EXECUTIVE SUMMARY

PROPOSED EXPANSION OF DISTILLERY CAPACITY 60 KLPD TO 240 PRODUCE RECTIFIED SPIRIT/ EXTRA NEUTRAL ALCOHOL/ ETHANOL BASED ON SUGARCANE JUICE/SYRUP/ "C"/ "B" HEAVY MOLASSES

AT

GAT NO. 196/1, PRAVARA NAGAR LONI, RAHATA, AHMEDNAGAR, MAHARASHTRA,

Pin code- 413 712

BY

M/S. PAD. DR. VITTHALRAO VIKHE PATIL SAHAKAARI SAKHAR KARKHANA LTD.

PROPOSAL FOR

ENVIRONMENT CLEARANCE

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EXECUTIVE SUMMARY

1 INTRODUCTION

M/s. Pad. Dr. Vitthalrao Vikhe Patil Sahakari Sakhar Karkhana LTD., is an expansion project from 60 KLPD to 240 KLPD ("C"/ "B" Heavy molasses/sugarcane juice/syrup) distillery unit registered under the Company Act 1956. Factory is located at Gat No. 196/1, Pravara Nagar Loni, Rahata, Ahmednagar, Maharashtra, pin code- 413 712.

Unit was established in the year 1970, with Capacity 15 KLPD. First Expansion was done in the year 1975 from 15 KLPD to 32 KLPD. Another Unit of 60 KLPD capacity was established in the Year 2002. Unit has received the Consent to Operate for two Plants existing in same plot with different capacities, which they had amalgamated in the year 2007.

The proposed project will produce total 240 KLPD RS/ ENA/ Ethanol from "C"/ "B" Heavy molasses/sugarcane juice/syrup as a raw material. The industry also having existing sugar unit of 7200 TCD crushing capacity, which is already obtained Environmental Clearance from SEIAA, Maharashtra on dtd. 24th June 2020. The raw materials required during off season such as "C"/ "B" Heavy molasses shall be from own sugar unit or directly taken from molasses traders. This will help to maintain socio economy in the region.

The effluent generated from distillery unit shall be treated in CPU and recycled in to process. Distillery effluent (i.e., Spentwash) shall be treated based on Biomethanation followed by Concentration in MEE and burnet into incineration boiler.to achieve Zero Liquid Discharge (ZLD).

The aggregated capital investment Total cost of the Project: **313.38 Cr.** (Existing – 153.38 Cr.+ Proposed Cost- Rs. 160 Cr).

The promoters have extensively and carefully analyzed the present and future scenario of central Govt. policies for promotion of ethanol addition in the petroleum fuels. They have also studied carefully the present irrigation facilities and surplus cane availability, as well as future potential of irrigation and additional cane availability.

1.1 PROJECT LOCATION

The salient features of the project site are

Table 1.1 Salient features of the project site

Sr. No.	Features	Description
1.	latitude	19°34'17.19" N
2.	Longitude	74°30'5.50" E
3.	Elevation above MSL	649 m
4.	Nearest highway	National highway Nagar to Manmad at 1.16 km (North-East)
5.	Nearest railway station	Shrirampur- approx. 17 km
6.	Nearest air port	Shirdi Airport - approx. 17 km
7.	Nearest town	Rahata (Taluka place) ~ 16 km, Rahuri and Sangamner25 and 30 km respectively

Sr. No.	Features	Description
8.	Nearest human settlement	Pravaranagar is approx. 1.0 km away from the site
9.	Road Connectivity	1 km from SH 10 and 45, 2 km from NH 222
10	Protected Area	None within 10 km
11	Reserved Forests	None within 10 km
12	Wildlife Sanctuary	None within 10 km
13	Archeological site	None within 10 km
14	State boundary	None within 10 km
15	Defense installations	None within 10 km

2 PROJECT DESCRIPTION

The details about the maufacturing capacity of the proposed expansion are given in table below

Table 2.1 Proposed Products manufacturing quantities

Sr. no.	Description	Unit	Existing Capacity	Proposed Capacity	Total Capacity	Remark
1.	Sugar Unit	TCD	7200	00	7200	
2.	Distillery Unit	KLPD	60	180	240	
	Rectified Spirit or	KLPD	60	180	240	Only one product at a time
	Extra Neutral Alcohol or		60	180	240	
	Ethanol		60	180	240	

2.1 RESOURCE REQUIREMENT AND INFRASTURE FACILITIES

A) Land use Details

The total area available with the factory is **4.04 Hectares** Out of which, **1.33 Hectares will be** utilized for green belt development. A detailed area breakup is given below

Table 2.2 Landuse breakup

Sr. No.	Description	Area in Hectares	% of Area
1	Built Up	0.96	23.88
2	Area Under Road	0.29	7.36
3	Green Belt Area	1.33	33.00
4	Parking Area	0.40	10.00
5	Vacant Area	1.04	25.75
	Total Plot Area	**4.04**	100.00

B) Power requirement

The power requirement for proposed distillery unit will be 2.4 MW and it shall be taken from 8 MW back pressure Turbine generator.

C) Water Consumption details

The water required for proposed project shall be taken from Irrigation department (Pravara River Water)

Distillery Division – The net fresh water requirement for distillery division shall be 743 KLD. Detailed water budget of the industry is shown in **Table 2.3 to Table 2.5**

Domestic Purpose:

Water requirement for domestic purpose is 50 KLD.

