

## **PRE-FEASIBILITY REPORT**

### **1.0 EXECUTIVE SUMMARY**

#### **(I) Introduction**

DSCL Sugar- Hariawan, Distillery Division (A unit of DCM Shriram Limited) is proposing expansion in Molasses based Distillery from 200 KLPD to 260 KLPD along with Co-Generation Power Plant from 6.0 MW to 12.0 MW within existing plant premises at Village Hariawan, Tehsil & District Hardoi, Uttar Pradesh.

Environmental Clearance for 200 KLPD Molasses based Distillery along with 6.0 MW Co-generation Power Plant was obtained from MoEFCC, New Delhi vide letter no. J-11011/62/2016-IA II (I) dated 02<sup>nd</sup> May, 2017. 200 KLPD molasses based distillery plant is currently in the construction phase.

The proposed expansion will be done within the existing plant premises. The plant is adjacent to existing sugar mill namely DSCL Sugar- Hariawan having 10000 TCD capacity and for the distillery project molasses and bagasse will be sourced from the sugar mills.

As per EIA Notification dated 14<sup>th</sup> Sep., 2006 and as amended from time to time; the project falls in Category 'A', Project or Activity - 5(g).

**Table – 1  
Salient Features of the Project**

S. NO.	PARTICULARS	DETAILS
<b>A.</b>	Nature & Size of the Project	Proposed Expansion of Molasses Based Distillery from 200 KLPD to 260 KLPD along with co-generation Power Plant from 6.0 MW to 12.0 MW within existing plant premises.
<b>B.</b>	Category of the Project	As per EIA Notification dated 14 <sup>th</sup> Sep., 2006 and its subsequent amendments; the project falls in Category 'A', Project or Activity - 5(g).
<b>C.</b>	<b>Location Details</b>	
	Village	Hariawan
	Tehsil	Hardoi
	District	Hardoi
	State	Uttar Pradesh
	Latitude	27°31'40.60" to 27°31'54.25"N
	Longitude	80°09'17.93" to 80°09'40.86"E
	Toposheet No.	63 A/2, 63 A/3, 63 A/6
<b>D.</b>	<b>Area Details</b>	
	Total Plant Area	16.75ha(41.39 acres) No additional land is required for the proposed expansion, as the same will be done within the existing plant premises.
	Greenbelt / Plantation Area	5.53 ha (13.67 acres), i.e. ~33% of the project area will be covered under greenbelt/ plantation
<b>E.</b>	<b>Environmental Setting Details (with approximate aerial distance &amp; direction from plant site)</b>	
1.	Nearest Village	Akbarpur (0.5 Km in South direction)

2.	Nearest Town & City	Hardoi (14.5 km in South direction)		
3.	Nearest National Highway / State Highway	<ul style="list-style-type: none"> <li>NH 24 (30km in NE direction)</li> <li>SH 21 (14.5 km in South direction)</li> </ul>		
4.	Nearest Railway station	Hardoi Railway Station (14.5 km in South direction)		
5.	Nearest Airport	Lucknow (111 km in SE direction)		
6.	National Parks, Reserved Forests (RF)/ Protected Forests (PF), Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km radius	No National Parks. Reserved Forests/ Protected Forests, Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. falls within 10 km radius from the plant site.		
7.	River / Water Body (within 10 km radius)	<ul style="list-style-type: none"> <li>Sai River (Seasonal River) (800 m in South direction)</li> <li>Bhainsta River (Seasonal River) (1.0 km in SSE direction)</li> <li>Lucknow Branch Canal (6.0 km in East direction)</li> <li>Baruan Jhil (Seasonal Lake) (2 km in West direction)</li> </ul>		
<b>F.</b>	<b>Cost Details</b>			
	Total Cost of the Project	Rs. 90.0 Crores		
	Cost for Environment Management Plan	<ul style="list-style-type: none"> <li>Capital Cost: Rs. 10.0 Crores</li> <li>Recurring Cost: Rs. 0.50 Crores/annum</li> </ul>		
<b>G.</b>	<b>Basic Requirements for the project</b>			
	<b>Water Requirement (KLPD)</b>	<b>Existing</b>	<b>Additional (Proposed)</b>	<b>Total (After Expansion)</b>
		1792	538	2330
		<b>Source - Groundwater</b>		
	<b>Power Requirement (MW)</b>	<b>Existing</b>	<b>Additional (Proposed)</b>	<b>Total (After Expansion)</b>
		5.4	3.0	8.4
		Source - Co Generation Power Plant of 6.0 MW		
	<b>Man Power Requirement</b>	<b>Existing</b>	<b>Additional (Proposed)</b>	<b>Total (After Expansion)</b>
		145	20	165
		(Source:- Unskilled / Semi-Skilled - Local Areas; Skilled- Local & Outside)		
<b>H.</b>	Product Mix	Ethanol/ENA/ CL/IMFL/RS/ Impure Alcohol (Technical Alcohol)/CO <sub>2</sub> / Fusel oil		
<b>I.</b>	Working Days	330 days/annum		

## 1.1 ENVIRONMENT MANAGEMENT PLAN

### Air Management

- ESP with stack of adequate height will be installed with the boiler to control the particulate and gaseous emissions due to combustion of fuel.
- CO<sub>2</sub> generated during the fermentation process will be collected and sold.
- DG Sets will have adequate stack height as per CPCB Guidelines.

- Adequate measures for control of fugitive dust emissions will be taken.
- All the internal roads will be asphalted and swept regularly.
- Greenbelt development around the periphery & within the premises of the project will help in attenuating the pollutants emitted and maintaining air quality.
- Regular monitoring will be done to ensure that ambient air quality standards.
- Online Stack Monitoring System will be installed.

#### **Water Management**

- The distillery will be based on “ZERO EFFLUENT DISCHARGE”.
- Spent Wash: Spent wash generated from the analyzer column during the operation, will be concentrated in integrated & stand alone Multi – Effect Evaporator (MEE) from initial 12% solid to 55% solid and transferred for complete incineration in a special boiler designed for spent wash. Hence, the complete spent wash will be concentrated & incinerated & no spent wash will be discharged.
- Process Condensate: Process condensate from MEE will be treated & polished in CPU and recycled to process and cooling tower makeup.
- Spent Lees: The spent lees are completely being used in fermentation process.
- Closed water recycles system and plant process is designed to minimize fresh water requirement by recycling various effluents after treatment.
- A full-fledged STP for domestic sewage treatment is already in place.

#### **Noise Management**

- Maintenance, oiling and greasing of machines at regular intervals.
- PPEs like earplugs and earmuffs to the workers exposed to high noise level.
- Development of green belt/plantation for 33% of the total project area.
- D.G. sets will be provided with acoustic enclosures to control the noise level within the prescribed limit.
- Regular monitoring of noise levels will be carried out and corrective measures in concerned machinery will be adapted accordingly to the possible extent.

