SREE RAYALASEEMA ALKALIES AND ALLIED CHEMICALS LIMITED

SY. NO. 51/1, 2A, 2B, 2C1, 2C2, 2C3, 56/1, 58/1, 59/1, 60, 62/3/2D2, 2C1/A2, 2C1/A3, 2C2/C, 2G/1, 2E, 2F, 1A, 1B, 62A, 62 B, 63, 64, 70/C2, 72/P, GONDIPARLA VILLAGE, KURNOOL MANDAL AND DISTRICT, ANDHRA PRADESH

EXECUTIVE SUMMARY

SUBMITTED TO
ANDHRA PRADESH POLLUTION CONTROL BOARD,
REGIONAL OFFICE, KURNOOL

EXECUTIVE SUMMARY

Introduction

M/s. Sree Rayalaseema Alkalies and Allied Chemicals Limited (SRAACL) a group company of TGV group; has established a Caustic soda manufacturing unit at Gondiparla village, Kurnool mandal in Kurnool district, Andhra Pradesh. TGV group established Caustic soda plant in 1987 and expanded in various phases during the last 20 years by adopting most modern, energy saving, environment friendly membrane process technology. The unit obtained ISO 9001, ISO 14001 and OSHAS 18001 certifications.

M/s. SRAAC obtained latest Environment Clearance Vide file no. F. No. J-11011/619/2009-IA.II (I), dt. 14.02.2012. It is proposed to expand the manufacturing capacity of Chlor-Alkali, Chloromethanes and inclusion of Chlorodifluoromethane plant in the existing area of 152.4 ha. The capital cost for expansion is Rs. 360 crores, towards enhancement of effluent treatment plant, production facility, pollution control equipment and additional equipment to enhance the capacity. Prior environmental clearance is mandated by Ministry of Environment and Forests, vide SO 1533, dated September 14, 2006, for chlor-alkali industry and synthetic organic chemicals manufacturing activity. The terms of reference for the environmental impact assessment studies was obtained from MoEF&CC vide letter no. F.No. J-11011/84/2016-IA II (I) dated 21.06.2016 as part of environmental clearance process. The certified compliance letter from the regional office of MoEFCC, Chennai is obtained vide letter no. 29.09.2016/1927 dated 29.09.2016.

Location of the Project:

The plant site is located at Sy. No. 51/1, 2A, 2B, 2C1, 2C2, 2C3, 56/1, 58/1, 59/1, 60, 62/3/2D2, 2C1/A2, 2C1/A3, 2C2/C, 2G/1, 2E, 2F, 1A, 1B, 62A, 62 B, 63, 64, 70/C2, 72/P, Gondiparla village, Kurnool mandal and district, Andhra Pradesh. The site is located at the intersection of 15^0 49′ 30″ (N) latitude and 78^0 4′ 30″ (E) longitude. The site elevation above mean sea level (MSL) is 300 m. The plant site is surrounded by open lands in east direction, Sree Rayalaseema Hi-Strength Hypo Limited (SRHHL) in north direction, Road connecting the NH-7 with Gondiparla village in the south and west directions. The nearest habitation from the plant is E.Tandrapadu village located at a distance of 0.5 km in northwest direction. The main approach road is NH-7 - Gondiparla

village adjacent to the site in northwest direction. The nearest Town and Railway station is Kurnool at a distance of 3.5 km in northwest direction and nearest airport is Shamshabad located at a distance of 165 km in northeast direction. Tungabhadra River is flowing from northwest to southeast direction at a distance of 1.5 km in south direction. Interstate boundary between Telangana and Andhra Pradesh is at a distance of 1.3 km in northeast direction. There are two reserve forests in the study area. Gadidmadugu RF at a distance of 5.5 km in east direction. Pullaiah RF at a distance of 9.3 km in southwest direction. There are no National Parks, sanctuaries and critically polluted area and interstate boundary within the impact area of 10 km surrounding the site.

