EXECUTIVE SUMMARY

OF EIA REPORT
For 21 MW Cogeneration Unit of

M/S. PRASAD SUGAR AND ALLIED AGRO PRODUCTS LIMITED

Prepared by

VSI
संशोधनेन संवृद्धिः

VASANTDADA SUGAR INSTITUTE

Manjari (Bk.), Tal : Haveli, Dist : Pune - 412 307; Maharashtra.
Telephone: (020) 2690 2100, 2690 2343/7/6; Fax (020) 2690 2244
Web Site: www.vsisugar.com

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JULY 2016

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1.0 INTRODUCTION

M/s, Prasad Sugar and Allied Agro Products Ltd. (PSAAPL), located at Vambori, Ahmednagar, is a progressive private sugar mill established in the year 2010-11. It was developed due to the efforts and vision of Shri Prajakt P. Tanpure, a dynamic local leader from Ahmednagar district. The mill registration number is CIN/U/15421/PN/2005/PTC/021744 and its existing installed (licensed) capacity is 2500 TCD. The management has undertaken extensive cane development activities and cultivation of land for cane production is now spread over approximately 5000 hectare. Therefore, the management has decided to modernize existing plant and machinery, so as to achieve installed capacity of 4000 TCD and also establish a 21 MW co-generation project.

As per the EIA notification SO-1533, issued in September 2006 and its amendment till the date, specifies that, the biomass based power projects upto 50 MW are placed under category 'B'. Therefore, this project requires 'Environmental Clearance' (EC) from the State EIA authority. Hence, the management of the factory has entrusted the work of preparation of EIA/EMP to **Vasantdada Sugar Institute (VSI),** Manjari (Bk.), Pune. VSI is a renowned institute, providing research, technical and consultancy services to the sugar and distillery industries, since 1975.

2.0 FEATURES OF THE SITE

The proposed cogeneration unit will be installed within the existing sugar factory premises. PSAAPL has 32 acres of land, which is adequate for the modernization of sugar, installation of cogeneration unit as well as ancillary units such as pollution control system, greenbelt, etc. The existing site meets the industrial siting guidelines of the Ministry of Environment Forest and Climate Change (MOEFCC) . Therefore, the project proponent did not explore any alternative site.

This site location map is enclosed as annexure I to the main EIA report. The other important aspects are highlighted in the following table.

Geographical Location	$19^0$18'49.45" N , $74^0$42'34.49" E, Elevation 545 MSL
Road Connectivity	Pune-Shirdi State Highway No.10 is approx.8 km from the site
Nearest village/s	Vambori - 3 km and Sade - 4 km
Nearest City/Town	Rahuri (a taluka place) approx 19 km

Railway Station	Rahuri railway station on Daund-Manmad route is approx.15 km
Air Port	Pune airport is the nearest airport approx. 150 km
River	River Mula flows west to east of the project site at approx. 12 km

3.0 HIGHLIGHTS OF THE PROJECT

1	Project Proponent	Prasad Sugar & Allied Agro Product Ltd. (PSAAPL)
2	Project location	Existing factory premises
3	Land	Total plot area is 32.00 acre. Proposed cogeneration project in 3.00 acre of land, 1.0 acre provided for green belt development
4.	Product	Power (21 MW electricity) (installed capacity)
5.	Operational Days	225 days for cogeneration unit (160 season days minimum + 65 off-season days)
6.	Main Raw Material	Water and bagasse
7.	Water Requirement	• During seasonal operation : 138 m3/day • During off seasonal operation: 209 m3/day
	Source of water	Mula canal (Permission is awaited)
8.	Fuel	Bagasse available = 1,82,400 T per season (@28.5 %on cane crushed) Crushing season : Bagasse-927.6 TPD (x160 days season) = 1,48,416 tons per season and Cane Trash- 56.4 TPD (x 160 days season) = 9,024 tons per season During off season: Baggase- 506.4 TPD (x 65 days off-season) = 32,916 tons per off-season
9.	Production equipment, machinery and ancillary units	Steam generating unit (Boiler), Condensate system, Steam turbine generator, ESP, air cooled condensing type cooling towers, fire protection system, bagasse and ash handling

		system, ETP, etc.		
10.	Power	**Power requirement will be met by their own cogeneration unit**		
		Particulars	**season**	**off season**
		Total generation of power from T.G set of 21 MW	19 MW	11.648 MW
		Total captive power consumption	**5.70 MW**	**1.50 MW**
		Surplus power for export to state grid	**13.30 MW**	**10.148 MW**
11.	Boiler	One new boiler of 110 TPH capacity with working pressure of 110 Kg/cm^2 and temperature of 535 ± 5^{o}C		
12.	Steam turbine generator (STG)	New 21 MW double extraction cum condensing (DECC) type		
13.	Air pollution control device	Electro-static precipitator (ESP)		
14.	Stack height and inner diameter	72 m height and 3.0 m inner diameter		
15.	Manpower	Approx 36		
16.	Project Cost	Rs. 10114.00 lakhs		
17.	EMP Cost	Rs. 945.00 lakhs		

4.0 THE PROCESS

In simple terms, cogeneration is on-site generation and utilisation of steam and power. Here, the steam is produced in high pressure boilers and used twice. First, it is fed to the steam turbine generator to produce power and then exhaust steam from turbine is used for the process in sugar unit (during crushing season). A schematic of power generation from the cogeneration is shown in following figure.

