

EXECUTIVE SUMMARY

1. INTRODUCTION

Natural Sugar & Allied Industries Ltd. (NSAIL) is having its distillery unit of 30 KLPD and is proposing Expansion of Distillery from 30 KLPD to 60 KLPD at Sai Nagar Ranjani, Tal: Kallam, Dist: Osmanabad. The geographical location of the project site is at Latitude 18° 32' 06.35" N, Longitude: 76° 14' 42.01" E). Site is well connected with state highway -160 connecting to Nearest Town Kallam (25 km). Nearest Railway station is also at Latur (35 km) and nearest Airport is Latur at the distance of 27 km. (The study area map is attached as *Annexure 1*)

2. PROJECT DESCRIPTION

2.1 Salient Features of the Project

The proposed expansion of distillery from 30 KLPD to 60 KLPD is proposed within the existing premises. (Layout Plan is attached as *Annexure 2*). The benefit of the sites is that the raw material and water availability is within the premises.

The projects requirements are as follows:

- The land requirement for the proposed 30KLPD distillery is approximately 14.5 acres and is already in possession of NSAIL.
- Operational days of the distillery are 270.
- The water requirement for the existing distillery is 300 m³/day and after expansion of the distillery unit it will be 600 m³/day.
- The raw material required will be in the form of molasses. The amount required for proposed expansion will be 27000 TPA and will be sourced from own sugar factory.
- Molasses storage tanks of existing distillery sufficient for proposed expansion also which are 3 Numbers X 6000MT.
- The total manpower requirement is 81 numbers out of which 36 will be skilled manpower and 45 shall be unskilled.
- The source of steam will be biogas based boiler of 6TPH capacity.
- Salient Features of the existing 30 KLPD Distillery and the proposed expansion of 30 KLPD are given below:

Sr. No.	Feature	Particulars	
1.	Name and address of the Company	Natural Sugars & Allied Industries Ltd. Sai Nagar Ranjani, Tal: Kallam, Dist: Osmanabad	
2.	Project	Expansion of Distillery from 30 KLPD to 60 KLPD	
3.	Date of registration of Sugar Factory	24 th November 1998	
4.	Working days per year	270/Annum	
5.	Products Alcohol	Existing 30 KLPD Plant 30 KLPD	Proposed 30 KLPD Plant 60 KLPD
6.	Main raw material	27000 MT of Molasses/Annum	27000 MT of Molasses/Annum
7.	Man power requirement	51	30
8.	Total land area	25 Acres (Total area of factory)	14.5 Acre (used for expansion within premises)
9.	Boiler capacity	30TPH	6TPH
10.	Boiler fuel	Bagasse(100T/Day)	Biogas
11.	Steam Requirement	120 TPD	120 TPD
12.	Power requirement	3500 KWH/day	3500 KWH/day
13.	Water requirement & source		
	Source	Manjra River	Manjra River
	Quantity	300 m ³ /day	300 m ³ /day
14.	Investment on EMP	3 Crores	10.4 Crore
15.	Project Cost	-	Rs.21.73 crores

2.2 Manufacturing Process

The process used for proposed expansion unit is Hi Ferm fermentation process is in batch mode followed by Multipressure Vacuum Distillation.

1) Fermentation

The purpose of fermentation is to convert the fermentable sugars into alcohol. The process is completed in following steps:

- **Molasses handling and Distribution-** This includes Screening of molasses, transfer to molasses receiving tanks, distribution to cell mass propagation, fermentation and sent to yeast activation section

- **Yeast propagation-** Yeast propagation section comprises molasses diluter and hygienically engineered yeast vessels equipped with heating, cooling and air sparging facility.
- **Pre-fermentation-** In the pre-fermenter vessel, molasses, process water, nutrients and additive are added for activation / growth of cell mass. Filtered air is sparged to repair the cell membranes and other cell components. Temperature is maintained at 30-32°C. Cellmass is transferred to yeast activation vessel to build up cellmass required for fermentation.
- **Fermentation-** The purpose of fermentation is to convert the fermentable sugars into alcohol. The fermenter temperature is maintained at around 30 -32°C by forced recirculation flow through plate heat exchangers.

2) Distillation

This step is followed to purify the product of fermentation process. In NSAIL proposed expansion project the following products are harnessed.

1. **Rectified Spirit (RS)**
2. **Extra Neutral Alcohol (ENA)**
3. **Absolute Alcohol**

The NASIL has proposed the following Storage facility for RS & ENA:

- Rectified spirit : 1 tank of capacity 12 lakh litres.
- Impure spirit : 1 tank of capacity 1 lakh litres.
- Pure ENA : 1 tank of 12 lakh litres capacity.
- Impure alcohol (Technical alcohol): 1 tank of capacity 1 lakh litres.

