EXECUTIVE SUMMARY

OF

DRAFT EIA/EMP REPORT

FOR

ESTABLISHMENT OF NEW NATURAL AND SYNTHETIC SURFACTANT CHEMICAL MANUFACTURING UNIT

AT

MOUZA KULEPAIRI, P.S. BAGNAN, DIST-HOWRAH, WEST BENGAL

BASELINE STUDY PERIOD: OCTOBER-DECEMBER 2019

MCPL/EMD/CHEM/2019-20/09/02/(DEIA-V_{01}).....March, 2020

PROJECT PROPONENT

M/S DETERGEO CHEM (EAST) PRIVATE LIMITED, NEW DELHI, (DCEPL)

Registered office: A-29, Block B1 Ext., Mohan Co-operative Industrial Estate, New Delhi-110044, India

ENVIRONMENTAL CONSULTANT

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Executive Summary

1.1 Project Name, Location and Environmental Settings

The project proponent M/s Detergeo Chem (East) Private Limited, New Delhi, (*Hereon referred to as, DCEPL*) is engaged in the production of natural and synthetic surfactants. These surfactants are used in personal-care and home-care formulations such as laundry detergents, shampoos, toothpastes, shaving creams, etc. DCEPL is proposing to set up a surfactant manufacturing facility near Kolkata to cater to the raw material demand of the home-care, personal-care and oral-care industry in East India.

DCEPL has selected the following surfactants for its product portfolio:-

Sulphates

Linear Alkylbenzene Sulphonic Acid, Sodium Lauryl Ether Sulphate, Sodium Lauryl Sulphate and Alpha Olefin Sulphonate. All these products will be manufactured on the same plant (continuous type) however organic feedstock shall change depending on the final product.

Sulphate-free

Cocoamidopropyl Betaine, Cocamide Monoethanolamine, Cocamide Diethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate. All these products will be manufactured on the same plant (batch-type) however raw materials shall change based on the final product.

Table 1:Project and Environmental Settings

S. No.	Particulars	Details
1.	**Nature and size of the Project**	Establishment of new natural and synthetic surfactant chemical manufacturing unit at Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal. Proposed capacity- 82000 MT/A
2.	**Location details**	DAG No. 42, 44, 45, 46, 52, 53, 54, 55, 131, 132, 138, 139,141, Mouza Kulepairi, P.S. Bagnan, Dist-Howrah, West Bengal
	Geographical Cordinates	22°31'49.08"N & 87°55'47.78"E
	Toposheet number	73N/14, 73N/15, 79B/2 & 79B/3.
3.	**Area Details**	
	Total Project Area	1.3493 ha.
4.	**Environmental Setting Details (with approximate aerial distance and direction from the project site)**	
	Nearest City	Bagnan~7.4 Km, SE
	Nearest Highway	NH-06 ~7.4 Km, SE SH-15 ~5.7 Km, SE
	Nearest Railway Station	Bagnan~ 8.7 Km, SE
	Nearest Airport	Netaji Subhash Chandra Bose International Airport~ 54 Km, E
	National Parks/ Wild Life Sanctuaries/ Biosphere Reserves/ RF and PF within 10km radius	There is no National Park and Biosphere Reserve within 10 Km radius. No RF/PF within the 10 KM of the project site.
	Nearest Water Bodies	Rupnarayan river- 3.6 Kms Damodar kata Nadi (Hurhur khal)-2.7 Kms Mendeshwari River-3.8 Kms

		Kanashabat Nadi- 49 Kms Damodar River- 4.0 Kms Gaighata Khal -1.1 Km
	Interstate Boundary	None
	Seismic Zone	Zone II
5.	**Cost Details**	
	Project Cost	Rs. 20. Crores
	Cost for Environmental Protection Measures	Capital cost Rs. 150 Lakhs, recurring cost- 20 Lakhs,
	Cost for CER	Rs. 40.00 Lakhs
	Cost of OH&S	Rs. 5.0 Lakhs/Yr

