EIA Studies for Multi-feed Distillery (50 KLPD) along with Cogeneration Power Plant (1.5 MW) at KGS, Pimpalgaon (Nipani), Tehsil Niphad, District Nasik, Maharashtra (India)

Sponsor:

M/s KGS Infra Corporation Ltd., Nasik

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Mahatma Nagar, Nasik - 422 007, Maharashtra, India

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Introduction

KGS Sugar and Infra Corporation Limited (hereafter being referred as KGS or project proponent (PP) or simply as Karkhana) is a public limited company. It is. an existing company incorporated under company's Act, 1956. Its registration No. is 25-12967. The company has professionals on the board who have several years of experience. Mr. P. N. Karad Patil is the Chairman cum Non Executive Director who has been associated with sector at senior position since last 30 years. Mr. Dinkar Bodke is the Vice President and Managing Director. He is a qualified Chartered Engineer.

KGS has acquired 3,57,000 m^2 land near village Pimpalgaon (Nipani) in Niphad Taluka of Nasik district in the state of Maharashtra. Here the company has presently set up a sugar mill with cogeneration unit. Sugar mill cane crushing capacity is 4000 TCD. Cogeneration unit generates 14 MW electrical powers. Selected capacity of these activities is exempted from schedule of activities requiring environmental clearance (EC) under Notification SO1533 dated 14th September, 2006. The reason is cane crushing capacity is less than 5000 TCD and power generation using biomass is less than 15 MW.

KGS applied for consent to operate from MPCB for this project and received it under reference consent no. Format 1.0/BO/CAC-CELL/EIC No. NK-17172-14/O/CAC-10185 dated 07.11.2014 for manufacturing of 480 MTPA white crystalline Sugar, by products and 14 MW cogeneration..

Sugar manufacture from cane generates several by products use of which increases productivity and profitability of unit. The by-product of 4000 TCD sugar mill worked out to be (i) Bagasse 1200 MTPA, (ii) Molasses 180 MTPA and (iii) press mud 140 MTPA. Hence KGS decided to set-up manufacturing facilities for 14 MW electricity using bagasse generated in the own sugar mill as fuel. It will generate steam at high pressure which will be used first to generate power and then fulfill heating need of sugar mill.

This leaves two by-products i.e. 180 MTPD molasses and 140 MTPD press mud for further utilization. To make full utilization of these by-products, KGS envisages installation of 50 KLPD multi-feed distillery unit. The idea is to run the distillery as much as possible with available molasses and when molasses is exhausted run the same with grain. Since sugar plant will be non operational in off season a 1.5 MW captive power plant is planned, dedicated for distillery use only. No power export will be done from this generator.

The process of environmental Impact Assessment serves to meet the primary goal of Parliament in enacting Environmental (Protection) Act (EPA), 1986 to establish a national policy in favor of protecting and restoring the environment. As per EIA notification SO1533 dated 14th September 2006, prior environmental clearance is mandatory for establishment of projects /activities listed in the schedule of above notification. All molasses based distillery projects are categorized under 5(g) of schedule of activities under category "A", hence, require prior environmental clearance from the Expert Appraisal Committee (EAC) of MoEF. Grain based process is also in category "A" as limit is $\geq$ 30 KLPD.

KGS retained Mantras Green Resources Limited (MGRL), Nasik as environment consultant. MGRL initiated process of obtaining environment clearance..MGRL prepared application documents consisting of basic information, form-1 and prefeasibility report

and applied to MoEF for obtaining "TOR" for the project. MoEF allotted "TOR" for the proposal in 17th reconstituted expert appraisal committee (industry) meeting held between 18th–19th March, 2014 under item no 17.7.25. The Expert Appraisal Committee prescribed (ToR) vide letter no. J-11015/437/2012-IA.II (M) Dated 14th May, 2014

MGRL will also be conducting Environmental Impact Assessment (EIA) studies encompassing baseline scenario with respect to different components of the environment viz. air, noise, water, land, biological and socioeconomics etc including parameters of human interest for evolving suitable Environmental Management Plan (EMP). The EIA report will be submitted for the purpose of requirement of obtaining environmental clearance from statutory authorities. The EIA report will cover the identified impacts with elaborate EMP so as to prevent any damage to environment and ecological balance of the area.

As a part of environmental clearance process, a draft EIA is first circulated for public hearing. Final EIA is prepared after incorporating public comments and thereafter processed for EC.

2.0 Project Profile and Location

The KGS factory site is located on Saikheda – Sinner Road 15 km from National High way (NH-50) and 5 km from State High way (SH-23). The nearest railway station is Nasik, at a distance of 35 km from the factory site. Nearest air port is at Ozar, Major city Nasik is 40 km from the factory. Places of religious interests are Trimbakeshwar and Shirdi about 50 km and 52 km respectively from the factory location. The study area is covered by Survey of India Topo-sheet Nos. 46H/16, 46L/4, 47E/13 and 47I/1 and the geographical location falls in 19°56'07.86"N to 19°56'24.87"N Latitude and 74°01'35.83"E to 74°01'56.86"E Longitude.

