

EXECUTIVE SUMMARY

Chapter 1: Introduction

1.M/s Sonhira Sahakari Sakhar Karkhana Ltd [Sonhira SSK], is a presently became one of the major industry in the Sangli District. This industry was established by Dr. Patangrao Kadam, who is very known Leader of state of Maharashtra & also to the national level. Sonhira SSK is an important milestone in Agro-industrial transition conceived by Dr. Patangrao Kadam. Sonhira SSK is contributing to change the Social & economic environment of the area.

Sonhira SSK was established in the year of 1999. The proposed Expansion is envisaged for sugar 2500 TCD to 7000 TCD, Co-gen 22 MW to 34 MW and Distillery 30 KLPD to 60 KLPD at Mohanrao Kadam Nagar, Wangi, Tal-Kadegaon, Dist- Sangli, State-Maharashtra. The plot admeasures of proposed area is about 109.306 hectare. The expansion project will be done within the existing premises.

2.The Factory has been performing extremely well. It has excellent communication facilities. This place is easily accessible for transportation of raw material. The notification no. S.O. 1533 promulgated on 14th September 2006 have covered these type of industries under its entry 1(d), 5(g) & 5(j) for that captive power plant, Distillery & Sugar processing industry respectively.

Chapter 2:Project Description

3. Location of Project

The geographical location of the project is 17^o13'20.8" N Latitude & 74^o22'19.0" E Longitude with an elevation of 652m [2139.11ft] above mean sea level. Local authority has assured to provide all infrastructures like assures Electrical power, continuous treated water supply and internal road network, external approach road etc.

4. Manufacturing Process

Sugar

- Harvested cane transported to the factory by the farmers where cane weighing is done on Weigh Bridge. Sugarcane is passed through cane carries and kicker to the processing unit. Fibrizor cut the came in pieces to extract juice in three rollers in four mill tandem. Raw juice is heated at 35^ocand up to 70^oc followed by sulphitation and addition of milk of lime. Sulphited juice is again heated up to 102-103^oc. Scum is settled through Rapi

- Dorr and clarified juice is again heated in tabular juice heater up to 110⁰c. Clean juice containing about 70% water is passed through 4-6 evaporators. The thick juice called syrup is taken on pan floor for sugar crystal formation. After this process finished product containing sugar crystal formation. After this process, finished product containing sugar crystals (massecuite) is rotated in centrifugal machine to separate sugar and mother liquor from massecuite. Separated sugar from the centrifugal machine is passed in to the hoppers where sugar is dried, and cooled. Sugar is packed into polythene bags and ready for marketing. The present capacity of the sugar factory will be increased to 7000 TPD. The plant will be operated 190 days in a year.

- **Co-Generation**

Co-generation will be done through steam turbines of double extraction condensing route by 80 TPH boiler at 540° C steam temperature & using steam turbines for T.G. Set to produce 34 MW/day power.

- **Distillery**

Molasses is used for production of alcohol. Molasses contains about 50% total sugars, of which 30 to 33% are cane sugar & rest are reducing sugar. During Fermentation, yeast strains to the species *Saccharomyces Cerevisiae*, a living micro-organism belonging to class fungi converts sugar present in the molasses such as sucrose or glucose in the alcohol.

Molasses, diluted with the water to the desired concentration is metered continuously into fermented.

The yeast in the fermented wash is removed as 45 to 55 % v/v slurry & is returned to the fermenter.

Fermented wash is pumped to the wash preheated, which uses vapors from the distillation column to preheat wash.

When the fermenter enters the continuous production mode, propagation vessel III is used as an intermediates wash tank. Propagation is carried out only to start up the process initially or after very long shutdown during which the fermenter is emptied.

CO₂ produced during fermentation is scrubbed with water in sieve plate type scrubber, to recover alcohol. The water from the scrubber is returned to the fermenter. About 1% of total alcohol production is saved by scrubbing the fermenter.