1.2 Products and capacities

The proposed quantities for the manufacturing of products are given in table below;

Table 2: List of Proposed Manufacturing Products

S. No.	Product Name	Proposed Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene Sulphonic Acid 96%	12,000	MS Tanker
2.	Linear Alkyl Benzene Sulphonic Acid 90%	12,000	MS Tanker
3.	Alpha Olefin Sulphonate	1,000	SS Tanker
4.	Sodium Lauryl Ether Sulphate	24,000	SS Tanker
5.	Sodium Lauryl Sulphate	6,000	SS Tanker
6.	Cocoamidopropyl Betaine	3,000	Truck
7.	Cocamide Monoethanolamide	3,000	Truck
8.	Cocamide Diethanolamide	3,000	Truck
9.	Ethylene Glycol Distearate	3,000	Truck
10.	Ethylene Glycol Monostearate	3,000	Truck
11.	Dilute Sulphuric Acid	12,000	MS Tanker
12.	Sodium Sulphate	400	
Total Capacity		**82,400**	

1.3 Raw Material Requirement

Raw material required for the manufacturing of new natural and synthetic surfactant chemical are given in below table;

S. No.	Product Name	Manufacturing Capacity (MTA)	Mode of Transport
1.	Linear Alkyl Benzene	17,215	MS Tanker
2.	Alpha Olefin	560	ISO Tanks
3.	Lauryl Ether	13,200	ISO Tanks
4.	Lauryl Alcohol	3,150	ISO Tanks
5.	Sulfuric Acid 98%	12,000	MS Tanker
6.	Caustic Soda	4,052	MS Tanker
7.	Sulfur	3,487	Truck
8.	Coconut Fatty Acid	5,028	ISO Tank
9.	Dimethylaminopropylamine	264	ISO Tank
10.	Monochloroacetic acid	243	Truck
11.	Monoethanolamine	732	ISO Tank

12.	Diethanolamine	1029	ISO Tank
13.	Stearic Acid	5490	ISO Tank
14.	Ethylene Glycol	870	MS Tanker

1.4 Water Requirement

The unit proposes to consume 203 KLD of Fresh water. The entire quantity of raw water will be supplied by state approved water tanker suppliers. Water balance table for the operation of the proposed plant is as follows:

- Process – For Dilution: 13.0 KLPD
- Make-up cooling water: 168.0 KLPD
- Boiler Makeup Water: 20.0 KLPD
- Alkali Scrubber (Recycle Water): 5.0 KLPD
- Domestic: 2.0 KLPD
- Gardening : 5.5 KLPD

1.5 POWER/ELECTRICITY

The Power requirement will be 1000 KW sourced through WBSEDCL. DG set will be installed of 1000 KW in case of power failer.

1.6 MANPOWER DETAILS

Total manpower will be 40 Nos.

1.7 Manufacturing Process Flow Diagram

SULPHATES

Sulfur Trioxide Gas Generation

Sulfur trioxide gas is generated by burning sulfur at high temperature and sulfur dioxide then formed in presence of air which later converted to sulfur trioxide in presence of a catalyst in a well closed loop system. Industrially SO_3 is made by the contact process. Sulfur dioxide, which in turn is produced by the burning of sulfur. After being purified by filtration, the SO_2 is then oxidized by atmospheric oxygen at between 400 and 600 °C over a catalyst. A typical catalyst consists of vanadium pentoxide (V_2O_5) activated with potassium oxide K_2O on kieselguhr or silica support. The heat generated during this process is utilized for steam generation. This steam is consumed in various uses like sulfur melting, Air drying and water chilling etc.