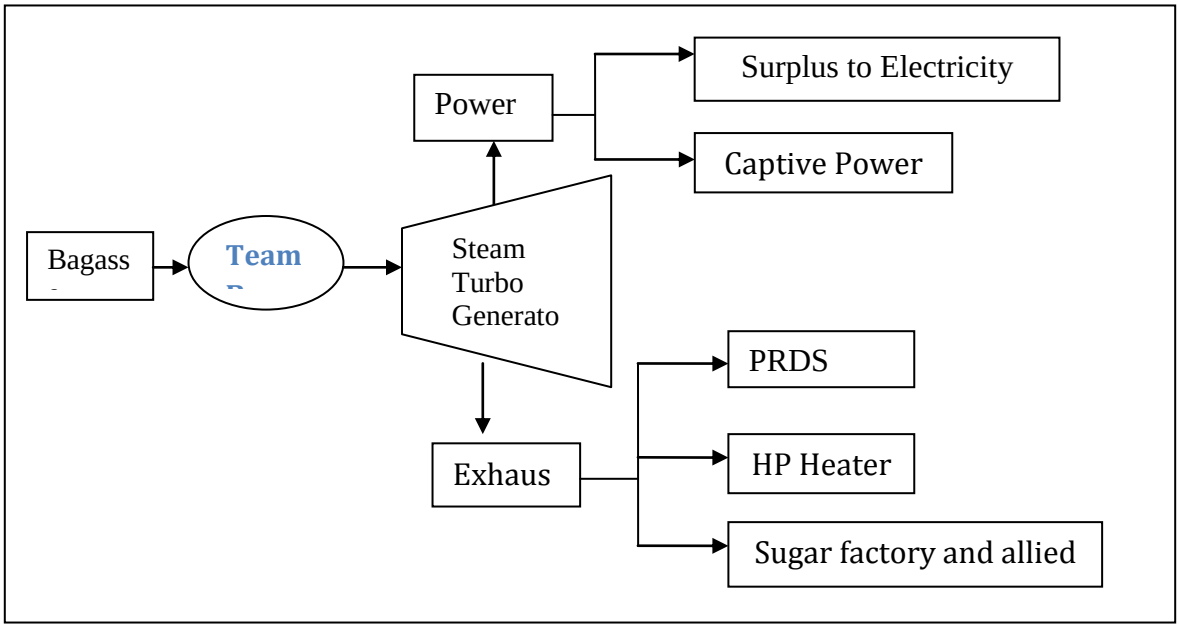

Figure 1: Process flow diagram of cogeneration power plant

4.1 Cogeneration scheme for crushing season (160 days)

Table 1: Power balance for crushing season

Total Generation of power from T.G set of 21 MW	**19 MW**
Sugar Factory power consumption	4.10 MW
Cogeneration plant auxiliaries power consumption	1.50 MW
Misc. use	0.10 MW
Total Captive consumption	**5.70 MW**
Surplus power to be exported to state grid	**13.30 MW**

4.2 Off-Season Scheme (Non-crushing – for 65 days)

To generate 11.90 MW power at the generator terminals, the steam generation in the boiler will be 55.0 TPH. During off Season, there will not be any requirement of the process steam at sugar factory, steam will be required for Cogen plant auxiliaries i.e. 55.0 TPH.

Table 2: Power balance for off- season

Captive consumption	
Cogeneration plant auxiliaries power consumption	1.20MW
Misc. use	0.30 MW
Exportable Power	**10.148 MW**
Total Power generation	**11.648 MW**