2.3 Pollution control measures

The major pollutant from the Distillery is the Spent wash. NSAIL has the spent wash holding tank of 15 lakh litres which can store the spent wash for 3 days.

The Spent wash is further sent to the following units for:

- **Biomethanation unit:** The spent wash from the ethanol plant will be passed through bio-methanation process to generate bio-gas and reduce the BOD / COD to the targeted levels and converts the sugar-rich biomass into methane. Further the CO₂ & Sulphur will be recovered from this unit. Which will in turn reduce the air pollution.
- **Multieffect Evaporator:** The spent wash after bio-methanation will be passed through a 5 stage multiple effect evaporator system to concentrate the solid to 10%. Hence it will be a totally zero discharge spent wash treatment. By means of incineration.

- **Incineration:** The reduced quality of spent wash will be sent to incineration in the boilers.

3. EIA STUDY

MITCON Consultancy & Engineering Services Ltd., Pune has been entrusted the task of carrying out EIA/EMP studies in order to obtain regulatory clearances from MoEF for the proposed Expansion of 30KLPD to 60 KLPD Distillery. The EIA studies were carried out for various environmental components so as to assess the anticipated adverse impacts due to the proposed facilities and to suggest suitable mitigation measures.

TOR has been issued for the preparation of the EIA report vide F.No. J-11011/94/2012-IA II (I) dated 27th July 2012. Considering the points in TOR the EIA report is prepared as per the EIA notification dated 14th September 2006 of the Ministry of Environment & Forests, New Delhi (MoEF).

Two broad types of methodologies *viz.* Field Surveys Methodology and Impact Assessment Methodology were followed for the above studies.

To get the idea of existing environmental conditions the survey the 10 Km radial area from project site is selected and the data collection is carried out for air & Noise quality at 5 locations, water quality at 7 locations, soil quality in 6 locations. The Ecological study is also carried out for 6 locations.

4. CURRENT ENVIRONMENTAL STATUS

4.1 Topography

- The existing site has plain topography and does not require cutting or filling.
- The R.L of the project site is as indicated by the contours on the toposheet is 660m.
- The difference between the highest R.L's in the East and West direction is 38 mts while between North to South direction is 15m.

4.2 Climate & Rainfall

- The climate of the district represents hot summer and general dryness throughout the year except during the south-west monsoon season, i.e., June to September.
- The mean minimum and mean maximum temperature is 8.5°C and 42.5°C respectively.
- The normal annual rainfall in the study area 842.80 mm

4.3 Air Quality

- The Air Quality are studies in the 5 locations including upwind and downwind direction
- The PM₁₀, PM_{2.5}, SO₂ and NO_x level are within permissible limit

4.4 Water Quality

4.4.1 Surface Water

- pH of Manjra River water 7.15 shows that the water is nearly neutral in nature.
- Electrical conductivity is 186 µmhos/ cm for Manjra river
- Total hardness of the sample ranges is 96 mg/l.
- Total Dissolved solid content are 138 mg/l.
- All the parameters are within permissible limit of IS 10500.

4.4.2 Ground Water

- The ground water level in the study area in premonsoon season are within 10 m. bgl.
- In post monsoon season water levels of 2-5 m. bgl is seen in the study area.
- Ground water level fluctuation >4 m.bgl during pre and post monsoon season. Observing the long term trend there is a rise in water level 0.2 to 0 m/yr.
- The Ground water quality in the study area is within permissible limits of IS 10500.

4.5 River System and Drainage

- Manjra River is the main river flowing through the district.
- Other rivers are Sina, Terna, Bori, Benitura and Banganga.
- The project area follows dendritic drainage pattern.

4.6 Seismology

- Project area falls in Seismic Zone III.
- It suggests that the area is a moderately affected Zone.

4.7 Soil Types

- The soil type of the study area is Clay loam.
- The soil quality analysis shows that the electric conductivity ranges from 182 to 305 µmhos/cm which is within the normal range.
- The soils are non acidic, as the pH ranges from 7.15 to 7.86 the soil is neutral in nature.

4.8 Minerals

- No major Minerals found in the study area.

