

INTRODUCTION

This is a proposal to expansion of 15.5 MW co-gen plant and new 45KLPD Distillery project. Agro – based Sector on a mousy land. This is for molasses-based standard product of Ethyl Alcohol in the form of Rectified Spirit/ Extra Neutral Alcohol/ Absolute Alcohol, but improving the process. The Proponents are **M/s JAIHIND SUGAR PVT. LTD.** At. Po.- Achegaon, Tal-South Solapur, Dist-Solapur, Maharashtra. The proposed products (main & attendant) are –

Table No. 1: Product Details

SL.NO.	Product	Production			Unit
		Existing	New	Total	
1	Crystalline Sugar	3500	---	3500	TCD
2	Co-gen power	14.5	15.5	30	MW
3	Ethyl Alcohol	---	45	45	KLPD

The Notification no. S. O. 1533 promulgated on 14th September 2006 has covered this No.1 Product and is at Entry 5(j), 1(d). The proposal is acknowledged by Government of India, Ministry of Commerce and Industry, Entrepreneurial Assistance Unit, New Delhi.

Justification for the project

Justification of this Project can be submitted in many ways, namely –

- How this Project is economically strong by converting waste molasses and Bagasse of surrounding Sugar Mills to serve as raw material for this unit,
- How this Project is economically strong by converting its own waste in useful product and power generation.
- How the pollution generated from this unit can be successfully managed through EMP implementation, or in fact
- How the pollution generated from this unit can be converted to useful irrigation water with nutrients, and
- How the pollution generated from this unit can be converted to Electricity.

Table No. 2: Justification of Project

- | |
|--|
| <ul style="list-style-type: none"> • India Needs Alcohol • Saves Petrol (additives) • Foreign Exchange Saver-Earner • Condensate water for Boiler/ process • Irrigation water with nutrients for crop • Consumes Bagasse, which otherwise is an environmental risk • Consumes spent wash concentrate, which otherwise is an environmental risk • Consumes molasses, which otherwise is an environmental risk |
|--|

Various Government Departments will also be examining **Justification** and propriety of this venture and permissions will be obtained to establish this unit. Many are already in hand.

- Certificate of incorporation of the company
- Industrial Entrepreneurs Memorandum (IEM), New Delhi for Alcohol
- Industrial Entrepreneurs Memorandum (IEM), New Delhi for Co-gen Power
- Industrial Entrepreneurs Memorandum (IEM), New Delhi for Sugar
- NOC from Local body
- Land Registration, NA permission and Industrial purpose
- Water drawl permission
- On site emergency plan approval
- Central Excise Registration

Location and Boundaries

The government has a desire to improve status of this District and has encouraged Tax incentives, subsidies, interalia. In order to have a sustainable development, the pollution generation from this industry is finally made insignificant having taken all the precautions right from raw material selection up to low or no waste generation and more over conversion.

This site of about 84 acres has a connecting road and has approachability. This site is connected with Maharashtra State Electricity Board power. When various sites were seen, this site appeared to be environmentally best as also from the business angle and therefore this option was finally adopted.

The site is located at rural surroundings and is 11.2 km about Hotgi Railway station & Solapur Railway Station 24 km from site also 25 km from Akkalkot, 29 km river Bhima, is in the midst of cane growing area but not itself a prime agricultural land. It is geographically located in 17°31'37."N latitude and 76° 03'28"E longitude. The premises is about 84 acres and as much as about 1/3 of which is already planned to be brought under the honest green-belt and landscaping. A 2.5 meter high perimeter wall in random rubble masonry or fencing will be erected all around the boundary. The site is away from SH 151 about 22.5 km.

There is no sensitive establishment in the vicinity such as health resort, hospital, archaeological monuments, sanctuaries, etc. The normal wind direction is found to be favorable at this site. All villages are away. All are provided with drinking water from wells or Government Water Supply Schemes RWS.

With all this consideration, this site was ranked first and adopted. The features.