KGS acquired 3,57,000 m^2 of total land area for conducting manufacturing activities as detailed above as well as proposed distillery. Out of this area 1,77,000 m^2 land is reserved for 50 KLPD multi-feed distillery. Area is sufficient to install all production facilities, storage facilities, effluent treatment systems and green belt.

3.0 Need of the Project

Initially alcohol was used mostly for potable consumption in form of Indian made foreign liquors (IMFL) and country made liquor. But now due to multifold increase in number of automotive, drugs and chemical industries, alcohol demand has increased manifold. Worldwide demand for alcohol is also rising and it creates significant export potential. Presently projected overall demand for ethanol is far outpacing supply. Of the total ethanol required, only 37% is currently being produced. Alcohol can be used as fuel. Hence Government is creating favorable regulations for ethanol industry so that our dependence on imported gasoline gets reduced. It will ensure saving in foreign exchange. Additional benefit of reduction in pollution will occur as petroleum route is more polluting. Employment benefit to local communities will grow exponentially as raw material base is agriculture. Trends about the supply and demand of ethanol in past years particularly during 2012-13 indicate the supply of ethanol as 2512 million liters while the demand works out to 3174 million liters. Deficit of ethanol was noticed as 662 million liters during 2012-13 and it is likely to rise in coming years.

In such demand supply gap scenario, an alcohol producing industry is very much required to fill in growing gap between demand and supply. Such industry is also welcome

because it supports agricultural base and will ensure employment to several persons, directly and indirectly.

4.0 Justification for Proposed Distillery

KGS has set up 4000 TCD sugar mill with 14 MW cogeneration unit to produce power from bagasse. Other by product – molasses is very hazardous chemical and highly polluting. Now best way to dispose molasses is to extract alcohol from it. Hence a molasses based distillery is the obvious choice. Spent wash produced after distillation of alcohol from molasses, is equally hazardous and needs to be totally destroyed. Latest trend is to convert it into bio-compost. For bio-composting filler material is required. Here press mud is available as filter material.

At the same time power situation in Maharashtra was worsening every day. Power interruption leads to unplanned shut downs and consequences are excess consumption of utilities, compromise in quality of sugar and overall increase in manufacturing costs. Hence, it was decided to utilize bagasse produced for cogeneration of power.

With site as center 10 km radius area does not involve any places of Archeological interests or any reserve forest, or any ecologically sensitive area, or critically polluted area, or the interstate boundary. Land is in possession of promoters and there are no rehabilitation or resettlement issues pending. There is no litigation against the project.

5.0 Products Manufactured

From existing sugar mill following products and by products are generated:

Product	Capacity	Units
White Crystalline sugar	480	MTD
Electrical power	14	MW
By products		
Bagasse	1200	MTD
Press mud	140	MTD
Molasses	180	MTD

Present proposal is to manufacture alcohol as below:

Product	Capacity	Units
Alcohol (RS/ENA/AA)	50	KLPD
Electrical power	1.5	MW
By products		
Biogas	22000	Nm^3/day
Bio-compost	100	MTD
Dried distillers grains and soluble (DDGS)	40	MTD
Carbon dioxide	35	MTD

Raw materials required:

Product	Requirement (MTD)	Source
Sugar cane	4000	Nearby farmers

Grain	129	Nearby farmers
Molasses	210	From own sugar mill

6.0 Magnitude of Operation:

The following points indicate all facets of proposed project to elaborate magnitude of project operation:

Sr. No.	Particulars	Details	
1.	**Area Statement**	**Area (m^2)**	
	Total Plot Area	3,57,000	
	Distillery Unit Area	1,77,000	
2.	**Days of Operation**		
	Total Working Days	330	
	Molasses feed in Season	240	
	Grain feed in off Season	90	
	Note: Number of days of operation are indicative only and will depend on availability of raw material.		
3.	**Water Resources**		
	Surface Water	Godavari River (8km)	
	Bore Well (own)	Two numbers	
	Fresh Water Demand	Sugar mill : 1016 KLPD: Molasses based distillery : 647 KLPD Grain based distillery : 674 KLPD	
4.	**Power Requirement**		
	Distillery	1.1 MW (molasses based operations) 1.3 MW (grain based operations)	
	Sugar plant	4 MW	
	Cogen plant (DG Set)	2 MW	
	Power export	8 MW without distillery	
	Power export	6.9/6.7 MW if distillery in operation	
	Back-up power	250 KVA	
	DG Set rating	250 KVA	
	Fuel Used	HSD	
	Fuel Consumption	65 L/hr (If used at full Load)	
5.	**Man Power**	**Distillery & Cogen**	**Sugar & Cogen Unit**
	Staff	18	62
	Workers	14	106
	Contractual labor	20	100
	Total	**52**	**268**
6.	**Project Cost**		
	Total Investment	**For distillery** Rs. 86.96 Cr	**For sugar plant :** Rs 90.00 Cr
7.	**Utilities**		