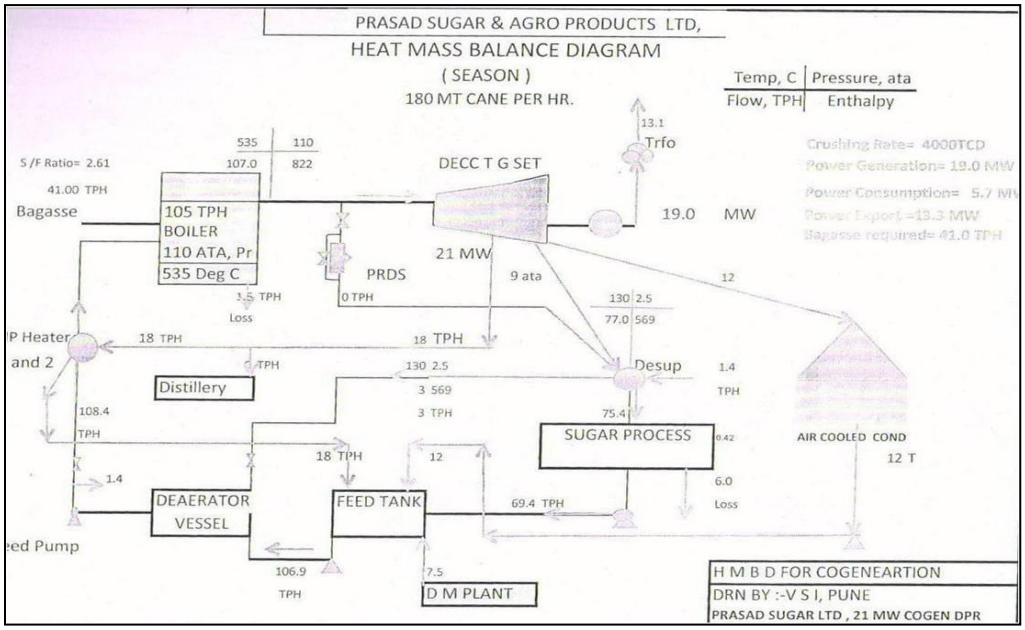

Figure 2: Process flow chart for seasonal operation

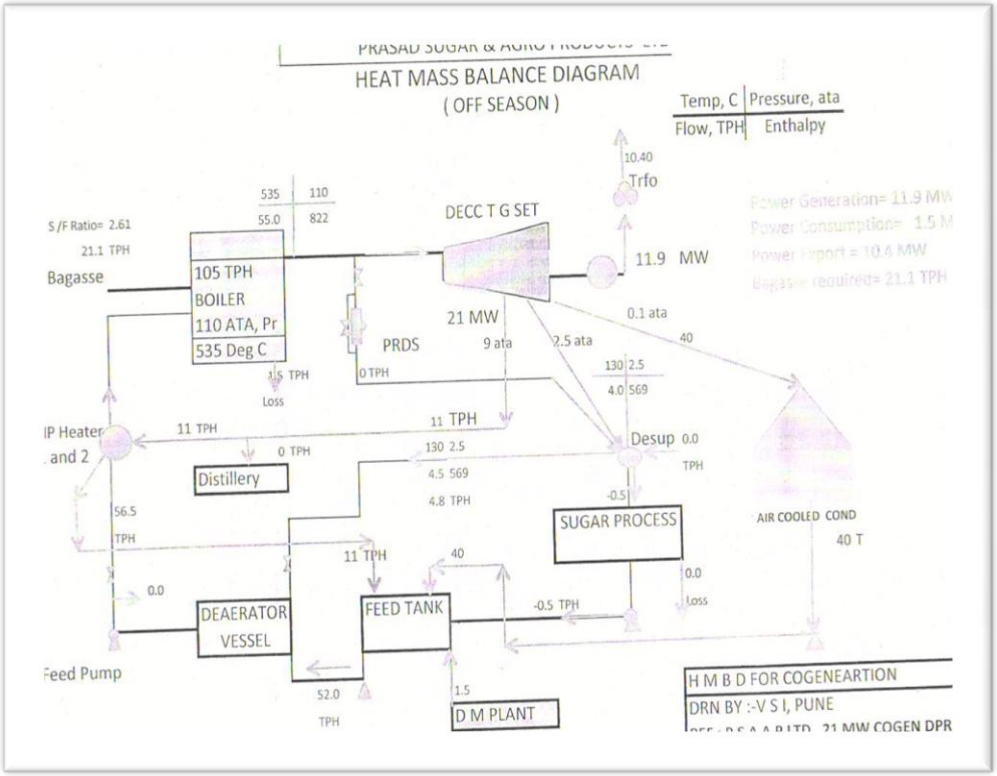

Figure 3: Process flow for off-season

5.0 RESOURCES

5.1 Bagasse: Bagasse requirement for season is of 984TPD (41 TPH) and for off-season it is 506.4 TPD (21.1 TPH). it is observed at the proposed utilization rate of 41 TPH, only 24,960 tons of bagasse will be available during off-season. Therefore, in order to fulfill the off-season's requirement, it is planned to use cane trash (discarded leafy tops of the cane) as a supplementary fuel during the season at a rate of 56.4 tons per day (=9,024 tons per season). The bagasse balance indicates that the sugar factory is having adequate source of fuel i.e. bagasse and trash to operate the proposed cogeneration unit during season as well as off-season.

Table 3: Bagasse Balance

A.	**Bagasse balance for crushing season (Tonne per season)**	
	Bagasse to the cogeneration plant from sugar plant @28.5% on cane crushed	1,82,400
	Less Bagacillo used for process (Less)	640
	Less bagasse required to generate 107TPH steam @ 38.65TPH for 160 days	1,48,416
	Cane trash required @2.35 TPH = 56.40 TPD x 160 days	9,024
	Bagasse saved during season	33,344
	Total Saved Bagasse	**33,344**
B.	**Bagasse balance for non-crushing season (Tonne per season)**	
	Bagasse reqd. to generate 55.0 TPH steam @ 21.1 TPH	**32,916**
	Number of operational days for off-season (bagasse saved/daily bagasse requirement)	**65**
	Bagasse reqd. for 65 days of operation	**32,916**
	Saved bagasse available for off-season	**33,344**

5.2 Water: At present sugar factory draws water from Mula canal, and Kukkudvedhe farm pond situated about 12 km from factory. The water requirement for cogeneration project during seasonal operation will be around 138 m^3/day and 209 m3/day during off seasonal operation. Water conservation will be achieved by recycling of water.