Table 2.1: Location features of the project site

#	Feature	Particulars
1	Location	Achegaon village, South Solapur Taluka, Solapur district, Maharashtra state.
2	Latitude/Longitude	Latitude: 17°31'37" N; Longitude: 76°03'28" E
3	Average altitude above mean MSL	468 m above MSL
4	Temperature in °C	The highest temperature is usually observed during the months of April–May and lowest temperature during December/ January. Maximum – 45° C, Minimum – 25° C
5	Rain fall in mm	Total annual average rainfall 625 mm
6	Wind velocity	This region is characterized by low to moderate wind velocities. The mean day velocities are in the range of 1.8 to 4.6 and especially high during pre monsoon period of April to May.
7	Nearest highway	Solapur- Akalkot straight highway, SH 151
8	Rail line way line	Hodgi Solapur-Vijapur line
9	Nearest airport	Pune – 250 km
10	Nearest Villages	Shingadgaon :3.2 km NW
11	Nearest town	Solapur :30 km N-W from the site
12	Nearest major city	Solapur 30 Km
13	Nearest water body	River Bhima : 20 km
14	Sensitive locations such as protected forests , monuments, national park, zoos etc.	No such locations with in 25 km from the site

Land Utilization:

Less buildings and less roads means saving of rubble, sand, bricks, etc, which otherwise has to be procured by robbing nature. The land utilization is

Land application	Present		Addition proposed for	
	Built-up	Other	Built-up	other
Sugar factory	14000 m ²	60000 m ²	---	---
Co-gen	4000 m ²	12000 m ²	3000 m ²	16,000 m ²
Distillery	---	----	3500 m ²	44,000 m ²
Total	18000 m²	72000 m²	6500 m²	60000 m²

PROJECT INVESTMENT,

#	Particulars	Existing	Proposed	Total (Rs. in lac)
1	Land and Site Development	834	349	1183
2	Civil Works	2561	1090	3651
3	Plant & Machinery	7152	3862	11014
4	Preliminary & Pre-operative exp.	1179	2393	3572
5	Transmission Line	211	112	323
6	Contingencies	212	430	642
7	Margin Money	351	264	615
	Total (Rs. in lac)	12500	8500	21000

Raw Materials and Products for Distillery

Material	Quantity	Transportation	Storage
Basic raw material			
Molasses	180 T/d	Pipe line	MS Tank
Alternatively, 30 % sugar cane juice	247 KLPD		
Chemicals/ nutrients			
Sulphuric acid	0.100 T/d	Lorry tanker	MS Tank
DAP	0.050 T/d	Lorry	50 Kg Bags
Urea	0.075 T/d	Lorry	50 KG Bags
Antifoam	0.050 T/d	Lorry	50 Kg Drums
Product/By-product			
Alcohol (RS/ENA/AA)	45 KL/d	Lorry tanker	MS Tank
Yeast sludge	2 T/d	Tractor	Constructed Yard
Boiler ash	10 T/d	Tractor	Constructed Yard

Resources:

Plant Capacity: We have proposed a unit of 45 KLPD new Distillery as distillery which have integrated MEE followed by stand alone MEE followed by composting of CSW with Pressmud for the treatment of spent wash to achieve ZLD, so the said industry can run its operation throughout the year (300 days). We are limiting the water use to 12 KL/KL and spent wash generation to 8KL/KL.

Raw Materials:

The capacity of the proposed Molasses based distillery shall be 45 KLPD. For this the main and sole raw material is molasses. The yeast brings about the change. Some chemicals in small quantity will be used for supporting propagation of the yeast and help to fermentation. Thus, the following raw materials will be used.

Table No. 3: Raw Materials

Item	Quantity TPD	Particulars
Molasses	180	Available from own factory & procure from outside/ nearby sugar factories.
Sulphuric acid	0.100 T/d	Used for keeping proper environment for process
DAP	0.050 T/d	
Urea	0.075 T/d	
Turkey Red Oil	0.075	As anti-foam agent occasionally
Yeast culture	8 lit.	To initiate biochemical reaction

Raw Material Availability

Our requirement of molasses at the rate of 180 TPD for 270 working days will be 48600 TPY

We have many sugar factories in the district with separable molasses. Survey is made and MoU obtained. Molasses in Maharashtra is procured through state excise authority. We shall get the required molasses without difficulty.

