

**SRI KUSUMA HARANADHA AGRO FURAL LIMITED  
(UNIT-II)**

**SY. NO. 116/1, 119/3, 120/7, 118/2, 119/3, 98/4, 117/2,  
119/6,120/2 AND 120/5 ALLIVEDU REVENUE VILLAGE,  
PEDAVEGI MANDAL, WEST GODAVARI DISTRICT, ANDHRA PRADESH**

**EXECUTIVE SUMMARY**

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**SUBMITTED TO  
ANDHRA PRADESH POLLUTION CONTROL BOARD,  
REGIONAL OFFICE, ELURU**

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**Introduction**

Furfural, “the sleeping beauty bio-renewable chemical” has gained a renewed attention as a potential chemical for the production of biofuels and biochemicals. Furfural is the most commonly produced industrial chemical because its production is very flexible. Furfural is a natural precursor to a range of furan-based chemicals and solvents. Furfural and its derivatives have been widely applied as fungicides and nematicides, transportation fuels, gasoline additives, lubricants, resins, decolorizing agents, jet fuel blend stocks, drugs, insecticides, bio-plastics, flavor enhancers for food and drinks, rapid all-weather repair system for bomb-damaged runways and pot holes and also for wood modification and book preservation.

Sri Kusuma Haranadha Agro Fural Limited, Unit-II proposes to set up Synthetic Organic Chemicals unit in an area of 5 acres at Sy. No. 116/1, 119/3, 120/7, 118/2, 119/3, 98/4, 117/2, 119/6, 120/2 & 120/5 Allivedu Revenue Village, Vijaya Rai Panchayath, Pedavegi Mandal, West Godavari district, Andhra Pradesh. The capital cost of the project is Rs. 6 crores. Prior environmental clearance is mandated by Ministry of Environment, Forest and Climate Change (MoEFCC), vide SO 1533, dated September 14, 2006, for synthetic organic chemicals manufacturing activity. The project sought terms of reference for preparation of EIA report during February 2017, and the scoping of TOR was held in AP SEAC meeting held in March 2017. The terms of reference for the environmental impact assessment studies was obtained from AP SEIAA vide letter no. Lr.No. SEIAA/AP/W.G./IND/03/2017/291 dated 04.05.2017 and the draft Environmental impact assessment (EIA) report is prepared in compliance of the TOR to conduct public hearing.

**Location of the Project:**

The plant site is located at Survey No. 116/1, 119/3, 120/7, 118/2, 119/3, 98/4, 118/2, 117/2, 119/6, 120/2 & 120/5, Allivedu Village, Vijayarai Panchayath, Pedavegi Mandal, West Godavari District, Andhra Pradesh. The site is located at the intersection of 16° 47' 55" (N) latitude and 81° 2' 54" (E) longitude. The site elevation above mean sea level (MSL) is in the range of 39 - 41 m. The proposed site is connected by Eluru to

Chintalapudi road in south direction, and is surrounded by open agricultural lands in the remaining directions. The nearest habitation from the plant is Vijayarai village located at a distance of 1.1 km in northwest direction. The main approach road is Chintalapudi - Eluru Road at a distance of 0.6 km in west direction. The nearest Town Eluru is at a distance of 7.8 km in southeast direction. The nearest Railway station Eluru is at a distance of 11.5 km in southeast direction and nearest airport is Gannavaram located at a distance of 38 km in southwest direction. Polavaram project right main canal is flowing from southeast to southwest direction at a distance of 3.0 km in southeast direction. The following reserve forests are located within impact area; Katrenipadu RF at a distance of 4.7 km in west direction, Ramasingavaram RF at a distance of 6.4 km in northeast direction and Bhogolu RF at a distance of 9.8 km in north direction. There is no National Park, Wildlife sanctuary, ecologically sensitive area and Interstate Boundary within the impact area of 10 km.

### Product Profile

The manufacturing capacity of proposed products and by-products is presented in the following tables. It was decided to withdraw manufacturing of Furan, as it entailed more capital outlay, making the project unviable due to the requirement of incinerator for Carbon monoxide generated in the process.

#### Manufacturing Capacity

S.No	Name of Product	Capacity	
		Kg/day	TPM
1	Furoic acid	631	18.93
2	Tetrahydrofuroic acid	364.7	10.94
3	Furfuryl Alcohol	1475	44.25
4	Tetrahydrofurfuryl Alcohol	1445	43.35
5	2-Methyl Furan	1343.6	40.31
	<b>Total (Worst-case 1 product on Campaign basis)</b>	<b>1475</b>	<b>44.25</b>

#### List of By-Products

S.No	Name of Product	Stage No.	Name of By product	Quantity (Kg/day)
1	Furoic acid	I	Furfuryl alcohol	690
		II	Sodium Bisulfate	675.9

## Manufacturing Process

The manufacturing process of the above mentioned molecules mainly involve hydrogenation reaction followed by purification and drying. Solvents are used during chemical syntheses, extractions, and purification. The manufacturing process of all the compounds, reactions involved, material balance is presented in chapter 2 of EIA report.

