1.0 EXECUTIVE SUMMARY

1.1 Preamble

M/s India Glycols Limited has proposed to establish a Grain based Distillery (Unit II) with proposed capacity – 200 KLD (72000 KL/Annum) along with 7.0 MW of Co-Generation Power Plant at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand, India

M/s India Glycols Limited was incorporated on 19th November, 1983 as U.P. Glycols Limited. It was renamed as India Glycols Limited on 28th August, 1986. By using Molasses as a raw material, IGL started its commercial production of MEG in the year 1989 with the collaboration of ***Scientific Design Co. Inc., USA***. In the year 1994, expansion of the Plant was done to manufacture Ethylene Oxide Derivatives and Condensates. The Plant was commissioned with the collaboration of ***Press Industria, Italy***. IGL also commissioned Plant for Formulation / Specialty Chemicals in 1997 in collaboration with ***Sanyo, Japan***.

M/s India Glycols Limited (IGL) has established & commissioned a stand-alone 120.0 KLPD molasses based distillery plant in the year 1988-89. Due to increasing demand of alcohol IGL expanded distillery capacity from 120.0 KLPD to 205.0 KLPD in the year 1999 and 205.0 KLPD to 425.0 KLPD in the year 2004 w.r.t. Environment Clearance (EC) granted by MoEF, New Delhi vide F. No. J-11011/219/2003-IA-II, Dated 24.06.2004 for expansion of Distillery Unit to manufacture Ethanol (Capacity – 425 KLPD i.e. 325.0 KLPD Molasses based & 100.0 KLPD based on Cane Juice). Revised EC for up-gradation of existing effluent treatment system was granted vide letter no. J-11011/219/2003-IA II (I), Dated 11th July 2006.

M/s India Glycols Limited (IGL) is complying the stipulated conditions of Consolidated Consent to Operate & Authorization (CCA - Renewal) granted by UKPCB for Alcohol production (RS/ENA/Absolute alcohol) of 7200.0 KL/Month (240.0 KLPD).

For treatment & disposal of spent wash as per directions of CPCB/UKPCB, IGL has installed & upgraded the falling film and forced circulation Multiple Effect Evaporation Plant (MEE) followed by Slop boiler for treatment of 2160.0 m^3/day of spent wash to achieve "Zero Liquid Discharge" (ZLD).

India Glycols is the first and only Company in the world to have commercialized the production of Ethylene Oxide, its Derivatives and Glycols from renewable agricultural resources.

Apart from Chemicals, India Glycols has a significant presence in the Natural Active Pharmaceuticals and Nutraceuticals space with Ennature Biopharma; a well-established Natural Gum Division manufacturing Guar Gum and a variety of Derivatives; a Spirits Division that manufactures Country and Indian-made Foreign Liquor adhering to the

highest quality standards. India Glycols Limited has three Plants at Kashipur, Gorakhpur and Dehradun.

The total cost of the proposed project for Grain based Distillery (Unit II) is estimated as Rs. 100.0 Crores. The company is proposing for manufacturing of RS/ENA/AA from its Kashipur plant (Unit II) with annual capacity of 72000 KL/Annum along with the required utilities viz. Boiler, Cooling Tower, Integrated MEE, Decanter, DWGS dryer along with CPU etc. & required manpower. Water will be sourced from proposed bore well. Permission for abstraction of ground water will be taken from competent authority. The project activity is categorized as "**A**" under **5(g) – Distilleries** as per the **EIA Notification, 2006 due to attracting the General condition i.e. falling within interstate boundary (Uttar Pradesh-Uttarakhand within 05 Km).** The proposed project is based on **ZERO LIQUID DISCHARGE (ZLD)** concept and unit is a Grain based distillery which is less polluting in nature when compared to Molasses based operations. Also, the production of ethanol (Power Alcohol) will be done as per market/Govt. requirement which will be directly send to Govt. & its authorized Oil manufacturing units for blending in Petrol.

The proposed project is situated in existing premises of M/s India Glycols Limited at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.

1.2 Salient Features of the Project

Table – 01: Salient Features of the Proposed Project

S. No.	Parameters	Description
1.	Proposed Project	Environmental Clearance for Proposed 200 KLD Grain Based Distillery (Unit II) with 7.0 MW of Co-Generation Power Plant by M/s India Glycols Limited at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand, India
2.	Category of Project as per EIA Notification & Amendments	The project activity is categorized as "A" under 5(g) – Distilleries as per EIA Notification, 2006 due to attaracting "General" condition.
3.	Plant Capacity	Proposed Capacity – 200 KL/day or 72000 KL/Annum.
4.	Proposed capacity of Power Generation	7.0 MW Power
5.	Total area of the Plant	28,993 Sq. M
6.	Capital Cost	Rs. 100.0 Crores.
7.	Location	A-1, Industrial Area, Bazpur Road, Kashipur, District-

		Udham Singh Nagar, Uttarakhand.
8.	Coordinates of the Site (Central)	Latitude – 29°10'10.36"N Longitude – 79° 0'32.77"E
9.	Products	RS/ENA/AA
10.	Water Requirement/Source	
	Water Requirement (KLD)	Total water requirement: 2977 KLD Net water requirement: 898 KLD Recycle/reuse water: 2079 KLD
	Source of water	Ground Water i.e. Bore well (Proposed)
11.	Water Break-up (KLD)	Process water in Liquefaction : 1297 Makeup water for Cooling Tower : 700 Boiler : 960 Domestic Purpose : 3 Green Belt : 17 **Total : 2977**
12.	Waste Water Management Waste water generation Mode of Disposal	Spent Wash – 1100 KLD Proposed Decanter, Integrated MEE, Dryer, CPU Domestic Sewage: 2.40 KLD Proposed STP Capacity: 3.0 KLD Treated water will be recycle/reuse in Process, utilities & greenbelt development.
13.	Employment generation	Proposed – 100 Nos.
14.	Power Supply/ Start up Power	7000 KWH (from cogeneration power plant)
15.	Boiler	One Boiler of 55.0 TPH (Rice Husk/Indian Coal Based)

1.3 Synopsis of the Report

The pre-feasibility report includes a brief introduction of the company, need and justification of the project, process description, required and available resources, land-use and proposed infrastructure, Environment management plant, project schedule, cost estimate for environmental clearance.

2.0 INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

M/s India Glycols Limited has proposed to establish a Grain Based Distillery (Unit II) with proposed capacity – 200 KLD (72000 KL/Annum) along with 7.0 MW of Co-Generation power plant at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand, India Broken rice or maize (grain) will be used as raw material in the proposed distillery (Unit II).

2.1 PLANNING CONCEPT

M/s India Glycols Limited is proposed to establish a Grain Based Distillery (Unit II) with proposed capacity – 200 KLD (72000 KL/Annum) along with 7.0 MW of Co-Generation power plant at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand, India. The needed infrastructure is available and locally available manpower is most suited for such a plant.

- Land use is Industrial and situated at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand, India
- The existing infrastructure i.e. Road, Power and Water is readily available.
- Adequate Infrastructure has been planned.
- The finished Products will be marketed in Domestic Market as well as Foreign for fulfillment of growing Market Demand.

2.2 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

M/s India Glycols Limited has engaged in RS/ENA/AA production since several years. Now, the management has proposed to install 200 KLPD Grain based Distillery (Unit II) to meet out exponential growth demand of ENA in the market. Being a major bottler of IMFL for various manufacturer and also having its own brands, the management has decided to install world class Grain based Distillery plant (as Unit II) to produce super fine alcohol (Extra Neutral Alcohol), Rectified Spirit and also Absolute alcohol considering the local fuel ethanol demand.

2.3 BRIEF DESCRIPTION OF NATURE OF THE PROJECT

M/s India Glycols Limited has proposed to establish a Grain Based Distillery (Unit II) with proposed capacity – 200 KLD (72000 KL/Annum) along with 7.0 MW of Co-Generation power plant at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand, India at an estimated cost Rs. 100 Crores. Most of the infrastructure facility is already available with the industry as present distillery operation is being continued from several years. The project is placed under item 5 (g) - for distillery plant as 'A' category as per EIA Notification, 2006 and will be appraised at Central Level Expert appraisal committee level. The company proposes to set up an integrated pollution free Zero Liquid discharge based Grain Based Distillery plant (Unit II) in the State with an installed capacity of 200 KLD in the State of Uttar Pradesh.

Table – 02: List of Proposed Products along with their Production Capacity

Sr. No.	Products	Proposed Capacity
1.	RS/ENA/AA	200 KL/day (72000 KL/Annum).

2.4 NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY AND OR REGION

Ethyl Alcohol, Alcohol, Spirit, Denatured Spirit, there are myriad descriptions for this agriculture-based product. A globally traded commodity, Ethanol fires combustible engines in Brazil, slakes the thirst of many in Europe and finds its way in pharmaceutical and chemical industries, across the world. Ethanol is made by two routes: either by synthetic one from petroleum substances or by fermentation from sugar-bearing or starchy substrates using yeast.

2.5 DEMAND-SUPPLY GAP

The size of the alcohol-based chemical industry is estimated to be in the region of Rs.50 Billion. Through licensing and price controls on feedstock, Central and State governments encouraged the alcohol-based chemicals industry. In June 1993, the Union government decontrolled alcohol to encourage this industry. Presently, there are over 200 alcohol-based products manufactured in India, the single largest alcohol-based chemical being acetic acid. Acetic acid itself is the raw material for the manufacture of several other alcohol-chemicals like ethyl acetate (EA), butyl acetate (BA) acetic anhydride, etc. Ethyl alcohol is also used to produce acetaldehyde and ethylene.

2.6 IMPORTS VS. INDIGENOUS PRODUCTION

No import is proposed as demand in domestic market is enough to consume the product.

2.7 EXPORT POSSIBILITY & DOMESTIC/EXPORT MARKETS

The company is setting up grain base RS/ENA/AA plant (Unit II), to supply the finish goods in the country at present is no export possibility at this capacity is envisaged.

2.8 EMPLOYMENT GENERATION DUE TO THE PROJECT

During operation phase, the total direct employment potential of the proposed industry would be about 100 peoples. However, apart from this there will be significant non estimated employment generation at the supplier firms and service industry providing services to the company. Company shall be giving preference to people from economically weaker sections for employment in various semiskilled/unskilled jobs thereby contributing to their upliftment.