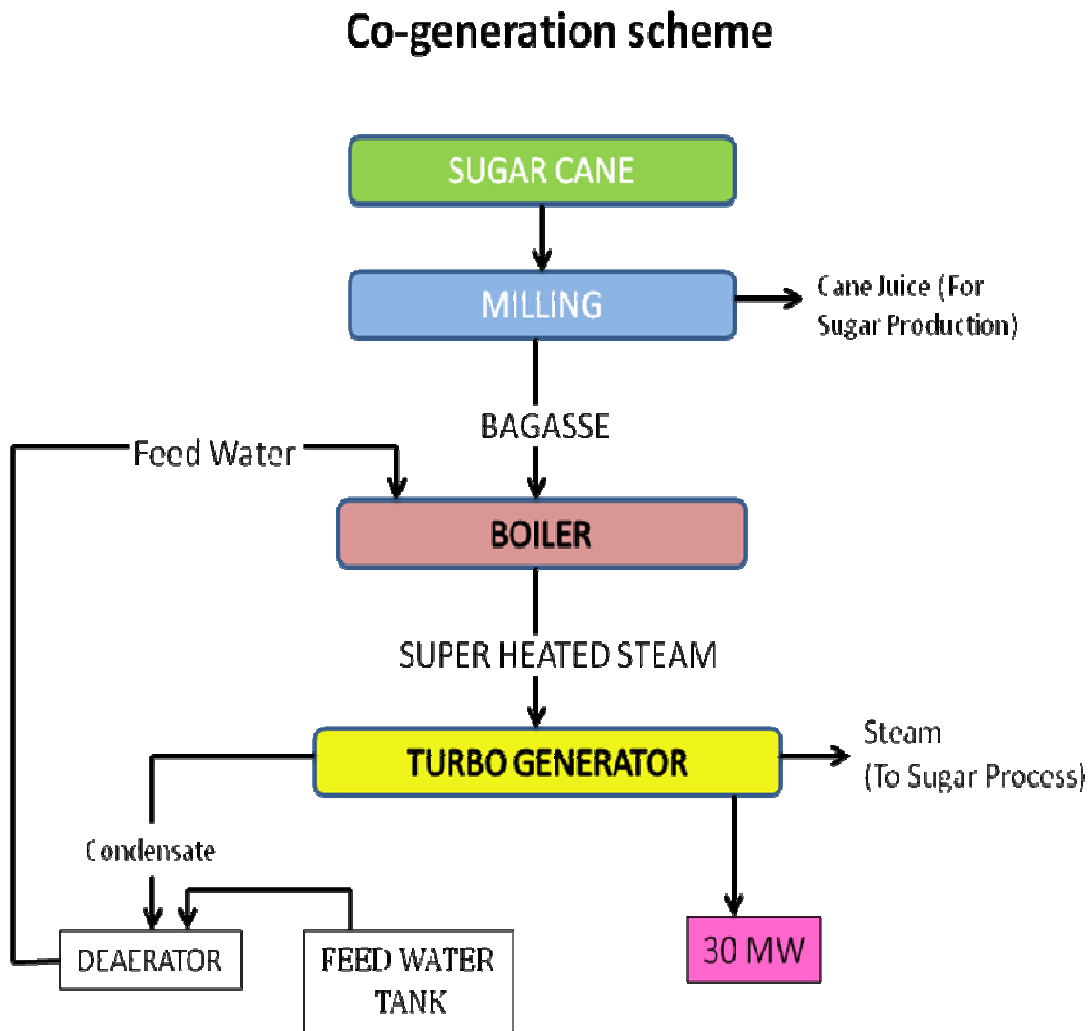
Utilities

In addition to the raw material, utilities are also required. These are:

- Power: Need connected for Distillery 1.5 MW & co-gen, colony lightening 5.0 MW. Available through Govt. Electricity Board and own generation.
- Fuel: Available as Bagasse and agro- residue and concentrate fro spent wash.
- Man Power: Staff, skilled and unskilled totally 372 persons will be required, and will be available.
- (Existing manpower in the sugar unit is 252. Additional manpower needed to operate the proposed power and distillery plants will be 120. More than 85 % of the manpower requirement will be met from the local source. Man power requirement for construction work will be about 120. Construction workers will reside in nearby villages and residential facility will not be required for the construction personnel.)
- Steam requirement of 80 TPH, 100 TPH for co-gen and distillery i.e. equivalent to 50 TPD.
- Compressed air is required for instrumentation and servicing. Thus, a compressed air is provided.

