EXECUTIVE SUMMARY

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1.1 Introduction:

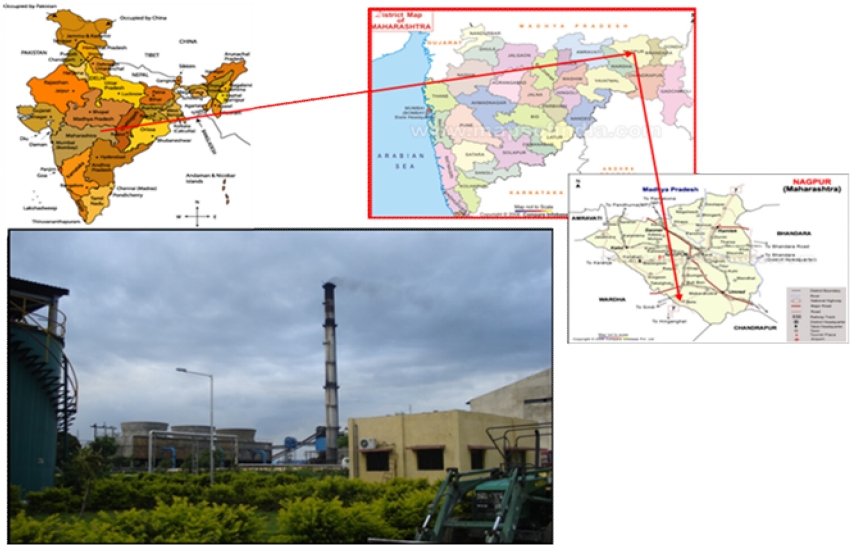
The Indian wine industries are producing liquor in less quantity as compared to developed countries worldwide. The Indian distillery industries are in its infancy stage, have compound average growth rate (CAGR) of above 25% over the last 6 years since 2010 which is very less. This has attracted high participation from the local entrepreneurs. The distillery industries are based on fermentation process with the help of the microorganisms. The Indian fermentation technology categorized as Maltry, Brewery and Distillery. In distillery fermentation process raw materials used are molasses or grains. M/s. Purti Power & Sugar Ltd. is interested in setting up of Proposed Demonstration Plant to process 50 TPD of Dry Lignocellulosic Feedstock to produce Absolute Alcohol / Rectified Spirit & Technical Alcohol.

The proposed expansion project is categorized as Category 'B' project as Environmental Impact Assessment (EIA) Notification, 2006 which necessitates obtaining the Environmental Clearance from the State Level Environment Impact Assessment Authority (SEIAA).

As per the requirement of EIA Notification, M/s. Purti Power & Sugar Ltd. has submitted the necessary application to SEAC for approval of terms of Reference (TOR). This report has been prepared as per the EIA Notification 2006.

1.2 Location and Boundaries

The proposed expansion project has been identified in Village - Khursapar (Bela), Tehsil- Umred, District – Nagpur, Maharashtra. The industry is located in the vicinity of potential sugarcane-growing area, which reduces the transportation cost of Sugarcane/ Bagasse / Molasses thereby reducing the pollution load due to the proposed activities. The proposed expansion activity has been identified in the existing facilities which will have less impact on cutting – filling of the land.