#### **Solid & Hazardous Waste Management**

- Concentrated spent wash will be incinerated with supplementary fuel (Bagasse/Rice Husk/Coal) in the incineration boiler.
- Fly ash generated from the boiler would be utilized for brick manufacturing/ soil amendment.
- Yeast sludge will be mixed with press mud and will be given to the farmers for soil amendment.
- Used oil & grease generated from plant machinery/gear boxes as hazardous waste will be sold out to the CPCB authorized recyclers.

### Greenbelt Development / Plantation

- Out of the total project area of 16.75 ha, 5.53 ha will be developed as greenbelt/plantation.
- Greenbelt has been developed as per Central Pollution Control Board (CPCB) guidelines.
- Native plant species will be planted in consultation with local horticulturist.
- Greenbelt development along with the road & plant boundary will be continued to attenuate noise level, arrest dust and improve the environment in surrounding.

### Odour Management

- Adequate greenbelt all around the periphery of the plant.
- Efficient CO<sub>2</sub> scrubbing to avoid carryover of alcohol vapours & other fumes.
- Better housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment.
- Longer storages of any product/by-products will be avoided & use of efficient biocides to control bacterial contamination.
- Regular use of bleaching powder in the drains to avoid generation of putrefying micro-organisms.

## 2.0

### INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

#### (i) Identification of Project and Project Proponent

DCM Shriram Ltd. came into existence in 1990 pursuant to the scheme of the erstwhile DCM Group, with a business history of more than 100 years. DCM Shriram Ltd. is headed by Shri Ajay S. Shriram being Chairman & Senior Managing Director of the group.

The other promoters are Shri Vikram S. Shriram, Vice Chairman & Managing Director and Shri Ajit S. Shriram, Joint Managing Director.

DCM Shriram, a diversified business conglomerate in North India has presence in the following business lines:

- **Chloro-Vinyl Businesses:**
  - Chloro- Alkali: This comprises of Caustic Soda (Lye and flakes), Chlorine and associated chemicals including Hydrochloric acid, Stable Bleaching powder, Compressed Hydrogen and Sodium Hypochlorite. The Company has two manufacturing facilities located at Kota (Rajasthan) and Bharuch (Gujarat) with coal based captive power. The Company's present Chlor-Alkali capacity stands at 780 TPD. Further a capacity of 465 TPD is under implementation which will make the final capacity at 1245 TPD.
  - Plastics Business: This is highly integrated business covering manufacture of Calcium Carbide and PVC resins with captive production of Acetylene, Chlorine and Coal based power located at Kota, Rajasthan.

- **Agri-Input Businesses:**
  - Fertilizer: The Company has the dual feed naphtha/LNG based Urea plant with a capacity of approx. 4 lakh T.P.A., located at its integrated manufacturing facility at Kota. It is currently operating on 100% Natural Gas.
  - Shriram Farm Solutions: This business provides complete basket of Agri-inputs to the farming community by offering a range of Fertilizers, Micro-nutrients, Hybrid seeds, Pesticides and other Value added products etc. through its wide distribution network along with high quality agronomy services aimed at increasing farmer productivity.
  - Bio-seed: Bio-seed business is present across the entire value chain, i.e. Research, Production, Processing, Extension activities and Marketing with established significant presence in India, Philippines and Vietnam. The Company is present in both Field and Vegetable Crops in India. In Philippines and Vietnam the business is present primarily in Corn. The Company has also started test marketing of Corn in Indonesia.
- **Sugar:**

Sugar business comprises of 4 facilities with a combined capacity of 33,000 TCD in Central U.P. and Co-Gen power capacity of 111 MW.
- **HariyaliKisaan Bazaar:**

The Company has rationalized this business and discontinued the retail operations except sale of fuel.
- **Cement business:**

Located at Kota with a manufacturing capacity of 0.4 Million tone and is based on waste lime sludge generated from the Calcium Carbide – Acetylene production process.
- **Fenesta Building Systems:**

Manufactures UPVC windows (Un-Plasticized PVC) and door systems under the brand “Fenesta”. The business offers complete solutions starting from Design, Fabrication to Installation at the customers’ site.
- **PVC Compounding:**

The business operates under a 50:50 Joint Venture of DCM Shriram Ltd. with Axial LLC (subsidiary of Axial Corporation – a leading international manufacturer of Chloro-Vinyl products) w.e.f. April 2014.

DCM Shriram Limited is having 4 sugar manufacturing units in U.P. namely

  - DSCI Sugar- Ajbapur, District LakhimpurKheri
  - DSCI Sugar- Loni, District Hardoi
  - DSCL Sugar Rupapur, District Hardoi
  - DSCL Sugar- Hariawan, District Hardoi

**(ii) Brief description of nature of the project**

DSCL Sugar- Hariawan, Distillery Division is proposing expansion in molasses based distillery from 200 KLPD to 260 KLPD and Co- generation power plant from 6.0 MW to 12.0 MW within existing plant premises at Village Hariawan, Tehsil & District Hardoi, Uttar Pradesh.

Environmental Clearance for the 200 KLPD Molasses based Distillery alongwith 6.0 MW Co-generation Power Plant has been obtained from MoEFCC, New Delhi vide Letter No. J-11011/62/2016-IA II (I) dated 02<sup>nd</sup> May, 2017. **The plant is currently in the construction phase.**

DCM Shriram Limited is having 4 sugar manufacturing units in U.P. named DSCL Sugar Ajbapur, District Lakhimpur Kheri and DSCI Sugar- Loni, Rupapur & Hariawan- all in District Hardoi.

The proposed plant is adjacent to nearby sugar mill named DSCL Sugar- Hariawan having 10000 TCD capacity and for this distillery project molasses and bagasse will be used from the sugar mills.

**(iii) Need for the project and its importance to the country and/ or region**

Advancement in science and technology has created so many products that have enhanced the quality of human life in every passing year. The human race is largely dependent on industrialization for up gradation in quality of life. Progress of the nation is judged through its economic growth which is largely dependent on industrial productivity. In Indian economy (which is agro based) many industries are dependent over agricultural produce for production of luxury and need based commodities. Alcohol has assumed a very important place in the Country's economy. It is a vital raw material for a number of chemicals. It has been a source of revenue by way of excise duty levied by the State Government on alcohol liquors. It has a potential as fuel in the form of power alcohol for blending with petrol in the ratio of 20:80. The use of alcohol for the purpose of potable liquor is as high as its use for industrial purposes. The Country Liquor is mainly used by the common masses.

According to analysts, the Indian alcoholic beverages industry is expected to witness accelerating growth in coming years with the consumer base likely to expand amidst rising disposable income. The domestic alcoholic drinks market is estimated around \$13 billion and has been growing at a compounded annual growth rate in excess of 10% in the past few years. The growth rate is higher than other major Asian markets like China and South Korea, etc.

In the path of company's growth and development this project will serve as yet another milestone.

**(iv) Demand- Supply Gap**

Not required in this project. This depends on Excise Department.

**(v) Import vs. Indigenous Production**

Indian market could not meet present alcohol demand. So they import alcohol 5-7% of total demand. As far as ethanol production is concerned, Indian market play a vital role at both domestic & international level. So they require producing more alcohol to meet the demand.

**(vi) Export Possibility**

There will be possibility of export of alcohol to African, European & Asian countries.

