

EXECUTIVE SUMMARY

1.0 Introduction

Swaraj India Agro Limited. (SIAL), a public limited company, integrated project of 4400TCD sugar & 19.50 MW capacity bagasse based cogeneration power project under commissioning & proposed to set-up 60 KLPD distillery unit & 2.5 MW power unit in factory premises at Village- Upalve, Tal- Phaltan, Dist. Satara, Maharashtra.

The environment clearance for 19.5 MW cogeneration has been received from Department of Environment, Government of Maharashtra (reference: SEAC-2013/CR-548/TC-2 dated 1st April 2015)

The proposed ethanol plant will have manufacturing capacity of 60 KLPD (RS/ENA/Ethanol). The steam and power requirement for the proposed ethanol plant will be made available by installing separate 25 TPH slop fired boiler and 2.5 MW back pressure turbine

The site is located at Village – Upalve, Tal – Phaltan, Dist. Satara of Maharashtra State. The total available land area of the project site viz. SIAL is 63 Acre. The site is located 7.5 Km away from SH -146 (Pusegaon -Phaltan) road.

The terms of reference issued by MoEF vide letter no. F. No. J- 11011/91/2014- IA II (I) dated 24th July 2014.

2.0 Project Description

Table: Salient Features of Project Site

Sr.	Details	Sugar	Cogen	Distillery & Power
1	Status	Under commission	Under commission	Proposed
2	Location	Village Upalve, Tal- Phaltan, Dist. Satara Latitude: 17°50'4.82"N Longitude: 74°23'10.98"E		
3	Gut No.	262, 264 to 266, 351, 340 346, 260, 258, 273 259 & 332/B/2		
4	Capacity	4400 TCD	19.5 MW	60 KLPD & 2.5 MW
5	Working days	160	Season: 160 Off season : 55	270
6	Raw material	Sugar cane	Bagasse	Molasses

7	Quantity of raw material	704000 MT	205568 MT	55149 MT 25432 MT – Inhouse 29717 MT – Procured from Other factory Spent wash :8.0 TPH Coal : 1.8 TPH
8	Water source	Existing Water Storage reservoir	Existing Water Storage reservoir	Existing Water Storage reservoir
9	Water requirement	130 M3/day	509 M3/day	643 M3/day
10	Project Cost	10061 lakh	11471 Lakh	9600 lakh

2.1 Location

The site is located at Village – Upalve, Tal – Phaltan, Dist. Satara of Maharashtra State. The total available land area of the project site viz. SIAL is 63 Acre. The site is located 7.5 Km away from SH -146 (Pusegaon-Phaltan) road. The project site have Latitude 17°50'4.82"North & Longitude74°23'10.98"East. Site is located 724 meter above the MSL.

It is just 15 km far away from Phaltan. The site is approachable by NH-13 Pune –Phaltan Road. Pune is 125 KM away and Satara is 44 KM away.

The nearest railway station is Phaltan Railway Station -5km away from the project site. The nearest state highway is SH- 146 (paranda to Barshi) which is located at 7.5 km away from the project site. The nearest airport is Pune which is 110 km away from the project site.

2.2 Land Requirement

An area of about 63 acres has been identified for locating the proposed project. The available land is adequate to install the sugar, cogen & distillery unit and its entire infrastructure.

2.3 Raw material requirement:

The raw material required will be in the molasses. The amount of molasses required for proposed project will be 55149 MT and 25432 MT will be sourced from own sugar factory and remaining 29717 MT will be procured from nearer factory.

2.4 Water requirement

The plant raw water requirement for distillery will be sourced from existing water reservoir & dug well in project site premises. The water requirement will be 388 m³/day.

2.5 Manpower requirement

The skilled manpower required for operation of the said 60 KLPD distillery will be easily available from the proposed areas. SIAL will require about 100 persons for operation of proposed expansion of distillery. Manpower training and skill up-gradation will become an integral part of the HRD policy.

3.0 Description of Environment

The study area for monitoring of environmental quality includes 10 km region around the project site. Site area covers the 10 KM radial study area in Survey of India (SOI) toposheet nos. E4305. The site is located in the rural area away from villages and other habitant.