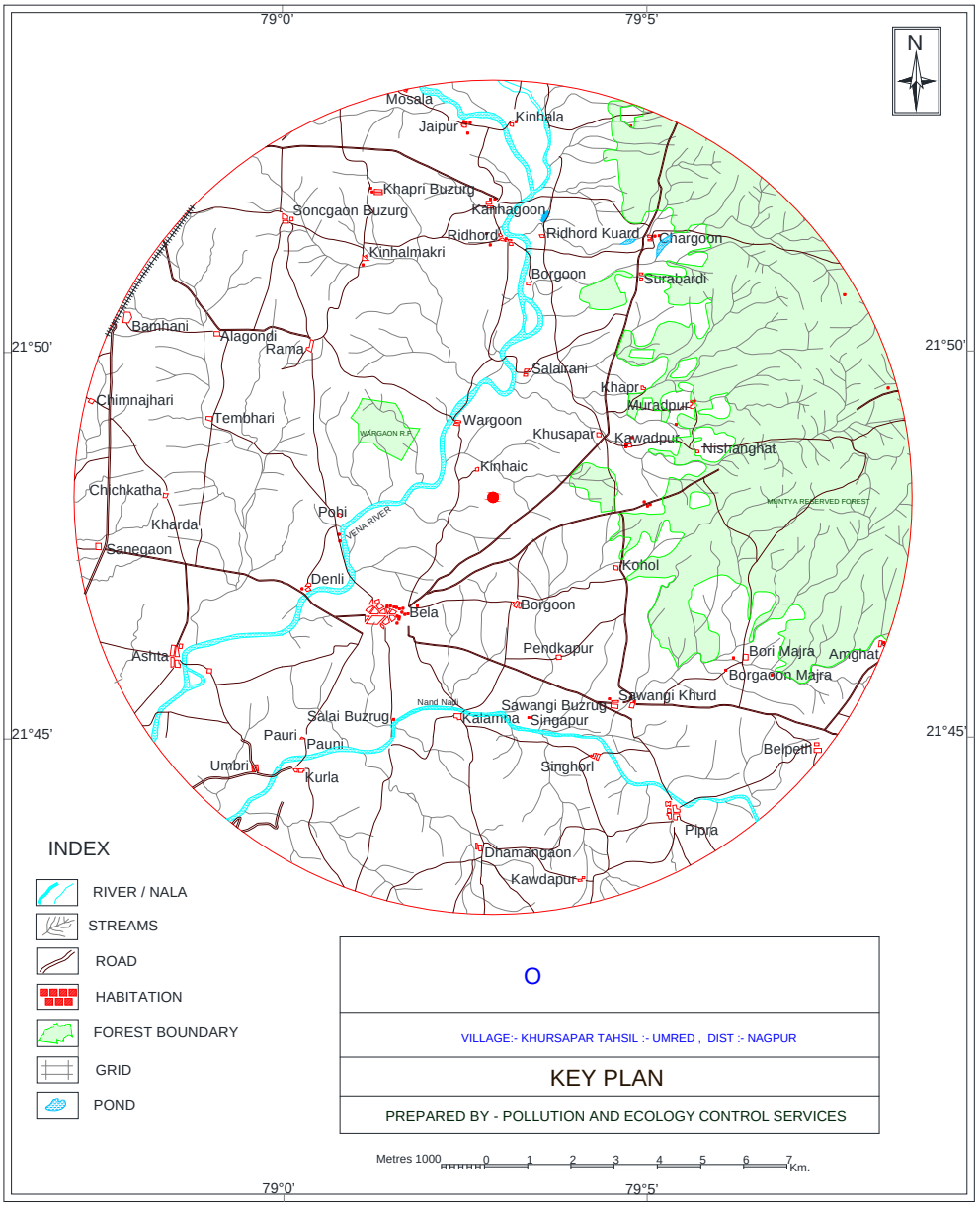


Location Map of the Proposed Expansion of Distillery Unit at Khursapar

Detailed Features of the Project Site within 10 km radius

SR. NO	FEATURES	PARTICULARS
1	Location	At/PO – Khursapar (Bela), Tah – Umred, Dist.- Nagpur State –Maharashtra.
2	Nearest National Highway	NH-7, 14 km at Sonegaon Village
3	Coordinates	Latitude – 20° 48’ 13.48”N Longitude – 79° 03’ 16.49”E
4	Nearest railway station	ButiBori, 25 km
5	Nearest village	Khursapar, 2 km
6	Nearest major city	Nagpur, 65 km
7	Nearest water body	Rama Dam ,2 km Venna River ,3 km
8	Nearest industry	Ideal Energy Projects Ltd. 0.5 km