Table – 03: Employment Generation Details

S. No.	Category	No. of Employees	Functional Area
01.	Key Managerial Staff	15	Finance, Marketing, Production, Quality control, R&D, Logistics etc.
02.	Administration	10	Office
03.	Plant Staff	20	Maintenance, Stores, Safety & Unskilled workers.
04.	Skilled & Semiskilled	10	Production Process
05.	Contract Workers	45	Plant activities
Total		**100**	

3.0 PROJECT DESCRIPTION

3.1 Type of Project

M/s India Glycols Limited has proposed to establish a Grain Based Distillery (Unit II) with proposed capacity – 200 KLD (72000 KL/Annum) along with 7.0 MW of Co-Generation power plant at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand, India at an estimated cost Rs. 100.0 Crores. It includes construction, plant machineries and installation, environment protection measures cost etc. It is also proposed Integrated Evaporation plant for effluent treatment to provide better environment conservation and pollution control arrangement in the plant as well as for the surrounding area.

3.1.1 Infrastructure

Land: The Company is already having land of 28,993 Sq. m situated at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand which will be utilized for installation of the proposed distillery (Unit II). All construction shall be made suitable for proposed plant along with the required utilities.

Power: The plant at full capacity will demand 7000 KWH of power which shall be taken from cogeneration power plant.

Water: Water is required for production process, domestic purpose, utilities and Green belt development. Initially total water demand is 2977.0 KLD and recycled water is 2079.0 KLD. Proposed Net water demand will be 898.0 KLD, which will be met from proposed Bore well. Approval for abstraction of water is to be taken from Competent Authority. Necessary provision for storage of water and water supply has been made in project cost.

Storage: Company will have sufficient provision for storage of raw material & finished goods under suitable environmental conditions.

Transportation: Adequate resources / infrastructure for transportation of raw Material and finished goods are available in Gorakhpur area.

Connectivity: The proposed project site is connected by 30m wide connecting roads to the Highway (NH-74). All the other infrastructural facilities are expected to be adequately available to the Plant.

3.1.2 Technical Know-How

The Production plant will have technical staffs that are qualified as per the provision of the Rules, separately for manufacturing and quality assessment (QA). The technical staff shall be assisted by the supporting staff. Further, necessary assistance from plant and machinery suppliers would also be taken by the promoters, for successful implementation of the project.

3.1.3 Construction Activities

In proposed project activity, installation of the proposed plant would be done along with the required utilities for production of ethanol products. All Construction and commissioning activities of proposed project shall be carried out after getting Environmental Clearance from EAC, New Delhi. Erection of various plant/machineries shall start simultaneously. Construction materials for column structure like brick, steel, sand aggregates, tiles etc. will be procured locally in the desired quantity as and when required. All construction materials will be transported via road only. Temporary storage yard will be provided for the storage of construction material. Storage yard will be covered from all the sides.

3.2 Location of the Project

M/s India Glycols Limited proposed to establish Proposed Grain based Distillery Plant (Unit II) at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand. No alternate site was considered –

- The basis of selection of this site is that the State of Uttarakhand is providing suitable Industrial environment with proper infrastructure support.
- The availability of basic infrastructure at Udham Singh Nagar District.

Table – 04: Contact Details of the Company

Name of the Company	**M/s India Glycols Limited**
Registered Office	M/s India Glycols Limited

	A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand
Address for Correspondence	M/s India Glycols Limited A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand

Proposed Project Site Coordinates:

The project site is located at elevation of 228m AMSL with Latitude: 29°10'10.36"N, Longitude: 79° 0'32.77"E (central). The corner coordinates of the proposed site is given in table below:

Table – 05: Coordinates of the proposed project site

Sr. No.	Point/Direction	Latitude	Longitude
1.	NNW	29°10'14.09"N	79° 0'31.67"E
2.	East	29°10'10.75"N	79° 0'36.97"E
3.	SSE	29°10'6.38"N	79° 0'33.67"E
4.	West	29°10'9.89"N	79° 0'28.31"E

The Key Map and Google Earth Satellite Image showing the location of the project site is given below in Figure – 01 & 02, respectively. The 10 km Radius Map of the site is given in Figure – 03 below.

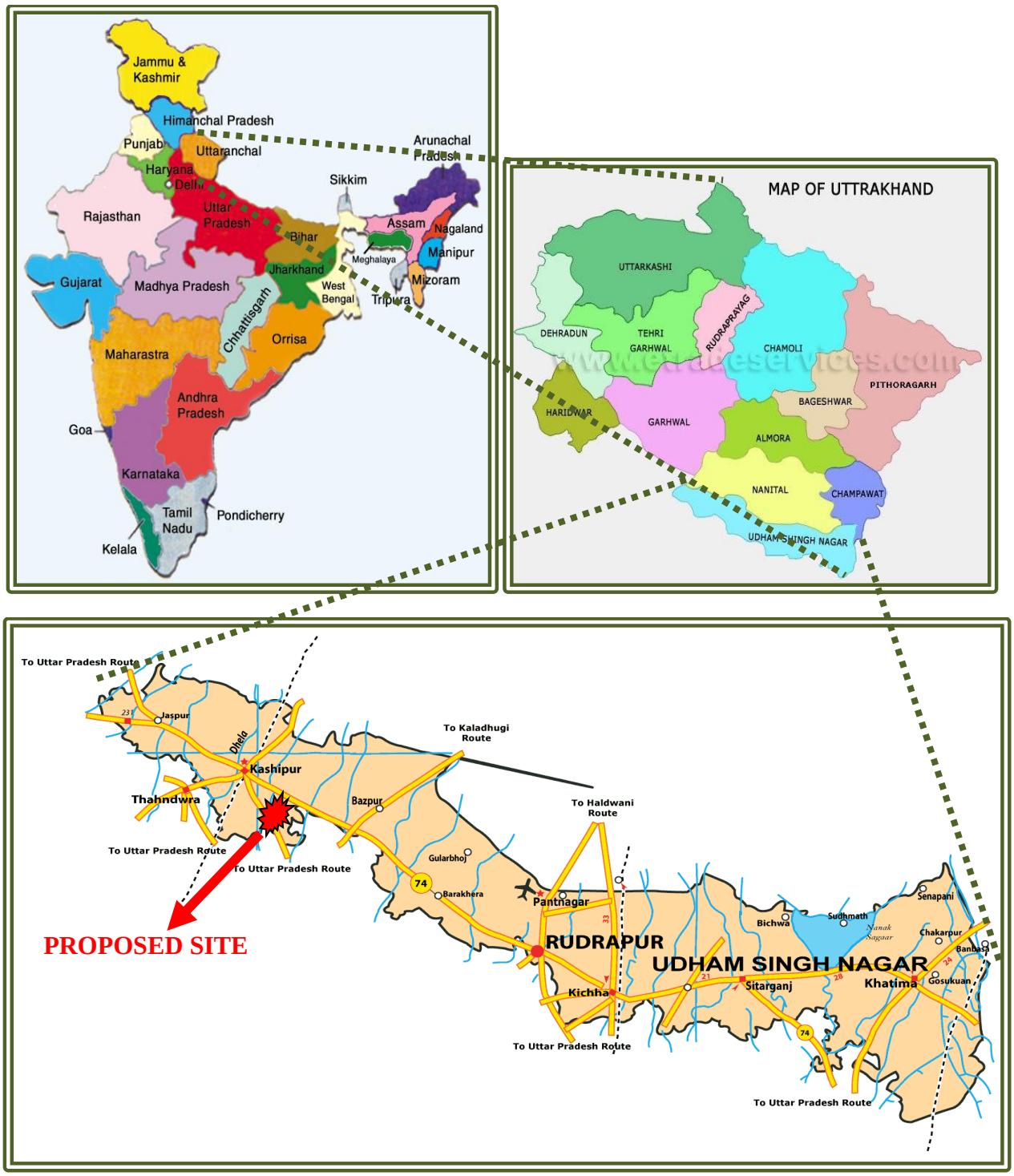


Figure – 01: Key Map Showing Project Site Location

Figure – 02: Satellite Image of the Proposed Project Site

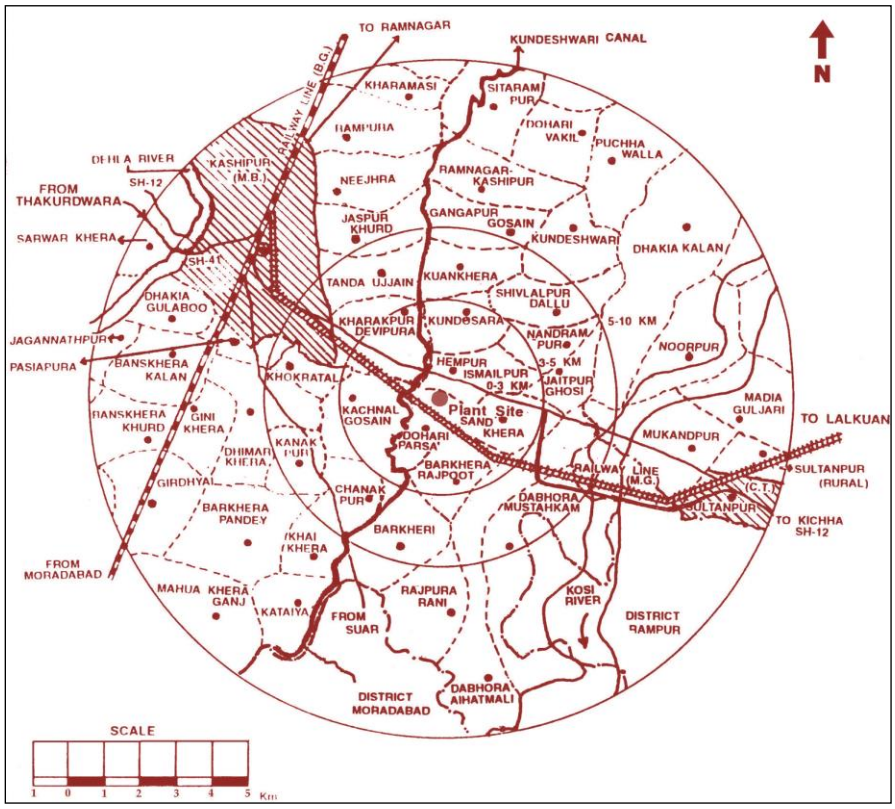


Figure – 03: 10Km Radius Revenue Map of the Proposed Project Site

3.3 Site Description

The proposed project is situated at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand. The area is situated in the survey of India Topo Sheet No. 53K/15, 53K/16, 53O/3, 53O/4 and Coordinates Latitude: 29°10'10.36"N, Longitude: 79° 0'32.77"E (central). The nearest National Highway (NH –309) is 0.9 Km in North East direction away from the site. The nearest railway station is Kashipur which is 6.08 Km NW direction away from the site. Pant Nagar Airport is located at 47.25 Km SE (aerial) from the site.

3.3.1 Site Selection

At the proposed site, adequate transportation facilities are available for transportation of product to Uttarakhand and other region of country. Hence the proposed project will be beneficial and techno-economically feasible. Hence, no alternative site is analyzed.