Climate of Project area tropical wet and dry. The temperature of area is varies in the range 33°C-38°C in Summer and 5°C-20°C in winter. Due to Monsoon, we can experience the rainy season between the periods June to early October. In this area, near about 1000 mm rainfall occurs during monsoon.

The wind pattern as per the IMD observations shows that winds are generally light i.e. in the range of 1 to 19 kmph with some increase in the force during latter half of the summer and in the southwest monsoon season. The annual wind pattern shows the prominent wind directions as west, north-west, north-east followed by south-west.

Ambient air quality of the study area has been assessed during summer season through a network of six ambient air quality stations within an area of 10 km region around the project site. After completion of baseline survey it was found that all ambient air quality parameters are within the NAAQ standards of Central Pollution Control Board. SO₂ emission is found at Uplave due to transportation. NO_x emission at all monitoring location are within the NAAQ standards.

The minimum noise level 46.5 dB (A) and the maximum noise level 53.5 dB (A) were observed. The relative high values of noise recorded in factory premises and suburban areas were primarily due to vehicular traffic and other activities.

Surface and ground water in the study area is not polluted by any source during the study period.

Overall it is observed that the soils of the region are good for agriculture. The site is located in Zone-III as per the seismic map.

The vegetation of the area is deciduous type along with open scrub land. Total 63 floral species recorded & no RET floral species is reported in the study area.

Six species of Mammals, 9 species of Amphibian & Reptiles and 57 species of birds were recorded in and around the periphery of the project during the study period.

The project area falls under the Phaltan, Man & Khatav Tehsil of Satara district. Tehsil Phaltan has the highest number of villages (i.e 16). Villages falls under the Man & Khatav Tehsil are 14 & 7 respectively. Total population in the study area (37 villages covering three tehsil) is 53604 having 11511 numbers of households. Overall 50.56 % of the population is male & 49.44 % are Female.

4.0 Anticipated Environmental Impacts and Mitigation Measures

4.1 During Construction Phase

4.1.1 Impacts on Land Environment:

Due to construction activities within the project boundary, there would be considerable changes in soil characteristics. However the effect is limited to factory area only.

Mitigation Measures

- ❖ The packaging materials which may consist of wooden boxes and jute wrappers will be stored at suitable place and disposed off suitably.
- ❖ 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.
- ❖ Excavated soil will be used for green-belt development

4.1.2 Water Environment

Due to construction activities, the surface run-off during rainy season may contain more of eroded soil and other loose matter.

Mitigation

The earth work (cutting and filling) will be avoided during rainy season and will be completed during the winter and summer seasons only. Stone pitching on the slopes and construction of concrete drains for storm water to minimize soil erosion in the area will be undertaken. To strengthen the green belt in and around plant will be undertaken during the monsoon season. The overall impact on water environment during construction phase of the modernization unit will be temporary and insignificant.

4.1.3 Air Environment

During the construction phase, suspended particulate matter PM₁₀ & PM_{2.5} will be the main pollutant. The emissions from vehicles and construction equipment may also contribute to NO_x and SO_x.

Mitigation Measures

There will not be any major leveling operations required as the plant terrain of site is mostly plain. Construction vehicles are properly maintained to minimize exhaust emissions. The approach roads will be paved or tarred and vehicles will be kept in good order to minimize the pollution due to vehicular traffic. Dust will be controlled by regular water sprinkling all over the exposed area, at least twice a day using truck-mounted sprinklers.

4.1.4 Noise Environment

The major sources of noise during the construction phase are vehicles and construction equipment.

Mitigation

Equipments will be maintained appropriately to keep the noise level within 85 dB (A). Wherever possible, equipment will be provided with silencers and mufflers. High noise producing construction activities will be restricted to day time only. Overall, the impact of increase in noise on the environment would be insignificant, as it will be localized and mainly confined to the day hours.

4.1.5 Biological Environment

The project area does not encroach into any wildlife sanctuary or any other type of protected area. It could, therefore, be concluded that the project would not have major adverse impact on the wildlife.

4.1.6 Socio-Economic Environment

The impact of the proposed plant on Socio-Economic conditions of the study area is expected to be positive during construction phase.