Thus, the net fresh water requirement of the industry is **793 KLD** (Industrial 743 KLD, Domestic 50 KLD). The required water is sourced from irrigation department. The necessary permission from the state irrigation department is already obtained.

Water balance calculations:

Distillery division

I. Based on "C" Molasses

Table 2.3 Water Budget for Distillery Division (based on "C" Molasses)

Sr. No.	Details	Water Requirement (m3/day)	Consumption/ Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
Domestic Purpose							
1	Domestic	50	10	--	40	--	40
Industrial Purpose							
1.	Boiler 65 TPH	1500	40	1450	10	--	10
2.	DM Plant	**60**	50	--	10	10	
3	Process Water	2400	--	**Evaporator Condensate**	Spentwash - 448	--	448
					Spentlees – 480	480	--
4	Cooling Tower Make-up Water	250	195	--	55	55	-
5	Fermenter Washing	20	--	--	20	20	--
6.	Miscellaneous such as pump and gland cooling etc.	40	--	40	--	-	--
7.	**Evaporator Condensate**	--	--	**1472**	--	--	--
8	Condensate Polishing Unit	--	--	565	--	--	--
Total		**4270**	**285**	**3527**	**1023**	**565**	**458**

Note:

1*65 TPH incineration boiler shall be installed for 240 KLPD distillery.

Remark: 448 m3/day of concentrated spentwash shall be generated after anaerobic digester followed by MEE. (Raw spentwash quantity - 1920)

Solids content in raw spentwash shall be around 12 – 14 % by its weight, and finally it is converted to 60% by its weight after MEE.

Note:

The consumption/losses and final wastewater generated is amounting (285 + 458) = 743 m3/day.

Net Water Requirement: 4270-3527 = 743 m3/day.

Effluent Generation: 1023 m3/day out of which conc. spentwash – 448 m3/day, spentlees – 480 m3/day, DM plant wastewater generation-10m3/day, fermenter washing waste-20 m3/day, boiler blow-down wastewater-10 m3/day and cooling tower wastewater generation – 55m3/day.

All the effluent except concentrated spentwash and boiler blow-down shall be treated in proposed CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be burnt into proposed 65 TPH incineration boiler.

II. Based on "B" Heavy Molasses

Table 2.4Water Budget for Distillery Division (based on "B" Heavy Molasses)

Sr. No.	Details	Water Requirement (m3/day)	Consumption/ Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
Domestic Purpose							
1	Domestic	50	10	--	40	--	40
Industrial Purpose							
1.	Boiler 65 TPH	1500	40	1450	10	--	10
2.	DM Plant	**60**	50	--	10	10	
3	Process Water	1920	--	**Evaporator Condensate**	Spentwash - 240	--	240
					Spentlees – 480	480	--
4	Cooling Tower Make-up Water	250	195	--	55	55	-
5	Fermenter Washing	20	--	--	20	20	--
6.	Miscellaneous such as pump and gland cooling etc.	40	--	40	--	-	--
7.	**Evaporator Condensate**	--	--	**1200**	--	--	--
8	Condensate Polishing Unit	--	--	565	--	--	--
Total		**3790**	**285**	**3255**	**815**	**565**	**250**

1*65 TPH incineration boiler shall be installed for 240 KLPD distillery.

Remark: 240 m3/day of concentrated spentwash shall be generated after anaerobic digester followed by MEE. (Raw spentwash quantity - 1440)

Solids content in raw spentwash shall be around 8 – 10 % by its weight, and finally it's converted to 60% by its weight after MEE.

Note:

The consumption/losses and final wastewater generated is amounting (285 + 250) = 535 m3/day.

Net Water Requirement: 3790-3255 =535 m3/day.

Effluent Generation: 815 m3/day out of which conc. spentwash - 240 m3/day, spentlees – 480 m3/day, DM plant wastewater generation-10m3/day, fermenter washing waste-20 m3/day, boiler blow-down wastewater-10m3/day and cooling tower wastewater generation – 55m3/day.

All the effluent except concentrated spentwash and boiler blow-down shall be treated in proposed CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be burnt into proposed 65 TPH incineration boiler

III. Based on Sugarcane juice / concentrated sugarcane juice

Table 2.5 Water Budget for Distillery Unit (based on Sugarcane juice / concentrated sugarcane juice)

Sr. No.	Details	Water Requirement (m3/day)	Consumption /Losses (m3/day)	Reuse / Recovery (m3/day)	Waste Water Generation and treatment		
					Waste water Generation	Wastewater treated in CPU	Wastewater
Domestic Purpose							
1	Domestic	50	10	--	40	--	40
Industrial Purpose							
1.	Boiler 65 TPH	1500	40	1450	10	--	10
2.	DM Plant	**60**	50	--	10	10	
3	Process Water	1440	--	**Evaporator Condensate**	Spentwash - 144	--	144
					Spentlees – 360	360	00
4	Cooling Tower Make-up Water	250	195	--	55	55	00
5	Fermenter Washing	20	--	--	20	20	00
6.	Miscellaneous such as pump and gland cooling etc.	40	--	40	--	-	--
7.	**Evaporator Condensate**	--	--	**936**	--	--	--
8	Condensate Polishing Unit	--	--	445			
Total		**3310**	**285**	**2871**	**599**	**445**	**154**

Remark: 144 m3/day of concentrated spentwash shall be generated after MEE. (Raw spentwash quantity - 1080)

Solids content in raw spentwash shall be around 6 – 8 % by its weight, and finally it's converted to 60% by its weight after MEE

Note:

The consumption/losses and final wastewater generated is amounting (285 + 154) = 439 m3/day.