**(vii) Domestic/ Export Markets**

Market depends on Excise Department.

**(viii) Employment Generation (Direct and Indirect) due to the project**

For smooth functioning of the plant, the company needs a team of 165 persons. These persons are responsible towards their respective department such as Process Plant, Boiler Operating Plant and administrative block.

**3.0**

**PROJECT DESCRIPTION**

**(i) Type of Project including interlinked and independent projects, if any.**

There are no interlinked projects related to this proposed expansion project.

**(ii) Location (map showing general location, specific location, and project boundary & project site layout) with coordinates**



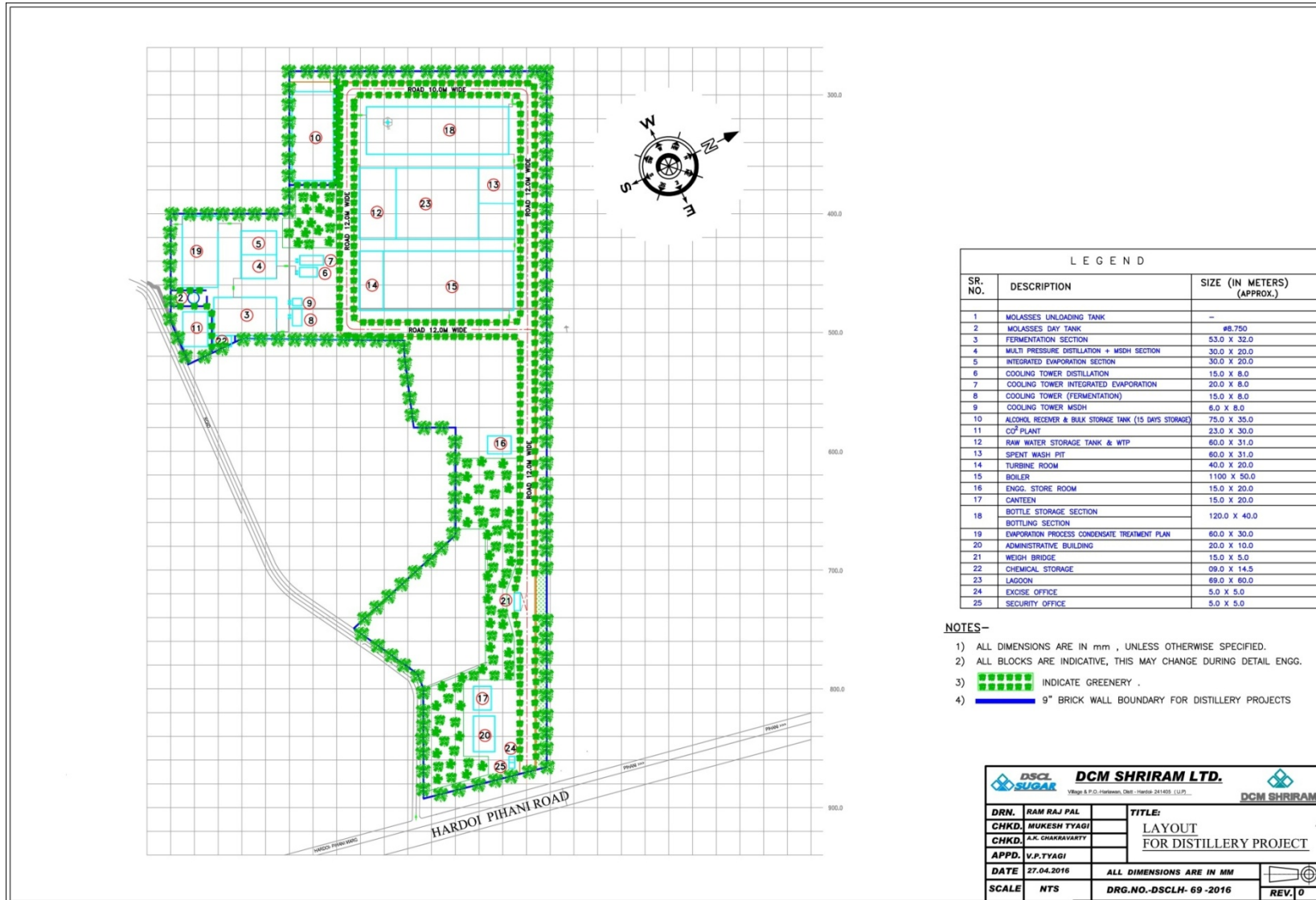


Figure - 2: Plant Layout

(iii) Key Plan

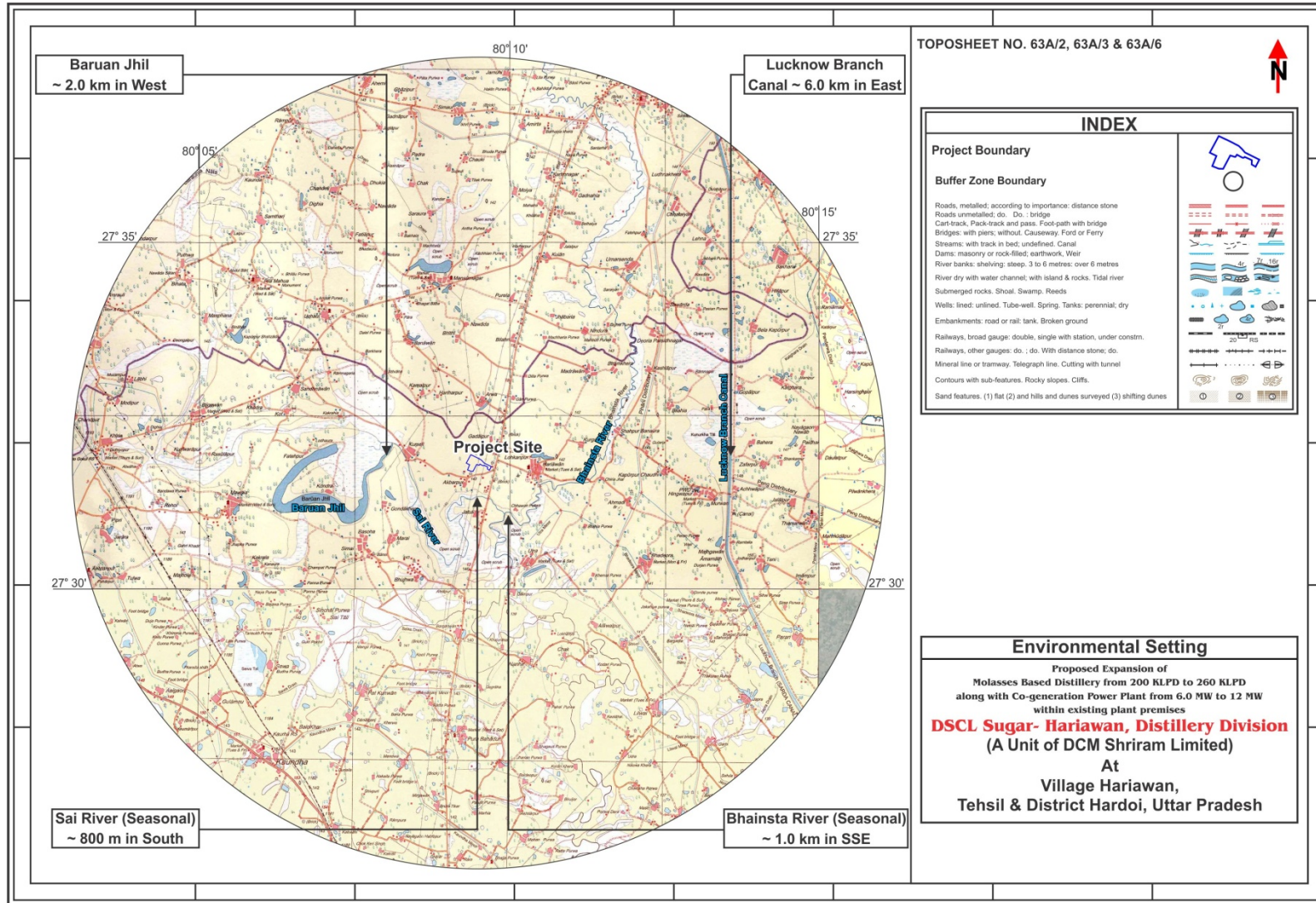


Figure - 3: Key Plan

**(iv) Details of alternative sites consideration and basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.**

Since the proposed capacity expansion will be done within the existing plant premises by modernization & efficiency improvement hence no additional land will be required; therefore, no alternative site has been considered.

The following points justify implementation of this project:

- Proposed project is located adjacent to the company owned existing sugar mill at Village Hariawan, Tehsil & District Hardoi, Uttar Pradesh. It is located nearby to its own sugar mills in District Hardoi and Lakhimpur Kheri.
- Easy availability of raw material i.e. molasses from the existing and adjacent sugar mill(s).
- Nearness to NH-24 (~30 km in NE direction) and State Highway SH-21 (~14.5 km in South Direction) makes it easier to transport raw materials & final product to market.
- There is no National Park, Biosphere Reserves and Tiger Reserves within 10 km radius of study area.

**(v) Size or magnitude of operation**

DSCL Sugar- Hariawan, Distillery Division (A unit of DCM Shriram Limited) is proposing expansion in Molasses based Distillery from 200 KLPD to 260 KLPD along with Co-Generation Power Plant from 6.0 MW to 12.0 MW within existing plant premises at Village Hariawan, Tehsil & District Hardoi, Uttar Pradesh. The 200 KLPD Molasses based distillery plant is currently in the construction phase.

**Table – 2  
Project Proposal**

S. No.	Units	Existing Capacity	Additional Capacity	Total Capacity after proposed expansion (KLPD)
1.	Distillery	200 KLPD	60 KLPD	260 KLPD
2.	Co-Generation Power Plant	6.0 MW	6.0 MW	12.0 MW

**(vi) Project Description with Process Details**

**FOR MOLASSES BASED OPERATION**

**i) Molasses Unloading and Storage**

Molasses from tankers will be unloaded at unloading point and transfer in to molasses storage tank.

**ii) Hiferm-Nm Saccharification and Instantaneous Fermentation:**

**Yeast Activation:**

Yeast seed material is prepared in water-cooled Yeast Activation Vessel by inoculating sterilized mash with Active Dry Yeast. Optimum temperature is maintained by cooling water.

The contents of the Yeast Activation Vessel are then transferred to Fermenter.

### **Fermentation:**

The Molasses from storage tank to be pumped to Dilutor installed in Fermentation section and diluted with water. The diluted Molasses called Wort will be feed into Pre Fermenter for activation of Yeast. The activated yeast from the Yeast activation vessel transfer into pre fermenter.