## Utilities

It is proposed to establish agro fired boilers of capacity of 2 TPH to meet the steam requirement. The DG sets required for emergency power during load shut down is estimated at 150 and accordingly 1 x 150 Kva DG set is proposed. The list of utilities is presented in following table;

**List of Utilities**

S.No	Utility	Proposed
1	Agro Waste Fired Boilers	2 TPH
2	DG Set #	150 KVA

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

## Water Requirement

Water is required for process, scrubbers, washing, cooling tower makeup, steam generation and domestic purposes. The total water requirement shall be 24.3 KLD, out of which 14.8 KLD shall be fresh water and balance 9.5 KLD shall be recycled water. The required water shall be drawn from ground water in addition to reuse of treated wastewater. The water balance for daily consumption is presented in following **Table**.

**Water Balance**

Purpose	INPUT (KLD)		OUTPUT (KLD)	
	Fresh Water	Recycled Water	Loss	Effluent
Process	3.8			4.1*
Washings	1			1
Scrubber	1			1
Boiler	4.5	1	4.7	0.8
Cooling Tower	1	8.5	8	1.5
RO/DM Rejects	0.5			0.5
Domestic	2		0.2	1.8
Water for gardening	1		1	
<b>Gross Total</b>	<b>14.8</b>	<b>9.5</b>	<b>13.9</b>	<b>10.7</b>
<b>Total</b>	<b>24.3</b>		<b>24.6</b>	

*\* Process effluents contain soluble raw materials, byproducts, solvents etc.*

**Baseline Environmental Data**

The baseline data was collected in the study area during March to May 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.

**Identification and Quantification of Impacts**

The impact assessment report has identified various sources of pollution and quantified the pollution loads. 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 process; liquid effluents from process, 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 the emissions from, agro waste fired boiler and standby DG set. The incremental concentrations are quantified using ISC-AERMOD model based on ISCST3 Algorithm. The results indicate marginal increase in ambient air quality concentration. The predicted values for SPM, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> are 0.68, 0.3, 0.15, 0.14 and 0.35 µg/m<sup>3</sup> respectively and the maximum values are observed at a distance of 0.4 km from the center of plant site in northeast direction, and 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 mitigation 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 process and utilities and domestic purposes. The total fresh water required of quantity 14.8 KLD, will be drawn from ground water sources in addition to recycled water of 9.5 KLD. No impact on water quality is expected due to discharge of effluents as zero liquid discharge is envisaged, which ensures reuse of treated effluents for cooling towers and boiler makeup. There is no usage of treated water for on land irrigation.

**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 of maximum 90 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 8 to 15m.

**Impacts on Soil:** The solid wastes generated from process, utilities and effluent treatment plant may have significant negative impacts if disposed indiscriminately. The total solid waste will be stored separately in Hazardous storage area. Solid waste will be sent to cements plants for co-incineration based on calorific value or sent to TSDF. The operational phase impacts shall be neutral due to effective implementation of mitigation measures in handling, storing and transferring of solid wastes, effluents and chemicals, and development of green belt.

**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**

It is proposed to monitor Ambient Air Quality (AAQ) for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub>, work room for VOC concentrations, stack emissions for boiler and DG sets, noise levels on quarterly basis. Water, treated wastewater on daily basis, Soil analysis will be done once in a year.

### **Additional Studies**

Risk assessment was conducted and the heat radiation damage distances of pool fire for ethanol tank of capacity 10 kl was limited to within 11 m for a heat radiation of 2 KW/m<sup>2</sup>, and the same was within the plant premises.

### **Project Benefits**

There is a potential for direct/indirect employment of about 30 people during construction phase and 40 during operation phase of project. The project shall have positive impact on socioeconomic environment due to provision of employment both direct and indirect and proposed CSR activities.

## Environment Management Plan

The management plan is drawn in consultation with project proponents and technical consultants after evaluating various mitigation 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 effluent generation is mainly from process, washings, scrubbers, cooling towers & boiler blow downs, RO/DM rejects from pre-treatment of water and domestic effluent. It is proposed to subject process effluent to steam stripping followed by Multiple Effect Evaporator (MEE) and Agitated Thin film dryer (ATFD). Condensate from stripper sent to cement plants for co-processing, while condensate from MEE and ATFD is sent to biological treatment followed by RO. Wastewater from washings, scrubber, utility blow downs, and domestic wastewater along with condensate from MEE and ATFD will be treated in Biological treatment and treated wastewater is used for cooling towers and boiler makeup. Total Effluent generated and mode of treatment is presented in following Table;