Product Profile

The manufacturing capacity of proposed products after expansion is presented in the following tables;

Manufacturing Capacity

S. No.	Product Name	Unit	Production Capacity		
			Existing	Proposed	Total
I. Chlor-Alkali Plant					
1	Caustic Soda Lye (Or) Flakes Potassium Hydroxide Lye (or) Flakes (100 % basis)	TPD	520	500	1020
2	Hydrochloric Acid (100%)	TPD	173	140	313
3	Liquid Chlorine	TPD	300	300	600
4	Sodium Hypochlorite (100% Cl_2 basis)	TPD	8	7	15
5	Barium Sulphate	TPD	5	5	10
6	Potassium carbonate	TPD	50	--	50
7	Sodium Sulphate	TPD	--	10	10
II. Chloromethanes					
1	Methyl Chloride	TPD	0.45	10	10.45
2	Methylene Chloride	TPD	61	61	122
3	Chloroform	TPD	56	46.45	102.45
4	Carbon tetrachloride*	TPD	7.6	7.6	15.2
5	Hydrochloric Acid (100 %)	TPD	23.5	23.5	47
III. Chlorodifluoromethane					
1	Chlorodifluoromethane (R22)	TPD	--	10	10
2	Hydrochloric Acid (100 %)	TPD	--	8.27	8.27
IV. Captive Power Plant					
1	Captive Power Plant (Coal based)	MW	76	--	76
2	Power generation Furnace Oil**	MW	31	--	31
V. Oil and Fatty Acid Division					
1	Oil and Fatty Acid Products (Non EC Products)	TPD	498	--	498

**Carbon Tetrachloride (CCl_4) generated will be sold as a feed stack to Authorized users/excess will be incinerated.*
*** Shall be kept as standby.*

Manufacturing Process

The manufacturing technology chosen for chlor-alkali plant is membrane technology which is environment friendly. The by-products are hydrogen, chlorine and sodium hypo chloride. Hydrochloric acid is manufactured using H_2 and Cl_2 produced from cell house.

Chloromethanes (CMS) is manufactures by hydro chlorination of methanol in vapor phase in presence of catalyst followed by thermal chlorination of methyl chloride in vapor phase with chlorine and rectification, azeotrope separation and dehydration of the mixed products.

Chlorodifluoromethane (R22) is produced by reacting chloroform with hydrogen fluoride. This reaction involves generation of HCl as by product. The refrigerant R22 along with HCl will evolve from the reactor in gaseous form. This is to be cooled and HCl absorbed in Hydrochloric acid absorption system, to produce 28 to 30% HCl.

Utilities

No additional utilities are proposed for expansion. The required steam will be met form existing coal fired boiler. It is proposed to establish standby DG sets of capacity 500 Kva in addition to existing stand by DG sets. The list of utilities is presented in following table;

List of Utilities

S.No	Description	Existing	Proposed	Total after expansion
1	Coal Fired Boiler	110 TPH	-	110 TPH
		100 TPH	-	100 TPH
		45 TPH	-	45 TPH
2	DG Sets**	5 x 6.2 MW	-	5 x 6.2 MW
		1 x 160	-	1 x 160
		1 x 285	-	1 x 285
		1 x 400	-	1 x 400
		1 x 500	1 x 500	2 x 500
3	Oil and H2 fired boiler*	3 TPH	-	3 TPH
4	WHRB connected to DG sets*	3 TPH	-	3 TPH
5	Oil fired boiler*	3 TPH	-	3 TPH

**DG sets will be used during load shut down by AP Transco.*

Water Requirement

The water required for the plant is mainly for brine preparation, Scrubbers, and washings, cooling tower makeup, process, steam generation and domestic purposes. The total water requirement shall increase from 12.137 MLD to 15.684 MLD out of which 15.167 MLD shall be fresh water and 0.517 MLD shall be recycled water. The required water is drawn from Tungabadra River through infiltration wells. The unit obtained permission to abstract water from Tungabhadra River in the order of 20MLD. The total water requirement is presented in following table;