Once the yeast activated in Pre fermenters it will be transfer in to fermenters and diluted molasses to be add. The process of fermentation is to convert the fermentable substrate into alcohol. The pH of the wort is adjusted by the addition of acid. Yeast is available in sufficient quantity to initiate fermentation rapidly and complete it within the cycle time.

At the start of the cycle, the fermenter is charged with wort and contents of the Yeast Activation Vessel. Significant heat release takes place during fermentation. This is removed by passing cooling water through the Fermenter PHE's to maintain an optimum temperature. The recirculating pumps also serve to empty the fermenters into Beer Well. After the fermenters are emptied, they are cleaned with water and caustic solutions and sterilized for the next batch. The carbon dioxide evolved during the process is vented to atmosphere after recovery of alcohol in a scrubber.

### **iii) Ethanol Distillation:**

Fermented wash from wash holding tank T-01 is pumped by wash feed pump P-01 to the top of degassing column (C-2) after preheating the same in beer heater E-02 and spent wash heat exchanger E-01. The vapours along with non-condensable gases from the top of degassing column (C-02) are rectified in Heads column (C-03), to expel the high volatiles, technically known as heads. Bottom liquid from the degasser flows into analyzer column (C-01) where alcohol is stripped from the liquid. The liquid from bottom of analyzer column (C-01) is completely stripped of alcohol and is pumped out by thick slop discharge pump P-02 through heat exchanger E-01 where it preheats the fermented wash before it enters degassing column. The slop from the analyser column will be feed in to decanter. The dilute alcohol vapours from near the top of analyzer column (C-01) are condensed first in beer heater (E-02) while exchanging heat with wash feed and then in analyzer condenser (E-03). Degasser and analyzer operate under vacuum. The condensate from E-02 and E-03 is collected in Rectifier Feed Tank V-02. The vapours for stripping alcohol are generated from analyzer column bottom liquid in the analyzer column re-boiler (E-04) by using the rectified column top vapours, as discussed subsequently.

Vapours from the top of heads column (C-03) are condensed in heads column condenser (E-06) and then in head column vent condenser (E-07). Part of the condensate is returned to column C-03 as reflux while a small portion is taken out as an impure spirit cut. Liquid from bottom of C-03 is also taken into Rectified feed tank V-02.

Dilute alcohol water mixture from rectifier feed tank (V-02) are pumped by rectifier feed pump (P-04) through rectifier feed pre-heater E-11 in to rectifying column (C-04). Rectifier and its associated equipment work under pressure so that these vapours can supply the necessary heat for generating the vapours.

The condensate from E-04 is then pumped as Reflux to rectifying column C-04. Rich alcohol vapors at a concentration of 95.5% v/v from top of rectifying column (C-04) are condensed first in Analyzer (E-04) and then in Reflux Vent Condenser (E-05). The liquid from E-04 and E-05 are collected in Rectifier Reflux Tank (V-01). Part of the liquid from E-05 may be drawn off as impure spirit. The impure spirit cut will be maintained as little as possible to maintain aldehyde levels to meet the required limits in Absolute Alcohol.