Net Water Requirement: 3310-2871 = 439 m3/day.

Effluent Generation: 599 m3/day out of which conc. spentwash - 144 m3/day, spent lees – 360 m3/day, DM plant wastewater generation-10 m3/day, fermenter washing waste-20 m3/day, boiler blow-down wastewater-10 m3/day and cooling tower wastewater generation – 55 m3/day.

All the effluent except concentrated spentwash shall be treated in proposed CPU and treated effluent shall be recycled in process.

Concentrated spentwash shall be burnt into proposed 65 TPH incineration boiler

Table 2.6 Water Requirement and wastewater generation of the factory

Sr. No.	Water Requirement m3/day	Wastewater generation m3/day	
1	**Distillery Division**		
A.	Based on "C" Molasses		
	743	1023	
		Concentrated spentwash-448	
		Spentlees	480
		Other dilute effluent	95
	OR		
B.	Based on "B" Heavy Molasses		
	535	815	
		Concentrated spentwash-240	
		Spentlees	480
		Other dilute effluent	95
	OR		
C.	Based on "Sugarcane Juice/Syrup"		
	439	599	
		Concentrated spentwash-144	
		Spentlees	360
		Other dilute effluent	95
	OR		

Note:

A. Other diluted effluent consist of DM plant wastewater, fermenter washing waste, boiler blow-down wastewater and cooling tower wastewater generation.

B. Spentwash Storage Ponds:

1. - Concentrated Spentwash (448 m3/day) - 30 days storage capacity i. e. 448*30 = 13440 m3.
2. – Raw Spentwash (1920 m3/day) – 7 days storage capacity i.e. 1920*7 = 13440 m3.

D) Air Emission Management

Bagasse will be used as fuel for 1*65 TPH Incineration boiler. The bagasse requirement of the proposed unit will be 624 MT/D.

A stack of 65 meters height and electrostatic precipitator (ESP) as APC equipment shall be provided to control air emissions..

Table 2.7 Details of boilers and its APC equipment for existing as well as proposed

Sr. No.	Stack attached to		Types of Fuel	Height in meter	APC System
Proposed Installation					
1	65 TPH incineration boiler	Distillery Division	Bagasse	65	ESP

E) Solid waste Management

a) Non Hazardous solid wastes details

Table 2.8 Details of non-hazardous waste generated and its disposal

Sr. No.	Description of waste	Quantity	Mode of Collection and Disposal
	Bagasse as fuel for boiler		
1.	Fly/ Boiler Ash	224.64 MT/M	Ash generated shall be sold to to brick manufacturer/ Mixed with pressmud and sold as manure
2	Bottom Ash	56.16 MT/M	
3.	ETP Sludge	300 MT/A	ETP Sludge and Pressmud shall be sold as manure.
4.	Pressmud	288 MT/D	
Other Solid Wastes			
1.	Paper waste	0.01 MT/M	Manually collected and stored in a designated area and sold to scrap vendors
2.	Plastic waste	0.01 MT/M	
3.	Municipal Solid waste		
	Non-Biodegradable	7 MT/M	Manually collected and sold to scrap vendors
	Bio-degradable	10 MT/M	Used as manure.

b. Hazardous Waste

Table 2.9 hazardous waste generated and its disposal

Sr. No.	Category	Description of waste	Quantity	Mode of Collection and Disposal
1.	5.1	Used Oil	1.01 KL/A	Shall be collected in Leak Proof Containers and utilized as lubricant for bullock carts

3 BASELINE ENVIRONMENTAL STATUS

3.1 AIR ENVIRONMENT

Ambient air monitoring was carried out at 8 locations, 24 hours a day, twice a week at each location over/for a period of three months (March 2021 to May 2021) to determine background concentrations. The Maximum concentrations of each pollutant observed are considered as a background concentration of the respective location, the summary of the results is given below.

1. Particulate Matter (PM_{10})

The minimum, maximum, average and 98th percentile concentrations for PM_{10} were recorded in the study area in the range of 39.3 to 58.5 µg/ m^3. The maximum 98th Percentile concentration is 58.27 µg/ m^3 were recorded at Project Site (location -1). The concentrations of PM_{10} are well below the CPCB standard of 100µg/ m^3.

2.Particulate Matter ($PM_{2.5}$)

The maximum, minimum, average and 98th percentile concentrations for Particulate Matter ($PM_{2.5}$) monitored in the study area were 20.2-36.6 µg/m^3. Highest 98th percentile value is 36.37 µg/m^3 which was observed at Project Site (location -1).). The concentration of $PM_{2.5}$ is well below the prescribed limit of 60µg/m^3.

3. Sulfur Dioxide (SO_2)

The Minimum, maximum, average and 98th percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 10.3 – 24.9 µg/ m^3. Maximum 98th Percentile value of Sulfur dioxide is 24.9 µg/ m^3obtained at Project Site (location -1). The concentration of SO_2 is well below the prescribed limit of 80µg/m3.

4.Oxides of Nitrogen (NOx)

The Minimum, maximum, average and 98th percentile value of Oxides of Nitrogen (NOx) in the study area from the monitored data was in the range of 13.8-28.8 µg/ m^3. Maximum 98th Percentile value of Oxides of Nitrogen (NOx) is 28.8 µg/ m^3obtained at Project Site (location -1).. The concentration of NOx is well below the prescribed limit of 80µg/m^3.