9	Sensitive locations	Archaeological structures, Historical places, Protected Forests, Sanctuaries and Biosphere Reserves, Wild Life sanctuary and Coral Formation Reserve are not present within 10 km
10	Nearest forest	Muniyar Reserve Forest 3 km East of the project site



Study Area Map (10 km radius)

2.1 Raw Materials:

List of main raw material along with its quantity and source is given in table

Feed	**Corn Cob**	**Bagasse**
Quantity	55.5 MTPD (90% solid basis)	71.5 MTPD (70% solid basis)
Components in Percentage %		
Other Solids	3.0	5.0
Xylan	31.0	22.0
Arabinan	3.5	2.0
Cellulose	34.0	36.0
Insoluble Lignin	14.0	20.0
Soluble Lignin	5.0	5.0
Ash	1.5	3.0
Protein	2.0	2.0
Extractives	4.0	3.0
Acetates	2.0	2.0

2.2 Utilities

Water Requirement

For the proposed Demonstration Plant to process 50 TPD of Dry Lignocellulosic Feedstock to produce Absolute Alcohol / Rectified Spirit &Technical Alcohol, the water requirement will be 290 m^3/day .Water storage reservoir facility is already available for the proposed project within the premises of the industry. Source of water will be Ramadam.

Water Requirement and Waste Water Generation

All figures in cum/day

Section	Water required (m^3/day)	Water loss (m^3/day)	Water Recycled (m^3/day)
Co-fermentation	50	50	-
Distillation	10	10	-
Cooling	170	170	-

Tower			
Boiler	150	60	90
Evaporation	-	-	-
Total	**380**	290	90

***Net Input (Fresh Water) – 290 m^3/day**

Power Requirement

Power will be sourced from own captive Biomass based Power plant of 24.5 MW. The cost of electricity from the existing turbo alternator to the distillery and ETP has been assumed as Rs 4.70 /unit.

Section	**Connected Load, kW**
Pre-treatment+ Hydrolysis	440.00
Co-fermentation	164.00
Distillation	27.00
Evaporation	110.00
Product Storage	3.00
Chemical Storage	2.00
Material Handling	200.00
Cooling Tower	140.00
Instrument Air Compressor	22.00
Plant Lighting & Other	100.00
Boiler	NA
Total	**1208.00 kW**

Steam Requirement

The steam requirement of the proposed Plant will be around 6 – 7 MT/Hr which will be met from the existing boiler unit, no additional boiler will be installed. The existing facilities are having two boilers with 50 Mt/hr and 100 Mt/hr steam generation capacity.

2.3 PROCESS DETAILS

Material Handling & Washing Section:

In this section, feedstock is subjected to size reduction followed by removal of foreign particles like stone, sand and metal particles and then conveyed to Pre-Treatment Section.

Pre-treatment Section:

In this section, mainly C5 hydrolysis is done (i.e. conversion of Xylan to Xylose) in a Digester, where a High Pressure steam is introduced inside the wet biomass slurry in presence of acid. The organic acid solution is mixed continuously as per the requirement. The slurry is cooked at required temperature and pressure for a given residence time. The slurry from Digester is then flashed in a Flash Vessel in order to reduce pressure and temperature and then pumped to Enzymatic Hydrolysis section.

Enzymatic Hydrolysis and Fermentation Section:

The slurry from Pre-treatment section is fed to the Pre-hydrolysis reactor along with water and enzyme through a Pre-masher. In Pre-Hydrolysis Reactor, Reaction conditions maintained so as to convert all the cellulose into the sugars. The Partially hydrolysed slurry is then fed to Hydrolysis and Fermentation reactor where rest of the cellulose is converted to sugars and then sugars are fermented to ethanol. This reaction might take prolong time. In the process CO_2 is evolved as by-product. Pre-fermentors are also provided for yeast propagation and different nutrients are added as per the required dosages. Once the desired alcohol is achieved; fermented wash is taken for distillation.