- ❖ Increase in floating population, demand of ancillary services.
- ❖ Economic upliftment of the area.
- ❖ Rising of home rents, land prices and increase in labour rates.
- ❖ Benefits due to the civil construction and transportation companies to the local people
- ❖ The local population will have employment opportunities due to the proposed project. The local people will be preferred as laborious during the construction phase
- ❖ Local people shall be given preference for employment depending on their qualification
- ❖ All the applicable guidelines under the relevant Acts and Rules related to labour welfare and safety shall be implemented during the construction phase;
- ❖ The contractor shall be advised to provide fire wood/kerosene/LPG to the workers to prevent cutting of nearby trees

4.7 During Operational Phase

4.7.1 Impact on Ambient air:

A major source of air pollution is bagasse fired boiler & slop fired boiler. SIAL has boiler having capacity 110 TPH for cogeneration unit and 25 TPH slop fired boiler for distillery unit.

Simulation Model for Prediction using AERMOD View 8.2

Predicted maximum ground level concentrations considering micro meteorological data of March 2015 superimposed on the maximum baseline concentrations obtained during the study period to estimate the post project scenario, which would prevail at the post operational phase.

4.7.2 Impacts Due to Fugitive Emissions

Particulate emission due to burning of fuel (i.e. bagasse) from proposed boiler; similarly transportation facilities will affect the surrounding will be controlled through adequate dust suppression and/or extraction system so that the impact will be negligible.

Mitigation Measure

- Suitably designed ESP with efficiency of 99.9% will be placed downstream of the stacks, with stack height of 82 m of 110 TPH boilers & 52 m of slop fired boiler, well design burner system, Adequate thickness of insulating material.
- Measures will be adopted like Dust suppression system, Development of green belt

4.7.3 Noise Environment

Noise level can be reduced by stopping leakages, by providing padding at various locations, Encasement of noise generating equipment, Providing noise proof cabins, providing air compressor, process air blower, pneumatic valves

4.7.4 Impacts on Fauna and Flora:

The effect of air emissions from the stacks upon breeding birds (if any) proximal to the site will not be clear without careful monitoring. Consequently, air emissions are not likely to affect local fauna and flora.

4.7.5 Impact on Water Quality

No negative impact on ground water quality is envisaged, as all the wastewater generated from the proposed unit will be treated in the ETP and reused for ash management, dust suppression and green belt development. Proposed unit will be run on zero discharge concepts.

As per MOEF Guidelines, “Zero Discharge” is mandatory for distillery project. Spent wash is main liquid waste generated from distillery. The total 460 KL/day spent wash will be generated. Spent wash is concentrated in multi-effect evaporator (MEE) to reduce the volume & concentrate. Concentrated spent ash will be used in slop fired boiler as fuel.

4.7.6 Impact of Solid Waste

Mitigation Measures

Boiler Ash: During burning of bagasse in boiler ash will be generated. It contains silica, and other metal oxides. It is a non-toxic material. It will be directly sold brick and cement manufacturer unit. Ash generated from Slop fired boiler will sold to brick manufacturing.

ETP Sludge: ETP sludge contains plant growth nutrient therefore it will be used for manure in agro-field

4.7.7 Socio-Economic Environment

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

5.0 Corporate Social Responsibility (CSR)

Its CSR initiatives will be prioritized on local needs, which focus on Health, Education, Sustainable Livelihood, Social Mobilization, Infrastructure Development, Water

Harvesting, Agriculture and Environment Conservation. However It is proposed to initiate various developmental activities in consultation with the villager.

6.0 Environmental Monitoring Program

Sr.No.	Particulars	Location	Frequency
1.	Ambient Air quality for PM ₁₀ , PM _{2.5} , SO ₂ and NO _x	a. 2 samples downwind direction at 500m and 1000m respectively. b. 1 sample upwind direction at 500m.	24 hour sample half yearly
2.	Flue gas from chimney for flow rate PM ₁₀ , PM _{2.5} , SO ₂ and NO _x	Sampling port of chimney.	Monthly
3.	Wind velocity and direction	At site	Hourly
4.	Temperature (maximum & minimum) Humidity (maximum & minimum) Rainfall	At site At site At site	Daily Daily Daily
5.	Ground water	Within 1 km radius from spent wash tank and compost yard. 2 locations downward 1 location upward additional three locations with in 10 km radius from the site.	Half yearly
6.	River water Drinking water standards	One each at upstream and downstream	Quarterly
7.	Soil Organic and Inorganic matter	At lands utilizing treated effluent, 3 locations	Pre -monsoon and Post monsoon.
8.	Waste water	At site	Daily