Table 4: Summary of water budget for cogeneration unit for operation in season (KLD)

Particulars	In-take (one time start-up)	Losses	Discharged as waste water	Recycled	Day-to-day requirement (KLD)
Domestic	5	2	3	-	5
Industrial Consumption					
Cooling (Air cooled condenser will be used)	-	-	-	-	-
Boiler	2354	260	310	1784	570
Total	**2359**	**260**	**315**	**1784**	**575**
Condensate available from sugar industry process for makeup water					**437**
Net water requirement during seasonal operation will be (575-437)					**138**

Table 5: Summary of water budget for cogeneration unit for operation in off-season

Particulars	In-take (one time start-up requirement)	Losses (KLD)	Discharged as waste water (KLD)	Recycled (KLD)	Day-to-day requirement (KLD)
Domestic	5	-	5	-	5
Industrial Consumption					
Cooling (Air cooled condenser will be used)	-	-	-	-	-
Boiler	1320	66	138	1116	204
Total	**1325**	**66**	**143**	**1116**	**209**
Net fresh water requirement during off seasonal operation will be					**209**

- During seasonal operation = 160 days x 138 m^3/day = 22,080 m^3
- During off seasonal operation = 65 days x 209 m^3/day = 13,582 m^3
- **Total water requirement per annum = 35,662 m^3**

5.3 Steam: During cane crushing season, the steam of 107 TPH will be generated from new 110 TPH boiler at 110 Ata pressure and 535$^oC \pm 5^0C$ temperature. This boiler will be connected to a RCC stack of 72 m height and 3.00 m inner diameter. Electrostatic precipitator will be used as an air pollution control device. Produced steam will be supplied to a new TG set of 21 MW. The exhaust steam from cogeneration unit will be utilized in sugar factory at a low pressure of 2.5 ata. During off-season of sugar unit, steam requirement will be 55.0TPH. Steam balance in detail has been provided in table

Table 6: Steam Balance

Particular	For season	For off-season
Total steam generation TPH @ Temperature 535° C & enthalpy 822	107	55
Steam required for Sugar process @ 41% @ Temperature 130° C & Enthalpy 569	74.5	Nil
Steam to De-aerator 2.5ata @ Temperature 130° C & Enthalpy 569	2.5	4.0
Steam to De-aerator 20 ata@ Temperature 130° C & Enthalpy 569	8.0	5.0
Steam to H.P .Heater 8 @ Temperature 130° C & Enthalpy 569	10.0	6.0
Steam condensed	12.0	40.0
Total steam consumption TPH	107.0	55.0

Table 7: Turbine generator set

Sr. No.	Steam Turbine Generator		Power generation (MW)
1.	21 MW (installed capacity of new STG)	Season	19.00
		Off-season	11.60

5.4 Land: The proposed project will be requiring 9637 sq. m. land i.e. approx 2.5 acres of land. Considering this requirement, the management has made provision of three acres of land for the proposed activity.

There will be a provision of mechanized handling of bagasse and ash. The proposed project will create 36 direct employment opportunities.

Table 8: Project Cost

Sr. No.	Particulars	Amount (Rs. in Lakhs)
1.	Civil work and building	365.00
2.	Plant and machinery including taxes and duties	7138.00
3.	Preliminary, pre-operative and other expenses	552.00
4.	Supervision charges	44.66
5.	Power and evacuation arrangement	1728.34
6.	Miscellaneous fixed assets	80.00
7.	Contingencies	181.00
8.	Margin Money	25.00
	TOTAL	**10114.00**

Table 9: Budgetary allocations for environment management

Sr. No.	Particular	Cost (Rs. in lakhs)
1	Air pollution control equipments (ESP)	132.00
2.	Ash & bagasse handling	74.00
3.	Air cooled condensing type cooling tower	590.00
4.	Fire protection	37.00
5.	RCC stack	100.00
6.	Greenbelt	12.00
	Total	**945.00**

	Particular	Recurring cost (Rs. In Lakhs)
1.	Air, noise pollution control	22.00
2.	Water pollution control	34.00
3.	Environment monitoring and management	01.50
4.	Occupational Health	05.00
5.	Greenbelt	01.50
6.	Solid waste management	12.00
7.	Others	
	▪ Fire protection	04.00
	▪ Ash handling and disposal	04.00
	Total	**86.00**