Total Water requirement

S.No	Description	Quantity (MLD)		
		Existing	Proposed	Total after expansion
1	Chlor-Alkali Plant (or) Potassium Hydroxide	1.98	1.765	3.745
2	Oil and Fatty Acid	0.317		0.317
3	Chloromethanes	0.85	0.845	1.695
4	Chlorodifluoromethane	---	0.42	0.42
5	Co-generation Power Plant	8.99	---	8.99
	Total	**12.137**	**3.03**	**15.167**

Baseline Environmental Data

The baseline data was collected in the study area during December 2016 – February 2017. The baseline data includes collection of Samples of ground water, surface water and soil, monitoring of ambient air quality, noise levels, ecological status and meteorological parameters. The analytical results show that the values are within the prescribed limits for air quality. The ground water quality is observed to be above the limits for potable purpose when compared to the prescribed standards of IS: 10500 – 2012 at few locations.

Identification and Quantification of Impacts

The impact assessment report has identified various sources of pollution and quantified the pollution loads due to proposed expansion. It has also identified the technologies to be adopted for the mitigation and control of the same. The sources of pollution are air emissions from utilities and scrubbers; liquid effluents from scrubbers, utilities and domestic usage; solid wastes from process, treatment systems and utilities; and noise pollution from utilities, and process equipment.

Impacts on Air quality: The impacts on air quality shall be due to proposed expansion is from standby DG set of 1 x 500 capacity and existing the emissions from, Coal Fired

Boilers and standby DG sets. The incremental concentrations are quantified using ISC-AERMOD model based on ISCST3 Algorithm, considering the emissions from the proposed utilities of both SRAACL and Sree Rayalaseema Hi-Strength Hypo Limited. The results indicate marginal increase in ambient air quality concentration. The predicted values for SPM, PM_{10}, $PM_{2.5}$, SO_2 and NO_x are 11.53, 0.61, 0.27, 5.79 and 5.89 $\mu g/m^3$ respectively and the maximum values are observed at a distance of 1.9 km from the center of plant site in southwest. The cumulative values of baseline air quality combined with predicted values are found to be within the prescribed limits of National Ambient Air Quality Standards. The mitigative and control measures of air pollution shall ensure that the impact on air quality is local – within the site area and its surroundings.

Impacts on Water: Water is essentially used for brine makeup and utilities and domestic purposes. The total fresh water required of quantity 15.167 MLD after expansion will be drawn from Tungabadra River through infiltration wells in addition to recycled water of 0.517 MLD. No impact on water quality is expected due to discharge of effluents treated effluents are reused for brine make-up and process.

Impacts on Noise quality: The noise levels may increase due to motors, compressors, DG set and other activities. The major source of noise generation is DG set which emit noise level ranging from 90 dB (A) to 110 dB(A) at a reference distance of 1m from the source. The predicted cumulative noise levels (as calculated by the logarithmic model without noise attenuation) ranged between 55 and 75 dB(A) at distances of 87 to 165 m.

Impacts on Soil: The solid wastes generated from brine preparation, utilities and effluent treatment plant may have significant negative impacts if disposed indiscriminately. The brine sludge will be sent to secured land fill within plant premises after recovery of barium sulfate from sludge. The operational phase impacts shall be neutral due to effective implementation of mitigative measures in handling, storing and transferring of solid wastes, effluents and chemicals.

Impacts on Ecology: There are no endangered species of flora and fauna in the impact area. The impact on biological environment is neutral with the effect confined mainly to the site area.

Environmental Monitoring Programme

SRAACL is monitoring Ambient Air Quality (AAQ) for PM_{10}, $PM_{2.5}$, SO_2 and NO_X, work room for Chlorine concentrations, stack emissions for boiler, scrubbers and DG sets, noise levels on quarterly basis. Water and treated wastewater are monitored on daily basis, Soil analysis is done once in a year and the same is practiced after expansion also.

Project Benefits

There is a potential for direct/indirect employment of about 300-400 people during construction phase and 350 during operation phase due to the proposed expansion. The project shall have positive impact on socioeconomic environment due to provision of employment both direct and indirect and proposed CSR activities. There will be direct and indirect benefit to government and local body by way of taxes.