4.9 Ecological Status

- **Flora-** The prominent plant in the study area is Gulmohor, which is found commonly near the road side. Babul was a common tree near the villages and on the hedge of agricultural field. The commonly found trees are Bahava, Bor, Tamrind, Samdi, Karanj, Acacia auriculaeformis, Neem, Peepal, Vad, Teak, Sheesham, Mango, Palas, Aniar etc.
- **Fauna-** No forest area comes under the study area. The Mammals found in the study area are Five Striped palm squirrel, Common / Indian Mongoose, Common Indian Hare, Indian Field Mouse, House mouse, House Shrew. Some reptiles like water snakes, monitor lizards and common lizards were also observed near village boundary. The dominant birds in the study area are House crow, Owl, Asian koel, Common Myna.

4.10 Socio-economic Aspects observed in the Study Area

The socioeconomic status of the study area as per census 2001 is tabulated below:

- Average size of household is 5
- Number of female is 943 per 1000 males
- SC population is 20.1 % whereas the ST population is 0.9%.
- 74% people are literate
- Workforce percentage ranges from 28.7-67%.
- Primary education facility, PHCs and post office
- Pucca & kaccha roads and bus facility is present
- Handpump or wells are used for Drinking water

5. ENVIRONMENTAL IMPACTS

Major impact due to the project will be on water use and water quality. However the other parameters are not affected much. However each parameter is covered in this section.

5.1 Impact on Water Use

The water requirement of the project is 300m³/day. Water will be drawn from Manjra River perennial source of water at a distance of 3.8 km from the site. The permission is already obtained for water drawl. Therefore the impact on this parameter will be negligible.

5.2 Impact on Water Quality

Nominal quantity of water will be used during construction period. Stagnant pools of water would promote breeding of mosquitoes and generally create unsanitary conditions. However, adequate arrangements would be made to ensure proper drainage of wastewater from the construction sites. During operation the ETP (biodigester) of 500 m³ will be provided to treat the spent wash generated after that Multi Effect Evaporation and incineration is done. This will be achieving 'Zero Discharge' plant to meet the guidelines of MoEF. The domestic effluent will be treated into STP followed by Gardening.

In addition to that the NSAIL has proposed to adopt rainwater harvesting. Total 26343 Sq.M. roof top harvesting area is available in the factory campus and around 600 to 700 mm rain is falling in this region every year. Total roof water is collected in the reservoir having capacity 7000m³ and the water is used for process & gardening. This would help in minimizing the negative impact on ground water environment; rather develop a better water environment in longer perspective.

5.4 Impact on Land Use Pattern

There would be very insignificant impact of the proposed project on the land use pattern as NSAIL has already possess the required land (14.5 acre) in factory premises. The land required for construction will be minimized by proper planning and time scheduling of construction activities. Domestic effluent will be sent to soak pit followed by septic tank inside the project premises.

5.5 Impact on Soil

This impact would be confined principally to the plant site and thus would be of localized nature. During the construction stage proper drainage system will be constructed for the waste water generated during construction period which will be discharged into low land areas and accumulation of water will be avoided. During operation phase the soil will not be affected due to any operation. However, any percolation of any contaminates into ground water will be prevented by constructing suitable storage facilities.

5.6 Impact on Air Environment

There will not be significant impact on the air quality as the boiler used will be biogas fired of the 6 TPH capacity with the stack height of 2.85 mts. During construction the air quality will be impacted due to fugitive dust emission. During construction and operation phase regular upkeep and maintenance of vehicle will be done to check the air pollution level under control. To reduce the fugitive dust emission regular sprinkling of water at the construction site is suggested.

5.7 Noise Environment

Noise would be an inevitable by-product of the operation. NSAIL will take all mitigation measures to control noise pollution by means of adopting paved roads and Proper study foundation provided for all the machines and equipments. Green belt plantation will act as noise buffer.

5.8 Impact on Ecology

The impact of construction activities would be primarily confined to the project site which is already in possession of proponent. As stated earlier, the land is principally agricultural in nature in the surrounding areas the impact on ecology will be very minor. NSAIL has already created a green belt of 10 Ha. and proposing to plant more trees which will restore the ecology of the study area alongwith increase in aesthetic beauty.

5.9 Impact on Demography & Socioeconomics

• Impact on Demography

The peak workforce strength during construction would rise-up to hundred persons. Though the technical persons and skilled labors would by and large, be imported from outside the study area, bulk of the labor force would comprise of unskilled and semi-skilled workers, a substantial number of whom would presumably be recruited from the surrounding areas itself.

Operation of the unit will require an appreciable quantum of skilled and semi-skilled workforce which, would have to be imported from outside the study area.

