

## EXECUTIVE SUMMARY

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### INTRODUCTION

M/s Sant Muktai Sugar & Energy Ltd. is an agro based Company focused on the manufacture of sugar, power and allied products. The company has established and running a 2500 TCD sugar at Gat no. 340, 348, 349, 350 of Village Ghodasgaon, Tal- Muktainagar, Dist- Jalgaon, Maharashtra, This Industry wishes to establish a new molasses based alcohol distillery of 30 KLPD capacity. The sugar unit generates large quantities by-products viz. bagasse, molasses and press mud. To be economically and environmentally sustainable it is necessary for the sugar industries to convert these by-products into high value products, and hence this is done.

M/s Sant Muktai Sugar & Energy Ltd. to establish a new molasses based alcohol distillery of 30 KLPD capacity. Further, the Notification no. S. O. 1533 promulgated on 14th September 2006 has categorized, 30 KLPD distillery based on molasses under Category-A; Schedule 5 (g). Accordingly, the project proponents had submitted prescribed application along with pre-feasibility report to the MoEF & CC New Delhi. MoEF, New Delhi has considered the project for ToR in the 14th EAC meeting dated 26th October, 2016. ToR approved by EAC and suggest the specified TOR and Scoping for conduct of EIA studies and preparation of Draft EIA Report. Accordingly the EIA studies were conducted and the draft EIA report is prepared for submission to authorities.

As per the TOR the industry has to prepare and environmental impact assessment (EIA) due to proposed activity. The draft EIA has been prepared and this summary is the executive summary of the same.

### PROJECT DETAILS

SMSSEL is an existing industry. SMSSEL owns a plot in village Ghodsgaon. The details of expansion proposal are as under:

#	Product	Production			Unit
		Existing	Additional	Total	
1	Sugarcane	2500	-	2500	TCD
2	Co-gen Power	-	-	-	MW
2	Ethyl Alcohol(*)	-	30	30	KLPD

## LAND UTILIZATION

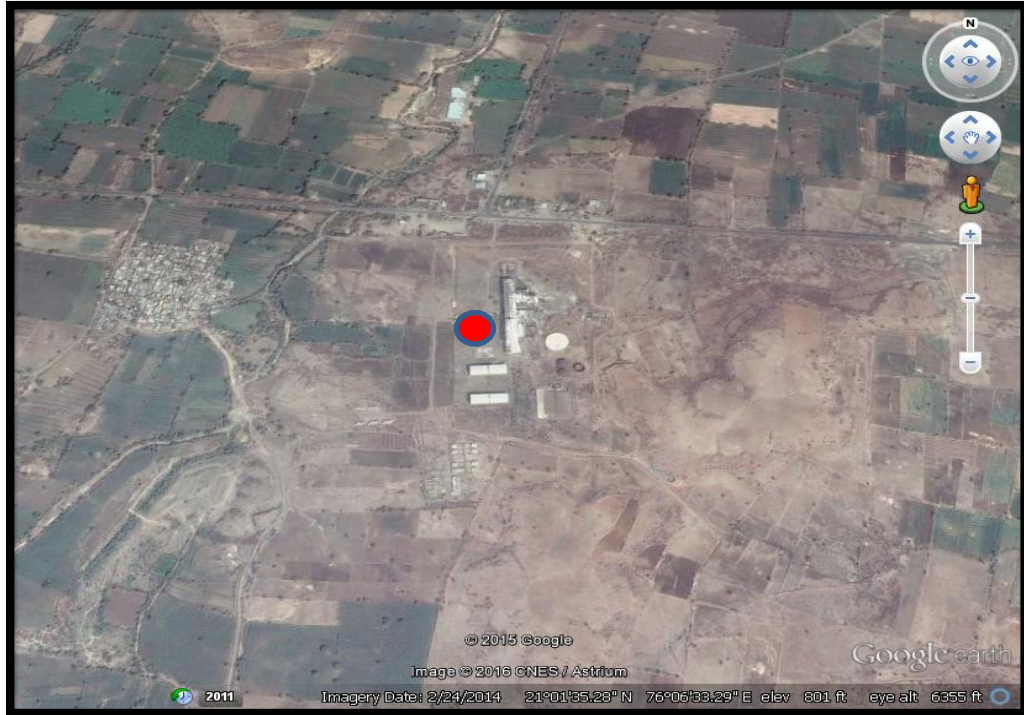
PP has in possession 15.16 Ha. land. Present factory is spread over in about 1.14 Ha. Expansion proposal will need another 3000 m<sup>2</sup> of land. 5510 m<sup>2</sup> of land has been reserved for green belt development. Balance land has been used for –

