 km. (SW)</li><li>• Damodar (6 Km. NE)</li><li>• Population –</li><li>• Vill. Tanr Balidih : 1.7 Km. (NW)</li></ul>

iii) **Topography (along with map):**

The terrain is plain. Toposheet of project area is shown herewith. **(Source SOI Toposheet No. 73I/2)**

## TOPOSHEET OF PROJECT AREA



M/s Bokaro Spirits & Allied Industries Pvt. Ltd.

At: Plot No. IV/A-10, Bokaro Industrial Area,  
Phase – 4, Balidih, Bokaro, Jharkhand

- iv) **Existing land use pattern (Agriculture, non agriculture, forest, water bodies including CRZ), shortest distance from the periphery of the project forest, national park, wild life sanctuary, eco- sensitivity area, water bodies Distance from HFL line, CRZ notification for notified industrial area.**

At present existing land use of the project area is Industria in nature.

- v) **Existing Infrastructure :**

There is no existing infrastructure at project site.

- vi) **Soil Classification:**

The Bokaro district is part of Chhotanagpur Plateau. It is highly undulating and hilly all over the district. The regional slope of the district is towards east and controlled by the alignment of the tributaries of Damodar river. The hill ranges trending WNW – ESE. The average elevation of the undulating pediplain ranges from 200 – 350m above MSL. The highest hill prominent block is Gomia. The northern and western part of the district are having hilly ranges. Chas and Chandankiyari are low upland where cultivation is practiced.

- vii) **Climatic Data :**

The temperature variations in different three seasons are given in table below :

Period	Min <sup>m</sup> . Temperature	Max <sup>m</sup> . Temperature
Mar. – June	18 °C – 25 °C	35 °C – 40 °C
Jul. – Oct.	16 °C – 18 °C	30 °C – 35 °C
Nov.- Feb.	10 °C – 12 °C	15 °C – 25 °C

- viii) **Social Infrastructure available :**

- Schools (Primary as well as secondary & High Schools are available within 5 km. radius.)
- Colleges (Science, commerce, Arts, engineering, medical, pharmacy, education within 10-15 Km. radius)
- Health centers, dispensaries, hospitals
- Electricity
- Drinking water supply

- Banks (Cooperative as well as nationalized) and credit societies

## 5. **Planning Brief :**

### i) **Planning concept (type of Industries, facilities, transportation etc) Town and country planning/Development authority classification.**

#### **Type of Industry :**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. proposed to set up an Greenfield 250 KLPD Grain based Distillery along with 6.5 MW Power plant with latest technology of Multi Pressure Distillation and MSDH for dehydration to achieve good quality of Fuel grade Ethanol.

Proposed production of 250 KLPD Ethanol/ENA with 6.5 MW captive Power Generation plant will be based on grain such as Maize, Broken rice and the Spoiled Grain as basic raw materials. Other inputs will be water, antifoam agents, Urea, H<sub>2</sub>SO<sub>4</sub> and enzymes. Rice husk/Biomass/Bagasse/Coal will be used as fuel in Boiler.

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

As per EIA Notification 2006 and amendments thereof, proposed Distillery Project is listed under Sl. No. 5(g) of Schedule I as 'B' category project.

#### **Transportation:**

Mode of transport of raw materials & finished products will be road through closed trucks & tankers.

#### **Town/Country Planning/Development authority Classification:**

The project is located in notified Industrial Area of JIADA.

ii) **Population Projection:**

Minor population influx is anticipated due to the proposed distillery project in the region.

iii) **Land Use Planning :** Site Layout Plan enclosed.

iv) **Assessment of Infrastructure demand (physical & social) :**

The basic infrastructure such as roads, electricity, transportation, drinking water supply, health centers and hospitals, school, colleges, sanitation facilities are available in the vicinity within 1-5 Km. radius. The proposed project is not going to exert any unbearable load on any of these resources.

v) **Amenities/Facilities :** Canteen, rest room, medical facilities, drinking water, etc. will be provided within distillery project premises.

6. **PROPOSED INFRASTRUCTURE :**

All factory infrastructure viz. raw material storage, production area, main plant, product storage, ETP, Boiler House, Turbine area will be developed with designated project area.

i) **Residential Area (Non-Processing Area):**

No residential area is envisaged in the proposed project.

ii) **Green Belt Area :**

1.86 Ha. (33% of total project area) of area will be developed as green belt within and all around the project premises. Approx. 2800 nos. of trees will be planted all around the periphery and within premises in phase wise manner for development of green belt.

iii) **Social Infrastructure:**

All infrastructure facilities are existing in the vicinity of the BSAIPL Project site.

iv) **Connectivity**

M/s Bokaro Spirits & Allied Industries Pvt. Ltd. (BSAIPL), has proposed to establish a Grain Based Distillery alongwith cogeneration plant Project at Plot No. IV/A-10, Bokaro Industrial Area, Phase-IV, PO- Balidih, Bokaro – 827014, Jharkhand, India having Latitude 23°40'55.64"N & Longitude 86° 4'8.21"E at 230 m. above MSL. The Project Site is connected to NH-320 through RCC Road. It is about 1.5 kms. from district head quarter at Bokaro and is well connected by NH-320. BSAIPL is about 3 Km. (SE) from Bokaro Steel City Railway Station on main Line of SER.

v) **Drinking Water Management :**

Borewells will be used to meet the water requirement of proposed distillery project.

vi) **Sewerage System :**

All the domestic waste water will be disposed off through septic tank followed by soak pit inside premises.

vii) **Industrial Waste Management :**

**Waste Water Generation & Treatment ;**

The spent wash 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 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.