Process:-

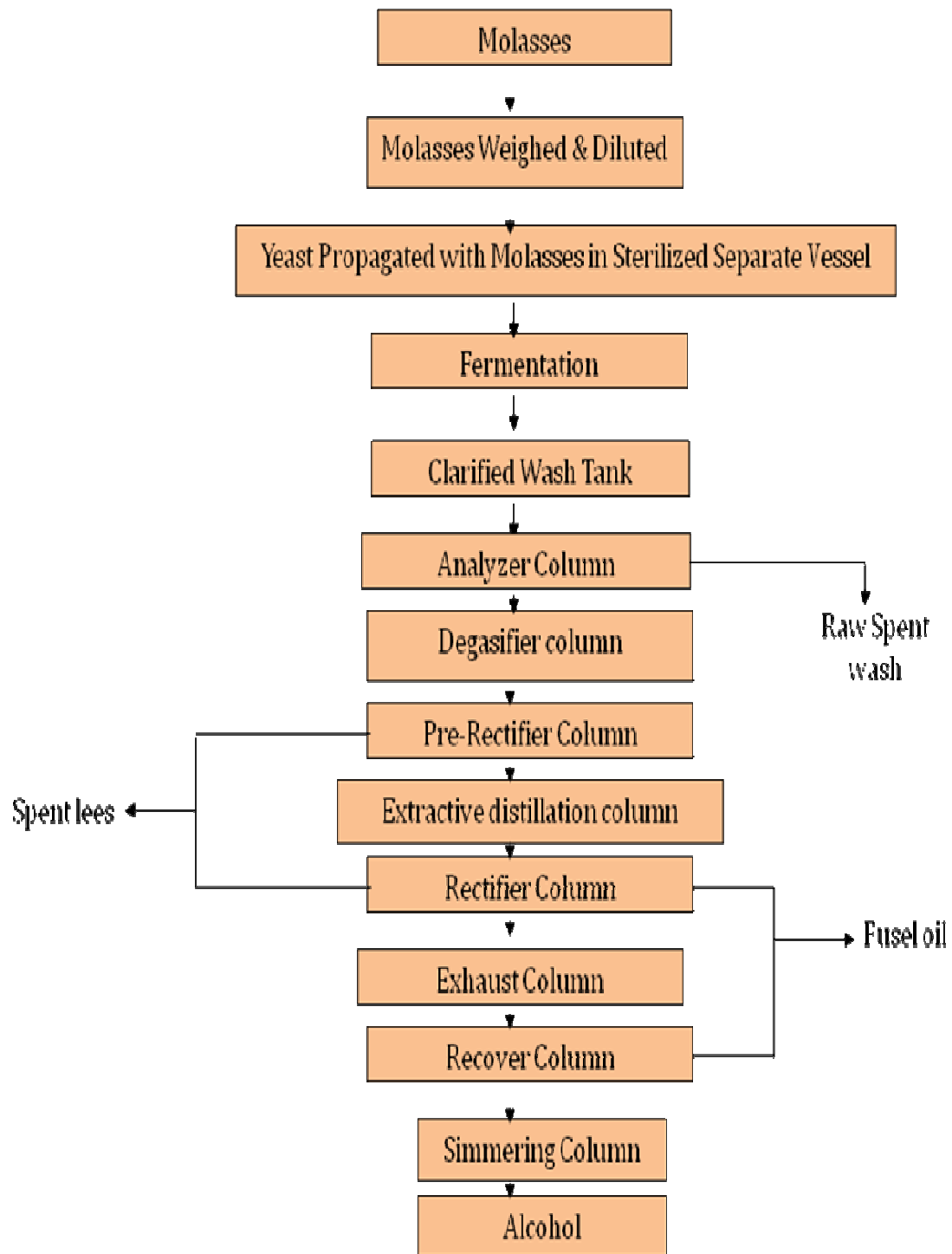
A) CO-GENERATION POWER PLANT:-



B) DISTILLERY :-

The process generally is in three steps namely;

1. Molasses preparation,
2. Fermentation and
3. Distillation The flow sheet can be presented as follows.



From the rectified spirit with dehydration ethanol is produced and with purification ENA is obtained.

For our own captive use we shall have our own power generator and excess will be sent to the State. The CO₂ generated in the fermentation stage is collected and sent as liquid CO₂

Pollution Control

WATER REQUIREMENT & USE:

Raw Water:

The water used for this Unit plant is already available, assured and dependable. This is treated to a reasonable extent by us, and it has good characteristics. As it is earmarked for this industry, we are not encroaching on anybody else's water source.

Water is used at various stations like heating, cooling, process, floor washing, vessel washing, laboratory, scrubbing etc.