Liquid from the reflux tank (V-01) is pumped by Product Pump (P-03) partly as product and partly as reflux to the top of the Rectifying Column (C-04). The necessary rectifying vapours to C-04 are generated by boiling the C-04 bottom liquid in Rectifier Column Re-boiler E-08 using medium pressure steam. Some side streams are drawn from rectifier column as light and heavy fractions of higher alcohols called fusel oils and cooled in fusel oil coolers E-09 and E-10 and are mixed with water and allowed to separate out in fuel oil separator F-01. All vents from E-03, E-07, V-02 and E-05 are connected to Vent Gas Absorber (C-05) where the vent gases are scrubbed with water to recover entrained alcohol. The scrubber water is used for washing the fuel oils in fuel oil separator to recover alcohol from the fuel oil fractions. The absorber vent is connected to vacuum pump (G-01) which is used to create vacuum in the analyzer and degasser.

Absolute alcohol is manufactured by dehydration of Rectified Spirit. The process adopted here is based on Pressure Swing Adsorption (PSA) system using Molecular Sieves (3-A). The flow scheme is shown in above referred flow diagram.

Rectified spirit, after preheating by waste hot streams, is vaporized and superheated in E-03 and E-04 by using medium pressure steam at 6 Kg/cm<sup>2</sup>g pressure. Hot vapours at kg/cm<sup>2</sup> g pressure and 130° C temperature pass through PSA column S-01A/S-01B where the water vapours are retained while water free alcohol is released as vapours. The vapours are condensed in E-07 and E-08 and collected as Absolute Alcohol. When the molecular sieve bed is saturated with water the alcohol vapours are shifted to the other tower and the first tower is taken for regeneration. Regeneration is done first by pressure releasing and creating vacuum and then by elutriating with dehydrated alcohol vapours from the tower in dehydration operation. The vapours are condensed in E-06 and E-05 and the vent vapours are recovered through scrubber C-02. Vacuum can be created vacuum by P-04. (Educator may also be considered for this duty). Product is cooled in E-09 and transferred to Absolute Alcohol receiving tank and then on to storage tank.

**iv) Alcohol Daily Receivers & Bulk Storage:**

Alcohol is first taken to Daily receiver storage tanks, which is based on the State Excise laws, storage for three days considering the weekly holidays of two days. Thereafter, the alcohol is transferred to Bulk Storage Tanks after taking the daily receiver Dip. This is transferred using flameproof pumps. Final dispatch of alcohol is metered and again is carried out using special flameproof pumps. The Bulk Spirit Storage is proposed to be set up for 30 days.

**EFFLUENT HANDLING SECTION**

**i) Evaporation Section:**

- ❖ The spent wash coming from distillation section will be fed in to first calandria of the evaporator section. There will be five calandria will be installed as per design to concentrate the dissolved solids .suggested treatment scheme is a four FF + Finisher Evaporation Plant for spent wash Evaporation. The following points will elucidate the basic working principle:
- ❖ Shell & Tube type Evaporators with highly efficient liquid distributor working on the principle of Falling Film Evaporation have been used, with Plate type Preheaters for preheating of FEED stream which serves the purpose of energy conservation.
- ❖ Analyzer vapour is fed to the first effect evaporator shell side at the given pressure and temperature as the heating medium.
- ❖ The Feed from the Feed balance tank is taken to to make the best heat recovery.
- ❖ The Feed after getting heated to the predetermined temperature in preheater is fed from the first effect evaporator which is Falling Film Evaporator -1
- ❖ Vapours generated in 1st effect VLS (Vapour Liquid Separator) are used as heat source in the 2nd effect. and from 2nd to third and so on.
- ❖ The product at the desired concentration of TS is obtained at the outlet from the final effect,
- ❖ A Shell & tube type Multi-pass Surface condenser is employed for condensing the shell side vapours.
- ❖ The Pure and the process condensate are collected in receiving vessels.
- ❖ Highly efficient operating pumps will be provided for pumping the required fluid.
- ❖ The operation of the plant will be under vacuum. Vacuum is created with the help of a water ring vacuum pump.
- ❖ The plant will have high level of automation to get consistent output at required concentration.
- ❖ The system operates under vacuum. Water-ring vacuum pumps are used to maintain a desired vacuum.
- ❖ Cooling water from cooling tower is used in the surface condensers for condensing the vapours.

ii) **Incinerator boiler:**

The concentrated effluent is mixed with bagasse/coal/rice husk and dried in a Rotary Dryer to generate mixed fuel. This mixed fuel is burnt in Incinerator boilers of 60 TPH & 40 TPH to generate high pressure steam.

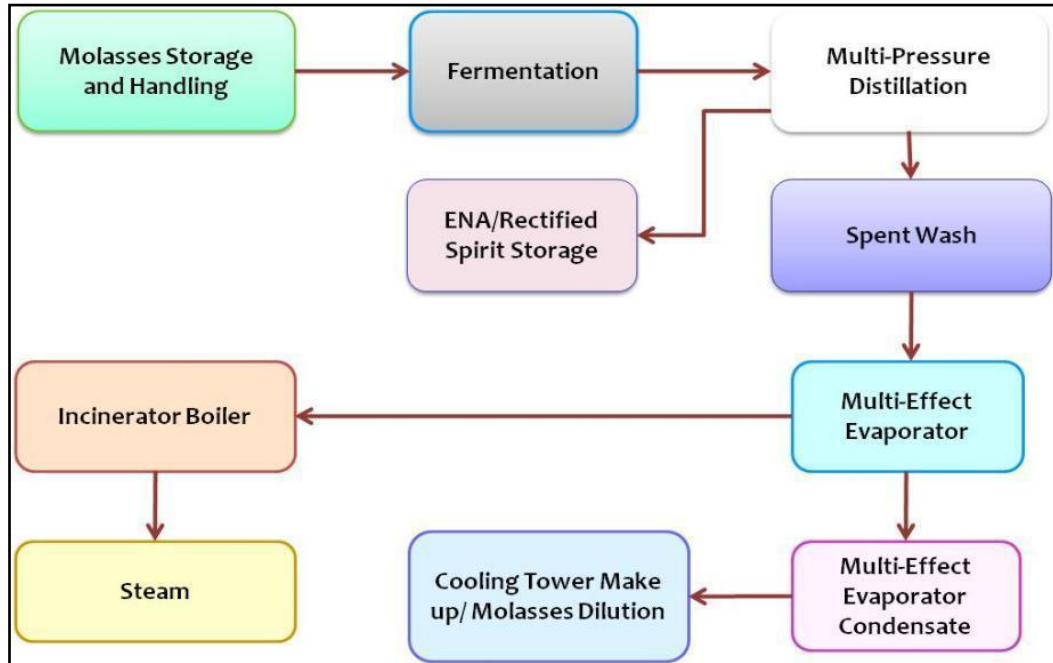


Figure 4:- Process flow diagram of Molasses based Distillery

**Power Co-generation 12.0MW**

**OPERATIONS**

The unit proposes to set-up boiler and power turbine.

2 Boilers of 60 TPH & 40 TPH will be installed based on Concentrated Spent Wash and Bagasse / Rice husk / Indian coal as available fuel options. The Boiler will operate mainly to feed steam to Molasses based operations and 12.0 MW power generations from Turbine.