The main features of the site including environmental considerations that make it suitable for proposed installation of plant are given below:

- Availability of sufficient stretch of industrial land with flat terrain situated at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.
- No habitation in the proposed project site, hence no direct R&R issues
- Suitable topography and geography for construction of facilities
- Suitable seismic zone
- The plant site is not falling within the vicinity of any monument or in an archeologically sensitive area.
- No declared biodiversity parks/sanctuaries are there in the surroundings of the site
- Nearness to source of main raw materials
- Location of consumer centre
- Convenient Rail & Road links
- Uttarakhand is providing suitable Industrial environment with proper infrastructure support.
- Adequate availability of raw material, power and other infrastructure.

Financial and social benefits with special emphasis on environmental consideration and benefit to the local people will be kept as top priority for the proposed project.

3.4 Size or Magnitude of Operation

The industry is a manufacturing plant with a total capital investment of Rs. 100.0 Crores only. The Proposed Production of RS/ENA/AA will be 200 KLD (72000 KL/Annum) along with 7.0 MW of Co-Generation power plant as stipulated in the report.

3.5 Project Description with Process Details (A Schematic Diagram/Flow Chart Showing the Project Layout, Components of the Project etc.).

The company has proposed to manufacture RS/ENA/AA based on the market demand (200 KL/Day or 72000 KL/Annum) including 7.0 MW cogeneration power plant along with required utilities installation Like Boiler, Cooling Tower etc. at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.

The finished products will be transported through the existing road network. The proposed production facility along with the required utilities will be set up in within the existing plot area of M/s India Glycols Limited. During operation phase, net water requirement will be just 898.0 KLD. Water requirement for the project will be sourced from ground water (Proposed Bore well). The plant at full capacity will demand 7000 KWH of power, which shall be taken from cogeneration power plant. The details of the proposed products along with their production capacities are provided in table – 02 of this report. The overall process is shown in Process Flow Diagrams below. The following describes the production of RS/ENA/AA and co-products from grain as raw material.

3.5.1 Process Description

M/s India Glycols Limited has proposes to establish a state-of-the-art system based on the most advanced technical process. The latest improved technology to be utilized enables significant improvement in the performance of a complex process system along with simplification of the design which results in major savings in capital, operating and maintenance costs over traditional systems. The production process involves the following stages:

Grain Milling

Grain is received from various sources and is pre-cleaned off Stones, husk, straws and iron metals etc. and then Stored in specially designed Storage Silos. Grains are continuously lifted from the bottom of the Silos and screened followed by removal of stones in De-stoner and iron metals in Magnetic Separators. Cleaned Grains are then milled using dry milling process in Hammer Mills. The flour is fed through the bucket elevator and conveyed to the Batch Machine through a Screw Conveyor. Dust is collected by three separate dust collection systems.

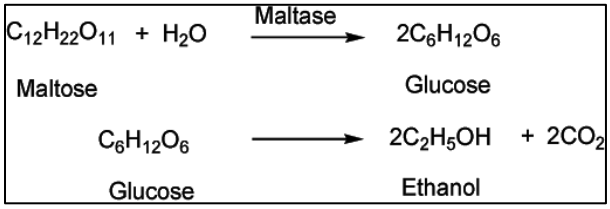
Starch Conversion

Slurry from pre-masher is taken to Initial liquefaction tank where liquefying enzyme is added. The mixture of slurry and steam is then passed through the retention vessel (cook tube) having sufficient capacity to provide the desired retention time at a given flow rate. The cooked mash is discharged to a flash tank for liquefaction. The gelatinized mash from

the flash tank is further liquefied in a final liquefaction tank where liquefying enzyme is added. Then the liquefied mash is passed through plate heat exchanger and cooled slurry transferred to Fermentation section

Fermentation

The purpose of fermentation is to convert the fermentable substrate into alcohol. At the start of the cycle, the fermenter is charged with mash and contents of the Yeast Activation Vessel. Significant heat release takes place during fermentation and CO_2 is generated as by Product. The fermenter temperature is maintained at around 30-32°C by forced recirculation flow through plate heat exchangers. There is a provision for spent wash recycle to Fermentation depending on solids concentration in fermented wash. The recirculating pumps also serve to empty the fermenter into Well. The complete reaction of conversion of starch into ethanol can be represented as follows:



Distillation

Pre-heated fermented wash is fed into a series of Distillation Columns to increase the alcohol concentration and remove various impurities including Fusel oil as by product. The columns are termed as below:

1. Analyzer Column
2. Degasifier Column
3. Pre Rectifier Column
4. Extractive Distillation Column
5. Rectifier cum Exhaust
6. Recovery Feed Column
7. Simmering Column

Multi-Pressure Distillation system to be invoked in this plant that will have seven distillation columns operating at various pressure conditions. Heat energy from columns operating under high pressure is utilized for columns operating under low pressure to optimize the operation for energy consumption. Pre-heated fermented wash will be fed to Degasifying column. Fermented wash is stripped off alcohol by ascending vapors in Analyser column. Rectifier vapors provide energy to Analyser column through a Thermosyphon reboiler. Vapors of Degasifying column are condensed and taken to Recovery Feed Tank. The condensed Analyser vapors are taken to Pre-Rectifier Feed Tank.

Condensate is concentrated in Pre- Rectifier column, which operates under pressure. Condensing steam provides energy to pre-rectifier column through a vertical Thermosyphon reboiler. A Technical Alcohol cut of about 1-2% of total spirit is taken from the Pre-Rectifier column.

Concentrated alcohol drawn from Pre-Rectifier column is fed to Extractive distillation column for purification. Dilution water in the ratio of 1:9 is added in this column for concentrating higher alcohol at the top. Top of this column is condensed in its condensers and fed to recovery feed tank while bottoms are fed to Rectifier cum Exhaust Column for concentration. Rectifier Column operates under pressure and condensing steam provides energy to this column through a vertical Thermosyphon reboiler. Technical Alcohol cut is taken out from the top of this column while ENA draw is taken out from appropriate upper trays and fed to Simmering Column after cooling. Fusel Oil build up is avoided by taking fusel oil draws from appropriate trays. These fusel oils along with the condensate of Degasifying & Extractive Distillation columns are fed to recovery column for concentration. A technical alcohol cut is taken out from the top of this column. Simmering Column is operated under high reflux for better separation of methanol and di-acetyls. Final ENA product draw is taken from the bottom of this column.

Evaporation Section

The Stillage from Distillation section is passed through a horizontal centrifugal concurrent decanter for the separation of wet solid (cake) and thin stillage. Recovered thin stillage from decanter is collected in a tank and then pumped back to the fermentation section for dilution of the starch slurry. Around 30% of thin stillage is recycled and remaining is concentrated in the Evaporator till 40% concentration.

Dryer Section

The wet solids (cake) and the concentrated product from Evaporation are sent to DDGS to produce Dried Distillers Grains with Soluble. The concentrated syrup is mixed with the wet cake from the decantation section. This mixture is termed as Distillers Wet Grains with Soluble (DWGS), which either sold as cattle feed or fed in Dryer to reduce the moisture up to 10%. This by-product is termed as DDGS, which is in a powder form.

Process Condensate Treatment Section

Fermenters and liquefaction tanks are equipped with CIP-nozzles. These and heat exchangers are connected to the piping of CIP-system for proper cleaning with caustic soda and hot water. CIP-system is operated automatically and liquids can be used several times before draining to the waste water treatment. The process condensate from the evaporation section is partially recycled in making Grain Slurry and balance quantity treated in this plant

and this treated condensate is then recycled back to process thus reducing the fresh water consumption.

Co-generation Power Plant [7.0 MW]

Proposed 7.0 MW co-generation plant consists of high pressure AFBC water tube steam boiler & back pressure 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 a ESP where the dust particles are collected & discharge. High pressure superheated steam from boiler is passed through a steam turbine and low pressure goes to Low pressure header, which is used for distillery. 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.