Environment Management Plan

The management plan is drawn in consultation with project proponents and technical consultants after evaluating various mitigaton and control measures to address the impacts identified, predicted and monitored. The impacts during construction stage are temporary and less significant, the management plan for impacts identified during operation stage is described as follows;

Liquid Effluents

The main sources of effluent generation from the plant are from scrubbers, floor washings, blow downs from boiler and cooling tower and domestic effluents**.** Effluents from scrubbers, washings, utility blow downs and domestic wastewater of Chlor-Alkali, Oil and fatty acid division and co-generation power plant will be sent to the effluent treatment system and treated effluent reused for greenbelt development and process. Effluent from chloromethanes and proposed chlorodifluoromethanes are sent to effluent treatment followed by RO. RO permeate is reused for process and rejects are recycled for brine saturation of Chlor-alkali plant. Total Effluent generated in the existing plant for proposed expansion is presented in following table;

Total Effluent Generated and Mode of Treatment

S.No	Description	Quantity (KLD)		Mode of Treatment/Disposal
		Existing	Proposed	
I	**Chlor-Alkali (Or) Potassium Hydroxide**			
1	Process	97.5	94	Sent to effluent treatment plant and treated effluent reused for greenbelt development.
2	Washings			
3	Gland Seal			
4	Cooling towers blow down	82.5	62.5	
5	Domestic	85	8	Sent to Sewage treatment plant and treated wastewater reused for greenbelt development.
	Total - I	**265**	**165**	
II	**Chlormethanes and Chlorodifluoromethanes**			
1	Cooling towers blow down	57	57	Sent to effluent treatment plant of Chlor-alkali followed by Ultra filtration and RO. Permeate reused for process and rejects sent for brine saturation.
2	Scrubbers	20	20	Sent to Brine make-up in chlor-alkali plant
3	Domestic	10	5	Sent to Sewage treatment plant and treated wastewater reused for greenbelt development.
	Total – II	**87**	**82**	
III	**Co-Generation Power Plant**			
1	Floor Washings	30	---	Sent to effluent treatment plant and treated effluent reused for greenbelt development.
2	Cooling towers blow down	600		
3	Domestic	50		
4	DM Plant /RO Rejects	405	---	330 KLD is reused for Brine make-up in chlor-alkali plant and 75 KLD reused for green belt development.
	Total –III	**1085**	**---**	
IV	Non EC Products	50	---	Sent to effluent treatment plant and treated effluent reused for greenbelt development
Grand Total (I+II+III+IV)		**1507**	**247**	

Effluent Treatment System

The effluents generated are collected in equalization tank followed by neutralization by using acid/alkali and pumped to pre-setting tank. After primary settling for 2.5 hours the effluents are passed to flocculent mixer where the flocculent are added. After mixing the effluent, it is settled in secondary clarifier for nine hours where the flock will be settled in the tank. The clarified effluent will be passed to treated effluent storage tank. The settled sludge in presettler and secondary clarifier will be pumped to sludge drying beds.

Air Pollution

No additional boiler is proposed for the plant except 1 x 500 KVA standby DG Set. The sources of air pollution from the plant are from 1 x 45 TPH, 1 x 100 TPH, 1 x 110 TPH coal fired Boilers, DG sets and Incinerator in chloromethane plant. The existing air pollution control equipment for coal fired boilers is Electro static precipitators (ESP). DG set shall be provided with stack heights based on the CPCB formula for effective stack height based on the CPCB formula.

The gaseous emissions from Chlor-Alkali process are Chlorine and Hydrogen Chloride vapors. Scrubbers are provided to neutralize sniff gases effectively. Dilute Chlorine is reacted with caustic to obtain sodium hypochlorite which is a value added product. Due to advancement of control checks and due to membrane cell electrolysis, possibility of chlorine emission to atmosphere is negligible. The second gaseous pollutant from chloro-alkali plant is hydrogen chloride gas emissions. To avoid emissions in the plant, tail gas vents are connected to a venturi scrubber and the lean acid formed is used for absorption of Hydrogen chloride gas in absorber.