6.0 BASELINE ENVIRONMENT

Table 10: Summary of Environmental features of study area

#	Facet	In brief
1.	General characteristics	Arid and semi-arid climate
2.	Rainfall	Average (for last ten years) 437 mm/annum Rains are received mainly during August-September months
3.	Temperature	In summer 28^0C to 41^0C. In winter 7^0C to 22^0C.
4.	Humidity	Maximum humidity ranges between 60 -70 % in the month of August Minimum humidity ranges from 40-50 % in the months of March & April
5.	Wind	Predominantly from north-east, north, during study period
6.	Land use	Major - agricultural 33%; open scrub 26%; Fallow land (current + long) 25 %
7.	Air Quality	Ambient air quality was monitored at eight locations including prevailing upwind and downwind; the observations for PM10, PM2.5, SO2 and NOx complies NAAQ standards of Nov. 2009 for all monitored locations
8.	Noise	Noise was monitored at ten locations, it was observed that, day time noise levels were marginally exceeding the standards at five locations
9.	Ground water	11 water samples were collected, analysed and compared with drinking water standard IS 10500:2012; hardness of ground water was above the specified limits for samples collected from site and surrounding villages; Also, chromium and cadmium was detected in some of the samples. As per Central Ground Water Board report 2014 - ground water is slightly alkaline, good for irrigation purposes throughout the district. However, potability is affected at some places due to high nitrate and total hardness
10.	Soil	Soil quality was monitored at nine locations; Most of the samples were showing, shallow to medium deep having clay to clay loam in texture. Most of the soils are alkaline in nature.
11.	Geology	Minerals of economic value are not found in the entire Ahmednagar district
12.	Nearest sanctuary	Rehkuri Sanctuary at 60 km from the site Kalsubai Harishchandragad wildlife sanctuary at approx 108 km from the site

7.0 IMPACT ASSESSMENT AND ENVIRONMENT MANAGEMENT PLAN

7.1 Air Environment:

Impact Causing factors 1) Emissions from process: It will be due to burning of bagasse as a main fuel and cane trash as an auxiliary fuel. Bagasse contain 2% of ash and <0% sulfur and Nitrogen

2) Transportation: Vehicles of employees and visitors are anticipated as the only source. Hence, this could cause negligible increase mainly in NOx, particulate matter and HC.

3) Fugitive and Other sources of air pollution: Fugitive Emissions: This will be mainly from Bagasse and dust particles. Since, fly ash will be collected through ESP and transported in covered vehicles/conveyers to the compost site, thus, ash is assumed to be negligible source of fugitive emissions.

7.1.1 Environmental management plan

- Use of Bagasse as a fuel, transported to boiler through closed conveyer
- Remaining Bagasse will be belled and stored in yard; no loose Bagasse will be stored or handled
- ESP to control fly ash (PM) and partly SO_2; Round RCC stack with 72m height; fly as well as bottom ash will be used to mix in soil, since it is rich in potash
- Provision of separate parking for goods and general vehicles, wide asphalted internal roads, approach road to state highway is also asphalted
- Green belt of 1.0 acre proposed around the project area
- Strict prohibition on washing and maintenance of vehicles on site or in parking area
- **Air Pollutant Dispersion Modeling**

Prediction of impacts on air environment has been carried out employing mathematical model - Aermod view dispersion model 9.2 software developed by Lakes Environment Software, Canada.