### **Air Pollution :**

To minimize air pollution load due to operation of proposed boilers of BSAIPL ESP with stack of adequate height will be installed with the boiler to control the particulate and gaseous emissions due to combustion of fuel. CO<sub>2</sub> 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 2.54 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.

### **Solid Waste Management:**

<b>Solid waste</b>	<b>Quantity</b>	<b>Disposal</b>
ETP sludge	125 kg/day	Used as manure
Boiler ash	75 TPD maxm.	Coal ash will be sent to cement manufacturing unit Rice Husk Ash will be sold to cement manufactures/ceramic industry. Ash of Biomass Briquette from agri waste will be sold to fly ash bricks manufacturing unit.
DDGS	155 TPD	Will be sold as cattle / fish feed.

#### 7) **REHABILITATION & RESETTLEMENT (R & R) PLAN :**

There will be no R & R issues due to proposed grain based distillery project as the land is under ownership of lessor and there is no habitation on the land.

#### 8) **PROJECT SCHEDULE & COST ESTIMATES :**

##### i) **Likely date of start of construction & likely date of completion.**

4 to 6 months required for Clearance from MoEFCC, Govt. of India and obtaining the No Objection Certificate from other Statutory Bodies.

After that, 12 to 13 months will be required for plant and machinery procurement, Erection and commissioning.

Tentatively project will be under operational stage by the end of 2022.

ii) **Estimated Project cost along with analysis in terms of economic validity**

Project Cost Details are as under ;

<b>Particulars</b>	<b>Estimated Cost (in Crore Rs.)</b>
Land, Environmental clearance and Licensing	8.0
Plant and Machinery with Structure/Electrical	47.5
Steam (Boiler)	9.6
Power(Turbine)	2.75
Civil work	13.5
Infrastructure & utilities	29.25
Other Statuary requirements	2.0
Preoperative and contingencies	10.0
<b>TOTAL</b>	<b>340.0</b>

9) **Analysis of Proposal (Final Recommendation):**

**(Financial & Social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area.)**

Financial and social benefit has been considered while analyzing the proposal. The proposal is environmental compatible and will help in improvement of financial status of the region.

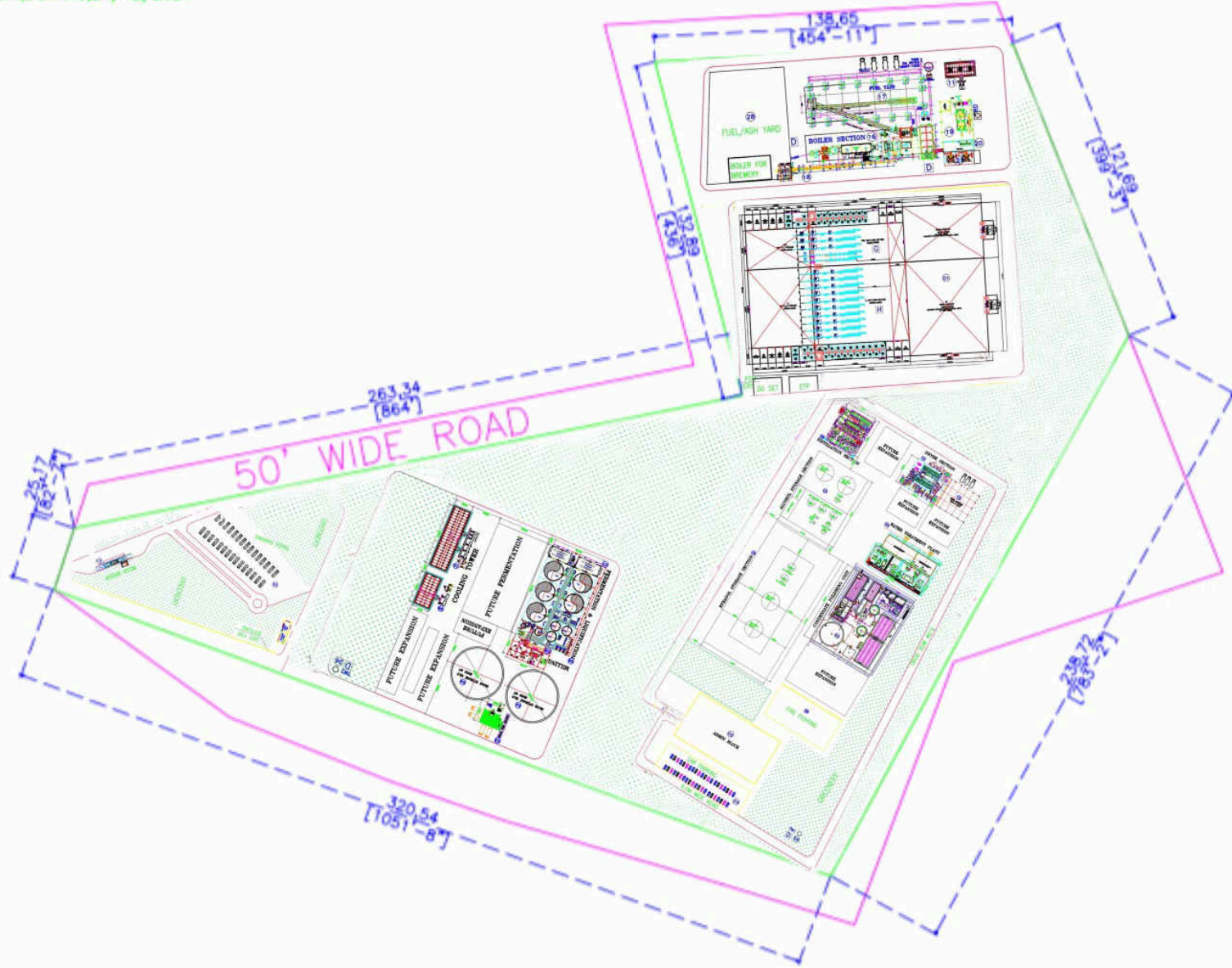
Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self-help groups.