Distillation & Dehydration Section:

In this section, fermented wash from the fermentation is distilled to produce rectified spirit of 95-96% concentration (v/v). The multi pressure distillation scheme shall be used with medium pressure steam. The whole stillage generated in distillation shall be pumped to Solid-Liquid Separation.

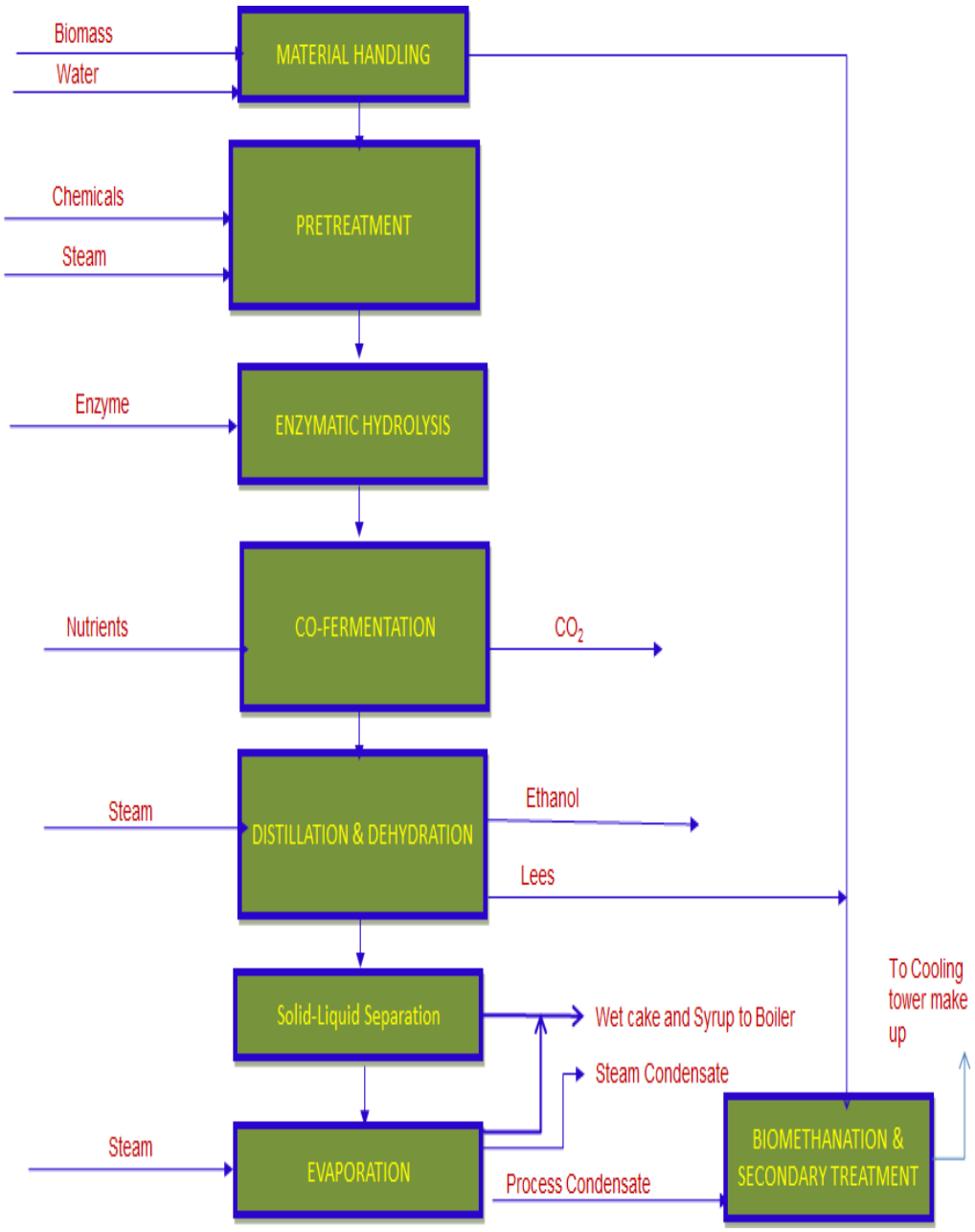
Evaporation Section:

The whole stillage generated from Distillation section shall be subjected to Solid-Liquid Separation to separate the suspended solids and to produce lignin rich wet cake. Filtered liquor after solid liquid separation shall be subjected to evaporation to

produce lignin rich thick stillage and generated process condensate will be recycled back to the process after treatment. This Thick Stillage and lignin rich wet cake will be fired in boiler to generate steam & power.

Effluent Treatment Section:

The Clarifier water from Pre-treatment section, Spent lees generated from Distillation section and process condensate from evaporation will be treated in ETP followed by aerobic digestion and water will be recycled back as cooling tower make-up.



Process Flow Diagram

2.4 DESCRIPTION OF THE ENVIRONMENT

Air Environment

The baseline environmental quality for theNovember, December and January – 2012-13 was assessed in an area of 10 km radius around the proposed project site.

It has observed that about 22.94% of total time, the wind was calm. The predominant wind directions were from NE (17%) and from ENE(13.6%).

The ambient air quality monitored at 8 locations selected based on predominant wind direction, indicated the following ranges;

PM_{10} - 27.69 to 46.92 µg/m^3

$PM_{2.5}$ - 10.1 to 18.7 µg/m^3

SO_2 - 5.8 to 17.0 µg/m^3

NO_x - 10.7 to 20.9µg/m^3

Industrial Area Residential, Rural Area (CPCB Norms)	100 µg/m^3	60 µg/m^3	80 µg/m^3	80 µg/m^3

The concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NO_x were found within the National Ambient Air Quality Standards (NAAQ).

Water Environment

A total 8 samples including four surface & four ground water samples were collected and analysed. The water samples were analysed as per Standard Methods for Analysis of Water and Wastewater, American Public Health Association (APHA) Publication.

The data indicates that the ground water as well as the surface water quality are below the stipulated standard for drinking water (IS 10500 – 1993 except high concentration of total coli form in surface water, which may be due to the human activities.

Noise Environment

Noise levels measured at eight stations are within limit of 55.0 dB (A) for Residential Area or 75.0 dB (A) for Industrial Area as given in MoEF Gazette notification for National Ambient Noise Level Standard.

Area Code	Category of Area	Limits in dB(A) Leq	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone**	50	40

**Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle horns, loud speakers and bursting of crackers are banned in these zones

Land Environment

Eight sampling locations have been selected in study area.Soil samples were collected at selected locations in the study area to assess the existing soil quality around the proposed project site. This will establish the baseline characteristics and will facilitate identifying the incremental concentrations due to the proposed project at a later stage. The baseline characteristics, which are analyzed, now include the impact on soil due to all the existing activities.

2.5 POLLUTION CONTROL

Impact on Air Quality

The steam and power requirement for Proposed Demonstration Plant to process 50 TPD of Dry Lignocellulosic Feedstock to produce Absolute Alcohol / Rectified Spirit & Technical Alcohol will be fulfilled from existing boilers of M/s Purti Power & Sugar Ltd.

The fuel pattern of existing boilers is 80% bagasses and 20% coal. The quantity is 1087 TPD bagasse and 164 TPD coal. M/s Purti Power and Sugar Ltd. already installed ESP followed by 90 Mt stack to control source emission.

Purti will implement all the control measures from the Day-1 of the proposed plant operation to comply with the new National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R No. 826(E) dated 16th November,2009.

The major emission is particulate matter from the plant complex due to use of bagasse and coal in the boilers.