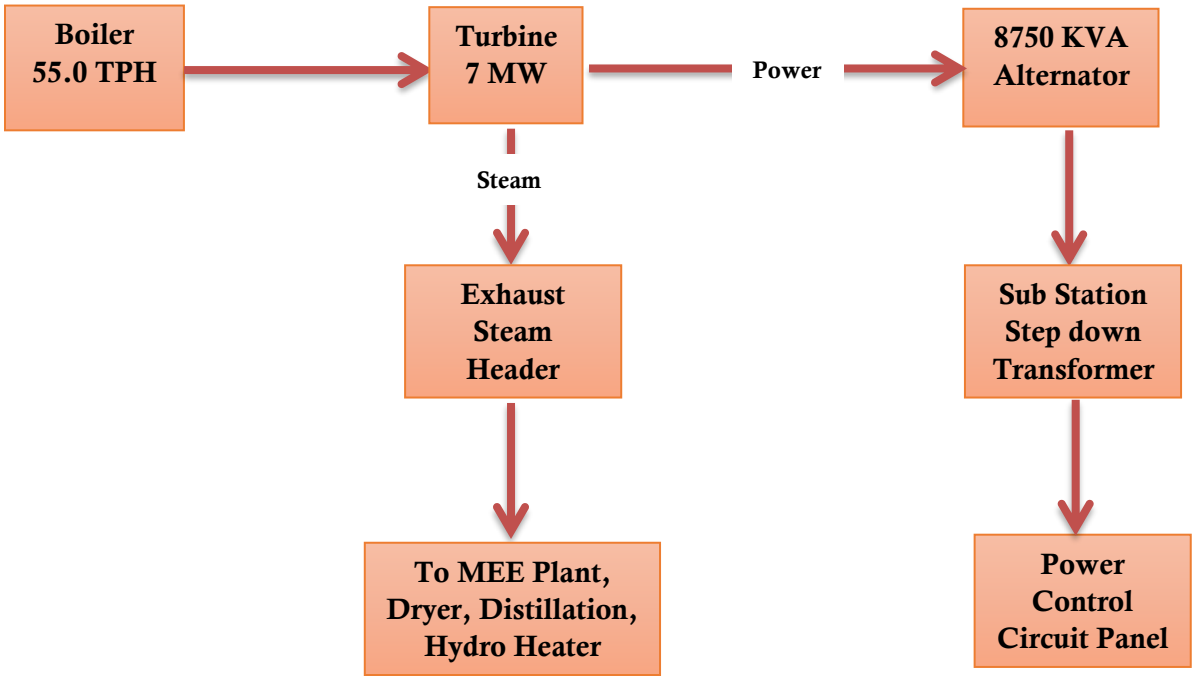


Figure – 04: Process Flow Chart of Co-generation Power unit

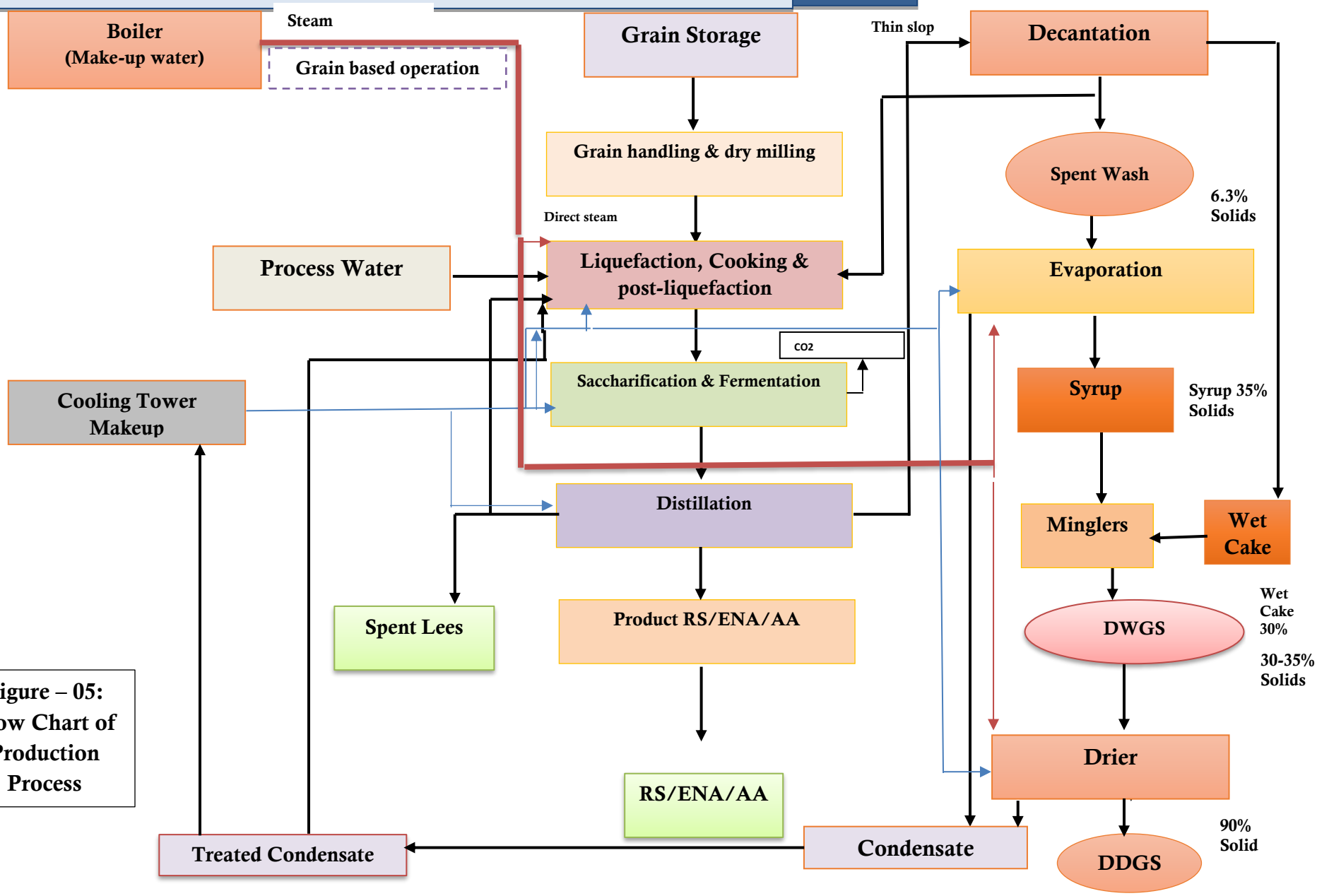


Figure – 05: Flow Chart of Production Process

3.5.2 Raw Material Requirement

Raw material for the proposed project activity will be procured from open market. Grain (Broken Rice or Maize) will be used as raw material which shall be available from local market. Raw materials as listed in table below will be procured as per the production requirement. The proposed products raw materials consumption details are provided in table below.

Table – 06: Details of Raw Material Consumption

S. No.	Raw Materials	Quantity
1.	Grain (Broken Rice or Maize)	437 TPD (Broken Rice) 493 TPD (Maize)
2.	Urea (46 % w/w Nitrogen)	As per process requirement
3.	Caustic (Lye – 48 %w/w)	As per process requirement
4.	Antifoam (Silicone based)	As per process requirement
5.	Concentrated Sulphuric Acid	As per process requirement
6.	Chemicals required for Evaporation	As per process requirement
7.	Steam for sterilization	As per process requirement
8.	Chemicals required for Evaporation Process condensate treatment plant	As per process requirement
9.	Liquefying Enzyme (240 KNU or other enzyme with equivalent strength)	As per process requirement
10.	Saccharifying Enzyme (750 AGU KNU or other enzyme with equivalent strength)	As per process requirement
11.	Viscoenzyme	As per process requirement
12.	Fermgen or equivalent	As per process requirement
13.	Active Dry Yeast (ADY) (Lallemand, Fali)	As per process requirement

3.5.3 Storage facility for raw materials and products

Appropriate storage facilities will be provided for the raw materials, products etc.

Table – 07: Details of Storage Facilities

Sl. No.	Storage Facility for	Facility
1.	Raw Materials	Warehouse
2.	Products	Finished Product storage Area.
3.	Hazardous Waste	The Hazardous waste (Spent Oil, Discarded Drums/Barrels) will be stored under separate area shed with Lock and Key.

3.5.4 Machinery & Equipment Details

The detailed list of machinery & equipment's in the proposed industry are appended in the Tables below:-

Table – 08: Details of the Proposed Machinery & Equipment's

GRAIN RECIEPT & CLEANING, MILLING & FLOUR HANDLING SECTION			
I	**SECTION**	**GRAIN RECEIPT / CLEANING SECTION**	**QTY.**
1.	Receiving Hopper	Duty – To feed Grains to Chain Conveyor Bags to be dumped manually in the hopper. Safety Grill on the top Manual Slide Gate at Bottom. Provided with hood on top for dedusting.	1
2.	Chain Conveyer	Duty – For feeding grains to Drum Cleaner (30TPH)	1
3.	Pre-cleaner	To separate oversize and undersize with aspiration system (30TPH)	1
4.	Bucket Elevator #1	Duty – For Feeding Grains to Storage Silos MOC-Mild steel, (30TPH)	1
II	**SECTION**	**GRAIN STORAGE SECTION**	**QTY.**
1.	Bulk Storage GIC Silos	Flat Bottom Silos Capacity – 4000 MT	2
III	**SECTION**	**COMMON SYSTEMS**	**QTY.**
1.	Electrical MCC Panel	Starter Panel for all Electrical drives and push button station.	1
2.	Electrical	Power cabling from MCC to field drive. Local push button station for all the drives.	1
3.	Ducting Chutes & Supports	All the equipment's supports, ducting / piping connection between the equipment's	LOT
IV	**SECTION**	**MILL FEED, MILLING, FLOUR SIEVING**	**QTY.**
1.	Silo Discharge Conveyor	Duty – For Discharging the grains from Silos15 TPH	1
2.	Bucket Elevator #2	Duty – For Feeding Grains to Milling Section 15TPH	1
3.	Classifier	With Aspiration System- Cyclone, Blower Rotary Airlock Valve at Bottom	1
4.	Magnetic Separator	Duty – For screening the ferrous material	1
5.	Destoner	Duty – To remove the stones from grain	1
6.	Hammer Mill Feed Hopper	Duty – for Feeding Hammer Mill Accessories – High Level Switch Vibratory Feeders fitted at the bottom of hoppers for controlled feeding to the mills.	1

7.	Hammer Mills (Indian Make)	Capacity 20 TPH (10 TPH x 2 Operating + 1 SB) (With Broken Rice = 20 TPH) (With Maize = 15-16 TPH)	2 + 1
8.	Screw Conveyor #1	Duty - To feed flour from hammer mill discharge to Bucket Elevator # 3	1
9.	Bucket Elevator # 3	Duty – For Elevating flour to feed Flour Sifter.	1
10.	Sieving Machine	Duty – To remove oversize material from floor (Oversize flour shall be diverted to buffer hopper of hammer mill)	1
11.	Screw Conveyor #2	Duty – To feed flour from Sifter discharge to Flour Storage Silos.	1
V	**SECTION**	**FLOUR STORAGE, FLOUR WEIGHING**	**QTY.**
1.	Flour Storage Silo	Duty–for Storing Grain Flour for 8 hours (60 MT) MOC– Mild steel with high & Low level switch Bin activator fitted at bottom for smooth discharge.	2
2.	Screw Conveyor # 3	Duty - To feed flour to bucket elevator # 4	1
3.	Bucket Elevator # 4	Duty – For Elevating Stored flour to Weighing	1
4.	Buffer Hopper	Duty – To Feed flour to Weigh Hopper.	1
5.	Weigh Hopper	Duty: To weigh Material Duty – Weighing, Accessories – Load cells with Microprocessor based programmable batch controller with built in batch counter and totaliser. Electro Pneumatic slide gate at discharge.	1
6.	Discharge Hopper with Screw Feeder	Duty – To feed Premasher Hopper Screw Feeder	1
VI	**SECTION**	**COMMON SYSTEMS**	**QTY.**
1.	Flour Dust Extraction System	Duty – To avoid dusting at various points in flour handling section and to recycle the flour to buffer hopper of flour weighing system.	1
2.	MCC Panel for Milling	Starter Panel for all Electrical drives.	1
3.	Electrical	Power Cabling from MCC to field drive. Local push button station for all the drives Cable trays as per layout.	LOT
4.	Ducting Chutes & Supports	All the equipment supports, ducting / piping connection between the equipment	LOT

SLURRY PREPARATION & LIQUEFACTION SECTION				
Sr. No.	**Equipment**	**Technical Specification**	**MOC**	**Qty.**
1.	Premasher	Std.	AISI 304	**1**
2.	Initial Liquefaction Tank with Agitator and Motor and Steam Sparger	Type-Cylindrical/ vertical with conical Top & Bottom Capacity: 55 M3	AISI 304	**1**
3.	Initial Liquefaction Tank Pump	Type: Centrifugal pump	Wetted part: CF8	**1+1**
4.	Reboiler for Liquefaction Tank	Type: Shell and Tube	AISI 304	**1**
5.	Jet Cooker with accessories	As per PRAJ Norm	AISI 304	**1**
6.	Retention Vessel	Tube type	AISI 304	**1**
7.	Vent Condenser, Shell & Tube type	Type: Shell and Tube	AISI 304	**1**
8.	Liquefaction Tank with Agitator and motor	Type-Cylindrical/ vertical with conical Top & Bottom Capacity: 200 M3	AISI 304	**1**
9.	Flash Tank	Type-Cylindrical/ vertical with conical Top & Bottom	AISI 304	**1**
10.	Liquefaction Tank Pump	Type: Centrifugal pump	Wetted part: CF8	**1+1**
11.	Slurry Cooler	Type : PHE, Frame MS, Plates AISI 316		**1+1**
12.	Liquefying Enzyme DosingTank	Vertical / Cylindrical Tank	SS 304	**1**
13.	Liquefying Enzyme Dosing Pump	Type: Metering Pump		**1**
14.	Recycle Stream Collection Tank	Cylindrical / Vertical Shell	AISI 304	**1**
15.	Recycle Stream Collection Tank Transfer Pump	Type: Centrifugal pump	Wetted part: CF8	**1+1**
16.	Caustic Dosing Tank	Type : Cylindrical/ vertical with flat Top & sloping Bottom	MS	**1**
17.	Caustic Dosing pump	Type: Centrifugal pump	Wetted part: CF8	1