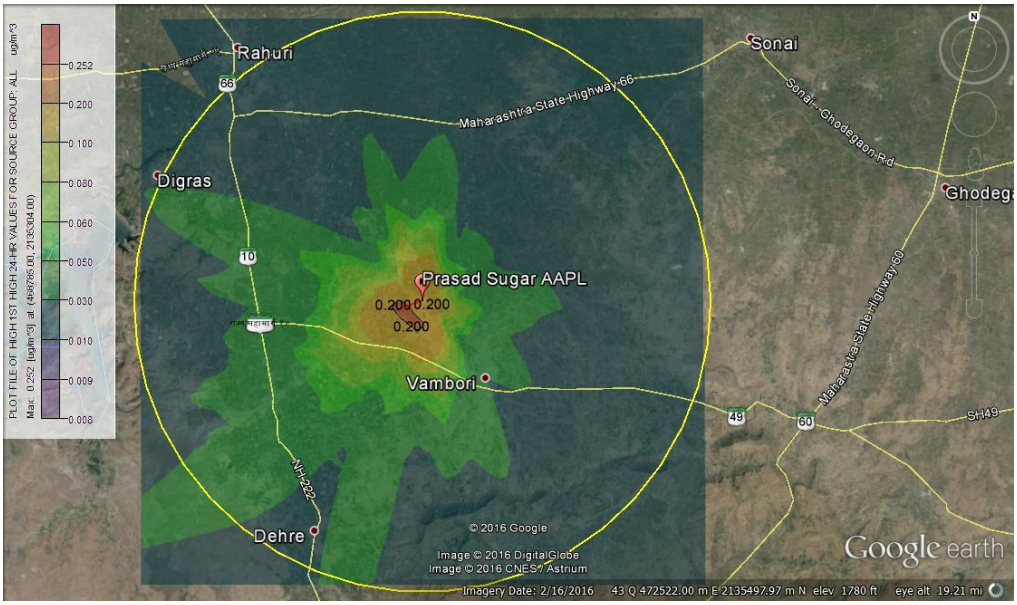

Figure 4: Short term 24 hourly GLCs of PM

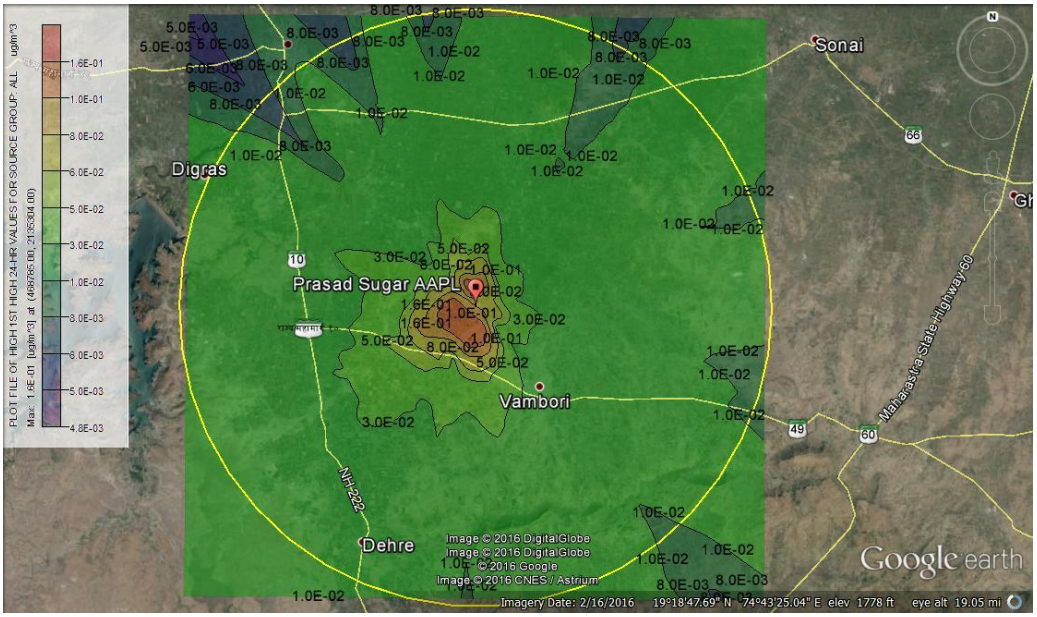

Figure 5: Short term 24 hourly GLCs of SO_2

a. Observation

From the results obtained from the software based simulation study of air pollutant dispersion, the following inferences are drawn

- There will be an increase in the concentration of PM and SOx mainly towards SW and SSW

- The maximum incremental load of all these pollutant will be at a distance of 0.8 km towards S and SSW, where increase of 0.252 μg/m^3 for PM and 0.157 μg/m^3 for SOx could be observed. This area is predominantly occupied by agricultural vegetation

Table 11: Summary of Maximum 24-hour GLC due to proposed project

Description	Concentration μg/m^3	
	PM_{10}	SO_2
Maximum rise in GLC	0.252	0.157
Direction of Occurrence and distance	SSW (0.8 Km)*	SSW (0.8 Km)*
Coordinates of maximum GLC	X- 468785	X- 468785
	Y- 2135304	Y- 2135304
Baseline Concentration reported nearby GLC (at	48.07	10.43
4.5km SSW)	(Dhamori khurd)	(Dhamori khurd)
Total Concentration (Post project scenario)	48.32	10.59
NAAQS	100	80
*The distance is measured from stack to the receptor of maximum GLC		

7.1.2 Impact Assessment: Estimated incremental concentrations of PM and SOx in the downwind direction of the site are very marginal, considering the baseline value. Therefore, it is anticipated that, the increase in the concentration of these air pollutants due to the proposed activity, likely to cause minor negative impact on air environment and negligible impact on surrounding ecology.

7.2 Water environment

7.2.1 Impact causing factors: Drawl of fresh water in large quantity and its usage, water pollution, disposal of polluted water into nearby water bodies

7.2.2 Environment management plan: In order to reduce the fresh water intake the management has planned to use excess condensate of sugar unit. It has also planned to install air cooled condensing system in lieu of conventional cooling towers which consumes large amount of water. Steam will be used twice, first for power generation and exhaust steam of turbines will be used in sugar unit. Steam condensate will be re-circulated. Rainwater harvesting is planned to fulfill partial startup requirement of water. In case of cogeneration project, the effluent generated is mildly polluted but having temperature of 60-80^{0}C. The sugar factory is operating an ETP, which is adequate (500 m^3/day capacity) to treat

effluents from cogeneration unit (Refer figure 6. 2 for schematic of ETP). Wastewater from various sources will be collected and properly treated so as to reutilize it and thus conserve the fresh water resource. The treated water shall be mainly reused in the sugar unit for auxiliary requirements and/or for gardening activity. The sanitary wastewater shall be disposed by using septic tank and soak pit system. Thus, zero liquid discharge will be achieved.

7.2.3 Impact Assessment: No negative impact on water environment and aquatic ecosystem is envisaged due to the proposed project. Minor negative impact is envisaged on soil within the premises. Water allocated to the sugar factory will be from the quota reserved for industrial activities. Therefore, impact on water availability for other users is envisaged to be minimal.