5. Carbon Monoxide (CO)

The Minimum, maximum, average and 98th percentile value of Carbon Monoxide (CO) in the study area from the monitored data was in the range of 0.01 – 0.12 mg/ m^3. Maximum 98th Percentile value of Carbon Monoxide (CO) is 0.12 µg/ m^3 .The concentration of CO is well below the prescribed limit of 4.0 mg/m^3.

The ambient air quality monitoring results indicates that the overall air quality in the study area is within permissible standards prescribed by NAAQ Standards.

3.1.1 IMPACT ON AIR QUALITY DUE TO PROPOSED ACTIVITY

1*65 TPH incineration boiler for distillery division shall be installed. Considered the boiler working at full load conditions to estimate the GLC of PM_{10}, $PM_{2.5}$, SO_2 and NO_x due to the expansion of the industry under the prevailing conditions of meteorology and emission data set, air quality modeling is performed for PDVVPSSKL, Pravara Nagar Loni, Rahata, and Dist. Ahmednagar. Incremental concentrations are worked out for 8 receptor locations, at which ambient air quality monitoring was carried out. Total concentrations are computed considering background (Ambient Air Monitoring) concentrations and incremental concentrations (AERMOD) due to the proposed expansion. Results are compared with the Ambient Air Quality Standards (AAQS).

Table 3.1 Stack Inventory

Sr. No.	Particulars	Description
A. Point Source (Stack attached to boiler)		
1	Stack attached to	Distillery boiler
2	Capacity	65 TPH
3	Fuel type	Bagasse
4	Total fuel quantity requirement	Bagasse -624 MT/day
5	Stack height	65 m.
6	Stack diameter	4.0 m.
7	Flue gas temp.	120^0 - 135^0C
8	Flue gas velocity	7.5 – 11.0 m/s
9	Controlling equipment	ESP – 99% removal efficiency
10	Emission rate	(g/sec)
	i. TPM	0.86
Based on Observed Conc. & Fuel		
	ii. NOx	based on observed concentrations - 6.91
	iii. SO_2	based on observed concentrations - 6.48
		based on fuel characteristics - Bagasse – 2.777
11	Ash content	9.36 MT/day
12	Ash below grate	1.872 MT/day (20 % of the total ash)
13	Remaining Ash	7.488 MT/day (80 % of the total ash)
14	Ash going to stack, QPM (with ESP removal efficiency of 99%)	0.0748 MT/day (Consider 99% ESP Efficiency)
15	Ambient temperature	30^0C
B. Line Source (Vehicular emission)		
	Average time of movement of vehicle inside the premises	5 min
	Distance travelled by the vehicles inside premises	0.2 km
	Q_{PM} (g/sec)	0.1047
	Q_{NOx} (g/sec)	1.1367
	Q_{CO} (g/sec)	0.5967

3.1 Results of the AERMOD software for air quality predictions for proposed expansion of the factory

The AERMOD software was developed by US-EPA and American Meteorological Society (AMS) to compute dispersion of air pollutants in the ambient air due to the various sources. In this study, emissions from proposed stack are coupled with the subsequent meteorological data by using AERMOD 8.0.5 air quality model. Also, dispersion patterns are studied by the output of concentration isopleths plotted by the software. Incremental concentration values for selected receptors are added in the background concentration values.

3.2 WATER ENVIRONMENT

Water sampling and subsequent analysis was carried out to determine both the groundwater and surface water quality of the study area. Ground water & Surface water samples were collected at 8 locations & 7 locations respectively within study area. These samples were analyzed for physical and chemical parameters to ascertain the Baseline status in the existing surface water and ground water bodies.

Table 3.2 Water Analysis Results

Sr. No	Parameters	Ground water		Surface water	
		Min	Max	Min	Max
1.	pH	7.1	7.5	7.3	7.5
2.	Dissolved Solids (mg/l)	398	475	390	489
3.	Total Hardness (mg/l)	136	191.24	132	196
4.	Chlorides (mg/l)	57.23	85.6	51.64	76.82
5.	Fluoride (mg/l)	0.01	0.18	0.01	0.01
6.	Sulphates (mg/l)	36.54	67.23	18.95	23.65

Ground water and surface water samples were collected and analyzed as per the Standard methods and the water quality of the study area is found within the permissible limits of IS: 10500- 2012. Except Fluoride concentrations observed are lower than the required concentration.

Groundwater quality is found to be good, which can be directly used for irrigation purpose. However, ground water used for drinking purpose after the appropriate treatment.

Surface water quality is found to be good, which can be directly used for irrigation purpose. However, for drinking purpose, conventional treatment suggested.

3.3 SOIL ENVIRONMENT

The soil monitoring was carried out at 8 locations in the study area, and analyzed for chemical and physical characteristics; the summary of the results is as under

- The finding of the study reveals that pH of soil in the area ranged between **7.20** to **7.60** which is an indicative of the **neutral** to **slightly alkaline** soil.
- The values for Nitrogen at all locations varied between **236.54** to **368.9 mg/kg.** Maximum concentration of nitrogen was observed at location S-4, while the lowest concentration can be observed at location S-3.

- It is important to note that the concentration of potassium was found to be high at all locations ranging between **62.41** to **148.9 mg/kg.**

Based on the above findings it can be concluded that the soil samples can be classified as per soil classification given by Tondon H.L.S. (2005). The samples fall under **medium to high** fertile soils.

3.4 NOISE ENVIRONMENT

In order to assess the noise levels in the study area, monitoring was carried out at eight different locations within 10 km radius of the study area.