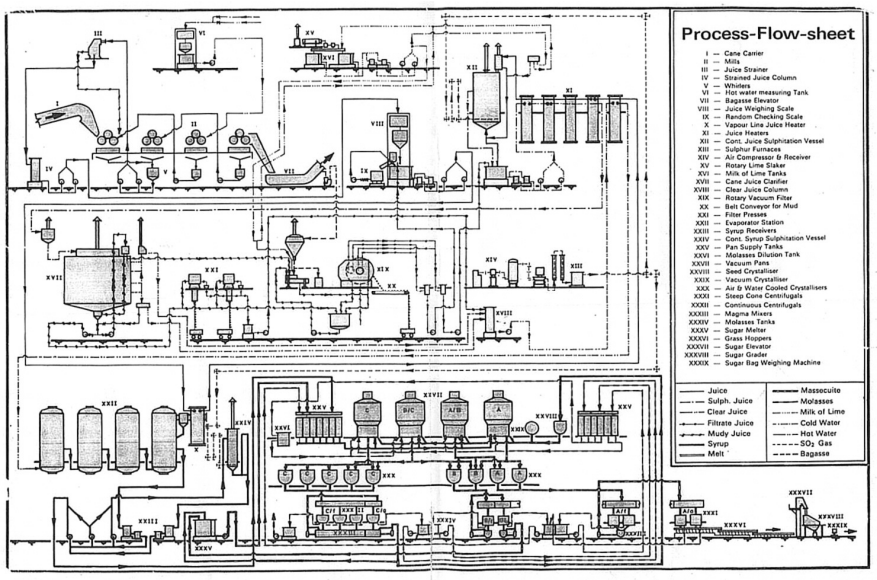
Sr. No.	Particulars	Details		
	Steam Required	(Molasses Based) 270 MTD: (Grain Based) 350 MTD	For Sugar plant and cogen plant and distillery in season 1440 MTD	
	Boiler Capacity Fuel – Bagasse with 2% ash and 0.2% sulphur	20 TPH 205 MTD	70 TPH 730 MTD	
	Note : Coal upto 15% may be used to support firing in case of drop in steam pressure from boiler			
8.	**Ash Generation from Boiler**			
		Distillery unit (MTD)	**Main Sugar units (MTD)**	
	Total Ash generation Expected Fly Ash	4.1 MTD 3.28 MTD	14.6 MTD 11.7 MTD	
	Expected Bottom Ash Fly Ash Dust Collector	0.82 MTD Ventury scrubber or ESP type dust collector emission with in 150 mg/nm^3	2.9 MTD ESP To limit dust emission 150 mg/nm^3	
	Fly Ash and Bottom Ash Disposal	To brick manufacturers		
9.	**SO_2 emission**	**Distillery boiler (kg/day)**	**Sugar mill boiler (kg/day)**	
	SO_2 emission Bagasse	820	2900	
	Grand total	**3720 kg/day**		
10.	**Details of Stack**			
	Height required	40.3 m	59 m	
	Height provided	43 m	70 m	
	Diameter	1.0 m	3.7 m	
11.	**Wastewater Generation**			
		Molasses based	**Grain based**	**Sugar plant**
	Spent Wash /Thin stillage KLD	450 After concentration 46 MTD	218	Nil
	Effluent KLD	--	--	393
	Treatment	MEE	MEE	ETP
	Disposal	Composting	DDGS	Gardening
12.	**Solid Waste Generation**			
	Total ash	0.82 MTD	2.9 MTD	
	ETP sludge	--	30 kg/day	

7.0 Process of Manufacture

7.1 Manufacture of Sugar

Sugarcane is weighed, washed, cut, shredded and fed to series of mills. Sugar cane juice is extracted and bagasse is separated. Juice is heated and clarified. Mud is separated out and clarified juice is subjected to multiple effect evaporators. Concentrated syrup is fed to vacuum pan where syrup gets super saturated and fine crystals start forming. Crystals and mother liquor are separated in centrifuges. Raw sugar is dumped on moving belt where it gets dried before moving to storage.