Proposed 12 MW Co-Generation plant consists of a high pressure water tube steam boiler extraction cum condensing steam turbine. Fuel in the steam boiler will be burnt with the help of air in the boiler furnace. Water will be circulated in the boiler drum and tubes thus getting heated by the flame burning in the boiler furnace. Water comes out of the boiler drum located at the top of the boiler as steam. Flue gases rise in the boiler furnace and come in contact with the steam coming out of boiler drum. Steam after coming in contact with flue gases gets heated up further thus getting superheated. Super heated steam leaves the boiler in a pipe. Flue gases after super heating the steam pass through economizer where they pre-heat the boiler feed water before it enters the boiler drum. After economizer, flue gases pass through air pre-heaters where they heat the air which is fed to the boiler furnace for burning the fuel. After air pre heaters flue gases pass through ESP where the dust particles are collected. The dust is collected from here.

High pressure superheated steam from boiler is passed through a steam turbine, which is used for distillery process operations. While passing through the turbine, the high pressure and temperature steam rotates the turbine rotor and an electric alternator mounted on the same shaft. Electric power is generated by the alternator. This electric power generated is consumed in house i.e. for running the distillery and utilities like boilers auxiliaries etc.

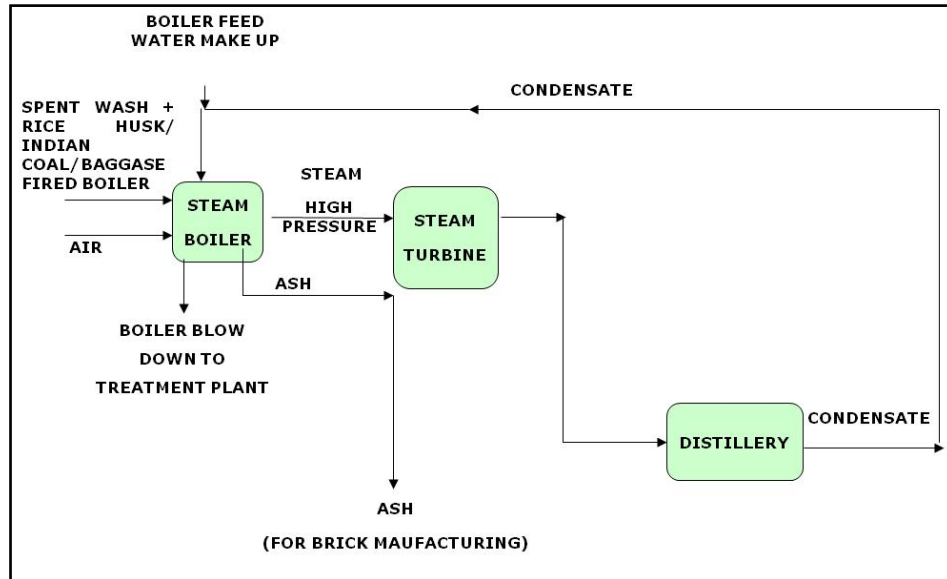


Figure 5: Process Flow Chart for Co-generation Power Plant

(vii) Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished product.

(a) Raw Material Requirement

Details regarding quantity of raw materials required, their source, mode of transportation along with their storage facilities for proposed Molasses based distillery are given in table below:

Table 3  
Raw Material Requirement for Molasses Based Distillery

S. No.	Particular	Existing	Additional (Proposed)	Total (After Expansion)	Source of the Raw Material & Mode of Transportation
1.	Molasses (MT/day)	915 MT/day	337	1252	From own sugar mills / By road & pipelines
2.	Chemicals	Quantity (MT/d)			Near-by Markets / By road
	Sodium Hydroxide (Caustic soda)	2.2 MT/ day	0.66	2.86	
	Nutrients	0.8 MT / day	0.25	1.05	
	Liquozyme	0.12 MT / day	0.04	0.16	
	Saccharifying Enzyme	0.24 MT / day	0.072	0.312	
	Yeast (Active Dry Yeast/Distiller's Yeast)	0.05 MT/ day	0.015	0.065	

**(b) Fuel Requirement**

Concentrated Spent Wash and Bagasse / Rice husk/Indian coal will be used for the boilers of 60 TPH & 40 TPH. Details regarding fuel requirements are given below.

**Table 4  
Fuel Requirement**

Name of Raw Material	Quantity			Source Of Materials
	Existing	Additional	Total (After Expansion)	
Concentrated Spent Wash	563 MT / day	170 MT / day	733 MT / day	Own plant through pipelines
Bagasse/ Rice Husk or Indian Coal	250 MT / day Or 150 MT/day	75 MT / day Or 45 MT/day	325 MT / day Or 195 MT/day	Own Sugar mills via conveyor belt/ Through local vendors via road

Note: - The usage of fuel mix will be as per availability & technology.

**(viii) Resources optimization/ recycling and reuse envisaged in the project, if any, should be briefly outlined.**

Water as a resource is being/will be recycled at each possible step of the process and latest technology and methodology is being/will be adopted to conserve and reuse the resources.

- No water is extracted from ground.
- The distillery is Zero Effluent Discharge so does not pose any threat to ground or surface water quality.
- Incorporation of advanced technique i.e. Multi Effect Evaporator and Incineration boiler is enabling substantial reduction of final effluent.
- Water is conserved at every stage of process. Large quantity of water is re-used & recycled.
- Rainwater from rooftop is collected and stored in water tanks and reused.

**(ix) Availability of water it's source, energy /power requirement and source should be given.**

**(a) Water Requirement and Source**

Existing water requirement is 1792 KLPD. After expansion & installation the total water requirement for the project will be 2330 KLD. Water requirement will be met from ground water.

Existing	Additional	Total (After Expansion)
1792	538	2330
<b>Source - Groundwater</b>		

**After expansion Water Requirement for 260 KLPD Molasses Based Operation**

The total water requirement for the Molasses based is estimated 2330KLPD, worked out as per details given below:

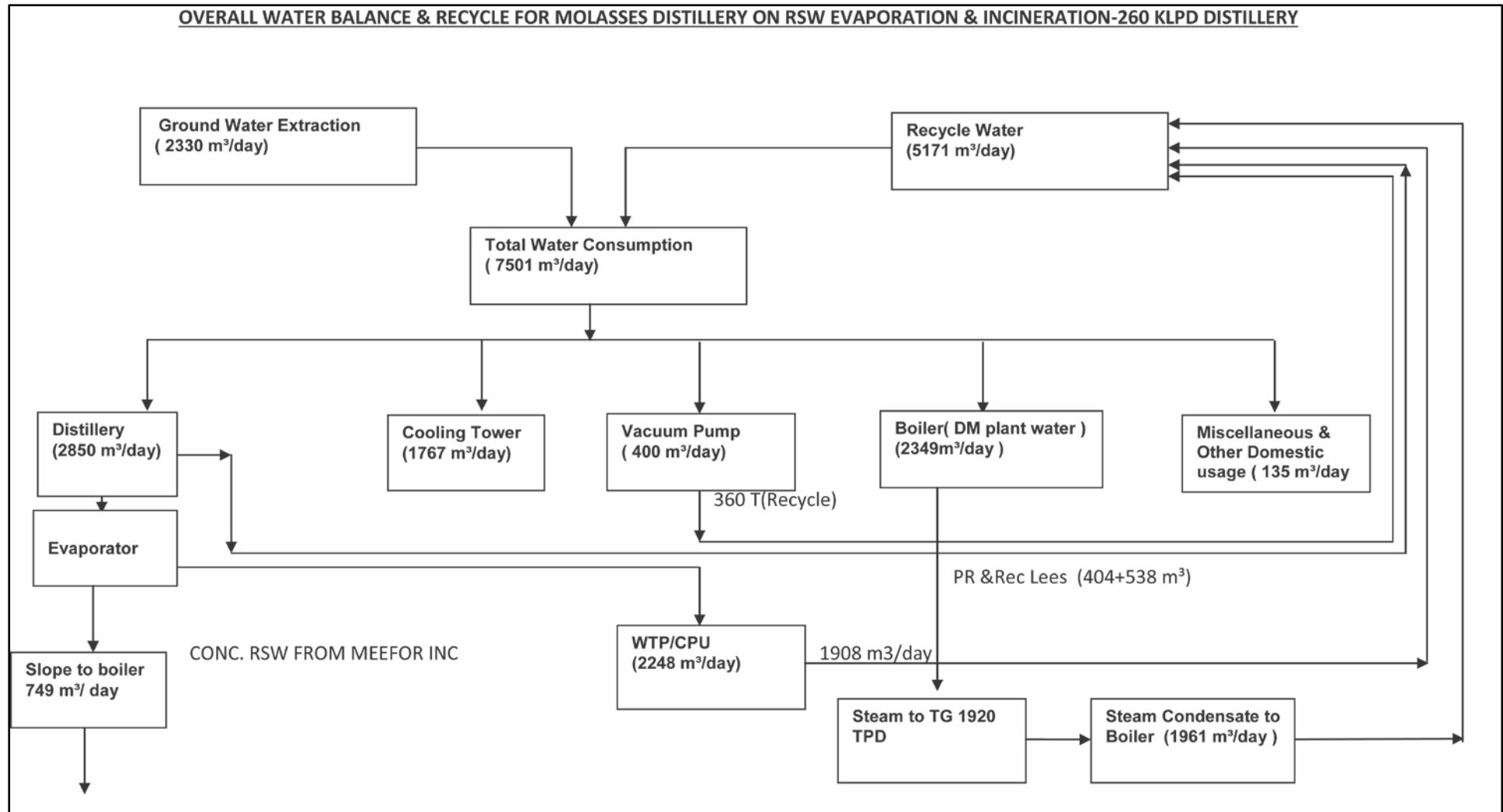


Figure 6: Water balance for 260 KLPD Molasses based Operation

**(b) Power Requirement and Source**

Existing power requirement is 5.4 MW and additional 3.0 MW of power will be required for proposed expansion & installation. Thus, the total power requirement after proposed expansion & installation project will be 8.4 MW.

Source: 12 MW Co-generation power Plant (Existing 6.0 MW & Proposed 6.0 MW & D.G. Sets (Existing 2x1500KVA & Proposed 750 KVA for back-up).

**(c) Steam Requirement**

Steam generated from the boiler will be utilized in the generation of 12.0 MW Power which will be for the own consumption and also for boiler feed water heating and distillery.

Fuel in the steam boiler will be burnt with the help of air in the boiler furnace. Water will be circulated in the boiler drum and tubes thus getting heated by the flame burning in the boiler furnace. Water comes out of the boiler drum located at the top of the boiler as steam. Flue gases rise in the boiler furnace and come in contact with the steam coming out of boiler drum. Steam after coming in contact with flue gases gets heated up further thus getting superheated. Super heated steam leaves the boiler in a pipe. Flue gases after super heating the steam pass through economizer where they pre-heat the boiler feed water before it enters the boiler drum. After economizer, flue gases pass through air pre-heaters where they heat the air which is fed to the boiler furnace for burning the fuel. After air pre heaters flue gases pass through a Bag Filter where the dust particles are collected on charged electrodes. After passing through it, clean flue gases with dust particle concentration also known as SPM level less than 100 mg/Nm<sup>3</sup> through a chimney of prescribed height. The dust is collected. High pressure superheated steam from boiler will pass through a steam turbine will be used for distillery. While passing through the turbine, the high pressure and temperature steam will rotate the turbine rotor and an electric alternator mounted on the same shaft. Electric power will be generated by the alternator. This electric power generated will be consumed in house i.e. for running the distillery and utilities like boilers auxiliaries etc.

The steam requirement for different purposes is given below:

**Table – 5  
Steam Requirement**

S. No.	Purpose	Existing Steam Requirement	Additional Steam Requirement	Total Steam Requirement after proposed expansion
1.	Multi-pressure Distillation	28.10 TPH	8.98 TPH	37.08 TPH
2.	Multi Effect Evaporator	19.75 TPH	9.2 TPH	28.95 TPH
3.	Boiler De - Aeration	2.15 TPH	1.0 TPH	3.15 TPH
<b>Total</b>		50 TPH	19.18 TPH	69.18 TPH

### Boiler Details

Details regarding this are mentioned in the table given below:

**Table – 6**  
**Boiler Details**

S. No.	Particulars	Existing	Additional
1.	Type of Fuel	Concentrated Spent Wash & Rice Husk/ Indian Coal	Bagasse/
2.	Capacity of Boiler	60 TPH	40 TPH
3.	Stack Height	60m	50 m
4.	Pollution Control Equipment Measures	ESP	ESP

### Details regarding the D.G. Sets

3 Number of D.G. sets of 2 x 1500 KVA (Existing) & 750 KVA (Proposed) will be installed for the power backup. Details regarding the D.G. Sets are mentioned in the table given below:

**Table – 7**  
**Details Regarding the D.G. Sets**

S. No.	Details	
1.	Type of Fuel	HSD
2.	Capacity	2x 1500KVA & 750 KVA
3.	Stack Height (above roof level)	As per CPCB/SPCB norms
4.	Pollution Control Equipment Measures	Adequate stack height/ Acoustic

### (x) Quantity of waste to be generated (liquid and solid) and scheme for their management/disposal

#### Waste Water Generation:

- The project is based on “ZERO EFFLUENT DISCHARGE”.
- Fresh water requirement of the project will be met by Ground Water. Efforts are will be made to conserve as much water as possible by recycling and reuse.
- Spent wash generated during Molasses operation, would be concentrated in Multi-effect evaporator and then used as fuel in boiler.
- Process condensate from MEE will be recycled back to the process.
- Fly ash from the boiler would be utilized in nearby brick manufacturing units/as per CPCB guidelines.

## 4.0 SITE ANALYSIS

### (i) Connectivity

The project site is well connected to Highway SH-21 (~14.5Km in South direction) & NH - 24 (~30 km in NE direction). The nearest railway station is Hardoi Railway Station (~14.5 km in South direction) and nearest airport is Lucknow (~111 km in SE direction). The site is suitably located with respect to availability of raw material, water, road network, skilled/semi

skilled/unskilled and professional manpower etc. All communication facilities such as telephone, telefax & internet are available in the vicinity of the project site.