Pre heated wash at around 72-74⁰C enters the top of degasifying column, which is attached the analyzer column. Analyzer column bottom temp has to be maintained around 80-80⁰C with the help of reboiler, where in heat is exchanged through the vapors from rectifying column top. From degasifying column part of the vapors will go to the aldehyde column to remove low volatile compounds which has been formed during fermentation like acetaldehyde and methanol. The total capacity of distillery will be 60 KLPD after expansion of the project.

5. Raw Material

The main raw material for sugar is Sugar cane, Lime & sulphur.

Raw material for Co-generation is Bagasse.

For distillery, the important raw material is Molasses.

Water

The total water requirement after expansion of project 2713 M³/day. [Sugar + Co-gen + Distillery].

Other utilities required are 1) Boiler: The power for the factory will consume for the in-house production and excess power will be sold to the MSEB. The boiler is designed for 115 TPH capacities with fuel Bagasse of 48.75 MT/hr. 2) Cooling Tower of capacity of 3800M³ with makeup of water from softener (768 M³).

- **DG Set: capacity shall be 500KVA**
- **Fuel for DG set will be HSD.**

The air pollution caused by this industry is mainly from boiler. The boiler will be provided with Electro Static Precipitator to combat ash pollution.

Waste Water : Water will be treated by adopting the approach of Biodigestion + MEE + Aerobic Composting. It is possible to achieve not only zero pollution but also will utilize fully the nutrient values and organic matter of Spent wash for the resource generation.

The main solid waste from factory will be of non-hazardous from office, garden, Effluent treatment plant. Non hazardous waste will be segregated as compostable and saleable. Solid waste such as yeast sludge and Boiler Ash are mixed with press mud and converted to bio compost will be made available to nearby farmers.

Legal requirements to mitigate the adverse environmental impacts have been incorporated in the feasibility report. All the equipment required for environmental pollution control will be installed during the construction phase. Environmental management plan (EMP) is suggested in this report.

Project Cost: Total Project Cost 141.21Cr b)CSR Cost 8 Cr c)EMP Cost 18 Cr

Chapter 3 Description of Environment

Environmental studies were carried out, as per TOR received from MoEFCC, Delhi

The study area is defined as area within 10 km radius from proposed expansion site of boundary.

Sangli has a semi-arid climate with three seasons, a hot, dry summer from the middle of February to the middle of June, a monsoon from the middle of June to late October and a mild cool season from early November to early February. The total rainfall is about 22 inches (580 mm).

Metrological data was obtained from IMD Sangli station for winter season. Accordingly, Ambient Air Quality monitoring stations were set up at 9 different locations. Parameters recorded are 1. Particulate Matter 2. Sulphur dioxide 3. Oxides of nitrogen 4. Carbon monoxide and hydrocarbons. Maximum concentration of SO₂ was 8.7µg/m³ at Shelkbav & minimum concentration was 7.1µg/m³ at Alsund as well as Wangi. Maximum concentration of NO_x was 11.1µg/m³ at Alsund as well as Shirasgaon & minimum concentration was 8.9µg/m³ at Shelkbav. Maximum concentration of PM₁₀ was 38.4µg/m³ at Project Site & minimum concentration was 24.9µg/m³ at Shelkbav. Maximum concentration of PM_{2.5} was 18.7µg/m³ at Project Site & minimum concentration was 8.8µg/m³ at Rampur. Maximum concentration of CO was 0.16µg/m³ at Project site & minimum concentration was 0.09µg/m³ at Bhalawani.

Noise levels were recorded at 11 different locations within the study area. The maximum noise level was observed 49.53 dB at Village Devrashtre in Day time & in Night time 40.53 dB at Village Chinchani. The minimum noise level was observed 40.75 dB at village Shivaniin Day time & in Night time the minimum noise level was observed 38.85 dB at village Wangi. The all observation was below the limit of standard Noise level Limit.