### Land utilization

Sr. No	Land Utilization For	Land Area, Sq. m
1	Factory sheds & Buildings	11351.98
2	Open space utilize for Bagasse storage,	3724 m <sup>2</sup>
	WTP, ETP,	2275 m <sup>2</sup>
	Molasses storage tank	189 m <sup>2</sup>
	spray pond,	5016 m <sup>2</sup>
	switch yard & 15days storage for ETP treated water (guard pond).	3880 m <sup>2</sup>
3	Internal Roads	65241.00
4	Reservoir (water storage tank)	176.00
5	Parking and cane yard	50959.00
6	Open space for green belt	5510.00
7	Reserved for future expansion	324.00
8	Distillery Area	3000.00
	<b>Total</b>	<b>151645.98</b>

## LOCATION

The distillery site is located at Village – Ghodasgaon, Tal- Muktainagar, Dist- Jalgaon, Maharashtra. The site is located at rural surroundings and is about 18 km from Railway Station (Bodwad) and 65 km from Jalgaon (district place), 3 km from river Purna. It is geographically located in 21°01'35.28"N latitudes and 76°06'33.29"E longitude. The site is near Jalgaon – Nagpur road but little away laterally. The location features of site are given in the Google map of the site.



Google

map

### of site

The area surrounding the proposed plant site is flat and is at the elevation about 397 meters above the sea level. The surface soil in the area is mainly red brown and light brown soil.

### Rivers and Water Bodies:-

Purna River flows approx 3.0 km away from the site.

Nearest city : Muktainagar

Nearest highway : NH 6 -Nagpur Jalgaon

Nearest airport : Jalgaon 65 Km

### Ghodsgaon is well connected to all the important places by Road.

Maharashtra is the Sugar Cane growing area and thus the raw material availability is assured.

Being industrially backward area, it attracts government incentives which can help to improve the economics of the project.

There is no wildlife sanctuary/reserve forest or archeological monument within 10 km radius from the site

### COST OF PROJECT

Total Cost for distillery project will be Rs. 3816 Lakhs. Cost of entire project (Existing + additional

M/s. Sant Muktai Sugar & Energy Ltd.

is) Rs 5270 Lakhs,

## **RAW MATERIAL**

The capacity of the proposed Molasses based distillery shall be 30 KLPD. For this the main and sole raw material is molasses. The yeast brings about the change. Some chemicals in small quantity are used for supporting propagation of the yeast and help to fermentation. Thus, the following raw materials will be used.

<b>Item</b>	<b>Proposed capacity</b>	<b>Particulars</b>
Molasses MT/M	3600	Self and available in District
Turky Red Oil (anti-foam) MT/M	1.8	Available from Solapur, Aurangabad and Pune
Nutrients MT/M	0.12	

The requirement of molasses is 128 T/d i.e. for 270 days 34,468 T/annum at optimum level of operation. Molasses will be obtained from captive source from our own sugar unit and B heavy molasses is 20,426 T/Annum, which makes a deficit of 14,043 MT/year. To balance the requirement molasses, will be fulfill from sister concern unit of SMSEL and other nearby sugar mills will be utilized by SMSEL. Precautions will be taken for transportation and unloading of molasses.