**(ii) Land from Land use and Land ownership**

Total plant area is 16.75 ha and the same has been acquired by the company.

**(iii) Topography**

Topography of the core zone of the proposed project is almost flat.

**(iv) Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ), shortest distances from the periphery of the project to periphery of the forests, national park, wild life sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the Gazette notification should be given**

**Environmental Settings of the Area**

S. NO.	PARTICULARS	DETAILS
1.	Nearest Village	Akbarpur (0.5 Km in South direction)
2.	Nearest Town & City	Hardoi (14.5 km in South direction)
3.	Nearest National Highway / State Highway	<ul style="list-style-type: none"> <li>• NH 24 (30 km in NE direction)</li> <li>• SH 21 (14.5 km in South direction)</li> </ul>
4.	Nearest Railway station	Hardoi Railway Station (14.5 km in South direction)
5.	Nearest Airport	Lucknow (111 km in SE direction)
6.	National Parks, Reserved Forests (RF)/ Protected Forests (PF), Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km radius	No National Parks. Reserved Forests/ Protected Forests, Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. falls within 10 km radius from the plant site.
7.	River / Water Body (within 10 km radius)	<ul style="list-style-type: none"> <li>• Sai River (Seasonal River) (800 m in South direction)</li> <li>• Bhainsta River (Seasonal River) (1.0 km in SSE direction)</li> <li>• Lucknow Branch Canal (6.0 km in East direction)</li> <li>• Baruan Jhil (Seasonal Lake) (2 km in West direction)</li> </ul>
8.	Seismic Zone	Seismic Zone - III as per IS: 1893 (Part-I): 2002

**(v) Existing Infrastructure**

Total plant area is about 16.75 ha. Proposed expansion will be done within the existing plant premises. The 200 KLPD Molasses based distillery & 6.0 MW Co-generation Power Plant is currently in the construction phase.

**(vi) Soil classification**

The chief varieties of soil are bhur or sand, dumat or loam and matiyar or clay. Bhur is formed along the high banks of rivers and streams, matiyar is found in depressions in the upland while dumat occurs in rest of the district.

**(vii) Climatic data from secondary sources**

The climate is sub-humid and it is characterised by a hot dry summer and a bracing cold season. The average normal rainfall is 874.8 mm. About 87% of rainfall takes place from June to September. During monsoon surplus water is available for deep percolation to ground water. January is the coldest month with minimum temperature of the order of 90 C. May and early June form the hottest period of the year. The mean monthly maximum temperature is 31.7° C and means monthly minimum temperature is 18.7°C. During March to May the air is least humid with relative humidity high in the morning and less in the evening mean. Monthly morning relative humidity is 70% and mean monthly evening relative humidity is 53%. During monsoon season the winds blow predominantly from east or southeast. The mean wind velocity is 5.6 km/hr. The potential evapotranspiration is 1494.00 mm.

**(viii) Social Infrastructure available**

There are primary schools, dispensaries, small hospitals, places of worship in nearby area of the project site.

**5.0 PLANNING BRIEF**

**(i) Planning Concept (type of industries, facilities, transportation etc.) Town and country Planning/ Development authority classification.**

The proposed project is molasses based distillery. Facilities required for the proposed project will be provided as per requirement. Transportation of raw material and final product will be done via existing road network and cement concrete road will be developed within the proposed project area.

**(ii) Population Projection**

Temporary influx of people will be there as the managerial and supervisory staff will generally be outsider. A projection may be made by a governmental organization, or by those unaffiliated with a government.

**(iii) Assessment of infrastructure demand (Physical & Social)**

The Company will assess the demand of infrastructure (Physical & Social) in nearby area of the proposed site and will be developed in under corporate social responsibilities programs.

**(iv) Amenities/Facilities**

The Company will develop the Amenities/Facilities in nearby area of the proposed project site as per requirement of local people under corporate social responsibilities programs.

**6.0 PROPOSED INFRASTRUCTURE**

**(i) Industrial Area (Processing Area)**

Total plant area is about 16.75 ha. Proposed expansion will be done within the existing plant premises.

**(ii) Residential area (Non Processing area)**

Existing housing facilities will meet the requirements for the proposed expansion project.

**(iii) Greenbelt**

Greenbelt will be developed in 33% of the total area of the project.

**(iv) Social Infrastructure**

The project will result in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure.

**(v) Connectivity**

The project is well connected with rail and road.

**(vi) Drinking Water**

Around 200 KLD of water will be required for drinking purpose

**(vii) Sewerage system**

Sewage Treatment Plant is being used in township / will be used for the treatment of domestic waste water.

**(viii) Industrial Waste management**

The Molasses based distillery would be based on “ZERO EFFLUENT DISCHARGE”.

**(ix) Solid Waste Management**

Solid waste generated would be ash from the boiler. The following are the management measures that will be taken up by the company:

- Concentrated spent wash will be incinerated with supplementary fuel (Bagasse/Rice Husk/Coal) in the incineration boiler.
- Fly ash generated from the boiler would be utilized for brick manufacturing/ soil amendment.
- Yeast sludge will be mixed with press mud and will be given to the farmers for soil amendment.

**(x) Power requirement and source**

Existing power requirement is 5.4 MW and additional 3.0 MW of power will be required for proposed expansion & installation. Thus, the total power requirement after proposed expansion & installation project will be 8.4 MW.

**7.0 REHABILITATION AND RESETTLEMENT (R & R) PLAN**

**(i) Policy to be adopted (Central/State) in respect of the project affected persons including home oustees, land oustees and landless labourers (a brief outline to be given).**

Proposed capacity expansion will be done within the existing plant premises. No additional land is required for proposed capacity expansion project. Therefore there will not be displacement of people and hence Rehabilitation & Resettlement is not applicable.

## 8.0 PROJECT SCHEDULE AND COST ESTIMATES

(i) **Likely date of start of construction and likely date of completion (time schedule for the project to be given).**

The project will start only after obtaining Environmental Clearance and other statutory permissions. Project will be completed in 2 to 3 years period after getting all the regulatory approvals.

(ii) **Estimated project cost along with analysis in term of economic viability of the project.**

- Total cost of the Project: Rs. 90.0 Crores
- Cost for Environment Protection Measures:
  - ❖ Capital Cost: Rs. 10.0 Crores
  - ❖ Recurring Cost/annum: Rs. 0.50 Crores/annum

## 9.0 ANALYSIS OF PROPOSAL

(i) **Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area.**

The project will result in growth of the surrounding areas by increasing ancillary development and supporting infrastructure. Special emphasis on Financial and Social benefits will be given to the local people including tribal population, if any, in the area.

Development of social amenities will be in the form of medical facilities, education to underprivileged and creation of self help groups.

Uttar Pradesh state will get revenues in terms of taxes. Business opportunities for local community will be available like transport of raw material/product to market, fly ash transport to Brick manufactures, maintenance & house-keeping contract work etc.