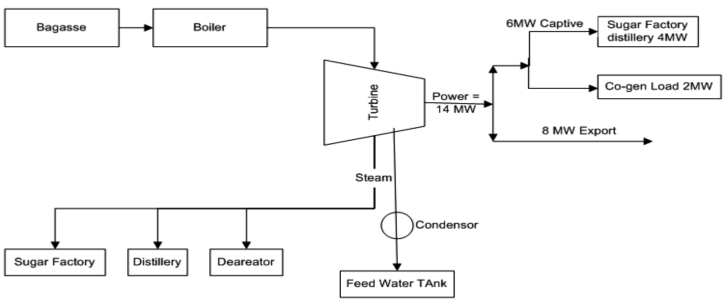
Manufacturing process is diagrammatically detailed below:



7.2 Generation of Electrical Power

When a properly coiled wheel is rotated within magnetic field electricity is generated. To rotate the wheel mechanical, water or steam many be used. Steam generated in a boiler is fed to a turbine coupled to an alternator. Steam is produced in a boiler by burning of bagasse and coal as fuel. Steam at high pressure moves the turbine which rotates alternator and electricity is produced.

Part of steam is ejected at low pressure is used for heating requirement of sugar mill, distillery, de-aeration of incoming water and balance is condensed and recycled.



Process Flow Diagram

The Company has put up a 14 MW power plant. The suppliers will set up an FBC (Fluidized Bed Combustion) boiler capable to generate 70 TPH steam at 67 kg/cm^2 pressure at 485 0 C temperature and one steam turbine generating 14 MW power at 11 kV.

For distillery a dedicated boiler of 20 MT/hr capacity will be installed with suitable turbo-generator system to generate 1.5 MW sufficient enough to run distillery independently of main boiler

Boilers will also use biogas generated in bio-digester to reduce fuel consumption. In normal courses main sugar plant boiler will function and fulfill steam requirement of distillery also.

7.3 Manufacture of Alcohol – Molasses Route

Molasses Handling and Storage: Molasses generated in main sugar plant is stored in molasses storage tanks. From here it is pumped to molasses day tank in fermentation area. From day- tank it is pumped to yeast propagation and fermentation areas through a weighing system.

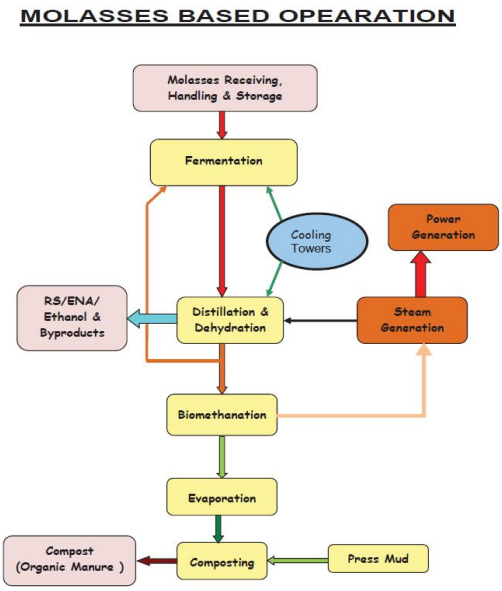
Yeast Culturing: Yeast culturing system comprises of three yeast propagation vessels of incremental sizes, which are connected in series. Diluted molasses mash is taken in 1st Vessel and yeast cell mass is pitched in it under hygienic conditions. Cell-mass grows and is then transferred to the next higher volume vessel. Yeast propagation vessels are provided with heating, cooling and steam sterilization arrangements. Once yeast has grown to proper healthy cell concentration, contents of last vessel are transferred to the pre-fermenter. Sterile air, necessary for yeast growth, is supplied to yeast propagator and pre-fermenter vessels.

Fermentation: Four fermentation tanks operate in Fed-batch Mode. Fermenters serve as bioreactor vessels in which sugar is converted to ethanol by yeast. Each fermenter is filled with dilute molasses and yeast cell mass from the pre-fermenter. The fermentation process is exothermic; To maintain an optimum temperature of around 32°C in fermenters, heat generated during fermentation process is removed by circulating fermenter contents through external heat exchangers, cooled by cooling water. The gases generated during fermentation process are collected and scrubbed in CO2 scrubber, to recover ethanol being carried over with vent gases. After completion of fermentation process, fermented beer is transferred to the beer-well and fermenter tank is thoroughly cleaned for the next fermentation cycle. Beer-well provides the surge capacity between Fermentation and Distillation Systems.

Clean-in-place System: Efficient CIP System is provided to ensure proper cleaning of process equipment with inter-connecting piping and minimize microbial contamination in the process. The system consists of hot water tank, caustic solution tank, a high-pressure pump, tank cleaning nozzles and associated piping. A good quality sterilant is used during the CIP cycle to disinfect the system, as and when required.

Distillation: Multi-pressure Distillation System comprises of seven distillation columns operating at different internal pressures, so that overhead vapours from the distillation columns operating under higher pressure can be used to heat columns operating under lower pressure. This thermal integration of distillation columns leads to a system where high grade neutral alcohol can be produced with very low energy consumption. The

various distillation columns are degasifying column, stripper column, pre-concentrator column, evaporator, extractive distillation column, rectification column and recovery column. The final product is purified dilute alcohol and is of 96% v/v ethanol content



Dehydration: The plant design is centered on three columns filled with molecular sieve beads. One of the columns is in adsorption mode while other two columns are in the different stages of regeneration mode. Feed alcohol is preheated in feed economizer with heat supplied by dry saturated steam. Hydrous ethanol vapors pass down the molecular sieve bed in one of the adsorption columns, where the water is adsorbed into the pores of the molecular sieve and ethanol passes through. Dehydrated ethanol product is condensed back to the liquid phase and cooled to the ambient temperature.