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

- Power and Steam: Need connected 750 KW. Available through Govt. Electricity Board and own generation.
- Fuel: slop + Bagasse, Indian / imported Coal.
- Man Power: Taking existing manpower into consideration, for distillery, what we shall totally need is 54 (35 skilled, 14 semi skilled and 5 unskilled for production and pollution control) persons. More than 85 % of the manpower requirement will be fulfilled by employing the local people. Man power requirement for construction work will be about 200. Construction workers will reside in nearby villages. Residential facility will not be required for the construction personnel.
- Water: Water need annually for proposed plant is 300 m<sup>3</sup>/d and for most part recycling is done. Fresh water need is met from surface flow with Irrigation Department Permission available and by recycling the waste water.
- Air: Multicyclone Dust collector is provided for control of emissions like SO<sub>2</sub>, PM, CO<sub>2</sub> etc in existing Boilers and ESP is proposed for new boiler.
- Steam requirement of unit can be met by using the proposed boiler 12 TPH.

- Compressed air is required for instrumentation and servicing. Thus, a compressed air is provided.
- Building materials: It will not be a heavy construction, and majority is in fabrication from Mild steel structural. The orientation is so kept as to balance nearly the cutting and filling. The small requirement is available systematically. The construction –erection time will be small and will be done in day time. Labour camp is not necessary.
- Plant facilities will be provided like: 30 KLPD alcohol plant with fermentation and distillation units, Water treatment plant, New boiler of 12 TPH, T.G set of suitable capacity, Evaporator for spent wash, Bulk storage facilities for molasses and alcohol, WTP, ETP, cooling tower, fuel storage yard etc.
- Storage: Alcohol and molasses storage facilities shall be provided as per the rules of (1) Excise Department, (2) Factory Inspectorate and (3) MoEF/ SPCB. Storage of Bagasse and press mud is provided with existing sugar industry.

### STEAM AND POWER REQUIREMENT

Steam economy is achieved by employing multi-pressure distillation and multi effect evaporation units and adopting heat recovery systems in the plant. The new boiler of 12 TPH shall be provided for distillery plant. The details of boiler are given below.