Water Budgeting: Distillery unit

Table No.2.10: Details of water balance (Distillery unit)

#	Step	Water input cum/d	Loss	Wastewater out cum/d
1	Regeneration De-min	Fresh = 2	-	Moderate BOD to ETP =2
2	Boiler	Fresh = 10 (Make-up)	3	Sober to ETP =7
3	Cooling	Fresh = 100 (Make-up)	80	Sober to ETP = 20
4	Fermentation	Feed = 36 Fresh = 322 Recycle From MEE 275 Recycle Spent lees =127 Recycle scrubber = 12	8	To Distillation =580
5	Distillation	From Fermentation = 580	-	Moisture in product = 3 High BOD Spent wash = 450 Spent lees to recycle = 127
6	CO2 Scrubbing	Fresh = 12	-	Sent to Fermentation = 12
7	Pump Blower Sealing water	Fresh = 50	2	Sober to ETP =48
8	Floor & vessel washing	Fresh = 10	2	Mod. To ETP = 8

Input side (Industrial):

a. Fresh Water for Industry, (Distillery)	- 322 cum/d
b. Recycle From MEE	- 275 cum/d
c. Water from Feed	- 36 cum/d

Total Input - 633 cum/d

In addition to this water is needed for domestic use (worker's personal hygiene and canteen / colony) & Greening drive. The recovered waste water is treated and recycled. 20 m³ as domestic for workers hygiene and 100 m³ fresh for greening.

If we consider only industrial water, the fresh water is only is 77 % of the requirement. This becomes 9.37 Ltr/Ltr as fresh water.

Output side :

a. Loss from Industrial Use	- 95 cum/d
b. Effluent sober nature sent for ETP	- 75 cum/d
c. Effluent Moderately polluted sent to ETP	- 10 cum/d
d. Effluent Highly polluted spent wash sent for fuel recovery	- 450 cum/d
e. Moisture in product	- 3 cum/d

Total Output - 633 cum/d

Internal recycling is Condensate water, CO₂ scrubbing and spent lees.

In addition to this water is needed for domestic use (worker's personal hygiene and canteen / colony) & Greening drive. The recovered waste water is treated and recycled. 20 m³ as domestic for workers hygiene and 100 m³ fresh for greening.

The industrial effluent is 450 m³/day or 10 lit/lit. at generation point and then controlled. After MEE 275 M³ per Day re-circulate for process.

Water Budgeting: Cogen unit**Table No.2.11: Details of water balance (co-gen)**

#	Step	Water input cum/d	Loss	Wastewater out cum/d
1	Regeneration De-min	Fresh = 10	1	Moderate BOD to ETP =9
2	Boiler	Fresh = 100 (Make-up)	72	Sober to ETP =28
3	Cooling	Fresh = 235 (Make-up)	200	Sober to ETP = 35
4	Pump Blower Sealing water	Fresh = 55	2	Sober to ETP =53
5	Floor & vessel washing	Fresh = 10	2	Mod. To ETP = 8

Input side (Industrial):

a. Fresh Water for Industry, (Cogen)	- 410 cum/d
--------------------------------------	-------------

Total Input -410 cum/d

Output side :

a. Loss from Industrial Use	- 277 cum/d
b. Effluent sober nature sent for ETP	- 116 cum/d
c. Effluent Moderately polluted sent to ETP	- 17 cum/d

Total Output - 410 cum/d

Segregation:

As MoEF desires, TI has decided to bring the segregation principle in practice. Now, the industrial waste water streams are segregated first in three branches as (A) Sober, (B) Moderately Polluted and (C) High BOD polluted. The first two are then combined. It shall help in many ways for ease of treatment.

Stream (A) Sober

The Sober wastewater stream (75 m³ from distillery & 116 M³ from cogen = 191 M³) comes from boiler blow down, cooling purging water and sealing water. Except temperature, it has little other objectionable characteristic. This can be cooled and used. However, taken for treatment with Stream (B). The quantity and pollution load is small and independent ETP is untenable. Thus with small collection tank, it is allowed to mix with moderately polluted Stream B. This too serves as diluents.

Stream (B) Moderately Polluted

Moderately polluted wastewater (10 m³ from distillery & 17 M³ from cogen = 27 M³) comes from de-min plant regeneration, process and floor- vessel washings. This needs Biological treatment. This is provided by way of extended aeration followed by tertiary treatment, along with stream A

Stream (C) High BOD Spent wash

The Industrial wastewater from distillery is acidic in pH, has deep color, and has high BOD, COD and TDS. However, it is neither poisonous, nor toxic, nor hazardous, is highly biodegradable, and has good calorific value. It is proposed to treat the effluent in two stages, by Anaerobic Methane Bio-Digestion, and followed by concentration through MEE (Multiple Effect Evaporator), followed by composting of CSW with Pressmud from sugar unit & then it sold to farmer as manure.