SACCHARIFICATION & FERMENTATION SECTION				
Sr. No.	**Description**	**Tech. Data**	**MOC**	**Qty.**
1.	Prefermentor with Cleaning Nozzle, air Sparger	Type :Cylindrical, vertical, Conical Top & Flat Sloping Bottom, Capacity Gross : 180 m3	SS 304	1
2.	Prefermentor cooler	Type: Plate Heat Exchanger	Plates : AISI 316 Frame : MS	1
3.	Prefermentor transfer Pumps	Type: Centrifugal Pump	Wetted Parts CF8	1+1
4.	Fermentor with accessories like Cleaning Nozzle, Agitator, S/L Glass, etc.	Type :Cylindrical, vertical, Conical Top & Flat Sloping Bottom, Gross Cap: 900 m3	SS 304	3
5.	Fermented Wash Coolers	PHE	Plates : AISI304 Frame :MS	3
6.	Fermented Wash Re-Circulation Pumps	Type : Centrifugal pump	Wetted PartsCF8	3+1 Store standby
7.	CO_2 Scrubber	Sieve Type	AISI 304	1
8.	Fermenter Safety System	Type – STD	SS 304	3
9.	Beer Well with accessories like Cleaning Nozzle, Agitator, S/L Glass, etc.	Type: Cylindrical, vertical, Conical Top & Flat Sloping Bottom Gross Capacity : 900 m^3	SS 304	1
10.	Beer Well Pumps	Type : Centrifugal pump	Wetted Parts CF8	1+1
11.	Nutrient Dosing Tank with agitator	Type : Cylindrical / Vertical Shell	MS	1
12.	Nutrient Dosing pump	Type : Centrifugal pump	Wetted Parts CF8	1
13.	Enzyme Dosing Tank	Vertical / Cylindrical	SS 304	2
14.	Enzyme Dosing Pump	Type: Metering Pump		2

15.	Air Blower with Motor	Type : Water Ring Type	CI	1+1
16.	Filter For Air Blower	Type : HEPA	HEPA Type	1
17.	Liquid separator for Air blower	Type – STD	SS 304	1
18.	Air filter frame	Type – STD	MS	1
19.	CIP Tank (Common for Liquefaction & Fermentation)	Type: Cylindrical / Vertical Shell.	MS	1
20.	CIP Pump (Common for Liquefaction & Fermentation)	Type : Centrifugal pump	CI	1
21.	CIP Effluent Pit		In RCC	Client Scope
22.	CIP effluent transfer pump	Type : Centrifugal pump	CI	1
23.	Sealing water system – Process Pump(Common for Liquefaction & Fermentation)	Tank, pump & PHE	SS 304	1
24.	Sealing water system – Air Blower (Common for Liquefaction & Fermentation)	Tank, pump & PHE	SS 304	1
25.	Piping, Valves & fittings	As per mentioned in respective Annexure		Lot
26.	Instrumentation	As per mentioned in respective Annexure		Lot
27.	Electricals	As per mentioned in respective Annexure		Lot

ADD ON DISTILLATION & INTEGRATED EVAPORATION SECTION

Sr. No.	Equipment	Description	Material of Construction	Qty.
1.	Analyzer Column	Dia - 2700	AISI 304	Modification in existing column - Add on tray
2.	Reboiler for Analyzer Column	Type: Shell and Tube	AISI 304	Existing to be used +1 New
3.	Reboiler for Exhaust Column	Type: Shell and Tube	AISI 304	Existing to be used +1 New

4.	Analyzer Flash Tank Pump	Type: Centrifugal pump	Wetted part: CF8	1+1
5.	Exhaust Column Bottom transfer Pump	Type: Centrifugal pump	Wetted part: CF8	1+1
6.	Falling Film Evaporator	Designed based on falling film principle; Construction: Shell & Tube Type.	Shell: SS 304 Tubes : SS 304 Tube sheet: SS 304	4
7.	Forced Circulation Evaporator	Designed based on Forced Circulation principle; Construction: Shell & Tube Type.	Shell: SS 304 Tubes : SS 304 Tube sheet: SS 304	1
8.	Vapor Liquid Separators	Construction: Vertical, with tangential entry for effective vapor separation.	Shell : SS 304	5
9.	Surface Condenser	Shell and Tube heat exchanger	Shell : SS 304 Tubes : SS 304	1
10.	Thin Slops Feed Tank	Cylindrical / Vertical Shell with Dished Ends	SS 304	1
11.	Process Condensate Tank	Cylindrical / Vertical Shell with Dished Ends	SS 304	1
12.	Concentrated Product (Syrup) Tank	Cylindrical / Vertical Shell with Dished Ends	SS 304	1
13.	Thin Slops Feed Pump	Type - Centrifugal Pump	Wetted Parts : CF8	1+1
14.	Recirculation cum Transfer Pump	Type - Centrifugal Pump	Wetted Parts : CF8	5+ 2 Store standby**
15.	Process condensate pump	Type - Centrifugal Pump	Wetted Parts : CF8	1+1
16.	Product Syrup Transfer pump	Type - Centrifugal Pump	Wetted Parts : CF8	1+1
17.	Vacuum System	Water Ring Type	CI	1+1
18.	Sealing water Recycle system	(One MS Tank , PHE & one CI pump)		1 set
19.	Piping + Valves	As per mentioned in respective Annexure		1 Lot
20.	Instrumentation	As per mentioned in respective Annexure		1 Lot

21.	Electrical (MCC and onwards)	As per mentioned in respective Annexure	1 Lot

DECANTATION SECTION				
Sr. No.	**Equipment**	**Description**	**MOC**	**Qty.**
1.	Decanter Centrifuge (Client Scope) - SGDM-305	Centrifugal Type	As applicable	3+1*
2.	Thin Slop Holding Tank	Type : Cylindrical /Vertical	AISI 304	1
3.	Thin Slops Transfer Pump	Type: Centrifugal	Wetted parts CF8	1+1
4.	Ribbon Mixer	Ribbon type	AISI 304	1
5.	Pipes, Fittings & Valves	As per mentioned in respective Annexure		Lot
6.	Electrical	As per mentioned in respective Annexure		Lot
7.	Instrumentation	As per mentioned in respective Annexure		Lot

ROTARY STEAM TUBE BUNDLE DRYER FOR DWGS			
S. No.	**Equipment**	**MOC**	**Qty.**
(I)	**DWGS DRYER**		
1.	Dryer Housing	Dryer lower & upper trough in SS 304. End cover of trough Mild Steel with SS304 cladding ; Outer supports are in Mild Steel ; Base frame in Mild Steel	1 Set
2.	Rotating Steam Tube Bundle with shovels & shovels carrying angle	Tubes in MS - Seamless (3 mm thick) Tube Sheet in Mild Steel, dish ends in Mild Steel, Shovels are in SS304 and shovel carrying angles are in MS.	1 Set
3.	Set of Rotary Joints	Housing in Cast Iron with standard rotary joints for steam inlet & outlet	1
4.	Steam Trap	Cast Steel with standard supply	1
5.	Drive Arrangement	Gear Wheel & Pinion arrangement driven by a set of drive comprising Gear Box & Motor mounted on MS base frame	1 Set
6.	Feed screw	Main screw flight with trough and end covers in SS 304 and support parts in MS	1 Set

7.	Conveying screw	Main screw flight with trough and end covers in SS 304 and support parts in MS	1 Set
8.	Dosing screw	Main screw flight with trough and end covers in SS 304 and support parts in MS	1 Set
9.	Haul off Screw	Main screw flight with trough and end covers in SS 304 and support parts in MS	1 Set
10.	Discharge screw	Main screw flight with trough and end covers in SS 304 and support parts in MS	1 Set
11.	Vapor ducting	MS / SS 304 as per application.	Lot
12.	Cyclone Separator	SS 304	1
13.	Rotary Air lock Valve	Mild Steel	1 Set
14.	Exhaust Vapor fan	Mild Steel	1
15.	Rupture Discs	SS 304	1
16.	Steam Condensate Tank	MS	1
17.	Steam Condensate transfer pump	Centrifugal MOC: CI	1+1
(II)	**COOLING AND CONVEYING**		
1.	Cooling & Conveying	System comprising Air Blower with Rotary Valve, etc. in Mild Steel	1
(III)	**DDGS STORAGE**		
1.	Product (DDGS) Storage Silo along with required Accessories and bin activator	Capacity :- One day Storage (200 MT); MOC : MS	1
(IV)	**SEMI Automatic DDGS Bag filling System**		
1.	Semi-Automatic DDGS Bag Filling system	Type :- Semi Automatic	1

AUXILLARIES SECTION				
Sr. No.	**Description**	**Tech. Data**	**MOC**	**Qty.**
1.	Cooling Tower for Liquefaction Section	Type: Induced Draft,	Wooden with FRP splash bar	1
2.	Cooling Tower for Fermentation Section	Type: Induced Draft,	Wooden with FRP splash bar	1
3.	Cooling Tower for Integrated	Type:	Wooden with	1

	Evaporation sections	Induced Draft,	FRP splash bar	
4.	Cooling Water Recirculation Pumps for Liquefaction Sections	Centrifugal type	CI	1+1
5.	Cooling Water Recirculation Pumps for Fermentation Section	Centrifugal type	CI	1+1

3.6 RESOURCE OPTIMIZATION/RECYCLING AND RE-USE ENVISAGED IN THE PROJECT

- 100% of waste water will be recycled/reuse and Zero discharge condition will be maintained.
- Treated waste water will be recycle/reused in the Process, utilities & Green belt for irrigation purpose.
- Hazardous waste, will be disposed through authorized recyclers as per Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016.
- Organic and recyclable waste will use or sold to authorized recyclers.

3.6.1 DOMESTIC SOLID WASTE RE-USE

The total quantity of domestic wastes generated is about 20.0 kg/day which will be segregated at source, collected in bins and composted. The composted waste will be used as manure for landscape development.