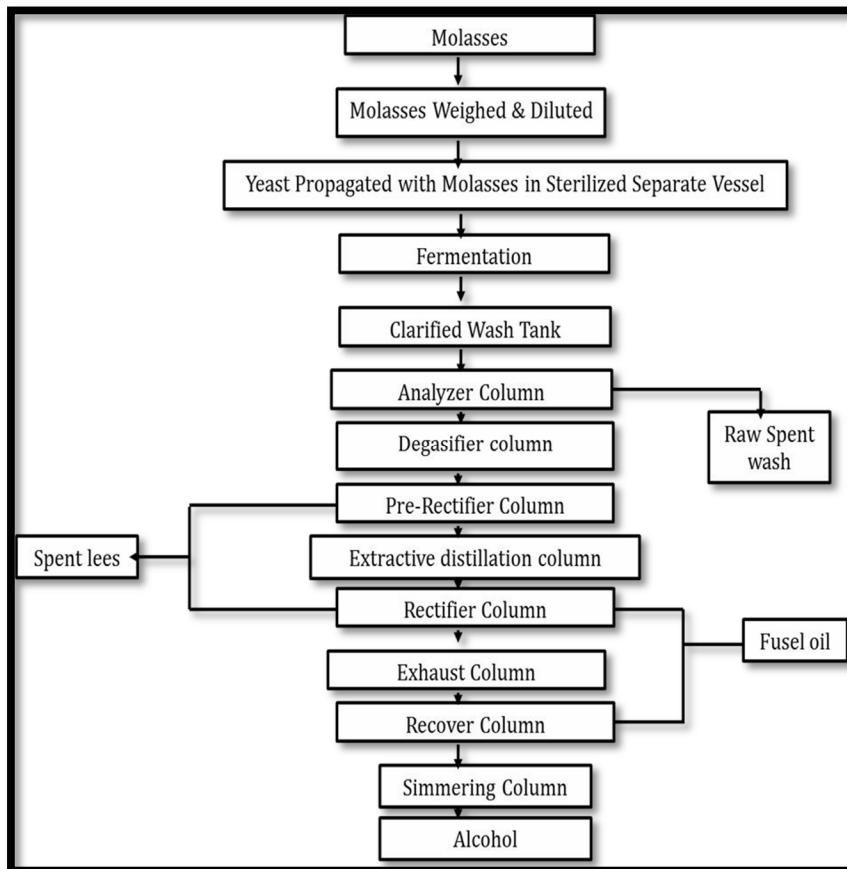
#### BOILER DETAILS

Boiler No.	1		
Boiler Capacity MT/hr	12		
Steam Pressure kg/cm <sup>2</sup> (g)	45		
Steam temp deg. C	400±5		
Efficiency	67% on 60% spent wash + 40 % coal or 61% on 60% spent wash + 40 % Bagasse		
Fuel used	slop	Bagasse	Indian / Imported coal
GCV (Kcal / kg)	1700	2272	3800 / 5200
Total ash generated %	14.28	1.5	39.81 / 7.00
Ash collected by ESP/Bag filter	99%	99%	
Fuel Quantity (TPH)	1.2	5.47	
Height of stack, m	48		

### MANUFACTURING PROCESS

Molasses is the major raw material used in India for production of Alcohol. Molasses contains about 50% total sugars, of which, 30 to 33% are cane sugar and the rest are reducing sugar. During the fermentation, yeast strains of the species *saccharomyces cerevisiae*, a living micro-organism belonging to class fungi converts sugar present in the molasses, such as sucrose or glucose to alcohol.

The flow diagram and manufacturing process of Distillery plant is given below.



Flow diagram and manufacturing process of Distillery plant

### I. Substrate (Feed) Preparation for Fermentation

Molasses is procured carefully with good contents. Molasses stored in a storage tank is first weighed in a tank with load cells so that accurate quantity can be fed to the fermentation section. The weighed molasses then transferred from tank to the diluter in fermentation section where it is diluted with water and fed to the fermenters or culture preparation vessels.

### II. Yeast Propagation and Continuous Fermentation

In this process the culture containing highly efficient yeast strain is propagated in yeast culture vessel under aseptic conditions. The ready yeast seed is then transferred from culture vessel to fermenter. The sugar/glucose in media gets converted to Alcohol in the fermenters operating on continuous cascade mode. CO<sub>2</sub> gas liberated during reaction is contaminated with traces of alcohol vapours. It is sent to CO<sub>2</sub> scrubber for recovery of Alcohol. After fermentation, the sludge containing spent yeast is separated from the wash in a thickener consisting of settler cum decanter tank and then concentrated in a decanter centrifuge. The yeast sludge in the form of cake with 2.5 % solids is disposed for use as manure.

### III. Multi-Pressure Distillation

The distillation plant consists of multi pressure vacuum distillation and columns operate at different

pressures to save steam. The plant operated with exhaust steam obtained from co-gen steam turbine. The distillation consists of following stages:

- Distillation of clarified fermenter product (wort) in distillation columns to separate aqueous alcohol (40 %) and spent wash.
- Rectification of aqueous alcohol to separate rectified spirit (RS) containing 95 % alcohol and spent lees.
- Dilution and rectification of rectified spirit to produce extra neutral alcohol (ENA).

The fermentation wash containing Alcohol, non-fermentable solids and water is supplied to distillation to separate the alcohol and other impurities, as a continuous flow. The distillation system is designed for quality. The system details are as below:

#### **IV. Dehydration of RS to Anhydrous/Fuel grade ethanol:**

There are various dehydration routes such as Azeotropic Distillation, Evaporation, Membrane Technology and Molecular sieve Technology. Environmentally best is selected. Rectified spirit is pumped by a feed pump to the dehydration plant. The rectified spirit containing 95 % alcohol and 5 % water will first pass through feed economizer, then through a vaporizer cum super heater which will convert the rectified spirit feed to superheated vapors. The superheated vapour will pass through a sieve column, which is already regenerated and pressurized to working pressure. All the water vapors present in vapor mixture are adsorbed in the column. Along with alcohol traces of alcohol are also adsorbed in the column. The Anhydrous alcohol vapors free from water vapors exhausted from the column are duly condensed in the re-boiler at the recovery column and is further passed through feed economizer to preheat the incoming feed and then to a final product cooler. After saturation of sieve column with water, the flow will be shifted to the next sieve column, which is already regenerated and pressurized. After completion of dehydration cycle, the sieve column saturated with water is regenerated by evacuation of adsorbed water and alcohol. The evacuated vapors are condensed. The condensed mixture of alcohol and water is then fed to a recovery column. This sequence of adsorption and regeneration of sieve column continues.