The gaseous emission from Chloromethane plant is chlorine and hydrogen chloride vapours. Due to advancement of control checks and due to membrane cell electrolysis, possibility of chlorine emission to atmosphere is negligible. HCl gas produced from thermal chlorination unit is used to produce methyl chloride. Excess HCl available is absorbed in HCl absorber to produce 32% HCl. To avoid emissions from HCl absorber, tail gas vents are connected to a tail gas tower followed by organic stripper to remove organics.

The gaseous emission from Chlorodifluoromethane plant is HCl which is sent to Hydrochloric acid absorption system, to produce 28 to 30% HCl.

Solid Waste

Sludge is generated during brine purification stage, and barium sulfate is recovered from the sludge to be sold as by product. The sludge generated form effluent treatment plant will be disposed to landfill which contains mostly inorganics. Used silica gel, calcium chloride, Calcium Fluoride, Antominy Pentoxide and Spent Sulfuric Acid are the wastes generated from the Chloromethane and Chlorodifluoromethane process. Used silica gel

and calcium chloride are sent to secured landfill within plant premises. Spent sulfuric acid sold as by-product and Calcium Fluoride is sold to hydrogen fluoride manufacturers. Waste oil and used batteries from the DG sets are sent to authorized recyclers. Other solid wastes expected from the unit are containers, empty drums which are returned to the product seller or sold to authorized buyers after detoxification. Coal ash from boiler is sold to brick manufacturers.

Noise Pollution

Noise is anticipated from turbines of captive power plants, motors, compressors, centrifuges and DG sets. DG set shall be provided with acoustic enclosure. Motors and compressors shall be mounted properly to ensure reduction of noise and vibration. Employees working in noise generating areas shall be provided with appropriate personnel protective equipment.

Occupational Safety and Health

Direct exposure to chemicals or its raw materials may affect health of employees. Direct exposure to hazardous materials is eliminated by providing closed handling facilities. Personal Protective Equipment (PPE) i.e., hand gloves, safety goggles, safety shoes, safety helmets, respiratory masks etc. are provided to all the employees working in the plant. Company has a policy of providing PPEs to all personnel including contract workers. Periodic medical checkup in addition to checkup during recruitment is adopted to monitor health status of employees. Online chlorine, VOC monitors shall be installed to monitor the ambient air quality and work room air quality, while chlorine sensors are also used for identifying potential hazard areas.

Prevention, maintenance and operation of Environment Control Systems

The pollution control equipment, and the effluent treatment system is monitored periodically to estimate their efficiency and performance potential as part of adoptive management. Proactive maintenance and monitoring program for all equipment and machinery is adopted to identify the problems/under performance of the equipment. Necessary measures will be adopted to rectify the identified problems/defects. The management agrees that the results of monitoring will be reviewed periodically to adopt new measures if necessary, for efficient pollution control.

Transport systems

All the raw materials and finished products are transported by road. Dedicated parking facility is provided for transport vehicles. There will be 230-250 additional truck trip per day to the factory for transporting raw materials and finished products. Traffic signs will be placed in the battery limit. The drivers of vehicles will be provided with TREM cards of chemicals and materials to be transported, and will be explained the measure to be adopted during various emergencies

Reduce, Recycle and Reuse

A number of measures are proposed to achieve high yields and reduce generation of wastes. Barium sulfate recovered from sludge is sold as by-product. It shall be endeavor of the R&D team to improve yields through constant research and development activities. Treated effluent is reused for brine make-up and process.

Green Belt Development

The management developed green belt in a total area of 89.03 ha and proposed to increase density to enhance environmental quality through mitigation of fugitive emissions, attenuation of noise levels, balancing eco-environment, prevention of soil erosion, and creation of aesthetic environment.

Post Project Monitoring

Environmental monitoring for water, air, noise and solid waste quality shall be conducted periodically either by proponent or third party. The frequency of monitoring and the quality parameters shall be as suggested by the Ministry of Environment and Forests and Climate Change, Government of India.

Environment Management Department

Executive director, Director – Technical, Sr. Manager – Environment and Sr. Manager – Safety will take the final responsibility for environmental Management and Safety control. The Environmental Manager and staff will supervise the day-to-day activities of the environmental management and control.