7.0 Environmental Management Plan

Environmental Management Plan includes the protection, mitigation and environmental enhancement measures to be implemented to nullify the adverse impact on the environment. The management of the SIAL will take all the necessary steps to control and mitigate the environmental pollution in the designing stage of the project. While implementing the project SIAL will follow guidelines specified by CPCB under the Corporate Responsibility for Environmental Protection (CREP) for co-gen power plant. The EMP operation/implementation will be the responsibility of the “EHS Officer”, who will be coordinating, arranging the collection and reporting of the results of all emissions, ambient air quality, noise and water quality monitoring.

7.1 EMP for Construction phase

The construction activities of the proposed activity will increase in dust concentrations and fugitive emission due to vehicles. Frequent water sprinkling in the vicinity of the construction sites will be undertaken. During construction phase SIAL will be taken care to provide all necessary facilities to construction workers such as water supply, sanitary facilities, temporary housing, sewage treatment facilities, drainage facilities and domestic fuels.

7.2 EMP for Operation phase

7.2.1 Air Environment

The major pollutants from boilers during operation phase are PM10 & PM2.5, Sulphur Dioxide and Oxides of Nitrogen. These pollutants will be nullified by adopting following measure.

- Suitably designed ESP with efficiency of 99.9 % will be placed downstream of the stacks of cogeneration and slop fired boiler which will separate out the incoming dust in flue gas so as to maintain the emissions PM10 & PM2.5 (50 mg/Nm³) at the outlet of the stack.
- The height of the stack will be 82 m and is of single chimney as per CPCB Norms.
- The height of stack will be will be 52 m for proposed 23.5 TPH slop fired boiler

- Stack emissions will be regularly monitored by SIAL/external agencies on periodic basis by installing online monitoring station.
- To control of the airborne fugitive emissions from the ash handling area will be achieved through regular water sprinkling in this area.
- Avenue plantation and green belt development will be undertaken in the operation phase.

7.2.2 Noise Environment

- ❖ All rotating items will be well lubricated and provided with enclosures as far as possible to reduce noise transmission. Vibration isolators will be provided to reduce vibration and noise wherever possible
- ❖ Manufacturers and suppliers of machine/equipment like cane handling equipments i.e. crusher, kicker, roller, Buckauwolf mill, Hy. Truck Tippler, Feeder Tables, Belt Conveyor, Vacuum Pans, crystallizer, compressors, STG, turbines and generators will be manufactured as per OHSAS/MoEF guidelines.
- ❖ The insulation will be provided to reduce noise.
- ❖ The personnel safety such as ear muffs, ear plugs and industrial helmets will also act as a noise reducers
- ❖ Central control room(s) provided for operation and supervision of plant and equipment will be air-conditioned, glass fiber insulated frames which will help in reducing noise levels. Necessary enclosures will also be provided on the working platforms/areas to reduce the noise levels ;
- ❖ The workers working in the high noise areas like compressor houses, crushers, crystallizer, sulphator, blowers, generators, feed pumps, steam generation plant and turbo generator area will be provided with ear muffs/ear plugs

- ❖ Acoustic laggings and silencers will be provided in equipment wherever necessary. The compressed air station will be provided with suction side silencers. Ventilation fans will be installed in enclosed premises
- ❖ Supply ducts and grills on the ventilation and air conditioning system will be suitably sized for minimum noise level
- ❖ The silencers and mufflers of the individual machines will be regularly checked
- ❖ The noise level will not exceed the permissible limit 75 dB (A) during the day time 70 dB (A) night time within the plant premises. Green belt around the plant area will reduce the noise level further.
- ❖ Occupational Safety and Health Administration (OHSAS) System for evaluation of exposure of noise pollution on the associated staff and comparing it with permissible exposure and subsequently taking corrective actions will be developed.
- ❖ The adoption of the above measures, it is anticipated that noise levels will be maintained in 45-50 dB (A) range at the boundary of the plant premises. Earth mounds and plantations on the periphery of the plant would further attenuate noise level.