Sulphonation / Sulphation Unit

The Sulfonic acid forms in the unit when an SO3-in-air mixture is injected into a multi-tube reactor, simultaneously with the desired organic feed. The removable organic distribution flanges are factory calibrated prior to installation in the reactor. Uniform distribution of the air-SO3 gas is the result of symmetrical gas flow through the reactor. Reaction temperature is also a very important parameter of control in sulfonation and sulfation process. Cooling jackets in the reactor remove heat of reaction. Organic feed rate to the reactor vessels is measured by means of a highly accurate mass flow meter and controlled by a control valve and centrifugal pump. The organic feed rate is controlled based on the preset sulphur-to-organic mole ratio. Exhaust gas is separated from the acid recycle stream in the liquid separator and cyclone vessels. For the production of sulfonic acid,

the acid product is fed directly to the digestion system where reaction with absorbed SO3 goes to completion.

Neutralization

The Sulphonic acids produced after Sulphonation of LAB/AO/LE/LA is neutralized to make their respective sodium salt.

This process takes place by mixing Sulphonic acid with liquid sodium hydroxide solution up to getting neutral pH of the product. This reaction is exothermic hence proper cooling is provided to the neutralization vessel. The product is formed as paste which then diluted with pure water to get desired concentration of liquid.

BATCH SULPHONATION PROCESS

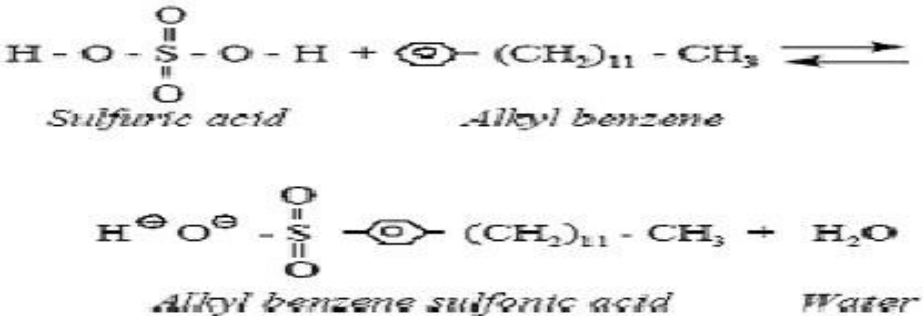
LABSA 90% is produced by sulphonating Linear Alkyl Benzene (LAB) with Sulphuric Acid (98%). The equipment used are MS/SS reactor vessels. The required amount of LAB is transferred to Reaction Vessel and Sulfuric Acid is added gradually. The reaction is highly exothermic and the acid addition rate is determined by the ability to remove the heat of reaction. The temperature should be maintained below 65°C for optimum product quality. The temperature is controlled by circulating water in jacket of the vessel. The mixture is continuously stirred to ensure homogenous mixing and completion of reaction between LAB and Sulphuric Acid. The mixture now contains LAB Sulphonate (LABSA) and Sulphuric Acid. To facilitate the separation of LABSA and Sulphuric Acid, water has to be added to the total mass. The water addition (typically about 6 to 8% by weight of the reaction mixture) causes a phase separation to occur between the sulfonic acid and the diluted sulfuric acid. The separation takes place in a separate, lined vessel and occurs over a period of about 30 minutes. The Dilute Sulphuric Acid (80-85%) forms the bottom layer and is transferred to a storage tank. LABSA forms top layer and is transferred to a separate storage tank. The Dilute Sulphuric Acid (80-85%) is sold to authorized end users for further beneficial uses like: SSP Fertilizer, Zinc Sulphate, Magnesium Sulphate and Alum.

This is a highly exothermic reaction; therefore, effective heat removal is very important to get a high quality final product. The reactants increase in viscosity between 15 and 300 times as the organic feedstock is converted to the sulfonic acid. This large increase in viscosity makes heat removal difficult. The high viscosity of the formed products reduces the heat transfer coefficient from the reaction mass. Effective cooling of the reaction mass is essential because high temperatures promote side reactions that produce undesirable by-products. Also, precise control of the molar ratio of SO_3 to organic is essential because any excess SO_3, due to its reactive nature, contributes to side reactions and by-product formation. Therefore, commercial scale sulfonation reactions require special equipment and instrumentation that allows tight control of the mole ratio of SO_3 to organic and rapid removal of the heat of reaction. Sulfuric acid (H_2SO_4) is widely used as sulfonating agent. It is an equilibrium process, as water is formed in the reaction and the resultant water dilutes the sulfuric acid. This process has the dual advantage of low SO_3 cost and low capital equipment cost as compared to the gas sulphonation route.