AIR POLLUTION:

Emission Control Equipments (ECE):

The air pollution caused by this industry is mainly from dust as SPM from fuel. The dust is not predominantly due to the composition and handling of raw materials because those are largely controlled.

The efforts taken by the Industry in this respect are also indicated. Further, regarding the product looking to the description of manufacturing operations and the corresponding flow sheet, TI knows from which unit operation or process, air pollutants are expected. For the purpose of arresting and capturing the pollutants, measures are proposed and designed.

Table: Emission Control Equipments

#	Source	Pollutant	In-plant Measures	Control Equipment
1	Molasses /Cane Yard	SPM road Dust, HC	Leveled Roads & land, rubber tire, slow speed. Less waiting	--
2	Boiler	SPM, CO	Feed Bagasse/husk more dry, also will be used methane. Improved quality of water	Dampers, ID Fan, CO ₂ meter, Fly-ash arrestor (wet scrubber for existing & ESP for proposed) (*), Light ash through very tall stack.
3	Fermentation	CO ₂	Tank covered	Collected and converted to liquid CO ₂
4	Distillation	HC	Closed circuit	

5	Spent-wash	HC, Heat	Heat Exchanger	(Not open to sky cooling)
6	Other effluents	H ₂ O, CO ₂	Closed transfer	Fully Aerobic regime.

(*) = The Dust Collector of suitable capacity, with hopper bottom. The dust-free air is sucked and thrown into stack through duct by I.D. Fan. The length of duct is kept very small. Instead of cyclone, ESP will be provided.

As co-gen is of moderate size and Boiler uses three types of fuels, for agro residue & Bagasse long distance haulage is not required.

Solid Waste

Based on above working, the summary is per day

Table: Solid Waste per Day

#	Waste	Quantity	Treatment	Disposal	Remark
1	Canteen	2.0 CuM	Compost	Own garden	Organic
2	Colony	4 CuM	Compost	Own garden	Mixed
3	ETP	55 kg	Compost	Own garden	Organic, Non-Haz.
4	Office	2 CuM	--	Sales	Non-Haz.
5	Packing Sec.	1 CuM	--	Sales	Non-Haz.
6	Yeast Sludge	30 kg	Composting	Manure	Organic, and Non-Haz.
7	Digester Sludge	6 CuM	Digested	Fields	Manure
8	Ash	15 TPD	Silos	Sales	Takers available
9	Lube oil	10 Kg/day	Oil skimmer	Carts	In season

Guest House is very small (only nominal) and the labor strength attends in shifts. The municipal waste from the colony and canteen is thus controllable. This will be composted and used in due course on own land as manure. Plastic use is discouraged. STP sludge is organic and digested. Thus after dewatering can be used on land for conditioning. This will be so done. Office and packing trash is kept minimum and disposed by sales or reuse. In addition to above plantation is done for mitigation.

Background Study:

This is important part of study.

(A) Natural Environment: We have undertaken to do the sampling as –

1	Surface Water
2	Ground Water
3	Ambient Air
4	Ambient Noise

The stations are selected in all the directions from the factory and in 10 km radius. The Environmental quality is generally found satisfactory.

(B) Manmade environment

This includes existing land-use, demography, employment, socio-economic aspects and community development needed and proposed. This is for entire area both rural and urban in this study zone.

- Socio-Economic Status in Influence Zone will include the study of Non-Workers percentage whether high, from the percentage employed population on Agricultural, how far is the scope for other avenues of livelihood like Live Stock, Forestry, Fishing, Hunting, Orchards, Mining, Trade Commerce.
- Further out of Total Land what percentage is already under Cultivation and Out of Total Land what percentage is already under Irrigation?
- If the land is not likely to support more people, then whether Industrialization is necessary to improve the situation. All this is studied as cost benefit ratio.

It was found that industrialization is the only solution.