3.7 WATER, ENERGY/POWER REQUIREMENT & SOURCE

3.7.1 Water

The water demand will be met from ground water source i.e. Proposed Bore well. The requirement of water for the plant is for domestic, industrial purposes and Greenbelt development. Details are appended in section 3.8.1 later in the report.

3.7.2 Steam & Power

Total Steam Requirement for the proposed unit will be 55.0 TPH. The plant at full capacity will demand 7000 KWH of power which shall be taken from cogeneration power plant.

3.8 WASTES GENERATED & SCHEME FOR THEIR MANAGEMENT/DISPOSAL

3.8.1 Water demand and wastewater/effluent discharge

Water demand and wastewater/effluent discharge
Source of water supply: Proposed Bore well.

Total number of proposed employees: 100 Nos.
Per capita water demand: 30 LPCD, therefore water demand for human consumption is 3.0 KLD.

Table – 09: Water Requirement for the proposed plant (KLD)

Sr. No.	Particulars	Total water requirement (Proposed)
1.	Process water in liquefaction	1297.0
2.	Makeup water for cooling tower	700.00
3.	Water for Boiler	960.00
4.	Domestic Purpose	3.00
5.	Green Belt	17.00
	Total	**2977.00**
	Recycle	**2079.00**
	Fresh	**898.00**

Table – 10: Recycling Water Requirement for the proposed plant (KLD)

Sr. No.	Particulars	Total water requirement
1.	Process Condensate	1230.00
2.	Steam Condensate	700.00
3.	Spent wash	147.00
4.	Treated Sewage in Greenbelt	2.00
	Total	**2079.00**

3.8.2 TREATMENT SCHEME FOR WASTE WATER

M/s India Glycols Limited has decided to install Distillery plant (Unit II) of Capacity 200 KLPD (grain based). The final Product of Distillery plant will be RS/ENA/AA. Captive Power plant of 7.0 MW will also be installed. To ensure Zero Discharge effluent industry, Industry has decided to install Multi effect evaporator technology, Decanter, DDGS Dryer along with CPU plant.

Spent wash from the bottom of the column will be fed to decanter. Decantation section centrifuge for separation of suspended Solid from Spent Wash (SLOP). Supernatant of spent wash will be concentrated in MEE and the reject from MEE (SLOP) will be mixed with Decanter sludge (wet cake) for drying in DDGS dryer and Dried Solid will be sold as cattle feed.

The total effluent generated from proposed distillery activities shall be to the tune of 1100.0 KLD. Spent wash will be fed into the decanter for solid separation, supernatant from

decanter will be concentrated in MEE of capacity 900.0 KLD. Concentrated spent wash (syrup) will be mixed with wet cake of decanter and produce DWGS (Distillers Wet Grains Soluble). DWGS is then fed into DDGS dryer for sodify upto to 90 %. Dried material is DDGS (Distillers dried grain with Solubles) which will be directly sold to the open market.

Along with the main product i.e. alcohol, the distillery would also manufacture animal feed called as 'Distiller's Dry Grain with Soluble (DDGS)'. This DDGS production would be mainly responsible for elimination of process effluent discharge. The whole integrated approach and production of DDGS would result in "Zero Discharge" of effluent from process.

MEE condensate will be treated in Condensate Polishing plant (CPU) of adequate capacity to be installed in proposed unit.

3.8.3 Rainwater Harvesting & Groundwater Recharging

Rain water harvesting is in place within the premises (housing colony) as per Norms. Five pit are developed of adequate capacity to harvest and recharge the ground water.

3.8.4 Air pollution Sources

The major air pollution source from the industry is from Boiler. The source will be provided with stack of adequate height so as to disperse the emanating flue gases containing SPM, oxides of sulfur and nitrogen without affecting the ground level concentrations as per the regulatory requirements. The source of air pollution, type of fuel used, fuel consumption and chimney heights for the air pollution source of the proposed project is indicated in table below.

Table – 11: Air pollution sources, fuel consumption and chimney height details

S. no.	Stack attached to	Fuel used	Fuel consumption	No. of stacks	Stack height	Air pollution control Plant	Predicted emissions
1.	Boiler (55.0 TPH)	Rice Husk/Indian Coal	366 MTPD (Rice Husk)/ 275 MTPD (Indian Coal)/357.5 MTPD (RH+IC)	01	80m	ESP	*SO_2, NO_x, SPM*

3.8.5 Noise Pollution Details

The major source of noise pollution in the industry is the boiler. Also ambient noise levels will be ensured within the ambient standards by inbuilt design of mechanical equipment and building apart from vegetation (tree plantations) along the periphery and at various locations within the industry premises. Ambient air quality and stack emissions will be regularly monitored to ensure ambient air quality standards.

3.8.6 Solid Waste Details

The quantity of solid waste generated from the proposed industry is detailed in the following table.

Table – 12: Solid waste generation during the operation phase

Total No. of Employees	100
Assuming per capita solid waste generation rate as 0.20 kg/capita/day	
Quantity of solid waste generated	20.00 kg/day
Organic solid waste : 60 % of the total waste	12.00 kg/day
Inorganic solid waste : 40 % of the total waste	8.00 kg/day
Disposal of domestic solid waste	Domestic wastes are segregated at source, collected in bins and composted.

3.8.7 Hazardous waste generation and its management during the manufacturing process

Hazardous Wastes generated during Operation phase of the proposed project shall be dealt as per Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016. The details of hazardous waste generation is provided in table below.

Table – 13: Summary of hazardous waste generation & its Disposal

S. No.	Source	Quantity of hazardous waste generated	Category according to Schedule I of hazardous waste	Treatment/ Disposal
1.	Used Spent Oil	500 Liters/Annum	5.1	Authorized Recyclers
2.	Discarded Drums/Barrels	500 Nos./Annum	33.1	After detoxification sent back to suppliers/UKPCB Authorized Recyclers

3.8.8 Environmental Impacts and Management Plan

3.8.8.1 Environmental management plan during construction phase (Table – 14)

S. No.	Environmental component	Predicted impacts	Probable source of impact	Mitigation measures	Remarks
1.	Ambient air quality	Negative impact inside the construction site premises. No negative impact outside.	Fugitive dust emissions generated during construction in the beginning followed by fabrication, erection of plant and machinery during later part of the project.	▪ Carrying out the construction activities in closed manner. ▪ Intermittent spraying of water. ▪ Use of PPE. ▪ PUC vehicles will be allowed.	Impacts are temporary (only during construction period) in nature.
2.	Noise	Negative impact near noise generation sources inside the premises. No significant impact on the ambient noise levels in the surrounding area.	Noise generation from construction activities and operation of construction equipment's and also from the movement of vehicles carrying construction materials to and from the project site.	▪ Use of well-maintained equipment. ▪ Use of PPE – ear plugs and muffs by the construction workers.	Temporary impact only during construction phase.
3.	Water quality	No significant impact	Discharge of sewage from laborers.	The sewage generated shall treat in the Septic tank/soak pits.	Impact will be temporary. Local laborers shall be employed.

4.	Land	No negative impact	Waste from laborers.	Waste from laborers will be collected and composted on site. Non-compostable waste will be sent for recycling.	--
5.	Socio-economic	Overall positive impact	Employment opportunities	Locally available man power will be utilized to the maximum possible extent.	--

3.8.8.2 Environmental Management Plan during Operation Phase (Table – 15)

S. No.	Environmental component	Predicted impacts	Probable source of impact	Mitigation measures	Remarks
1.	Ambient air quality	Minor negative impact.	▪ Manufacturing Process ▪ Particulate and gaseous emissions from Boiler	▪ Manufacturing process involves closed operations in various controlled vessels/reactors ▪ The process area will be provided with abundant natural light and ventilation and high roofs ▪ The emission from Boiler will be let out through stack of height 80m for Boiler followed	--

				by ESP.	
2.	Noise	Minor negative impact near noise generation sources inside the premises.	▪ Operation of machineries during the manufacturing process. ▪ Handling and conveying of raw materials and semi-finished components to different areas of operations	▪ The conveying system shall be maintained by following routine and periodic maintenance to reduce noise generation in material handling. ▪ Also the use of PPE (ear plugs) will be mandatory in this area. ▪ Green belt at the project boundary will further act as noise barrier and help in attenuation of noise.	--
3.	Water quality	No significant adverse impact	Discharge of domestic sewage and industrial effluent	▪ Domestic sewage shall be subjected to Proposed STP & effluent generated from the industrial manufacturing process will be treated in the proposed MEE respectively & re-used in various utilities & green belt.	Water conservation measures will be encouraged.

4.	Land	No negative impact	▪ Discharge of wastewater. ▪ Storage and disposal of solid wastes.	▪ The treated wastewater will be re-used for various Utilities green belt. ▪ The domestic solid wastes are segregated at source, collected in bins and composted and inert portion will be handed over to authorized recyclers.	--
5.	Socio-economic	Overall positive impact	Employment opportunities	Positive Impact due to direct employment of persons from the nearby area. Substantial benefits in the form of contracts to local agencies for different services. Employment generation in transport sector for transportation of raw material and finished goods	--

3.8.8.3 Environment Management Cell

An Environment Management Cell will be constituted to review, assess and monitor the progress of Environmental Management Plan implementation. Plant in- charge will be the head of cell. If necessary, the cell invites experts from the plant or outside.

The group has meets periodically and monitors the progress made with respect to Environment management plan implementation and initiates the measures as and when required.

3.8.8.4 Environment Monitoring Program

Monitoring of environmental factors will enable us to identify the changes in the environmental impacts. To ensure the effective implementation of the EMP, monitoring of ambient air quality, stack emissions, analysis & monitoring of water environment and noise level will be carried out as required / specified by statutory authority.

Table – 16: Environmental Monitoring

Sr. No.	Place of monitoring	Parameters of pollution	Frequency of monitoring
1.	Stack emission (Boiler)	Temperature, Velocity, Gas discharge, PM, NOx and SO_2	Carried out quarterly
2.	Ambient air quality at plant boundary	As per NAAQS	Carried out quarterly
3.	Monitoring of ground water quality	As per IS:10500	Carried out once in 3 months
4.	Noise monitoring near fans, product house, raw material yard and plant boundary	Leq dB(A)	Work zone noise levels once in a month, Ambient noise levels once in 3 months
5.	Effluent generated within the plant	pH, SS, TDS, COD, BOD. temperature, oil and grease etc	Daily

Note: The monitoring will be carried out as per Consent conditions and in consultation with UKPCB. In future the EC compliance condition will also be included.

Capital and recurring cost earmarked for environmental protection measures:

Total cost of the proposed project is estimated at Rs. 100.0 Crores. Cost of EMP is 20.0 Crore (Proposed Scenario) with its recurring cost of Rs. 3.50 Crores. The project will spend 2.0 % of project cost under Corporate Environment Responsibility (CER).