• Impact on Socioeconomic conditions

Construction of any major industrial project invariably results in socioeconomic changes. The influx of material and money lends to change the economic status of the community. Markets, workshops and commercial centers would develop in the area.

• Growth Dynamics and Stress Areas

It has been observed that people always have a propensity to settle at locations where civic amenities as transportation, postal service, educational institutions, drinking water, market, medical treatment, electricity etc. are easily available within a short distance, as well as the working place being within a reasonable distance. Therefore, some migrated people would settle in the peripheral zone.

6. ENVIRONMENTAL MANAGEMENT PLAN

6.1 Construction Phase Environment Management

a) Site Preparation

The development of site for erections of plant structure, office building & other allied activities shall require careful management planning as the construction activities will be located in plain barren land owned by the project proponent.

Care will be taken to control the dust nuisance that would be created by excavation, leveling and transportation activities so that impacts on the various components of environment would be minimized.

b) Noise

Though level of construction activities shall not be very high, still some specific sources of noise like welding, transportation, movement of earth movers, tractors, concrete or asphalt mixing etc. will be carried out in a controlled manner. Neither the plant nor the construction workers should be exposed to excessive noise levels.

c) Construction Equipment and Waste

Transport vehicles as well as transport routes will be properly maintained during whole construction phase to minimize smoke / dust emission from vehicle exhausts and unpaved roads. Composite solid wastes including metal scrape, earthwork, other wastes, getting generated in construction process will be disposed off in safe manner. Certain hazardous waste materials, though the requirement of such materials shall be small, will be stored safely and be disposed off properly.

6.2 Operational Phase Environment Management

a) Water Environment & Management

The ground water shall be used for the plant operation and generation of waste water & discharge should be maintained as per the MoEF current guidelines. The followings are to be strictly followed to meet the requirement:

- Multi effect evaporator will be used to reduce the spent wash generation from about 7 liters / liter of ENA to 700 ml of ENA in order to reduce pollution. Reduced spent wash will be burnt as boiler fuel.
- All sewage will be collected in a common septic tank and treated in an STP and will be reused for Landscaping/Green belt development.
- The record of input water every day for quantity will be recorded by installing water meters and periodically of quality will be ascertained.
- Measures will be adopted to segregate the storm water drain from effluent.

- Water conservation is to be accorded high priority in every section of the factory by avoiding wastage of water.
- Record of wastewater returned back to process and to gardening, both the quantity will be kept by installing water meters.
- The water balances will be regularly updated and that should be made available to all concerned members of Environment Management Cell.

Water Pollution & Control Facilities

The major contributions of pollution in a proposed expansion of distillery is aqueous effluent i.e, spent wash. The air pollution is mostly from Boiler stacks. Other sources of pollution are solid waste & noise.

Effluent Treatment Scheme for the Distillery Unit

The effluent treatment scheme for the Distillery Unit will be first treated in Anaerobic digester out of which Biogas generated will be used as a fuel to the Boiler. The treated spent wash is further led to multi-effect evaporator to reduce the volume of spent wash from the distillery. The concentrated sludge from the multieffect evaporator will be used as boiler fuel.

b) Air Environment Management

To minimize the impact due to the proposed project operations the following steps would be initiated:

- The emission characteristics should also be monitored regularly.
- Green belt to trap dust being emitted from fuel combustion and /or fugitive sources and also attenuate the other gaseous pollutants.
- The control of fugitive emission such as hydrocarbons from DG sets, process units/storage, the following measures are recommended:
 - Proper maintenance and clearing of the roads inside the plant
 - Raw materials trucks should be covered to stop dust emission
 - Monitor the consented parameters at ambient air quality monitoring station.
 - Monitor the work zone at various stations to satisfy the corporate requirements for health and environment.

c) Noise Environment

The following precautionary measures are to be adopted in the proposed project

- Insulate/enclose all the noise sources to avoid occupational exposure to the workers and to minimize the generation of excess noise level.
- Monitor the ambient and work zone noise level to conform the stipulated norms.
- Noise attenuation devices such as ear mufflers must be provided to the workers in the high noise exposure areas.

d) Biological Environment

Special attention is given to maintain green belt in and around the factory premises. 10 Hectares of green belt is already existing within the extant premises of NSAIL. Around 10,000 nos of trees are planned to be planted in factory premises and 10,000 outside the premises. Suitable tree species will be planted in the green belt which will act as a noise barrier and would also reduce the air pollution & improve the aesthetic backdrop of the site. As far as possible, the species should be indigenous and locally available Species would be planted.

e) Land Environment

However, the construction of green belts, parks, would largely offset the change to the existing landscape and would provide visual comfort. The improved economy of the area is expected to cause increased outputs to agriculture, trade and commerce. As NSAIL will implement zero wastewater discharge methodology, there would be no impact due to any wastewater disposal on land.

f) Occupational Safety & Health

All precautionary methods will be adopted by the company to reduce the risk of exposure of employees to occupational safety and health hazards.