One of the molecular sieve columns is always in the adsorption mode while the others are in regeneration mode. In regeneration mode, the adsorbed water is removed from the molecular sieve beads by applying deep vacuum to the molecular sieve column under regeneration. This steam is sent back to the rectification column where the ethanol is concentrated and recycled, while water leaves the system from the base of rectification column.

Evaporator: Spent Wash Concentration System comprises of a triple-effect evaporator unit thermally integrated with the distillation plant. The integrated evaporator will use only waste heat from the distillation plant for the concentration of spent wash. Evaporator system will reduce the spent wash volume by over 40% of feed flow. Concentrated spent wash from the integrated evaporator will be sent to the composting yard, where it will be mixed with the Press Mud from the adjacent sugar mill and composted to produce valuable composted organic manure.

This ensures a zero discharge system for spent wash.

7.4 Manufacture of Alcohol: Grain Route

In grain based distillery starch containing grains such as corn, wheat, barley, sorghum etc. are used as raw material.

A grain based distillery plant has additional sections, mainly for conversion of starch to fermentable sugars and additional fermentation capacity is required as the process cycle is longer in case of grain based fermentation. The different sections/ equipment required for plant operation are as follows:

Grain Handling and Storage:

Normally, capacity of grain storage silos is for about 30 days of plant operation. Grain received in the trucks is unloaded into the receiving hopper above the set of conveyors, which transfer it to the grain storage silos. Grain is transferred from the storage silos to milling area, as and when required, by a set of conveyors for silo unloading.

Milling:

Grain from silos is passed through a grain cleaning system for the removal of foreign matter and taken into a surge Bin. Magnetic Separators are also installed at critical points for the removal of metallic particles. Surge bin provides the required buffer capacity between grain storage and milling systems. The grain from surge bin is fed to hammer mill for milling. Hammer mill sieves are designed to ensure proper milling of the grain to give an optimum particle size distribution. Feed grain is therefore milled to a uniform size to minimize processing time and improve yields.

Liquefaction:

Milled grain and hot water are mixed in a paddle cum ribbon mixer to prepare mash, which flows to mash tank. Mash tank is equipped with agitator to keep grain solids in suspension. Small quantity of liquefying enzyme is added to the mash tank to reduce viscosity and improve pump-ability of the mash. A high pressure jet cooker is used for heating the mash. The cooked mash is then flashed to reduce its temperature before liquefaction. Liquefaction enzyme is added to liquefaction tank for converting starch to form short chain dextrin's. The liquefied mash is cooled in mash coolers and then sent to the fermentation area for conversion to ethanol. Thin stillage from Distillation section is added to mash to dilute it and to reduce the pH value of mash.

CIP connections are provided at required points to ensure proper cleaning of equipment and pipelines, to maintain sanitary conditions and control the contamination during liquefaction process.

Fermentation, Distillation, Dehydration:

The processes shall be same as discussed in Molasses based distillery section. .The alcohol and distillery dry grain and solubles are processed in different sections.

Extra Neutral Alcohol:

The 95% of pure alcohol produced in Distillation process undergoes a further distillation process for getting Extra Neutral Alcohol. The system consists of total 5 nos. columns along with related condenser, coolers, re-boilers, pumps, piping, etc.

The distillation columns provided are as follows:

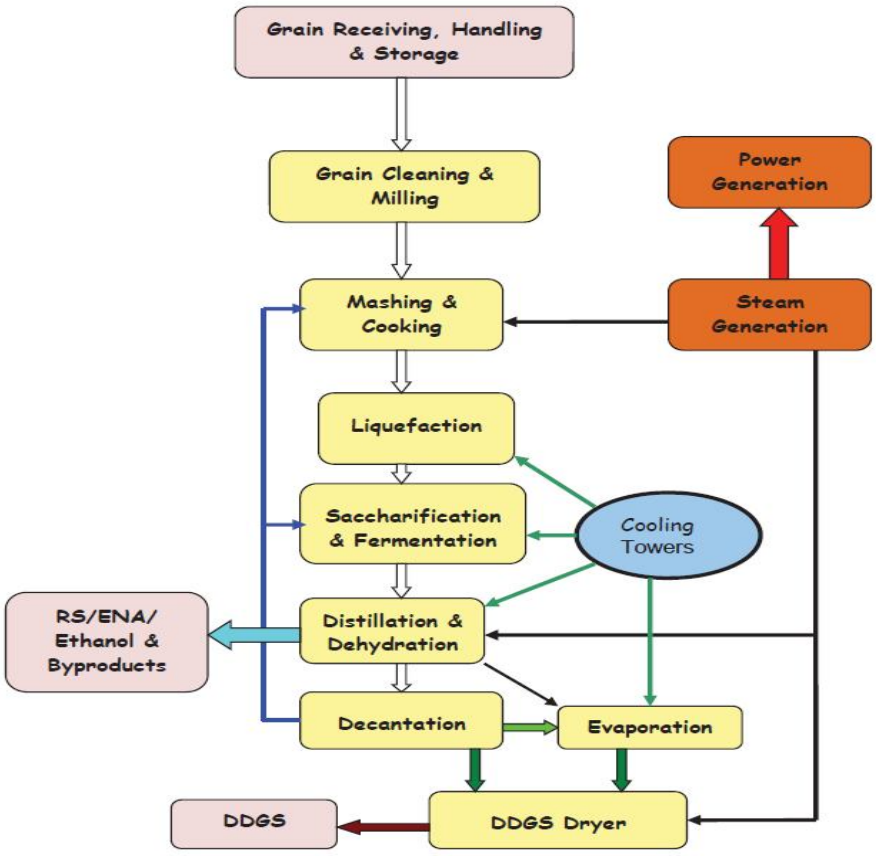
- Purification Column
- Exhaust cum Rectification Column
- Heads Concentration Column

- Fusel oil Concentration Column
- Shimmering Column (Refining)

To remove all the impurities present in rectified spirit, it has to be redistilled in multi columns. Rectifier Spirit with additional water is fed to the purification column at 20% alcohol content in feed.

From this column low boiling impurities are removed from heads of the column. The bottom product containing high boiling and identical boiling impurities are feed to the exhaust cum rectification column where there is removal of low fusel oil (LFO), high fusel oils (HFO) and identical boiling impurities (heads cut).

GRAIN BASED OPEARATION



The removal of impurities from purification and rectification columns are fed to heads concentration column. This heads cut contain ethyl alcohol in it to concentrate the heads, the impure spirit is removed from the top position of heads column and alcohol from its bottom is fed back to purification column.

The LFO and HFO from rectification column is fed to fusel oil concentration column to concentrate this impurities. Alcohol which is concentrated at the top is fed to purification column to recover the alcohol and ENA is removed from the top plate of Rectification column.

In refining (shimmering) column removal of traces of impurities is carried out from the top of the column and pure ENA is drawn from the bottom of the column which is suitable for potable liquor (IMFL).

Bio Fertilizer:

Press mud is obtained in sugar mill to a tune of 3.5% to 4% of the weight of sugarcane crushed. Press mud contains sizable quantity of macro and micro nutrients, besides 20-25% of organic carbon. Press mud is a solid residue, obtained from sugarcane juice before crystallization of sugar.

Generally press mud is used as manure in India. It is a soft, spongy, lightweight, amorphous, dark brown to black colored material. It generally contains 60-85% moisture (w/w); the chemical composition depends on cane variety, soil condition, nutrients applied in the field, process of clarification adopted and other environmental factors.

Typical composition of press-mud is given below:

Composition of Press Mud

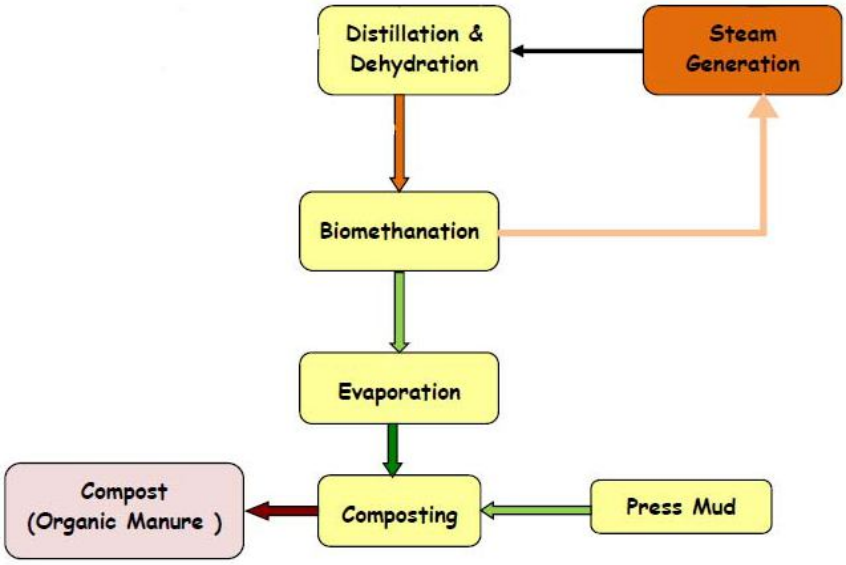
Compound	Percentage
Cellulose	11.4
Hemi cellulose	10.0
Lignin	9.3
Protein	15.5
Wax	8.4
Sugar	5.7
Sodium	0.22

Bio-fertilizers are known to play a number of vital roles in soil fertility, crop productivity and production in agriculture as they are eco-friendly. The main advantages of bio-fertilizer are as follows:

- Increase crop yield by 20-30%
- Replace chemical Nitrogen and Phosphorous by 25%
- Stimulate plant growth
- Activate soil biologically
- Restore natural fertility
- Provide protection against drought and some soil borne diseases.