Safety

Safety and Occupational Health will be dealt carefully. A disciplined approach is natural to this industry. Safety policy will be in place. The unit will be registered under Factory Act and are bound by State Factory Rules. Thus, First aid trained and Fire-fighting trained person will be available in every shift. Safety Officer will be appointed, as also the competent person retained. Where necessary, provisions of other Acts, where required like Petroleum act, Explosive Act, etc. will be obeyed. Fire fighting system is kept as per norms of Insurance Company and CIF.

DMP (Disaster Management Plan) and off-site emergency plan will be in place. Accordingly, Personal protection equipment will be given and use will be insisted. Consulting Physician is retained to attend the factory.

Benefits

This industry will provide Alcohol as useful material for India, which will not only save but also earn foreign exchange. We shall also generate some power for the State. The liquid CO₂ will be produced which is useful for forging industry as well as food

preservative. This will not disturb the present land use because our area occupied is already sanctioned by Govt. for industrial purpose, with only small % of Influence zone 10 km and already is in possession. Compatible Architecture will be adopted and No Prime Agriculture Land will be put to this industrial use. Trees will be maintained and not razed down. No Rehabilitation is involved because the land is already in possession of the Industry. The problematic waste materials like solid waste will be reused or taken care of, Wastewater will be reused to grow greenery, and air pollutants will be arrested. Water harvesting will be done and greenery will be increased. People will get some jobs here. Some incidental small employment like eatery, canteen, tyre repairs, and garage too will become available to genuine people.

In the final analysis, it is the endeavor of the Proponents to give benefits --

- To keep transparent relations with the neighbours in the area
- To strengthen the Gram Panchayat democratic set up by assistance to community.
- Not to disturb any prime agricultural land
- Not to encroach on others' existing water source
- Not to overload the existing power supply, causing load-shedding to the villagers
- To remove the barren-ness of the land and prevent wasting of rainwater.
- To Recharge the groundwater
- To strengthen the physical infrastructure
- To create greenery within our premises and even outside to some extent.
- To reduce the wastewater pollution created by this new activity by utilizing it in our own fields as water to grow plantation and landscaping.
- To reduce the solid waste pollution created by this new activity by utilizing it in the fields of our own community land development.
- This could be a win-win situation with benefit to Proponents, benefit to the Public and no (or low) harm to the environment.
- All this is possible for which Environment Management Plan as worked out in next Chapter is scrupulously obeyed.

EIA Study Report

This is finally prepared and submitted as per guidelines given by MoEF as -

Table No.8: EIA Study Report

Chapters	Contents	
I	Proponents, ToR, Purpose	
II	Project explained. Why this, Why needed, Why here, What priorities, What options	
III	Environment Setting	Natural & Man-made
	Material, Method, Approach	Delphi technique
IV	High Significant Impact → Low Insignificant Impact & Shield	
	Proper Site → Prevention → Abatement → Treatment → Mitigation → Smooth Disposal	
V	Alternate Analysis	

	Selection of Raw Materials, Site, Process, Machinery-Hardware, Collaborators, Staff & Team	
VI	Monitoring = Stations, Parameters, Frequency, Statistics, Rectify	
VII	Risk	To Environment, To Health, To Bankers
	Public	Community, Rehabilitation, Others- Assistance
VIII	Benefits = Physical, Social, Employment, Other Tangible. Sustainable??	
IX	Cost-Benefit. If Project Done? If No-Project??	
X	EMP = Plan, Cell, Schedule, Watch-dog, Monitoring, Documentation, Reporting	
XI	Summary, Conclusion,.	
XII	EIA Team = Proponent, Consultant, Associates, Future	

The preparatory drill for above was on the background of our thinking --

Conclusion:

This industry will manufacture Alcohol, Power and Liquid CO₂ which are in good demand for growing infra-structural facilities in India and abroad. This will not disturb the present land use because our area occupied will be only small % of Influence zone 10 km and is already permitted for industrial use. No Prime Agriculture Land will be put to this industrial use. Trees will be maintained and not razed down. No Rehabilitation is involved. There will be no problematic waste materials as all will be utilized.

- This project is very necessary in view of making useful material available to Indian developmental activity for community, defense and as a foreign exchange saver/ earner product.
- The local people desire that industries should come here on existing plot.
- The candidate site is suitable from general MoEF expectations.
- Water, power, Raw material, and Market is assured and found available with ease.
- Full precautions will be taken for Pollution Control, Resource Conservation and Environmental Protection.
- This is cost effective and Sustainable Development.

The Report gives the details and finds that the impact overall is favorable to the country, to the people and to the environment as a sustainable development.

-----000-----