Air Pollution Sources and Air Pollution Control Equipments

Sr. No.	**Source**	**Pollutant**	**Mitigation Measures**	**Control Equipment**
1	Boiler	SPM , CO	Mostly methane will be used. Hence no impact due to flue gases.	Dampers, ID Fan, CO_2meter, Fly-ash arrestor. Light ash through stack will be discharged.
2	Fermentation	CO_2	Tank covered	Scrubbed in water
3	Distillation	HC	Closed circuit	----------
4	Spent-wash	HC, Heat	Heat Exchanger	Cooling in closed circuit
5	ETP for Demo Plant	HC, Heat	Heat Exchanger	Cooling in closed circuit

Noise Levels

During operation of the fermenter for the production of the rectified spirit, no noise are generated as the process is biological in closed circuit.

Under any circumstances the noise level from the other sources of the industry will not exceed 75 dB (A). Noise levels generated at the project site will be confined to the plant area.

Mitigation Measures

The noise levels stipulated be Central Pollution Control Board at any point of time will not exceed the standards. The equipments will have inbuilt noise control devices. The measured noise level produced by any equipment will not exceed 75 dB (A) at a distance of 1.0 – m from its boundary in any direction under any load condition.. The general mitigation for the attenuation of the noise are given below:

- Encasement of noise generating equipment
- Use of lagging with attenuation properties on plant components / installation of sound attenuation panels around the equipment
- Other than the regular maintenance of the various equipment, ear plugs/ear muffs are recommended for the personnel working close to the noise generating units;
- All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Extensive vibration monitoring system will be provided to check and reduce vibrations. Vibration isolators will be provided to reduce vibration and noise wherever necessary;
- The insulation provided for prevention of loss of heat and personnel safety will also act as noise reducers.

Impact on Water

The total water requirement for the proposed plant is 290m^3/day.

The major sources of wastewater for biomass based distilleries are

- Process Waste Water
    - Recycle (Clarifier) Water Purge
    - Spent Lees
    - Process condensate

- Non-process Waste Water
    - Cooling water
    - Waste wash water
    - Boiler blow down
    - Domestic / Sanitary wastes

Process Waste Water

Recycle (Clarifier) water purge, spent lees and process condensate is nothing but the dilute effluent stream which shall be treated in ETP and used for cooling tower make-up.

Hence, no liquid shall be discharged out of the proposed plant.

Non-process Waste Water

Floor- vessel washings

This is biodegradable. The quantity is so small, no separate ETP is possible. This is used as a diluent before the effluent is fed to bio-digestor.

Wastewater from boiler blow down and cooling purging water

This is the less polluted stream without organic load except high temperature. This is cooled and is used for gardening purpose.

Reusable wastewater from CO_2 scrubbing

This will be used in fermentation process.

Sanitary / Domestic

The effluent is with low BOD (90-120 mg/lit) which is biodegradable and can be treated in a well designed septic tank of hydraulic retention time of more than 24 hours.

M/s. Purti Power & Sugar Ltd. has provided septic tank in the existing facilities. The treated effluent used for irrigation is disinfected to control odour. This disinfected treated effluent is being used safely by sewage farm workers for irrigation / gardening. This is found to be satisfactory.

Impact on soil

Project site has been identified in the Village - Khursapar (Bela), Tehsil- Umred, District – Nagpur, Maharashtra. The forest area in the study area is in patches. There

is no designated ecological park or Bio Reserve/Wild life sanctuary in the 10 km radius of the proposed plant site. The impact on terrestrial ecology will be negligible in the first instance and shall be insignificant.

Solid Waste Generation

Wet Cake

Wet cake separated from whole stillage and concentrated syrup from the evaporation shall be mixed and fired in the Boiler. Solid sludge from Feedstock washing and Clarification will be disposed of for land filling purpose.