The raw material consumption for per ton of LABSA 90% is as follows:

LAB: 680 +/- 10 KG

Sulphuric Acid 98%: 1000+/100kg.

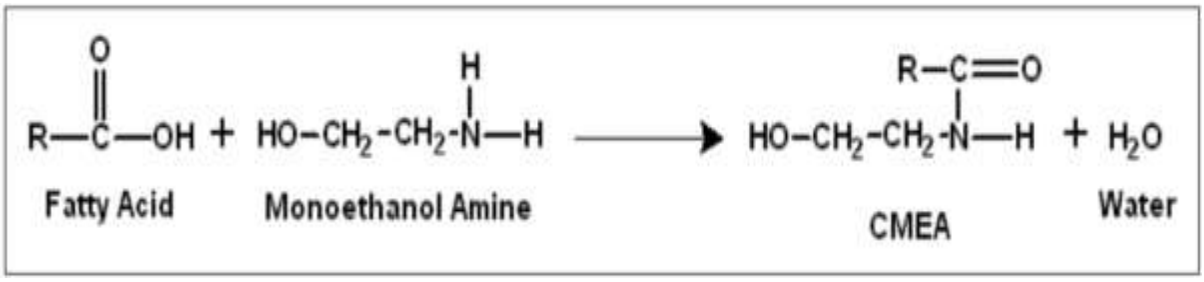


SULPHATE-FREE

The sulphate-free products, i.e., Coco-amido-propyl Betaine, Cocamide Mono-ethanol-amide, Coc-amide Di-ethanolamine, Ethylene Glycol Distearate and Ethylene Glycol Monostearate, are produced in an agitated batch reactor. The same reaction system is used for all products however the raw materials differ based on the final product that needs to be produced.

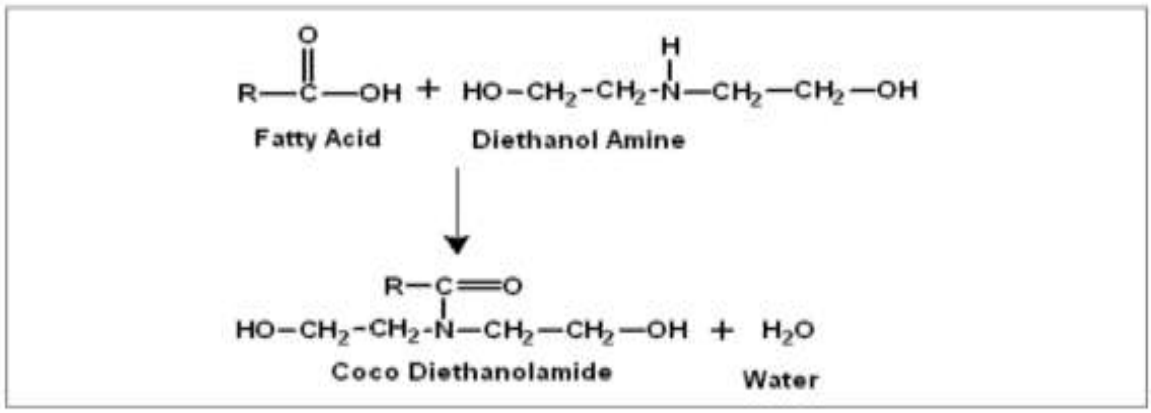
Cocamide Mono-ethanolamine

Esterification of Coco Fatty acid with Monoethanolamine is carried out at 140 -160C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.