### **EMISSIONS AND DISCHARGES DUE TO PROPOSAL**

#### **Emissions in air:**

When new boiler of 12 TPH will be run to operate. Fly ash discharged in the air will be in the prescribed limit of CPCB as ESP is proposed for control of dust.

#### **Water pollution**

The industry will utilize latest technology of treatment of spent wash by recovering biogas and then concentrating followed by burning of spent wash in boiler, thus adopting zero effluent discharge system.

#### **Noise pollution**

Operation of a distillery does not involve any heavy duty impact type of machinery operation hence does not contribute to noise pollution.

#### **Solid Waste Management**

When new boiler of 12 TPH will be run to operate. An estimated bottom fly ash will be sold to brick manufacturer

### **Biodiversity**

The proposed activity is to be done at existing site itself. Further industry has opted for zero discharge system of spent wash treatment hence no effect is expected on existing biodiversity of region.

## **BASELINE STUDIES**

The actual on site monitoring of existing environmental setting was done to establish the baseline conditions with respect to climate, hydrological aspects, atmospheric conditions, water quality, soil quality, vegetation pattern, ecology, socio-economic profile. The study covered an area within 10 km radius from the Plant site. The studies for the project was carried out in the study area in summer month pre monsoon in 2017 Data on baseline condition of water environment of the study area was collected and observations are as under:

<b>Parameters</b>	<b>Actual average values</b>	<b>Ambient Air quality</b>
Pm10	62	100
Pm 2.5	34	60
SO <sub>2</sub>	27	80
NO <sub>x</sub>	21	80

It may be seen observed values of monitored parameters are within prescribed standards.(Monitoring location: Project site, Sukli, Ghodsgaon, Dudhalgaon,Nimkhede Kh,Chikhali,Muktainagar and Bhandugre etc.)

### **Ground Water**

pH in ground water sample was observed at (Nimkhede Kh,Chikhali Sukli, Ghodsgaon and Bhandugre) to be in the range 7.2 to 7.7 while conductivity was observed in the range of 277 to 788  $\mu$ S/cm . The value of alkalinity and hardness were observed in the range of 80-256 mg/l and 101-313 mg/l respectively. Whereas heavy metal was found to be within the limit.

### **Surface Water**

Water sample were collected from lakes and rivers. Samples were collected and analyzed as per standard methods and frequency of sampling was thrice /station. pH observed to be in the range of 6.9 to 7.3 and Chloride and Sulphate were observed to be in the range of 28 to 67 mg/l and from 18 to 19mg/l respectively. The heavy metal contents are found well within the limit.

### **Noise Environment:**

Noise level measurement was carried out at each ambient air quality station and also within the existing plant premises. The frequency of ambient noise level monitoring and noise level at source were



twice/week/station and thrice/station respectively. Ambient noise levels were recorded in following time schedule:

Day time - 6 am to 7 am, 9 am to 10 am, 1 pm to 2 pm, 5 pm to 6 pm, 9 pm to 10 pm

Night time - at 10 pm to 6 am.

## **PREDICTION AND MITIGATION OF IMPACTS**

### **Emissions in air:**

When new boiler of 12 TPH will be run to operate. PP proposes to install ESP type of dust collector and achieve the prescribed limit of fly ash discharge.

### **Water pollution**

The industry will utilize latest technology of treatment of spent wash by recovering biogas and then concentrating followed by burning of spent wash in boiler, thus adopting zero effluent discharge system.