Land Use

A recent satellite image for study area was collected from NRSC. The image was interpreted for identification of various land use / land cover classes. Ground truthing was done to confirm and edit the interpreted land use / land cover classes. The major portion of land is covered by Agriculture land. Land use of the study area has been classified into 1) built up area (1.71%) 2) crop land (49.6%) 3) fallow land (13.40%) 4) water bodies (0.47%) 5) river (0.96%) 6) barren land (17.54%) 7) scrub land (10.52%) and 8) reserve forest (6.15%).

Soil:

Soil samplings were carried out at 8 locations in the study area

Soil around site area is dark brown to black colored cotton soil most commonly associated with Deccan plateau. As per Soil Classification, the soil within study area is mostly Silty Clay Loam and Silty Loam. The observation of soil sampling is follows as. The average soil texture of study area was Loamy. The maximum moisture content was observed in the Village Mohite Vadgaon (13%). The minimum moisture content was observed in the Village Shirasgaon (3.2%). The average porosity of soil in the study area was (48.77%). Maximum water holding capacity of soil was at Village Wangi (68%). The minimum Water holding capacity was at Village Chonchani (33%).

There are three reservoirs and two talav prevails rivers within the 10 km radius of the project site. Krishna is Major River and Yerala is small River. Chinchani reservoir [Sonkire talav] is located in the study area at approximate distance of 4.8 km in SW Direction from Plant site. Chinchani Talav is a water source for the M/s Sonhira SSK. Kadegaon Talav is located in the study area at distance 9.3 km in NW Direction, Tadasar Talav is located at the distance 5.6 km in NW Direction from the Project site. Water samples were collected from seven locations. Water quality assessment was carried out in Aavanira Biotech Pvt. Ltd. recognized by MoEFCC, GOI, New Delhi, and ISO 9001:2008, OHSAS 18001: 2007 NABL Certified Company.

Ground water sampling were carried out at 7 locations of the study area and analyzed for parameters mentioned in the Indian Standard BIS10500 (2012). All the heavy metals are found to be below the permissible limit. Total dissolved solids found high 543 mg/lit at village Vadgaon. Highest Concentration of Hardness found 252 mg/lit at village Vadgaon and lowest concentration of hardness found 39.6 mg/lit at Project site. Hence, all the water quality parameters are within BIS standard permissible Limits of ground water.

Ecology & Biodiversity:

The list of floral species is prepared based on visual observation during site visit and thorough review of literatures. Secondary data available with various government offices are referred for identifying rare or endangered species in the region. There are no endangered species of flora and fauna in the study area. There are no reports with the forest department about endangered species or notified protected species. Vernacular species are present in study area. Indian species such as *Hyena, Jackals, Wild Pigs, Red fox and Panther*. Typically vegetation is composed of natural and cultivated type. Like *Babhul, Neem, Beshrami* is common weed in wet areas. There are about sixty species of fish available in rivers, tanks, ponds. No threaten on flora and fauna in study area.

Socio-Economic Study:

Social survey is conducted 17th September, 2014 to 18th September, 2015 in 28 villages to collect factual information by involving community. For secondary data primary census abstract of 20011, Government of India has been used.

Chapter 4: Anticipated Environmental Impact Identification and Mitigation Measures.

Air Environment:

Impacts

Various identified sources, in production of Sugar, Power and Alcohol that can cause potential impacts on air quality are emissions from:

- Emission during construction phase
- Emissions during operation phase
- Emission from DG sets during power failure/ emergency purpose
- Emission form vehicular movement

Mitigation measures for air quality impacts include:

- Air pollution control equipments like ESP attached to boiler;
- Effective water spraying on the access roads to control re-entrained dust during dry season (if required);

- Plantation within project premises and around the boundary will reduce effect of air pollutants in the surroundings area.
- Valid Pollution under Control Certificates (PUCC) for all vehicles used on site will reduce air pollutants on roads.
- Proper periodic maintenance of pollution control equipments will be carried out to ensure its efficient operation.
- The methane from ETP shall be trapped and used as fuel in boiler.

A number of mitigation measures are taken to control fugitive emissions, the presence of which will be taken to Noticeable by plain vision if not controlled.