Daytime Noise Levels (Leq)$_{day}$
Residential Zone: The daytime noise levels in all the residential locations were observed to be in the range of 45.07 dB (A) to 57.83 dB (A), which is well below the permissible limit of 55 dB (A).

Night time Noise Levels (Leq) $_{night}$
Residential Zone: The night time noise levels in all the residential locations were observed to be in the range of 40.27 dB (A) –48.25 dB (A), which is well below the permissible limit of 45 dB (A).

The industry is making all efforts to control the noise levels within the limits by providing acoustic measures and silencer pads etc. all the employees in these work places shall be provided with ear plugs / muffs after the proposed expansion.

3.5 LAND USE/LAND COVER OF THE STUDY AREA

Table 3.3 Change in General Land use/ Land cover of Study Area (2009 to 2019)

Landuse	Area in km2		% of Study Area	
	2009	2019	2009	2019
Agriculture land	222.41	252.08	55.60	63.02
Barren Land	101.37	74.2	25.34	18.55
Open Scrub	38.2	30.05	9.55	7.51
Settlement	32.71	36.04	8.18	9.01
Water Bodies	5.31	7.63	1.33	1.91
Total	**400**	**400**	**100.00**	**100.00**

- In the year 2009 Water body area is about 5.31 km^2, whereas in the year 2019 is increased and it is 7.63 km^2.
- It can be inferred that there is an increase in 8.83 % of land under settlement, water bodies and agricultural land whereas a decrease in area under Scrub and Barren Land is 8.83 %.
- Increase in settlement due to an increase in industrial growth and migration of the people.
- Increase in agricultural land due to improved irrigation facilities like drip/trickle irrigation instead of surface and subsurface irrigation techniques. Therefore barren land is converted into agricultural land.

3.6 ECOLOGY AND BIODIVERSITY

- The existing biodiversity in the study area was observed to be very low mainly due to the semi-rural and agrarian setting of the location. The project is well connected to major and minor roads.
- During project implementation, monitoring of the existing biodiversity and its improvement or degradation with respect to project activities should be monitored periodically.
- Proper sanitary conditions should be provided to all workers working within the premises to avoid open defecation as it poses not only a health hazard but can also allow unwanted weeds to grow within the premises. The staff and workers should also be educated and sensitized about the same.
- The efficiency of the waste treatment facilities should also be periodically with proper maintenance of records for auditability. Also the recycled water being supplied for agriculture should be checked for its pathogenic activity.
- The project activities should be carried out only after considering all possible secondary and tertiary impacts on the environment and mitigation measures should be incorporated such as to reduce any possibility of impact on the existing environment.

3.7 DEMOGRAPHIC OR SOCIO-ECONOMIC PROFILE

The proposed project has a positive response from the public. The willingness to pay and the willingness to accept the project has positive outcome. The losses due to the polluting agents can be diluted through various methods. The unit has recycled waste water after treatment. The social and cultural vulnerability index responds a very less and level of resilience is at the higher side. The families dwelling around could get more facilities due to the industry during the corresponding period.

4 IDENTIFICATION, PREDICTION AND MITIGATION MEASURES

Approx. 37 nos. of labours shall be employed during installation phase for the project which includes installing new machinery and units of the plant.

Table 4.1 Anticipated environment impacts its effect and mitigation measures during construction phase

Sr. No.	Impacts	Effects	Mitigation Measures
1	Dust	Respiratory diseases	All the internal Roads are tar felted Dust separation sprinkling water, use machinery meeting
2	Noise	Impairing, Hearing, Fatigue related Health issues	Provide acoustic measures and silencer pads to reduce noise level. Provide personal protective equipment to the workers.
3	Land	Reduction of vacant land	Utilize the existing infrastructures and adopt vertical expansion and maximize the operation schedules.
4	Top soil	Loss of fertility	Utilize for Green belt development.
5	Water	Additional water is required for construction activities and Drinking	Minimize the water requirements by adopting mechanical mixing and Drinking water in Bottles instead of Taps.
6	Wastewater	Improper disposal of waste water leads to contamination of water sources and soil	Domestic wastewater shall be treated based on Root zone technology and treated wastewater shall be used for gardening.

Anticipated environment impacts its effect and mitigation measures during operational phase is given in chapter 4.

5 ANALYSIS OF ALTERNATIVE (TECHNOLOGY AND SITE)

M/s. Pad. Dr. Vitthalrao Vikhe Patil Sahakari Sakhar Karkhana LTD., is an existing Sugar unit with Molasses based distillery unit going for an expansion for Distillery ("C" / "B" Heavy molasses/sugarcane juice/syrup) unit registered under the Company Act 1956. Factory is located at Gat No. 196/1, Pravara Nagar Loni, Rahata, Ahmednagar, Maharashtra, pin code- 413 712.

The registered office and site address of M/s. Pad. Dr. Vitthalrao Vikhe Patil Sahakari Sakhar Karkhana LTD., is at Gat No. 196/1, Pravara Nagar Loni, Rahata, Ahmednagar, Maharashtra, pin code- 413 712.

The proposed expansion of project is from 60 KLPD Molasses based distillery to 240 ("C" / "B" Heavy molasses/sugarcane juice/syrup) unit. The unit will produce total 240 KLPD RS/ ENA/ Ethanol from "C"/"B" Heavy molasses/sugarcane juice/syrup as a raw material. The raw materials are directly taken from sugar factories or molasses traders. This will help to maintain socio economy in the region.