3.8.8.5 Risk Reduction Measurement & Recommendation in view of Safety Consideration

There will be a full-fledged safety section forming part of the plant. This is catering the needs of safety supervision of all plants coming under the operating plant. The main responsibilities of this cell are as follows:

All construction work places will be inspected for any unsafe conditions and unsafe practices. Any unsafe condition or unsafe practices will brought to the notice of project management enabling remedial actions to be taken.

- Storage site will be confined & identified properly.
- Containment dykes with proper sloping and collection sumps should be provided.
- Provision of flameproof electrical fittings /equipment's.
- Proper maintenance of earth pits.
- Strict compliance of security procedures like issue of identity badges for outsiders, gate passes system for vehicles, checking of spark arrestors fitted to the tank lorries etc.
- Strict enforcement of no smoking.
- Periodic training and refresher courses to train the staff in safety fire- fighting.
- Employee training and education will be carried out.
- Emergency drills shall be carried out periodically to ensure preparedness must continue.
- Many operations involve use of highly toxic/flammable materials and these needs to be documented as SOPs. These must be made and kept updated on priority.
- Ventilation should be provided for any enclosed are where hydrocarbon or toxic vapors may accumulate. Several such areas were noticed- these may be surveyed and tackled accordingly.
- All personnel will be trained in handling emergency situations and shall be apprised of their role in handling emergency situation and to ensure adequacy of the emergency procedures simulated exercise will be carried out.
- Adequate number of caution boards highlighting the hazards of chemicals will be provided at critical locations.
- Monitoring of occupational hazards like noise, ventilation, chemical exposure etc. will be carried out regularly and its record will be maintained.
- Good housekeeping, use of PPE, Engineering controls, Enclosure processes, scrubber system, display of safety boards, SOP of loading / unloading, local exhaust ventilation, safety shower etc. are important safety measures have taken to keep these chemicals within TLV.
- Appropriate personal protective equipment will be provided & ensure the usage of them.
- Water storage of adequate capacity to meet the requirements of water for firefighting purposes.
- Fire hydrants and automatic sprinkler system. Diesel driven pumps and headers to supply water to fire hydrant network.

- Adequate Portable fire extinguishers, sand bucket, wheeled fire & safety equipment should be provided at the required places.

4.0 SITE ANALYSIS

4.1 Connectivity:

The proposed project is to establish the grain based distillery plant (Unit II) with capacity 200 KLD with 7.0 MW of cogeneration power plant along with the required utilities viz. integrated MME, Drier, Boiler, STP facility for waste water management & required manpower at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.

The area is situated in the survey of India Topo Sheet No. 53K/15, 53K/16, 53O/3, 53O/4 and Coordinates Latitude: 29°10'10.36"N, Longitude: 79° 0'32.77"E (central). The nearest National Highway NH – 74: 0.9 Km North East away from the site. The nearest railway station Kashipur which is 6.08 Km NW away from the site. Pant Nagar Airport is 47.25 Km ESE (aerial) from the site.

4.2 Land Use:

M/s India Glycols Limited is already having 28,993 Sq. m land available at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand which shall be utilized in the proposed establishment of proposed distillery (Unit II).

4.2.1 Site Selection:

At the proposed site adequate transportation facilities are available for transportation of product to Uttarakhand and other region of country. Hence the proposed project will be beneficial and techno-economically feasible.
Hence, no alternative site is analyzed. The main features of the site including environmental considerations that make it suitable for proposed plant (Unit II) are given below:

- Availability of sufficient stretch of industrial land with flat terrain (at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand)
- No habitation in the plant site, hence no direct R&R issues
- Suitable topography and geography for construction of facilities
- Suitable seismic zone
- The plant site is not falling within the vicinity of any monument or in an archeologically sensitive area.
- No declared biodiversity parks/sanctuaries are there in the surroundings of the site
- Location of consumer centre.

- Convenient Rail & Road links
- Uttarakhand is providing suitable Industrial environment with proper infrastructure support.
- Adequate availability of raw material, power and other infrastructure.

Financial and social benefits with special emphasis on environmental consideration and benefit to the local people will be kept as top priority for the proposed project.

4.3 Topography:

Proposed Grain based Distillery (Unit II – 200 KLD) with 7.0 MW of Co-Generation Power Plant will be installed by M/s India Glycols Limited at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.

The area is located in the survey of India Topo Sheet No. 53K/15, 53K/16, 53O/3, 53O/4 and Coordinates Latitude: 29°10'10.36"N, Longitude: 79° 0'32.77"E.

The site lies in seismic zone IV as per Seismic zonation & intensity Map of Uttarakhand and has the low seismic potential.

There is no Capable Fault within the study area. The seismic zone map of Uttarakhand is shown in the Fig. – 06. There is no Capable Fault within the study area. The seismic zone map of Uttar Pradesh is shown in the Figure below.

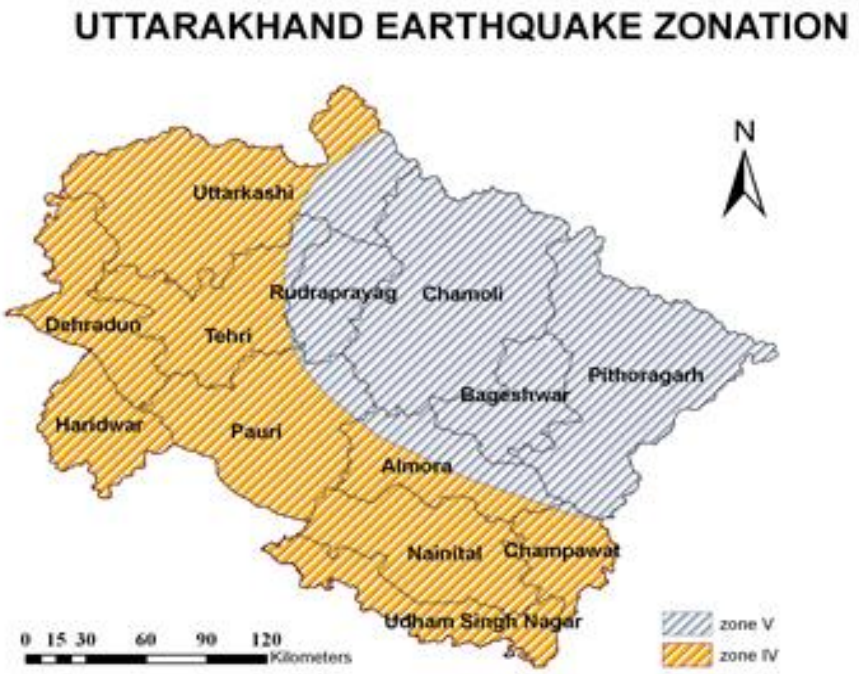


Figure – 06: Seismicity Map of Uttarakhand State

4.4 Existing Land Use Pattern:

M/s India Glycols Limited is already having its existing industrial land situated in A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand which shall be utilized for proposed installation of the project (Unit II). Total Land allotted for proposed unit along with required utilities is 28,993 Sq. M. 33% of total area is already developed as greenbelt within the premises.

4.5 Existing Infrastructures:

It is a proposal of installation of plant so infrastructure such as Drinking water facility, First-aid facility, Toilet facility are adequately available and shall be provided during construction and operation phase. Proposed Plant facilities will be developed inside the plant premises once all the statutory clearances are obtained. All the other infrastructural facilities are expected to be adequately available to the Plant.

4.6 Soil Classification:

Udham Singh Nagar district may be broadly divided into two physiographic units from north to south viz., Bhabar and Tarai respectively. Since the area is located in the Himalayan foothills, a very thick column of alluvium is deposited, which further is classified into two distinct divisions:

(A) The piedmont fan deposits known as Bhabar

(B) The Tarai Alluvium

These zones spread in northeast – southwest direction all along the foothills of the Siwalik formation having a maximum width of less than 30 km. The general gradient towards south varies from 9 to 17 m/km. The slope gradually decreases towards south in the Tarai region and becomes almost flat close to the boundary between Tarai and Central Ganga plains, which exists few km south of the southern boundary of the study area. The geomorphology of an area plays a very significant role in the groundwater movement and occurrence.

The soil types are controlled by the topography and rock types. Based on the National bureau of soil Survy and Land Use Planning (ICAR) Nagpur, the soils of the district Udham Singh Nagar can be classified into Udifluventic Ustochrepts, Typic Ustipsamments, Udic Ustochrepts, Udic Haplusstolls, Typic Ustochrepts as determined by their diagnostic properties. The Bhabar soils lay at the northern extremity of Khatima and Bazpur blocks, part of the alluvial fan deposits. Soils are shallow with sandy to loamy texture, poorly sorted, comprising mainly of gravel, sand, silt, clay with pebbles etc.

The Tarai soils run all along the northern extremity of the district, form continuous fringe with the Bhabar Zone. Bhabar formation is found in extreme northern parts of the Khatima

and Bazpur blocks, boundary demarcated by the contact of Tarai and Bhabar. The Tarai belt is 8–25 km in width, and the general slope is <1% towards south. Soil is calcareous, moderately productive and suitable for extensive cultivation of high yielding variety of crops like rice and sugar cane. Soils typify marshy and swampy environment.

4.7 Climatic Data:

The climate varies from Sub-tropical and sub-humid with three distinct seasons i.e. summer, monsoon (rainy season) and winter. The rainy season starts from the month of middle June to September end, and followed by the winter season, which starts from the end of October and goes up to February. The winter rains are generally experienced in late December or early January, which brings down the temperature and that's how December and January are the coldest months in the district. The summer season starts from March and it goes up to June. The hottest months of the year are May and June. The maximum temperature in the district goes up to 42˚C during the summers and the minimum temperature is between 1 and 4˚C, further north of the district, the temperature comes down to 0.4˚C in winter season. Rainfall, spatially, is highly variable depending upon the altitude. The intensity of the rainfall increases from south to north and the amount of rainfall decreases in generally from west to east. About 90% of the rainfall received during the monsoon period, and the remaining 10% of the rainfall in non-monsoon period. The average annual rainfall is 1296.85 mm (Year; 2004).

Social Infrastructure:

Infrastructure is the basic physical and organizational structures needed for the operation of a society or enterprise or the services and facilities necessary for an economy to function.

The term typically refers to the technical structures that support a society, such as roads, water supply, sewers, electrical grids, telecommunications and so forth and can be defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions.

Viewed functionally, infrastructure facilitates the production of goods and services, and also the distribution of finished products to markets, as well as basic social services such as schools and hospitals; for example, roads enable the transport of raw materials to a factory.