### **Noise pollution**

Operation of a distillery does not involve any heavy duty impact type of machinery operation hence does not contribute to noise pollution.

Operators in boiler and turbine sections will be required to use personal protective equipments when operating the system.

### **Solid waste disposal**

When new boiler of 12 TPH will be run to operate, generated ash due to boiler operation will be used by brick manufacturers. Concentrated dried spent wash will be burnt in the boiler.

## **ENVIRONMENT MANAGEMENT PLAN (EMP)**

SMSEL has drawn an Environment Management Plan (EMP) to conserve the resources, minimize the waste generation, treatment of waste, recovery of by products and recycling of material. It will also take into consideration vegetation and landscaping of open area. and also The post project quality monitoring to ensure and check compliance to proposed mitigation measures and preservation of environmental quality is integral part of EMP.

Management has made following budgetary allocation to ensure EMP is properly implemented and no financial constraints will be allowed.

The EMP will be carefully designed so as all the affected components/areas have been covered and monitored and mitigated as per requirement during construction and operation of proposed expansion cum

M/s. Sant Muktai Sugar & Energy Ltd.

modernization.

### Budget provision for Environmental Management Plan

#	Environmental Aspect	Capital Expenditure Rs in Crores	Recurring Expenditure Rs in Crores (per annum)
1	Emission control Engineering	0.95	0.50
2	Water & Wastewater management	1.50	1.00
3	Solid Waste	0.80	0.12
4	Greening Drive	0.70	0.10
5	Monitoring	0.30	0.10
6	Environmental Cell & PR	0.25	0.08
7	Other aspects like Rain Water Harvesting, Safety, Security etc.	0.50	0.10
	<b>Total</b>	<b>5.00</b>	<b>2.00</b>

The following aspects have been covered under EMP

1	Air Pollution Control	Provision of multicyclones for fly ash collection
2	Water Pollution Control	ETP to ensure zero discharge, STP with septic tank
3	Water conservation	Recycling of condensate water from distillation and cogeneration
4	Noise Pollution Control	Provision of vibration isolators, acoustic enclosures
5	Environment Monitoring and Management	Planned monitoring of air, water, noise and soil parameters
6	Occupational Health	Regular health check-up of the workers
7	Green Belt	Tree Plantation
8	Safety management.	Safety measures like ear muffs , gloves, helmet shoes, goggles, aprons to the workers

### ENVIRONMENT MANAGEMENT CELL

A separate Environment Management Cell will be established to look after the Effluent Treatment Facility and to monitor and control the environmental quality. Members of the Environmental Cell would be well qualified and experienced in the concerned field. Some of the routine tests of wastewater such as pH, solids, temperature, etc. will be carried out in the laboratory of distillery. However, for additional tests of water, wastewater, soil, air etc. services of reputed laboratories as well as that of a consultant

would be hired.

## **CONCLUSION**

- Setting up of a Molasses based distillery unit will be helpful to the industrial development in this region.
- The use of Molasses by the distillery will help the farmers in this region for marketing their products i.e. Sugar Cane and get extra benefits by value addition.
- Molasses generated by neighboring sugar industries will be used for useful financial benefits
- The project will be a boon to the farmers indirectly as factory will need molasses from nearby sugar industries who in turn will need sugar cane as raw material.
- The sale of alcohol will generate large amount of revenue by way of excise duties levied on the local front
- The distillery will also generate direct employment to a large number of local skilled, semi- skilled and unskilled workers. The distillery can also generate revenue for local population by the services that they render to the industry
- Project implementation will induce infrastructural development in the surrounding villages i.e. educational, social institutions, cultural institutions, health care facilities. road development, sewage treatment facilities etc.
- Safety council will be established by the safety officer to take safety steps for employees.

The promoter has selected industrial backward area in Maharashtra state. It would be advantageous to implement it as quickly as possible in order to improve the socio- economic in the area as it will improve the regional economy. Since the project is conceived as zero discharge project, self sufficient in its electricity requirement and concerns of environment properly addressed, it may be recommended for early environmental clearance.