The Project Site is conveniently located for development of the Project.

- Rahata village at a distance of 18.0 km
- Belapur Railway station: Approx. 26.0 km (North- West)
- Shirdi Airport 24 Km

- Environmental Setting-
  - Location – 19°34'17.19"N and 74°30'5.50"E
  - Nearest State Highway – Nagar Manmad highway approx..: 1.16 km (North-East)
  - There is no any river flowing near to the factory site
  - Seismicity – Seismic Zone as per IS:1893 (Part-I):2002

The industry has sufficient land for proposed expansion. The minimum quantity of water is required, which can be obtained from the irrigation department. There are no negative impacts due the proposed expansion. Thus, the existing site is suitable for the proposed expansion.

6 ENVIRONMENT MONITORING PROGRAMME

Table 6.1 Environment management programme

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
1.	Ambient Air quality at appropriate location for PM_{10}, $PM_{2.5}$, SO_2,andNO_x,	PM_{10}, $PM_{2.5}$, SO_2,andNO_x	24 hourly, Quarterly	5 Locations 1 @ Upwind and 2@ downwind directions from stack @ 120^0 to each other Near entry and exit gates
2.	Stationary Emission from Stack PM, SO_2, NOx	PM, SO_2, NOx	Monthly	1 DG set Stack, 2 Boiler Stack
3.	Water	Water quality parameters as per 10500:2012	Monthly	Drinking water locations
	Waste water quality (treated and Untreated)	pH, BOD, COD, TSS, Flow, TDS etc.	Monthly	ETP inlet and Outlet
4.	Noise	Day and Night levels Equivalent noise level- dB (A)	Quarterly or as often as required	6 Locations Upwind and downwind directions Near boilers and near main gate and ETP.
5.	Soil (Qualitative and quantitative testing/analysis to check the soil fertility,)	pH, Cation Exchange Capacity, Total Nitrogen, Phosphorous, Potassium, moisture, Permeability, Conductivity, Texture & structure, Organic carbon	Quarterly or as often as required	1 near Greenbelt 1 near ETP Composite sample shall be taken at each location
6.	Solid waste generation monitoring / Record Keeping	Manual record keeping	To be updated daily	
7	Greenbelt and plantation monitoring	Type of species shall be decided based on soil & climatic conditions. The number of trees would be 1500 per hectare, however; the number of trees would	Six Monthly	

SR.NO	ITEM	PARAMETERS	FREQUENCY OF MONITORING	LOCATION
		vary depending on the typeof soil		
8	Carbon and Water foot Print Monitoring	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery	Daily and Monthly	

7 ADDITIONAL STUDIES

7.1 RISK ASSESSMENT

HAZOP and Quantitative Risk Assessment studies are carried out for each product, disasters management plan, onsite and offsite emergency plan are prepared and given in Chapter 7 of the EIA Report

Consequence analysis of ethanol due to storage facility

Scenario of Ethanol in different forms

Location: PAD. DR. VIKHE PATIL SSK LTD, INDIA

Building Air Exchanges Per Hour: 0.34 (unsheltered single storied)

Time: October 9, 2021 1209 hours ST (using computer's clock)

CHEMICAL DATA:

Chemical Name: ETHANOL

CAS Number: 64-17-5 Molecular Weight: 46.07 g/mol

ERPG-1: 1800 ppm ERPG-2: 3300 ppm ERPG-3: N/A

IDLH: 3300 ppm LEL: 33000 ppm UEL: 190000 ppm

Ambient Boiling Point: 76.7° C

Vapor Pressure at Ambient Temperature: 0.088 atm

Ambient Saturation Concentration: 93,506 ppm or 9.35%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 1.83 knots from 148° true at 3 meters

Ground Roughness: open country Cloud Cover: 5 tenths

Air Temperature: 27° C Stability Class: B

No Inversion Height Relative Humidity: 50%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank

Flammable chemical escaping from tank (not burning)

Tank Diameter: 17.9 meters Tank Length: 20 meters

Tank Volume: 5040 cubic meters

Tank contains liquid Internal Temperature: 27° C

Chemical Mass in Tank: 3,267 tons Tank is 75% full

Circular Opening Diameter: 2 inches

Opening is 10 centimeters from tank bottom

Ground Type: Default soil

Ground Temperature: equal to ambient

Max Puddle Diameter: Unknown

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 128 kilograms/min

(averaged over a minute or more)

Total Amount Released: 4,440 kilograms

Note: The chemical escaped as a liquid and formed an evaporating puddle.

The puddle spread to a diameter of 90 meters.

SCENARIO: When Tank containing an unpressurised flammable liquid

1. **Type of Tank Failure: Type of Tank Failure: BLEVE tank explodes and chemical burns in a fireball**

Potential hazards from flammable chemical which is not burning as it leaks from tank.

- Downwind toxic effects
- Vapour cloud flash fire
- Over pressure (blast force) from vapour cloud explosion

When,

Flammable chemical escaping from tank chemical is **NOT** on fire Choose Hazard to Analyze: **Toxic Area of Vapor Cloud**

THREAT ZONE:

Potential hazards from BLEVE:

- Thermal radiation from fireball and pool fire
- Hazards fragments and blast force from explosion
- Downwind toxic effects of fire by products

BLEVE/Fire ball Scenario: The higher the internal tank pressure/temperature at the time of tank failure, the larger the fire ball. Any liquid not consumed by the fire ball will form a pool fire.