2.6 Benefits

- Alcohol is well known raw material for manufacture of a variety of organic chemicals including pharmaceuticals, cosmetics, polymers etc.
- Ethanol is a potential fuel in the form of power Ethanol when blended with petrol. In presence of ethanol petrol burns with more efficiency and low toxic smoke reducing the pollutant in exhaust gases of vehicles.
- Petroleum is scarce, non-renewable and environmentally harmful product. On the contrary Ethanol is an eco-friendly product and it is a substitute to the imported petroleum. Ethanol willbe produced from lignocellulosic feedstock.
- Lignocelluloses are the plant dry matter, here using corn cob, corn stover, bagasse& cane trash for production of Ethanol.
- Alcohol is a potential source of revenue as it is mostly used in the industry.
- The use of lignocellulose as a raw material in the distillery unit will increase revenue of the Sugar industries and farmers, thus the industries can give better prices to the farmers supplying the sugar cane and corn cob.

2.7 CSR

- Construction of Hanuman Temple in Khursapar village.
- Supply of seed, fertilizer at subsided rate.
- The proposed project is expected to contribute towards – up gradation of local people’s Quality of Life.
- Workforce available locally will be employed depending upon their suitability.
- ITI is proposed for surrounding local villagers. Skill development of local people through training in local School by providing computers.

2.7 EIA Study Report

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

Chapter 1: Introduction

Chapter one provides purpose of the report, background information of the proposed project, brief description of nature, size and location of project, environmental setting of the project, estimated project cost, and scope of the study. The key environmental legislation and the standard relevant to the project and the methodology adopted in preparation of the report have also been described in this chapter.

Chapter 2: Project Description

Chapter two contain the layout of the plan, location, process, details of the proposed project, other technical and design information and sources of anticipated pollution.

Chapter 3: Baseline Environmental Status

Chapter three presents the methodology and findings of field studies undertaken to establish the environmental baseline conditions, which is also supplemented by secondary published literature.

Chapter 4: Anticipated Impact Assessment and Mitigation Measures

Chapter four details the inferences have drawn from the environmental impact assessment of the proposed project during various stages of project advancement, such as design, location of project, construction and regular operations. It also describes the overall Impacts of the proposed expansion project activities and underscores the areas of concern, which need mitigation measures during both construction and operation phase of the project.

The chapter also provides recommendations/Environment Management Plan (EMP) including mitigation measures for minimizing the negative environmental impacts of the project and enhancing the positive impacts.

Chapter 5: Analysis of Alternatives for Technology and Project Site

The technology and project site alternatives are discussed in the chapter five.

Chapter 6: Environmental Monitoring Program

Environmental monitoring requirements for effective implementation of mitigatory measures during construction and operational phase have been delineated in this

chapter. Infrastructural facilities, monitoring equipment needs and environmental monitoring cost are discussed to execute the environmental monitoring programme.

Chapter 7: Additional studies

Chapter seven describes various additional studies carried out for the project. Various risks associated during operational stage of the project are assessed in this chapter. Hazard identification and consequences analysis is worked out to understand the remedial actions required during operation phase. A disaster management plan to minimize the risks or to combat the associated risks is also presented.

Chapter 8: Project Benefits

Chapter eight describes various benefits of the project to the community in the vicinity and as well as to the region on the whole.

Chapter 9: Environmental Management Plan

Chapter nine describes the institutional arrangements for environments protection and Conservation during the operational stage of the Project and the management strategy for the project. Activities for Corporate Social Responsibility (CSR) are delineated in depth.

Chapter 10: Summary and Conclusion

The summary of the EIA report has been given in this chapter along with conclusions. It is an effort to present the EIA report in the form of a chapter. It will be easy for a reader to cover the whole report by studying this chapter.

Chapter 11: Disclosure of Consultants

The list of experts involved in preparation of the present EIA/ EMP report is given along with brief introduction of the consultancy organization involved in EIA report.

2.8 Conclusion:

This industry will manufacture Alcohol which are in good demand for growing infra-structural facilities in India and abroad. This will not disturb the present land use. No Prime Agriculture Land will be put to the 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.

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