7.3 Land environment

7.3.1 Impact causing factors: Disposal of solid and hazardous waste, disposal of effluent, change in topography

7.3.2 Environmental management plan: The solid waste expected would be ash from boiler. It is estimated to be about 19.68 TPD during seasonal operation and 10.13 TPD during off-season. Sludge from ETP is another solid waste which will be organic in nature. The boiler ash from bagasse is generally rich in potash; hence, ash as well as sludge will be given to the farmer as soil enriching material. As an option, ash may be sold to the local bricks manufacturer.

7.3.3 Impact Assessment: The project is not going to generate any hazardous waste. Since, the solid waste is non-toxic and non-hazardous, it is anticipated that the solid waste will have no negative impact on land but very negligible negative impact on air environment due to emissions from stack. Minor negative impact is also envisage on the land environment of the site due to construction of the proposed unit.

7.4 Ecology

7.4.1 Impact Causing factors: discharge of air and water pollutants into environment, solid waste, change in land use, removal of vegetation cover, reclamation of wetland/water bodies, etc.

7.4.2 Environmental management plan: Use of bagasse – a renewable energy source; ESP as an air pollution control device; stack of 72 m height; mechanized handling of bagasse and ash, etc for air pollution prevention and control; Greenbelt development - for mitigation of air and noise pollution. Measures as discussed earlier for the conservation of water and provision of ETP (of sugar unit) for the treatment of effluent. Solid waste is organic and safely get disposed-off by applying into soil.

7.4.3 Impact assessment: In case of proposed project, the air dispersion modeling study reveals that the ground level concentration of PM (during operation phase) in ambient air will remain within the NAAQ standard limits; Whereas, no wastewater will be released into any of the ground and/or surface water bodies. Hence, it is envisage that, air and water pollutants from the proposed project will have no negative impact on surrounding ecosystem. The negative impact is anticipated due to following.

1. Due to construction on the present open areas, land- foraging ground may get lost permanently for some of the birds, insects and reptiles; also this activity may cause negative impact on soil micro-fauna
2. installation of transmission line up to the nearest substation, located at Pandhari Phul or at Rahuri, may require tree felling. This activity is anticipated to cause negative impact on the surround ecosystem.
3. In addition, the transmission lines may cause minor negative impact on soil and avian-fauna.

Beneficial Impact is anticipated due to following factors.

- The effluent/wastewater generated will be treated and recycled/reused for greenbelt, which is anticipated as positive impact for the conservation of resource as well as efficient utilization of it.
- Solid waste generated in the project (bagasse ash) will be organic in nature and rich in potash. It will be added to soils. Thus, nutrient will get recycled and soil enrichment will take place. This is anticipated as another positive impact on the land and the surrounding eco-system.
- Greenbelt development will help in enhancing the biodiversity of the area. It will also help in improving the aesthetics. This is another positive impact anticipated due to the project.

7.5 Socio-economic environment

7.5.1 Impact Causing Factors: issues of rehabilitation; restoration; population flux; pressure on available resources and infrastructure

7.5.2 Environmental Management Plan: Project is agro-based – therefore, indirectly beneficial to local farmers; no issues of rehabilitation or restoration; local candidates will be employed – thus, migration of population to the site surrounding area and pressure on infrastructure and resources is anticipated to be negligible

7.5.3 Impact Assessment: Considering the long term benefits to the locals, the project will have positive impact on socio-economic environment.

7.6 Other impact: Traffic

In the project, the transportation activity will take place mainly during the construction phase. Considering the availability of four lane state highway -SH 10, other district level asphalted roads in the vicinity, the nominal increase in vehicles during construction phase may not cause any traffic congestion. During operation phase, the transportation activity will be very negligible (for cogeneration project); hence, the probability of traffic congestion is insignificant.

8.0 PROBABLE RISK FACTORS

Following scenarios feel under maximum credible accident scenario

- Fire in fuel yard (bagasse yard) and/or Fire due to short circuits
- Injury to body and body parts (mechanical)

8.1 Fire in fuel (bagasse) yard: An elaborate fire hydrant network and fire fighting system comprising of trained crew and facilities will mitigate the risk of such incidents. In addition, as per requirement fire alarm system and smoke detectors will be installed.

8.2 Mechanical injury to body parts: In a power plant, there are several places where workers are likely to be involved with accidents resulting in injury to body parts. The places are workshop, during mechanical repair work in different units, during construction work, road accidents due to vehicular movement, etc

Workers exposed to mechanical accident-prone areas will be given personal protective equipment. The non-respiratory PPE includes tight rubber goggles, safety helmets, welders hand shields and welding helmets, plastic face shields, ear plugs, ear muffs, rubber aprons, rubber gloves, shoes with non-skid soles, gum boots, safety shoe with toe protection. All safety and health codes prescribed by the BIS will be implemented.