SOURCE STRENGTH:

BLEVE of flammable liquid in vertical cylindrical tank

Tank Diameter: 17.9 meters Tank Length: 20 meters

Tank Volume: 5040 cubic meters

Tank contains liquid

Internal Storage Temperature: 27° C

Chemical Mass in Tank: 3,267 tons Tank is 75% full

Percentage of Tank Mass in Fireball: 100%

Fireball Diameter: 833 meters Burn Duration: 37 seconds

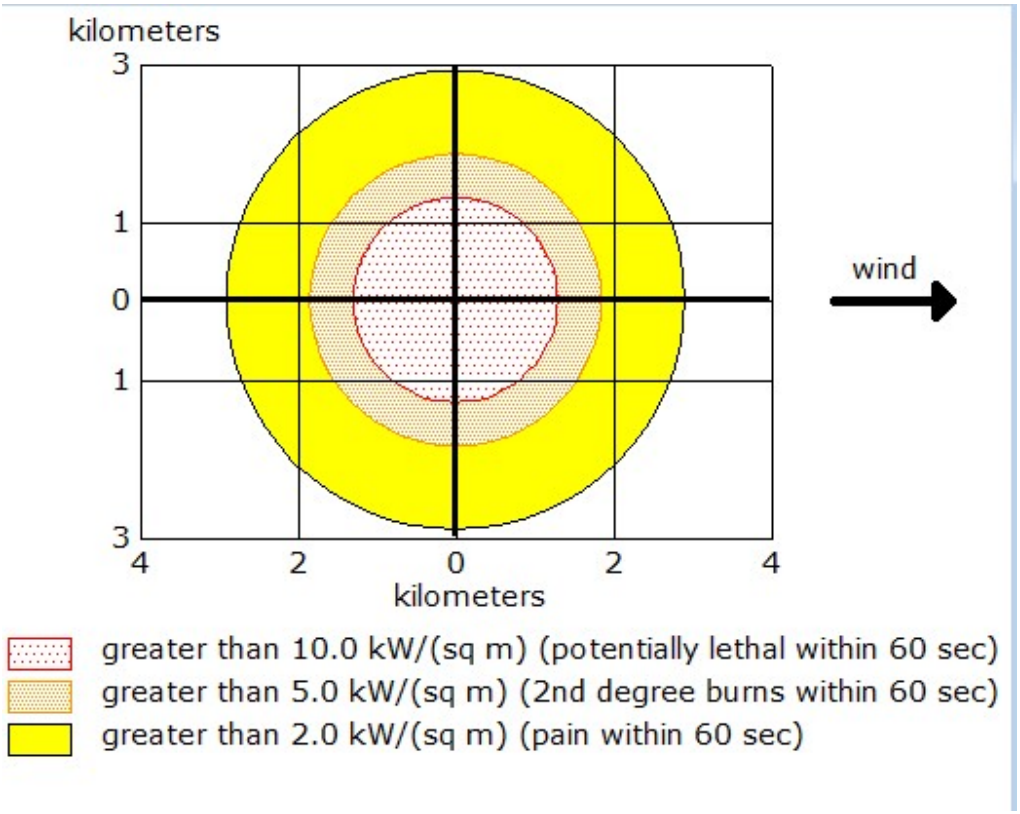
THREAT ZONE:

Threat Modeled: Thermal radiation from fireball

Red : 1.3 kilometers --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 1.8 kilometers --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 2.9 kilometers --- (2.0 kW/(sq m) = pain within 60 sec)


kilometers
3
1
0
1
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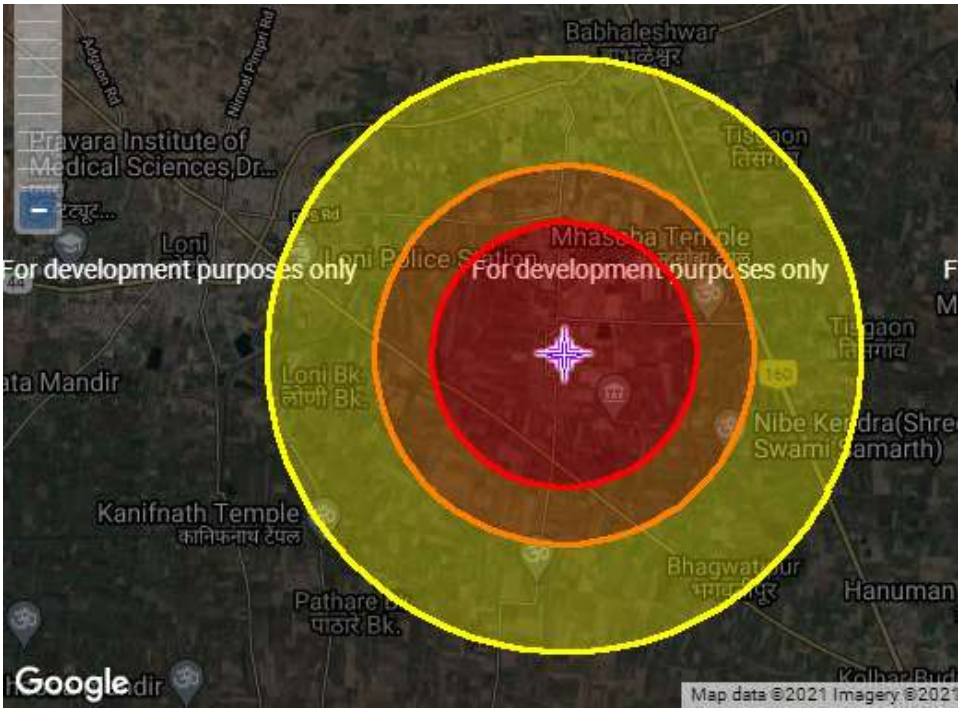
kilometers
wind
greater than 10.0 kW/(sq m) (potentially lethal within 60 sec)
greater than 5.0 kW/(sq m) (2nd degree burns within 60 sec)
greater than 2.0 kW/(sq m) (pain within 60 sec)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Map data ©2021 Imagery ©2021