7.2.3 Water Management:

The total fresh water requirement for the proposed activity will be 643 m³/day and waste water generation will be 182 m³/day. The continuous efforts will be made to reduce the water consumption and thereby reduce wastewater generation. Periodic water audits will be conducted to explore the possibilities of minimizing water consumption.

100 % waste water will be recycled and reused so that plant will be operating on zero discharge concepts.

Treated waste water will be used for dust suppression, green belt development, ash handling system and it will be recycled in process so that raw water consumption will be reduce.

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

The spent wash generated in the RS/ENA plant will be treated in following stages, to meet the SPCB / CPCB / MoEF norms.

The spent wash of a distillery process is a serious problem by way of threat to the environment. Its volume from continuous fermentation plant is as large as 460 KL/day for a distillery of 60 KL/day capacity if Mojji distillation technology of multi pressure distillation with integrated evaporator system has been used and it may vary as per different technologies of Praj as well as Biostil of Alfa- Laval

The spent wash evaporation technology is a multiple effect evaporator system in which heat recovered from one effect is used to concentrate spent wash in second effect evaporator with continuous recirculation of concentrated spent wash within the system until desired concentration is obtained. This entire concentration process is carried out under vacuum leading to less consumption of steam and maximum concentration of spent wash with in less period of time.

The concentrated spent wash generated after entire process of evaporation is then sprayed in a furnace with auxiliary fuel such as coal and is then burnt in a boiler.

7.2.4 Solid Waste Management:

Solid by-products such as bagasse, press mud and molasses are generated as process waste products (byproducts) from the industry. Press mud is supplied to member farmers for their use as bio-manure and molasses is used in distilleries for its use as raw material in manufacture of ethanol. Bagasse produced from the Industry is used as a fuel in the boilers. Solid wastes such as boiler ash & ETP sludge are also produced from the proposed unit. These are disposed to farmers for their use as soil conditioner in land

Solid Waste Generation Details

Sr. No.	Particulars	Quantity	Disposal
1	Bagasse	205568 MT During Season (160 Days)	Used in Cogen Boiler (19.5MW)
2	Bagasse Ash	4105 MT generated during operation (Season as well as off- season) 11667 MT generated from slop fired boiler	Sell to Brick and Cement Manufacturing unit
3	Pressmud	28160 MT during season	Distributed to share holders which used as fertilizer on land
4	Molasses	28160 MT during season	Used in Ethanol Production
5	E.T.P. Sludge	9 MT during season 3 MT during off-season	Used for land filling & fertilizer for gardening in own factory premises

7.2.5 Green Belt Development Plan:

The main objective of the green belt is to provide a buffer zone between the sources of pollution and the surrounding areas. The green belt helps to capture the fugitive emissions and attenuate the noise apart from improving the aesthetics quality of the region. An area of about 18 acres is to be developed by SIAL as green belt. Around 1000 plant species will be planted in premises of SIAL.

7.2.6 Environment Management Cell:

It will be the responsibility of this Cell to supervise the monitoring of environmental attributes viz. ambient air quality, water and effluent quality, noise level etc either departmentally or by appointing external agencies wherever necessary. Budgetary allocation for environmental protection measures for co-generation power plant will be 8.15 Crore

Environmental Budget for proposed Distillery unit

Before the commission of the plant the Environment Management Cell will be formed to take care of environmental issues including plantation. The total fiscal estimation for EMP is indicated to be Rs 1430 lakhs - details are given table below:

Sr. No.	Parameter	Capital Cost (Rs lakh)	O & M cost per annum (Rs. lakh)
1.	Spent wash fired boiler including ESP	1200	24
2.	Solid waste management/ Ash handling system	100	10
3.	Gardening & Landscaping i.e. Green belt development	30	3
4.	Noise pollution control	50	6.5
5.	Environmental Monitoring	--	10
6.	Rain water Harvesting	50	7.5
Total Cost		1430	61