Manufacturing Process – Bio Fertilizer:

The block diagram for Bio Fertilizer manufacturing process has been provided in below:



Dried Distillers Grains and Soluble (DDGS):

KGS will have duel advantage by installing multifeed distillery. When molasses is used it will generate biocompost which is a bio fertilizer usable to increase nutrient value of soil. When grain is used thin stillage will be concentrated and sprayed on decanted mass to distillers wet grains and soluble (DWGS). On drying it is converted to DDGS and is used as cattle feed.

Investment: The project cost including buildings, plant and machinery, operation and maintenance, electricity, furniture and fixtures are given below:

Sr. No.	Particulars (Distillery + PP)	Amounts (Rs. in Crores)
1.	Land and site Development	07.87
2.	Building and Civil works	10.75
3.	Indigenous Plant & Machineries	53.17
4.	Miscellaneous Fixed Assets	1.99
5.	Preliminary & Pre-operative expenses	3.46
6.	Contingences	3.50
7.	Margin Money	1.90
8.	IDC	4.32
	Total	**86.96**

8.0 Draft Environment Impact Assessment Report

MGRL was assigned the project of preparing environment impact assessment report for the proposal in light of background of existing sugar mill and cogeneration plant. For the environmental impact assessment studies, an area covering 10 km radial distance from the center of project area (covering around 10 km area from the boundary of proposed plant

on all sides) was identified as impact zone admeasuring around 314 km². Sampling points have been chosen from both the Impact zones.

The EIA study was carried out for each individual environmental component during summer season, (March –June) is briefly reported below and the details of which are presented in the report.

MGRL established the base line, studied the process requirement, raw material requirement, products generated, safety measures adopted, mitigation measures recommended and predicted impacts. Environment management plan was prepared and budget estimated. Post project monitoring plan was finalized to ensure predicted impacts are within line of control norms.

A draft EIA report was prepared and submitted for public hearing. After public hearing, the draft EIA will be modified and final EIA will be prepared incorporating public suggestions.

Final EIA will be discussed with EAC members of MOEF and final environment clearance will be obtained.

9.0 Present Base Line Conditions

- PM_{10} concentration was observed to be below the stipulated standards for residential, rural or mixed area (rural and residential) as well as in for industrial area ranged from 60– 88 µg/m³ during summer season (Standard Limits for PM_{10} is 100 µg/m^3)
- $PM_{2.5}$ concentration was observed to be vary from 38 to 56 µg/m³ and observed below the stipulated standards Limits ($PM_{2.5}$ = 60 µg/m³)
- Concentrations of SO_2 and NOx were recorded as 4-10 µg/m³ and 12-49 µg/m^3 were below the stipulated standards of (80 µg/m^3) respectively
- Carbon monoxide varied from 0.52 to 1.0 mg/m^3 in the study area and was below the stipulated standard of (2.0 mg/l)
- Major contributors for PM_{10}, are due to transportation activity on haul semi-permanent road network

10.0 Environmental Management Plan

Mitigation Measures

Operation of molasses based as well as grain based distillery is now a standard procedure and pollution problems related to both are known and proper mitigation measures are available.

For parent sugar and cogen plant an ETP has been erected of 400 KLD capacity to treat effluent. For ash collection ESP has been installed to limit pollution to within 150 mg/nm3. For noise control acaustic measures, vibration dampners have been provided. For SO_2 a chimney of 72 M height has been provided.

For proposed distillery a zero discharge system will be adopted for treatment of spent wash from molasses based as well as grain based operations.

Spent wash from molasses based operation will be first subjected to biomethanation to recover biogas. Biogas will be burnt in a boiler to reduce fuel consumption. After

biomethanation spent wash will be concentrated and sprayed on windroses prepared from press mud in compost yard. 100% spent wash will be converted to biocompost.

In grain based operation stillage from distillation will be decaned. The thin stillage from decanter will be concentrated and sprayed on solids available from decanter. DWGS so obtained will be fed to a dryer to remove water and DDGS so obtained will be used as cattle feed.

Hence grain based operation will also be a zero discharge process.

As it is a zero discharge system pollution effect on flora and fauna, soil, ground water and surface water will be negligible.

Ventury Scrubber/ESP on distillery boiler will limit ash emission to within limits.