9.0 DISASTER MANAGEMENT PLAN (ON-SITE)

9.1 Emergency Preparedness and Response Team Structure

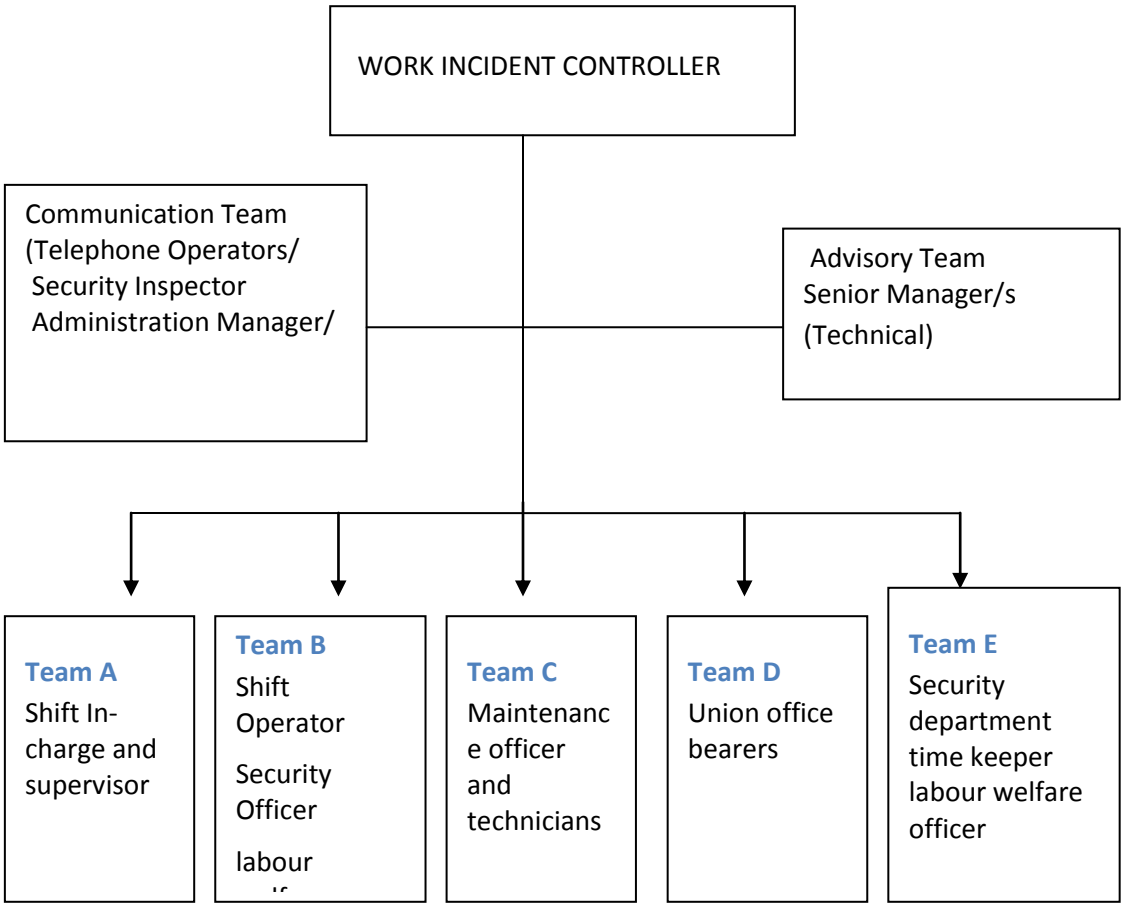

Figure 6: Emergency Preparedness and Response Team Structure

10.0 ENVIRONMENTAL MONITORING PROGRAMME

Table 12: Summarized environmental monitoring programme

#	Particulars	Parameter	Frequency[#]
1	Stack Emissions	Particulate matter, SO_2, NO_x	Monthly
2	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_x	Monthly within premises and twice a season at village Dhamori (Kh), Khadambe (Kh)
3	inlet and outlet of ETP	pH, EC, BOD, COD, SS, TDS, Oil &	Monthly

#	Particulars	Parameter	Frequency[#]
		Grease etc.	
4	Bore well /ground water sample nearer to site/ETP	pH, EC, COD, BOD, Total solids, dissolved solids, hardness, alkalinity, Chlorides, Sulphate, Phosphates, and heavy metals such as Chromium, Cadmium, Iron, etc.	Quarterly /monthly
5	Noise monitoring	Noise Levels measurement at high noise generating places as well as sensitive receptors in the vicinity	Monthly
6.	Occupational health	health and fitness checkup of employees get exposed to various hazards All other staff (except above)	Quarterly Once a year

11.0 PROJECT BENEFITS

- Efficient use of available resources such as bagasse and water, to produce surplus power
- The proposed project on implementation will generate 36 direct employment opportunities
- The project is agro based, hence there will be plenty of indirect employments to locals
- No rehabilitation/resettlement issues are involved
- Factory is already implementing several schemes/activities for the benefit of local farmers, employees and those schemes/activities will be continued
- Technology for the project and pollution control are available indigenously

12.0 CONCLUSION

Proper implementation of EMP, risk and disaster management plan will help to prevent, control and mitigate the negative impact of the project and allied activities. At the same time, it will help to enhance positive impact. Overall, social and economic benefits of the project envisaged being profound and therefore, the project will be beneficial to the society and overall development of the region.