Pre & post medical check-ups will be done of all the employees. Employees will be regularly examined and the medical records will be maintained for each employee.

Pulmonary function test and periodical medical check up shall be done once in every year. The following tests will be conducted for each worker:

- Lung Function Test
- Radiology – X-ray
- Pulmonary Function Test
- Audometric Test
- General clinical examination with emphasis on respiratory system
- Pre employment examinations
- Periodical medical examinations at the time of employment and after completion of employment.

For the safety of workers, personnel protective appliances like hand gloves, goggles, aprons, ear mufflers, nose mask etc. will be provided. Nose mask will be provided at places, where there is possibility of dust generation. In high noise generation areas ear mufflers will be provided for the workmen. Proper ventilation system will be provided in the process area.

g) Socio-Economic Welfare Activities

The operators and workers are to be trained in various aspects of ESH (Environment, Safety and Health). The managers and officers involved in Environment Management Cell shall undergo refresher workshop and up-gradation of information on various environmental issues.

The management of NSAIL shall help in promoting the activities related to environmental awareness in nearby villages. The proponent shall help in promoting local people for livelihood commensurate with their will, skill and abilities. Many other welfare measures will be taken from time to time.

h) Risk Assessment- Storage & Transportation RS/ENA

The proposed project will produce RS/ENA which is a flammable liquid. Leaving aside earthquake, cyclone, lightning, flood, arson, war and sabotage, the possible emergencies that can arise in the proposed project are:

- Release of ENA due to Failure of vessels, failure of pipelines, failure of process equipment.
- Specific failures like accidental spillage during handling.
- Consequential fires involving the flammable materials.

Mitigation Measures- The following mitigation measures are adopted

- Avoid breathing vapors & use of Self Contained Breathing Apparatus.
- Fire fighters should wear proper protective equipment.
- Spark & Leak arrestors will be provided at proper places.
- During Transportation the electrostatic charges should be prevented to avoid the explosion.

6.3 EMP Cost

The NSAIL has proposed to incur the following one time and recurring cost for the EMP measures.

EMP Cost for Expansion unit

No.	Particulars	Amount in Rs. Lakhs
One Time Installation Cost		
1.	Air Pollution Control System	20.00
2.	Noise Control System	10.00
3.	Green Belt Development	5.00
4.	Environment Monitoring and Management	15.00

5.	Water Pollution Control System (E.T.P.)+Multi-effect Evaporator	420.00
6.	Biogas plant	570.00
	Total	1040.00
Recurring Cost (per annum)		
1.	Environment Monitoring	10.00
2.	General maintenance of ETP/ Multi-effect Evaporator	35.00
3.	Greenbelt maintenance	2.50
4.	Occupational Health	2.50
5.	Environment Management	5.00
	Total	55.00

7. Environmental Monitoring

Environmental Monitoring is a tool to check the implementation of the Environmental Management Plan. It involves formation of a committee involving experts in various fields as well as Govt. officials for checking the implementation of the environmental management plan. The following monitoring plan is suggested for the project. The regular Environmental monitoring will be carried out to check the impact of the project on air, water, soil noise quality. Effluent from the distillery will also be monitored.

8. Project Benefits

The Expansion of distillery will have overall positive impact owing to the following benefits due to the project.

- The captioned project will have major socio-economic benefits including Employment generation, Infrastructure Development
- The benefits also include the socio-economic welfare measures viz. Advanced Soil Testing Laboratory Facility, Sugarcane Development Schemes.
- R & D facility plan including Adsali cane plantation Programme, encouraging reward for highest yield programme.
- Provision of Educational facilities.
- The proponent has allocated a total of Rs 9 crores for the socio-economic welfare of the people in the study area. The details of the same is tabulated below:

Budget for CSR activities

Sr. No.	Details	Financial provision (Rs in INR lacs)
1.	Soil testing for farmers	35
2.	Education facility on concessional rate	150
3.	PHC at campus for adjacent villages	60
4.	Ambulance and fire brigade	15
5.	Irrigation facility (Drip Irrigation) & seed distribution	300
6.	Training to farmers	10
7.	Providing of Bullock carts to farmers	250
8.	Pension scheme to parents of employees	80
Total		900