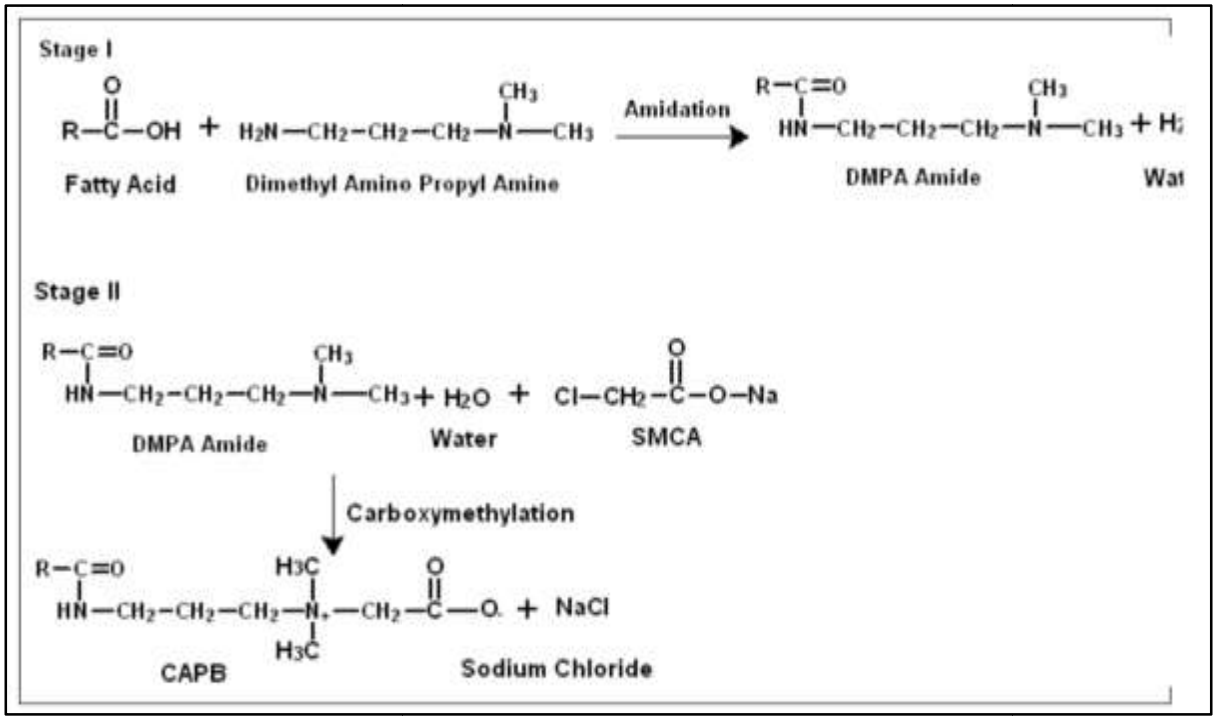
Cocamide Di-ethanol-amide

Esterification of Fatty acid with Di ethanolamine is carried out at 140 -160o C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed is directly filled in containers.



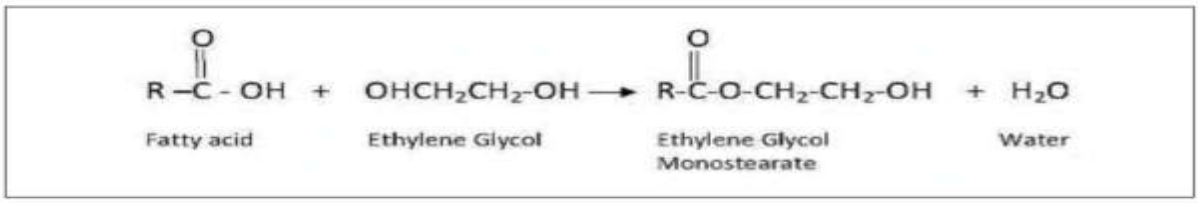
Coco-amido-propyl Betaine

Amidation of Fatty acid is carried out with Di-methyl-amino-propyl-amine at 140 -160C in presence of Nitrogen. The amide formed is quaternized with mono-chloroacetic acid and Sodium Hydroxide 48%. Water is added to make the product in liquid form. After the quaternization is over, pH of the product is adjusted if required. The Liquid product is directly filled in containers.