- Rubber wheel carts /trucks to bring in Raw materials, not filled high, sides cladded, slow speed travel , avoiding vibrations
- Engineering the plant layout in such a way so as to virtually Eliminate need of using heavy equipment for material handling in the main plant
- Concrete flooring & wind barrier for bagasse storage yard will be constructed.

Noise Environment

The proposed plant operations and related activities will lead to noise that may have significant impact on the surrounding communities in terms of increase in noise levels and associated disturbances.

Noise would result in increase in noise level due to

- Operation of Plant
- Construction activity and
- Vehicle / traffic movement

Mitigation measures for noise related impacts will

- Ensure hand-held concrete breakers are muffled
- Maintenance machines regularly
- Fit silencers to combustion engines. Ensure they are in good condition and work effectively
Keep machinery covers and panels closed and well fitted. Bolts/fasteners done up tightly
avoid rattles

- Selection of quieter tools/ machines. Equipments, placing noise barriers are other few majors adopted. Working staff shall be provided PPE and ear muffles.
- Enclose the noise sources
- Hearing protection by ear muffers

3. Water Environment:

The proposed project will utilize 2713 cum/day water during operation phase. The assured source of water will be from Chichni Talav through irrigation department. Total wastewater generation will be 970 cum/day. This waste water shall be used for green belt development. The waste water from existing distillery shall be used to generate biogas & bio-compost.

- Efforts will be made to reduce water requirement by recycle and reuse of process waste water etc;
- Treated wastewater will be used for irrigation and zero effluent discharge will be achieved.
- Recharge pits for rainwater harvesting will be made to improve groundwater condition;
- Domestic waste water shall be reused for Green belt.

4. Land

The study area covers 314 km². In that context the likely change in land use and land cover due to the project is likely to be in the order of 0.01-0.02% of the entire area, a relatively modest figure. Also as per the environmental risk categorization it comes under moderate risk level where the activity can operate subject to management and or modification.

Mitigation measures to reduce Land Use and land cover related impacts are:

- Optimization of land requirement through proper site lay out design will be a basic criteria at the design phase; Development and maintenance of green belt within project premises.
- As the Site is surrounded by Agriculture land as LU map suggest so care should be taken for the waste water disposal.

5. Soil

- Construction activity is limited. Effect on soil is limited to factory area only.
- Fertile soil will be stacked and used in landscaping.
- *The drainage plan will be implemented.*

- Fly ash, press mud and spent wash will be sale to authorized vendor. for composing
- Waste water will be treated in proposed ETP.
- Waste water will be channelized.
- The lagoons have been made by concrete with adequate size to prevent over flow. Thin layer lining will be done over concrete walls of lagoons to prevent percolation to ground water.
- Additional land comes under sugarcane cultivation. This will change the soil structure and will use additional water from ground/surface sources

6. Socio-Economic

Critical analysis of socio-economic profile of the area vis-à-vis its scenario with proposed project activities indicate that the negative impacts of the project are expected to be of low.

- Construction and maintenance of the approach road at regular interval will be carried out by the project proponent.
- Developed water management and Soil and Water conservation methods with recharge the groundwater will be adopted in the surrounding farms. Improving organic farming practices by providing agriculture technology in some of the villages in 10 km radius area, to solve the sanitation problems by sock pits, covered drains and construction of toilets and solid west management. Under CSR activities can be minimized the migration income generation activities and employment opportunity.
- People will not migrate to city or urban area in search of employment / livelihood. About 1000 village youth (Skilled and unskilled worker) will get the employment opportunities.
- Industry to ensure immediate action to stop contamination so that ground water is not polluted.

7. OCCUPATIONAL HEALTH & SAFETY

Risk of occupational injuries may occur during preparation of site development. Transportation activities like dust and wise pollution will have impact on community health. Potential damage to village roads will lead to inconvenience to the local community. Occupational risk during working at lights, welding operation is probable in construction stage. Risk of fire hazard need special emphasis and QRA has been done to minimize such events. PPEs during operation phase will reduce occupational health problems.