**Total Effluent Generated and Mode of Treatment**

Description	Quantity (KLD)	Concentration	Mode of Treatment
Process	4.1	pH: 5.5-6.5 COD: 6840 mg/l TDS: 5966 mg/l	Sent to Stripper followed by MEE and ATFD. Stripper Condensate sent to Cement Plants for Co-Incineration. MEE and ATFD Condensate sent to Biological treatment plant followed by RO. RO rejects sent to MEE and permeate is reused in cooling towers and boiler makeup.
<b>Total - I</b>	<b>4.1</b>		
RO/DM rejects	0.5	pH: 7-8	Sent to Biological Treatment System followed by RO. RO permeate reused for cooling tower makeup. RO rejects sent to MEE.
Washings	1	COD: 500-1000 mg/l	
Scrubber Effluent	1	TDS: 2000-2500 mg/l	
Boiler Blow downs	0.8	BOD: 200 mg/l	
Cooling Tower Blow down	1.5		
Domestic	1.8		
<b>Total - II</b>	<b>6.6</b>		
<b>Grand Total (I+II)</b>	<b>10.7</b>		

## **Effluent Treatment System**

The Effluent management system is developed to ensure 'Zero Liquid Discharge'. Segregation of effluents is an integral part that facilitates effective treatment of various effluent streams. The effluents are segregated into two streams; Process effluent and utility wastewater streams.

### **Process Effluents**

The treatment system for treating process effluents consists of Equalization, Neutralization, Settling tank, Stripper followed by MEE and ATFD. The organic distillate from the stripper is sent to cement plants for co-incineration and aqueous bottom from stripper is sent to MEE followed by ATFD, condensate from MEE and ATFD sent to biological treatment plant followed by RO. Salts from ATFD are disposed to TSDF.

### **Utility Wastewater**

Wastewater from washings, scrubbers, blow downs from boiler, cooling towers, domestic wastewater and condensate from MEE and ATFD are treated in primary treatment consisting of equalization, neutralization, and primary sedimentation followed by secondary biological treatment consisting of aeration tank and clarifier. The treated effluents after biological treatment are subjected to tertiary treatment in a reverse osmosis) system. Permeate from RO is reused for cooling towers and boiler make-up while rejects are sent to MEE followed by ATFD. Sludge from various units of Biological treatment are thickened in sludge handling system and sent to TSDF.

### **Air Pollution**

The sources of air pollution are proposed 2 TPH agro waste fired boiler and backup DG sets of 1 x 150KVA capacity. The proposed air pollution control equipment for 2 TPH agro waste fired boiler is multicone cyclone separator. DG sets shall be provided with effective stack height based on the CPCB formula.

The process emissions contain Hydrogen. Hydrogen gas is let out into atmosphere through a water column. Emissions are also released from various operations of manufacturing like centrifuge, drying, distillation, extraction etc. These emissions mainly contain volatile contents of the material used for processing. It is proposed to provide vent condensers in series to reactors, distillation columns, driers and centrifuge



etc. to mitigate VOC emissions release. Other vents are connected to common headers and scrubbers.

### **Solvent Use and Recycle**

Ether and Ethanol solvents used for synthesis of Furoic acid and Tetrahydrofuroic acid as reaction medium. Used solvents are recovered by distillation, for reuse. Residues from distillation columns and mixed solvents shall be sent to TSDF for incineration or cement plants for co-incineration.

### **Solid Waste**

Solid wastes are generated from process, solvent distillation, effluent treatment system, DG sets and boilers. Process residue and solvent residue are sent to cement plants for co-incineration based on acceptability as the same contain significant calorific value and are predominantly organic in nature. If these wastes are not suitable for co-incineration, the same are sent to TSDF facility. The evaporation salts and sludge from ETP are sent to TSDF for landfill. 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. Ash from boiler is sold to brick manufacturers.

### **Noise Pollution**

Noise is anticipated from 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.

### **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 1-2 truck trip per day to the factory for transporting raw materials and products. Traffic signs will be placed in the battery limit.

### **Reduce, Recycle and Reuse**

A number of measures are proposed to achieve high yields and reduce generation of wastes. The solvents shall be recycled for reuse in the process after distillation. Unconverted furfural is recovered and reused in process. The steam condensate shall be reused for boiler feed. Treated effluent shall be reused for cooling towers and boiler makeup.

### **Green Belt Development**

It is proposed to provide green belt in an area of 1.7 acres, covering the boundary of the site as part of environment management plan. Native species shall be identified for plantation and the guidelines issued by CPCB for development of green belt shall be followed. The green belt shall enhance environmental quality through mitigation of fugitive emissions, attenuation of noise levels, balancing eco-environment, consumption of treated effluent, 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**

The Environment Management Cell of the project shall be headed by the plant head, followed by operators, chemists and fitters/helpers.