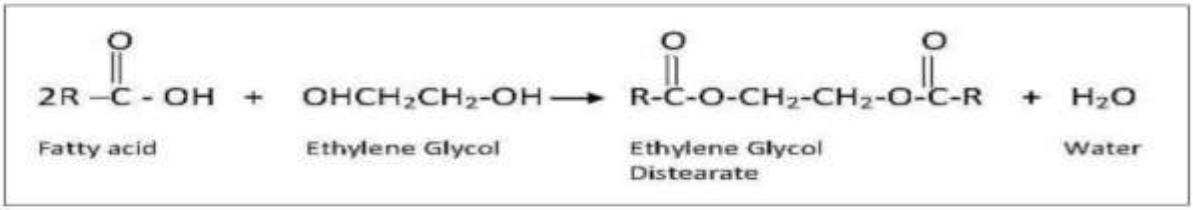
Ethylene Glycol Monostearate

Esterification of stearic acid is carried out using ethylene glycol at 140-160C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.



Ethylene Glycol Distearate

Esterification of 2 moles of stearic acid is carried out using 1 mole of ethylene glycol at 140-160C. The product is allowed to age for completion of reaction for 5-6 hrs. The liquid product formed can be allowed to pass through flaker / prilling to produce flakes or prills / granules.



1.8 ENVIRONMENTAL BASELINE STUDY

Various Environmental factors as existing in the study area which are liable to be affected by the activities have been assessed both quantitatively and qualitatively. Baseline environmental data generation of study area was carried out during the period from Oct. to Dec, 2019.

Parameters	No. of Sites	Description	Permissible Level
Air Quality	8	PM_{10} - 98.0 µg/m³ and 52.0µg/m³ $PM_{2.5}$ - 55.0 µg/m³ to 27.0 µg/m³ SO_2 – 4.0.0 µg/m³ to 16.0 µg/m³ NO_2 –12.0 µg/m³ to 28.0 µg/m CO – 0.58 µg/m³ to 0.97 µg/m³	100 µg/ m³ 60 µg/ m³ 80 µg/ m³ 80 µg/ m³ 2 mg/ m³
Ground Water Quality	8	pH - 6.73 to 7.71 Hardness - 224to 458 mg/l TDS - 409 to 838 mg/l.	6.5-8.5 200-600 mg/l 500-2000 mg/l
Surface Water Quality	6	pH - 6.80 to 7.48 Hardness - 398 to 428 mg/l. TDS - 648 to 681 mg/l BOD - 16 to 28 mg/l. COD - 92 to166 mg/l.	---
Soil Quality	8	pH - 7.29 to 7.91 Nitrogen - 18.4 to 24.2mg/100gm Organic Matter - 1.06 % - 1.39%.	---
Noise Level	8	Noise Level (Day) - 42.3-68.4 Leq dB (A) Noise Level (Night) - 37.8-58.4 Leq dB(A)	75 Leq dB (A) 70 Leq dB (A)

1.9 Ecological environment

Ecological data has been collected through secondary sources and by site visits. The tree species kikar, Jamun, Peepal and Mango etcare the dominant plant species of the study area. Mongoose, porcupine, jungle cat, cobra, krait, snakes, hare, pigeon and variety of birds are the common animals of the study area. No endangered species of plants and animals are found in the study area, so no impact on ecological environment.

1.10 Sensitive Ecosystem

Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. No ecologically sensitive area like biosphere reserve, tiger reserve, and elephant reserve, migratory corridors of wild elephant, wetland, national park and wildlife sanctuary are present within 10km distance of the project site. There is no Reserve and Protected Forests present around the project site of 10 km. Agriculture and industrial workers dominate the occupation structure of the study area. Several induction furnaces, rolling mills, ferroalloy plants, brick kilns, and other small units are present in the study area.