Distillery operations do not involve noise producing machinery; hence noise pollution is not expected.

11.0 Environmental Monitoring Plan

To ensure mitigation measures are effectively working a post project environment plan has been worked out as below:

Parameters	Sampling Location	Frequency
Ambient Air Quality	2 samples at downwind direction (500 m and 1000 m)	Once in 6 months
PM_{10}, $PM_{2.5}$, SO_2, NOx	Sampling port of Stack (Flue gas and flow rate)	Once in 6 months
Ground Water parameters	2 km from spent wash tank & compost yard 2 locations on downward drainage pattern 1 location on upward drainage	Half yearly
Surface Water	1 location each on down and upstream	Quarterly
Wastewater	Final Discharge point at project site	Daily
Soil	Farm using Bio-compost	Pre and Post Monsoon

12.0 Budget Allocation for EMP:

The EMP cost is bifurcated in two different parts i.e. EMP budget when molasses as feedstock and other is when grain is used as feed stock.

EMP Budget using Molasses as Feed Stock:

Sr. No.	Particulars	Capital Cost	Annual Recurring Cost
		Rupees in lacs.	
1	Water pollution control equipment including multiple effect evaporators and bio-digester	550	12
2	Compost yard	350	8
3	Composting equipments	100	6
4	Spent wash storage tank	250	14

5	Monitoring of pollution parameters	--	5
6	Laboratory and chemicals	5	4
7	Safety and healthcare	3	1
8	Operation and maintenance	--	10
9	Salary of EMP staff	--	36
10	Development of green belt	5	1
	Total	**1263**	**97**

EMP Budget using Grain as Feed Stock

Sr. No.	Particulars	Capital cost	Annual recurring cost
		Rupees in lacs.	
1	Water pollution control equipment complete with decanter, four effect multiple effect evaporator, dryer etc	950	36
2	DDGS storage yard	15	2.
3	Composting equipments	N.A	N.A
4	Spent wash storage tank	35	4
5	Concentration system for spent wash	N.A	N.A
6	Monitoring of pollution parameters	Included in molasses based operation	
7	Laboratory and chemicals		
8	Safety and healthcare		
9	Operation and maintenance		
10	Development of green belt		
	Total	**1000**	**42**

There will be a separate cell who will ensure regular inspection and maintenance of pollution control systems, statutory approval, waste treatment and disposal including stack emission etc

13.0 Occupation Health and Safety

- During the construction and operation phases there are chances of major or minor accidents at the project site
- There shall be regular medical check up of the workers
- Adequate safety precautions shall be exercised strictly for observing safety norms
- Protective equipments shall be stocked and made available to the workers as below:
- All the workers will be provided with helmets, goggles and safety equipments, welder equipments for eye and face protection, ear plug, ear muffs, dust masks, boiler suit, safety belt, hand gloves, and safety shoes along with safety instructions in the form of manual and first-aid facilities will be made available.

14.0 Conclusions

The development of proposed multi-feed distillery plant of 50 KLPD capacity at Pimpalgaon (Nipani) area is technically and economically feasible and environmental friendly. The conclusions of the project report may be drawn from the following points:

- Baseline environmental status, anticipated environmental impacts and mitigation measures have been prepared and included in the report to ensure there is no damage to the existing environment
- To check post project scenario a post project monitoring program is included in environment management plan
- All the activities of distillery units will be confined to the acquired area of KGS, emissions will be restricted well within allowed limits. Thus, the environment will not be adversely affected in any way.
- Distillery operations from both processes will be zero discharge projects. Thus there will not be any wastewater discharge in the environment
- The by-products (bagasse, press mud and mmolasses) produced from sugar manufacturing process will be used in distillery process for manufacturing of Rectified spirit, Alcohol, Ethanol, Eelectrical Power and Bbiogas etc.
- The development of 5000 plantation as green belt (35,700 m^2) will help to increase the biodiversity of the area. It will effectively mitigate environmental pollution
- Rain water harvesting, recycling of water, passive enclosures / dust suppression method for dust generating machines in the project areas reduce the demand of fresh water
- The unit will generate power from renewable resources bagasse. It will generate power in excess of its own requirement and feed to state grid.
- Being agro based industry it will offer ready market for local sugar cane growers
- Farmers producing other variety of grains will also find ready market. Apart from selling there produce to factory farmers will get back bio compost from factory to enhance nutrient level of their farms. They will also get DDGS to feed their cattle
- KGS will deliver its obligations under corporate social responsibility (CSR). Under CSR policy KGS will ensure development of the surrounding villages and the area and Quality of Life of local people will be improved.
- Preference will be given to local population for employment as well as in awarding works contract to ensure small scale industries are promoted in the area
- KGS will also a helping hand in improvement of infrastructural facilities like education, medical, transport etc.
- In view of such several advantages the management requested public to award their approval for the project.

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