Conclusion

When tank explodes and ethanol in a fireball due to BLEVE;

The thermal radiation for the Ethanol tank confined to the maximum at 1.3 km that means the thermal radiation intensity of 10kW/m^2 is potentially lethal within 60 seconds. Similarly, the other threat zone of 5.0 kW/m^2 causes 2nd degree burns within 60 seconds at 1.8 km and the rest is 2.0 kW/m^2 subjected to within the unit at 2.9 km, which causes pain within 60 seconds.

Project proponent will implement all preventive measures to tackle all type of emergencies arising out of operation or malfunction of individual unit's. The required resources for Onsite and Offsite emergency management plan will be properly planned and provided to implement the plan effectively. The factory shall give highest priority towards Health and safety of the employees and people residing nearby areas. Management shall conduct the training to the nearby villagers to appraise them about their role during emergency. All nearby people shall be given training on do's and don'ts during emergency situation.
Distillery Industry (Ethanol Plant) is associated with potential hazards to the employee and environment**.** As the hazards involved during operation and production activities will be known to the Management, all required mitigation measures shall be implemented in time to avoid the emergency situation from the arising. Unfortunately, if there is any emergency onsite of offsite, it will be tackled effectively due to availability of required resources at the site. Similarly, all the concern staff and members of the Teams shall be trained appropriately to tackle the emergencies in the plant. By knowing the type of emergency situation that may arise during operation of the plant, appropriate control measures will be implemented to reduce the gravity of the emergencies. Similarly, to avoid the emergency situation, all required mitigation measures will be implemented as recommended.

8 BUDGETARY PROVISIONS TOWARDS ENVIRONMENTAL MANAGEMENT PLAN:

The costs involved in environmental monitoring and management to mitigate the adverse effects will be put on account for the proposed project. The capital cost for the EMP will be Rs. 4880 Lakhs. And recurring cost will be Rs. 355 Lakhs. The detailed EMP budget is given in table below

Table 8.1EMP Budget

SR. NO.	COMPONENT	PARTICULARS		CAPITAL INVESTMENT (IN LAKHS)	RECURRING INVESTMENT (IN LAKHS)
1.	Air	Construction of new stack, incineration boiler and ESP		4000	200
2.	Water	• Distillery CPU • Anaerobic Digester, MEE for Distillery Spentwash treatment		800	100
3.	Noise	Acoustic enclosures, Silencer pads, ear plugs etc		20	5
4.	Environment monitoring and Management	Quarterly Environment Monitoring (Per Year)		--	20
		Ambient air monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx		
		Boiler & DG Set Monitoring	TPM, SO_2, NOx		
		Effluent (Treated &Untreated)	pH, COD, BOD, TSS, TDS, Oil & Grease		
5.	Occupational Health	Gloves, Breathing Masks, Gloves, Boots, Helmets, Ear Plugs etc. & annual health-medical checkup of workers, Occupational Health (training, OH center)		15	5
6.	Greenbelt	Green belt development activity		10	
		Maintenance of green belt		--	5
7.	Solid Waste Management	Solid Waste Management		20	10
8.	Rain water harvesting	Rain water harvesting		15	5
9.	Carbon and Water Foot Print	Maintain the data of raw materials consumption, steam consumption, vehicle frequency for transport of raw materials, effluent generation, air emissions, hazardous waste generation, and raw material recovery		--	5
		TOTAL COST (INR, LAKHS)		**4880**	**355**

9 CORPORATE ENVIRONMENT RESPONSIBILITY PLAN

The capital cost of the proposed expansion project is Rs. 313.38 Crores. The industry has reserved **Rs. 2.35 Crores** (0.75 % of the cost of the project as per Office Memorandum Vide F. No. 22-65/2017-IA.III Dated 01.05.2018) which will be spent on the activities like sanitation and health, education, and educational facilities as a cost towards corporate environment responsibility (CER).

10 RAINWATER AND STORMWATER HARVESTING PLAN

The industry is making efforts to conserve natural resources by adopting green technologies and as such industry proposes to adopt rain water harvesting system. With the annual rainfall of 560 mm there is good potential to harvest rainwater. The rainwater harvesting system is installed at various buildings and about 2271.90 m^3 per year water is harvested. This shall be shall be stored in storage tank and shall be utilized for greenbelt development/gardening purpose

Stormwater management system is also adopted by the industry. Separate drains of minimum 0.45 m * 0.60 m are provided for the collection and disposal of storm water from the industry premises. The rainwater harvesting design details are given in Annexure-III of the EIA Report.

11 CONCLUSIONS

As the industry has provided all the necessary pollution control measures for water, Air and Solid and hazardous waste disposal, the negative impacts on the environment would be minimal/ negligible. The expansion programme would help the farmers to crush their produce in time which would help to minimize the loss of sugarcane tonnage and yield maximum financial benefits.