Ancillary developmental activities like Cattle feed plants will be created due to the establishment of the proposed unit. Corporate Environmental Responsibility (CER) program will be executed on need base as per statutory requirement.

As per the requirement of ETHANOL BLENDED PETROL (EBP) PROGRAMME of Govt. of India and incentives and opportunities by Govt. of Bihar proposed Grain based distillery project will help in meeting the requirements of oil manufacturing companies for meeting the target under National Policy on Biofuel (NPB) – 2018. Project will also boost the employment in the region. Local farmers will be benefited by the project by meeting the raw materials requirement of the project.

\* \* \* \* \*

BALIDIH, BOKARO, 24/12/2021



**LEGEND**

SR. NO.	DESCRIPTION
1	IMPL/CL BOTTLING HALL
1A	BREW BOTTLING HALL
2	ADMIN BLOCK
3	GRAIN UNLOADING SECTION
4	GRAIN STORAGE SILO - 8000MT x 2 NOS.
5	MILLING SECTION
6	LIQUIFICATION & FERMENTATION SECTION
7	MCC ROOM FOR PLANT BUILDING
8	DISTILLATION & EVAPORATION SECTION
9	COOLING TOWER FOR FERMENTATION SECTION
10	COOLING TOWER FOR DISTILLATION SECTION
11	COOLING TOWER FOR TURBINE SECTION
12	DECANTATION & DRYER SECTION
13	DDGS GODDOWN
14	ALCOHOL STORAGE SECTION
15	ETHANOL STORAGE SECTION
16	BOILER SECTION
17	FUEL YARD
18	ASH HANDLING
19	TURBINE SECTION
20	DG SET
21	TRANSFORMER
22	CONDENSATE POLISHING UNIT
23	CAR PARKING
24	SECURITY RM
25	TRUCK PARKING
26	TUBEWEL
27	WEIGH BRIDGE CUM OFFICE
28	ASH YARD
29	FIRE FIGHTING STATION
30	WATER TREATMENT PLANT

**NOTES:-**

- 1) ALL DIMENSIONS ARE IN MM, UNLESS OTHERWISE SPECIFIED.
- 2) THE SIZES OF INDIVIDUAL SECTIONS ARE TENTATIVE & MAY VARY DURING DETAILED ENGINEERING.
- 3) INDICATES (200 KLPD) PLANT SECTION.
- 4) PROPOSED GREENERY.

REV. NO.	DESCRIPTION	DRAWN	CHKD.	APPRO.	DATE
0	FOR APPROVAL				08.12.2021

**REGREEN EXCEL EPC INDIA PVT. LTD.**  
 200 KLPD GRAIN BASED DISTILLERY PROJECT, BALIDIH, BOKARO, JHARKHAND  
 CLIENT : MUSTERHEIM ALCOHOL PVT LTD  
 PLANT : 200 KLPD GRAIN BASED DISTILLERY PROJECT  
 LOCATION : ---

TITLE :	SITE LOCATION PLAN	EXCEL JOB CODE	REEPL-BAPL
		CAD FILE NAME	SLP
DWG. NO. :	REEPL-BAPL-SLP-001	REV. :	01
		SHEET	1 OF 1
		SCALE	1 : 150