Kashipur is a major transport hub in Uttarakhand, acting as a gateway for the cities of Ranikhet, Pauri and Gairsain. The city is served by the National Highways NH 309 and NH 734. The NH 734 (formerly NH 74) connects to Najibabad via Jaspur and Nagina, while the NH 309 connects Kashipur to Rudrapur in the east, and the cities of Ramnagar and Srinagar to the north.

Major tourist attractions in the city include:

- Drona Sagar Lake
- Shree Moteshwar Mahadev Mandir
- Maa Balsundari Mandir
- Chaiti Mela
- Gurudwara Shri Nankana Sahib
- Tumaria Dam
- Giri Sarovar
- Arya Samaj Mandir

Kashipur is home to four colleges affiliated to the Kumaun University, Nainital: Radhey Hari Government P.G. College, Chandrawati Tewari Girls P. G. College, Sriram Institute of Management and Technology and Kashipur college of Education. The city also hosts the campus of an Indian Institute of Management.

The Indian Institute of Management Kashipur, also known as IIM Kashipur, is a public business school located in the Escorts Farm area of the city. It is one of the thirteen Indian Institutes of Managements the government has set up during the Eleventh Five-year Plan.

5.0 PLANNING BRIEF

5.1 Planning Concept (Type of Industries, Facilities and Transportation etc.) Town and Country Planning/ Development Authority Classification:

M/s India Glycols Limited based on Kashipur, Uttarakhand has proposed to establish the grain based distillery plant (Unit II) with capacity 200 KLD with 7.0 MW of cogeneration power plant along with the required utilities viz. Boiler, STP facility for domestic waste water management & required manpower at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.

5.2 Population Projection

Proposed employment will be approx. 100 persons. However, apart from this there will be significant non estimated employment generation at the supplier firms and service industry providing services to the company. Company shall be giving preference to people from economically weaker sections for employment in various semiskilled/ unskilled jobs thereby contributing to their upliftment.

5.3 Green Belt Development

Local native species suitable for this region are planted in compliance of conditions of environmental clearance. With a view to attenuate air pollutants, to resist noise propagation from proposed boiler and uptake of treated effluent to some extent, the green belt all around

the periphery of project sites and in vacant areas (33% of the total land) has been developed. Tree plantation will be undertaken in a large scale on land vacated after cessation of construction activities. Open spaces, where tree plantation is not possible will be planted with flowering herbs and grass which act as soil binders and also helpful in preventing erosion of topsoil. Proposed green belt will be being strengthened regularly.

Total 28,993 Sq. m land area is available at existing project site; greenbelt and other forms of greenery already been developed by planting the native species. This green area also enhances the aesthetic beauty of the area. Plants are grown in such a way to function as Pollutants sinks as well as it improve the aesthetics of the area and provide possible habitats for Birds, thus increasing hospitable nature also.

5.4 Assessment of Infrastructure Demand (Physical & Social):

M/s India Glycols Limited based on Kashipur, Uttarakhand has proposed to establish the grain based distillery plant (Unit II) with capacity 200 KLD with 7.0 MW of cogeneration power plant along with the required utilities viz. Boiler, STP facility for waste water management & required manpower at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.

Planning Concept

- Land use is industrial as situated at A-1, Industrial Area, Bazpur Road, Kashipur, District-Udham Singh Nagar, Uttarakhand.
- The existing infrastructure i.e. Road and other utilities like electricity; water are adequately available. The stable power distribution network for the industrial complex where this project is coming up.
- The adequate Infrastructure has been planned.
- The site is well connected with roads for movement of raw material and finished products and other material.

5.4.1 System Design for High Productivity:

The productivity of the plant and associated auxiliary objectives are achieved by adopting the following principles:-

Use of equipment and systems of design, performance and high availability which shall be fully established by a considerable record of successful operation for similar service conditions in all plant facilities. Use of only proven design concepts, conservative designs, strict implementation of quality assurance norms during design, manufacture as well as installation and commissioning stage. Strict compliance with the project, company

approved pre-commissioning and commissioning procedures as well as standard checklists forming will be a part of commissioning documents for the project.

5.4.2 Sizing of Critical Equipment- Margins & Redundancy/Standby:

Adequate margins will be provided while sizing all important auxiliaries and sub-systems to ensure operation of the plant at ultimate capacity under the worst conditions and taking into consideration normal wear & tear.

5.4.3 Design for Efficient Operation:

Centralized maintenance system is being followed. All repairs of capital nature, heavy maintenance jobs and plant civil maintenance will be done by engaging specialized external agencies. Implementation of computer systems including local area network (LAN) with standard user friendly software's in the field of financial management, personnel management, materials management, order scheduling, sales and marketing management, management information systems (MIS), production planning and control, maintenance and spares planning, etc. shall be considered to increase work efficiency and to reduce manpower requirement.

5.4.4 Operation Performance Management System (OPMS):

The operation of the plant will be optimized by implementation of OPMS. This system will clearly define the responsibilities of all key O & M personnel including the shift-in-charge. This will also cover the system of daily reporting to the project company Corporate Office and monthly O&M review meetings.

5.4.5 Operation & Maintenance Philosophy:

Most of the key positions in operation and maintenance of the proposed plant at different categories are being manned by the qualified persons having experience in the similar field. However, depending on the type of equipment /facilities along with the degree of automation contemplated, the operation and maintenance personnel of the plant so recruited will require specific need based training which is carried out on site by the respective equipment supplier during equipment erection, start up and commissioning of different plants.

5.5 Amenities/Facilities:

5.5.1 In-Plant Facilities:

The following facilities are to be provided in proposed plant:

a. Administrative Building, Service Building
b. Construction offices and stores
c. Time and security offices

d. First Aid and firefighting station
e. Canteen
f. Toilets
g. Car parks and cycle/scooter stands
h. Training Centre

Office space are provided as per good practice and canteens, toilets and restrooms according to norms laid down in relevant factories act. The above facilities are also be adequately furnished and equipped.

5.5.2 Employment Generation:

The total direct employment potential w.r.t. the proposed project is about 100 people. However, apart from this there will be significant non estimated employment generation at the supplier firms and service industry providing services to the company. Company is giving preference to people from economically weaker sections for employment in various semiskilled/ unskilled jobs thereby contributing to their upliftment. The project has enhanced the prospects of employment. Recruitment for the unskilled workers for the plant is from the nearby villages. The basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational facilities, medical facilities, entertainment, etc. shall be developed as far as possible.

5.5.3 Peripheral Developmental Activities:

M/s India Glycols Limited will undertake various activities around the project site as a mark of their Corporate Social Responsibilities.

6.0 REHABILITATION & RESETTLEMENT (R & R) PLAN:

Not Applicable

7.0 PROJECT COST ESTIMATES:

Total cost of the proposed project is estimated at Rs.100.0 Crores. Cost of EMP is 10.0 Crore (Proposed Scenario) with its recurring cost of Rs.2.50 Crores. The project will spend 2.0 % of project cost under Corporate Environment Responsibility (CER).

8.0 ANALYSIS OF PROPOSAL:

The Alcohol Industry has shown tremendous progress in terms of infrastructure development, technology base and wide range of products.

Proposed 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.

Uttarakhand 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.

The Alcohol Industry has been witnessing an impressive growth in the recent years, driven by rising consumption levels in the country and strong demand from export markets.

Project will create direct & indirect employment opportunities within the surrounding region. Plant will use good faith efforts to employ local people from the nearby villages depending upon the availability of skilled & un-skilled man-power surrounding the project site. In operation phase, the proposed project would require significant workforce of non-technical and technical persons. Migration of highly education and skilled experience will result in increase of skill in the surrounding villages.

It can be concluded from the matrices that the resultant impact is beneficial in the interest of common man, the society, the state and as the country as a whole. The benefits can be summarized as below:

- The proposed project will provide quality product to the users.
- There should be positive impact on the socio-economic condition of the area in terms of direct and indirect employment due to the proposed project.
- Numbers of local trained persons are likely to find jobs.
- This is cost effective & energy efficient proposal and aims at sustainable development.
- These products also have export potential. Hence, possibility of earning foreign exchange.
- The project will spend 2.0 % of project cost under Corporate Environment Responsibility (CER).

9.0 WASTE WATER MANAGEMENT:

The proposed Grain based distillery will be based on "ZERO EFFLUENT DISCHARGE".

10.0 AIR / NOISE POLLUTION CONTROL MEASURE:

The steam required for proposed distillery activities would be taken from a 55 TPH boiler to be installed in the premises. The boiler will be provided with ESP as Air Pollution Control (APC) equipment followed by a chimney of 80m height.

The major source of noise pollution in the industry will be Boiler. Also Greenbelt will be strength to attenuate noise to possible extent. Ambient noise levels will be ensured within the ambient standards by inbuilt design of mechanical equipment and building.

11.0 SOLID WASTE MANAGEMENT:

Spent wash generated during Grain based operation, would be first fed into decanter for solid separation then supernatant from decanter will be concentrated in Multi-effect evaporator. The thick syrup obtained from MEE is mixed with Wet cake from Decanter, finally dried into DWGS dryer. Final by product will be DDGS (Approx. 109.0 TPD, theoretically) which will be sell as Cattle feed. Approx. 6.48 MTPD of Fly ash will be generated from the Boiler which shall be subjected to brick manufacturer.

12.0 HAZARDOUS WASTE MANAGEMENT:

The Hazardous waste (Spent Oil, Discarded Drums/Barrels) will be stored under separate area shed with Lock and Key. Hazardous waste, will be disposed through authorized recyclers as per Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016.

13.0 SAFETY MEASURES:

Company is provided full proof fire hydrant system & all kinds of fire extinguishers to ensure the safe working environment. The workers are provided with face-mask, hand gloves, moreover the production halls are fitted with exhaust fans etc. The Organization will establish, implement & maintain documented Occupational health & safety objectives, at relevant functions & levels within the organization and training / awareness program will be conducted on regular basis.

14.0 ON-SITE EMERGENCY MANAGEMENT PLAN

Following is the Proposed On-site Emergency Management Plan.

1. **Emergency** can be because of following:
    a) **Fire** due to short circuit in the building/equipment.
    b) **Accident** during material handling, production process or equipment operation; resulting in injury to personnel or damage of asset.
    c) **Natural calamity -** such as earthquake/flood/lightning.

2. **Proposed Plan** for Emergency Management on-site is:
    a) **Core-group formation:** A Core-Group of Two Members from Production, One from QC, One from QA, One from Engineering and Two from Office Administration shall be formed.
    b) **The Core group** shall be Trained adequately as following:
        - Firefighting,
        - Care during accident, injury to affected personnel,
        - First-aid requirements,

- Ambulance facility,
- Natural calamities & control, and
- Avoiding panic.

c) Periodic Safety drills shall be conducted for the Core-group.

d) Availability of Fire Fighting equipment and water in Water Tank.

e) Availability of one Car & driver at factory during operation days.

****