1.11 Socioeconomic Condition

Socioeconomic status has been studied through secondary sources and by site visits. The social requirements identified such as Drinking water requirement, Promotion of Educational institutions and Medical facilities to the villagers (especially Senior Citizens and infants or pregnant ladies). Community centers, recreation facilities etc will also be developed as part of social responsibility.

1.12 CER Activities (Corporate Environmental Responsibility)

Proposed 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. Special emphasis on Financial and Social benefits will be given to the local people.

The company has separately earmarked **Rs. 40.00 Lakhs (2% of Project cost)** towards the Corporate Environment Responsibility (CER) Activities as per OM (CER) F. No. 22-65/2017-IA.III dated 01.05.2018.

The Expenditure of CER will be decided after Public Consultation.

1.13 Cost of EMP Measures

The budget for implementation of mitigation measures and environmental management plan to mitigate the potential adverse environmental impacts during the construction and operation phase will be given below.

So far amount of 150 Lakhs for Capital and 17.0 Lakhs amount will be incurred for Environmental Management activities.

1.14 Green Belt Development

- Out of the total project area 33% will be utilized for green belt development.
- Plantation will be done as per Central Pollution Control Board (CPCB) Norms & in consultation with the DFO/DM.
- The plantation in and around the project site will help to attenuate the pollution level.
- Native species will be given priority for Avenue plantation.
- The periphery will be devoted to generation of green belt area.
- The plantation would start along with the start of the construction activities of the proposed unit.

1.15 Mitigation Measures

S. No.	Particulars	Mitigation measures to be adopted
1.	Air Environment	• The particulate emissions are controlled through installation of multiple dust cyclone separators. • Scrubber is installed for scrubbing the residual Formaldehyde from the main product stream which also controls the odour problem. • Online Air monitoring system for stack emission (for Particulate Matter) will be installed and transmission of online data to WBPCB and CPCB will be done. • Greenbelt development (33%) of total area.
2.	Water Environment	• Domestic sewage to be collected in septic tank & used for gardening. • Treated water will be used for water sprinkling and Floor washing. • Online effluent quality monitoring system to be installed at the outlet of the unit for measurement of the parameters flow, pH, COD, BOD & TSS etc. and transmission of online data to SPCB and CPCB to be done.

S. No.	Particulars	Mitigation measures to be adopted
3.	Solid/Hazardous Waste Environment	• Boiler ash stored separately &sells to farmer. • Used oil to be sold to registered recycler. • Spent catalyst to be sold to registered recycler.
4.	Noise Environment	• The Noise free machines of latest technology will be installed. • The green belt will (plantation of dense trees across the boundary) help in reducing noise levels, generated as a result of attenuation of noise generated due to plant operations, and transportation. • Earmuffs would be used while running the equipment's of the plant. • D.G sets are provided with acoustic enclosures to control the noise level within the prescribed limit. • A high standard of maintenance and proper lubricants will be practiced for plant machinery and equipment's, which helps to avert potential noise problems.
5.	Odour management	• Scrubber system is used to control the odour from the exit gases. • The remedial measures will be taken such as better house-keeping by regular steaming of all the equipment's. • Temperature will be kept under control during the process. • The green belt will (plantation of dense trees across the boundary)

1.16 Conclusion

M/s DCEPL will generate a fair amount of direct, indirect and induced employment in the region. The local economy will receive a boost due to employee spending and services generated by the company. Due to the implementation of the project activity there shall be improvement in the standard of living viz. better education, improved health, sanitation facilities etc. This is envisaged as a major positive benefit. The company's management shall recruit semi-skilled and unskilled workers from the nearby villages due to availability of local labors. The employment provided due to the proposed project would rapidly increase the social status of the villagers.

Company commitment towards environment & using the latest technology, along with optimal usage of available resources will reduce the impact and makes the project viable.