Chapter No. 5: Analysis of Alternatives

The existing technology used by Sonhira SSK for Manufacturing of sugar, co-gen & alcohol one of the best and proven technologies; hence no alternative Technology has been analyzed.

1. Improvement in crushing capacity & its utilization with updating of Technologies.
2. Milling performance by maintaining the machineries & its components is expected in modernization of the plant.
3. Reduction in energy consumption by adopting modern energy saving equipment and optimum use of steam will be achieved in operation of the plant.

The existing distillery plant is already having the 30 KLPD continuous fermentation system & multi-pressure distillation system. Now the Karkhana has decided to install the new 30 KLPD distillery with,

1. Continuous fermentation/ Fed Batch System.
2. Multi-pressure distillation system to produce RS, ENA & for fuel ethanol and
3. Molecular sieve dehydration technology shall be adopted.
4. Biogas plant & stand alone evaporation system has been incorporated as primary & secondary treatment system

Chapter 6: Environmental Monitoring Programme

An environmental monitoring programme is prepared to;

1. Measure effectiveness of operating procedure.
2. Confirm statutory & mandatory compliance.
3. Identify unexpected changes in operating conditions of the plant.
 - Periodic monitoring of PM₁₀, PM_{2.5}, SO₂ and NO_x will be carried out during the operational phase.
 - Post project sampling and analysis will indicate the general effectiveness of pollution control measures adopted.
 - The yearly cost for all types of monitoring is 5 Lac.
 - Online monitoring is also installed in the factory to measure wastewater characteristics. As per CPCB guidelines and reported directly to centre government.

Chapter 7: Additional Studies

Hazard Identification and Consequence Assessment and QRA

Identification of hazards in the proposed plant is of primary significance in the analysis. Quantification and cost effective control of accidents involving chemicals and processes have been modeled as precautionary measures. Quantitative Risk Analysis has been done to combat and minimize accidents. Actions taken during emergency are delineated to minimize health hazard. A classical definition of hazard states that hazard is in fact the characteristic of system/plant/process that presents potential for an accident

On-site and Offsite emergency plan prepared as per the factory act and as per Rule no. 12 of factory act (control of Industrial Major Accident Hazard Rules, 2003) and as per the guidelines given in Schedule 6. It is absolutely necessary to train carryout mock drills for success of emergency plan during actual emergency. Emergency procedures are laid down clearly and convincingly to everyone on site.

Chapter 8. Project benefit

The proposed project on implementation will generate potential jobs directly, and will also generate many indirect job opportunities. Quality of life of the people will improve. Production of sugar, alcohol will lead the state at higher level in its economic development. Market and business establishment facilities will also increase Cultural, recreation and aesthetic facilities will be improved due to CSR activities Improvement is in expected communication, transport, education, community development and medical facility.

Chapter 9: Environment Management Plan

For each stage of the program, the EMP lists all the requirements to ensure effective mitigation of significant biophysical and socio-economic impacts identified in the EIA.

- Energy and water conservation practices will be adopted.
- Green belt development plan is designed for project over 20 acres with variety of plants.
- Total rainwater generated and harvested through built-up and open area will conserve.

Chapter 10: Conclusion

All the possible environmental aspects are adequately assessed and necessary control measures are formulated to meet with statutory requirements. Thus implementing this project will minimize adverse impacts on surrounding environment. At the same time, income generation capacity will also improve in the area by direct and indirect employment leading to socio-economic development in the area. Hence proposed project will be a welcome development.

Disclose of consultant

The project proponents retained Sd engineering services pvt. ltd. as consultant to prepare EIA report for Sonhira SSK. The consultant has more than 15 years of varied experience in the field of environment. The mission of company is providing sustainable solutions on "Environment for Development". The company is an accredited EIA Consultant Organization by NABET, Quality Council of India under EIA accreditation scheme as per mandatory requirement of the MOEF, Govt. of India for carrying out Environmental Clearance studies.