

EXECUTIVE SUMMARY OF  
DRAFT EIA REPORT  
OF  
**ARCHIMEDIS LABORATORIES PVT. LTD**

For

Proposed Bulk Drugs & Intermediates  
Manufacturing Unit

AT

Sy No: 108 & 109, Jayanthipuram (V) Jaggayyapet (M),  
Krishna District, Andhra Pradesh.

**PREPARED BY**



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## 1. INTRODUCTION

**Archimedis Laboratories Pvt. Ltd** proposed to establish a Bulk Drugs & Intermediates manufacturing unit at Sy No: 108 & 109, Jayanthipuram (V) Jaggayyapet (M), Krishna District, Andhra Pradesh.

The proposed project cost is about **Rs. 30.0 Crores**, which includes construction of the buildings, equipment, machinery and greenbelt development.

The project proposal was appraised by the Expert Appraisal Committee (EAC) and has issued Standard Terms of Reference vide F. No: J-11011/9144/2018-IA II (I) Dated on 5<sup>th</sup> Feb 2018, to carryout EIA Study. The Environmental monitoring and analysis was carried out during the period of **March – 2018 to May– 2018** and Draft EIA Report was prepared and submitted for Public Consultation.

### 1.1. PROJECT DESCRIPTION

The salient features of the unit are furnished below.

**TABLE-1: SALIENT FEATURES OF THE PROJECT**

Project location	Details
Latitude & Longitude	<b>Latitude:</b> 16°50'51.19" North <b>Longitude:</b> 80°08'11.93" East
Climatic Conditions	Annual Max Temp is 47.1 °C Annual Min Temp is 9.3 °C Normal Annual Rainfall is 982 mm <i>(Source: IMD Climatological Normals, 1981 - 2010)</i>
Land acquired for the plant	11.62 Acres (47024.47 Sq.m)
Land use	Industrial use
Nearest Habitation	Jayanthipuram Village 1.80 km (WNW)
Major urban Settlements	Vijayawada - 58 km (SE)
Nearest Highway	National Highway No.65 – 4.45 km (N)
Nearest Railway station	Motumuri Railway Station – 22.7 km (NE)
Nearest Airport	Vijayawada Airport - 77 km (SE)
Major Industries near the plant site	VBC Fertilizers & Chemicals Ltd Amoda Iron & Steel Ltd The Ramco Cements Mine of VSP Jaggayapeta Industrial Estate CKS Laboratories Pvt Ltd Mylan Laboratories Limited RA Chem Pharma Pvt Ltd
National Parks	None within 10 km radius
Wild life sanctuary	None
Water Bodies within 10 km radius	Palleru River – 3.30 km (W) Krishna River – 3.30 km (SSW)

	Nagarjuna Sagar Left bank Canal- 2.50 km (E) Chillakallu Major canal - 2.10 km (WNW) Gauravaram Cheruvu – 5.40 km (E) Pochampalli Cheruvu – 3.38 km (ESE) Konakachi Cheruvu – 5.51 km (ESE) Nawabpeta Cheruvu – 9.53 km (ESE) Water body near Jaggayyapet – 5.54 km (NW) Tank Near Chillakallu – 4.57 km (N) Tank near Shermohammedpet – 8.55 km (NNW)
Reserve Forest within 10 km radius	Jaggayyapeta Extension R.F – 0.52 km (S), 0.39 km (N) of Project Site Kuntimadi R.F- 5.12 km (SSW) Ginjupalle R.F- 5.60 km (SSW) Venkatayapalem R.F- 7.80 km (SSW) Budavada R.F- 4.68 km (W)

## 2.0 PROCESS DESCRIPTION

The manufacturing process of Bulk Drugs & Intermediates consists of chemical synthesis extending to stages of processing involving different type of chemical reactions. Total production capacity of proposal will be **115 TPM**. (Given in Table -2).

The unit will take adequate control measures for storage and handling of Raw materials and cylinders with in factory premises.

**TABLE- 2: PROPOSED PRODUCTS AND QUANTITIES**

S No	Product name	Quantity in TPM	CAS NO	Therapeutic category
1	Itraconazole	4	84625-61-6	Anti fungal
2	Lansprazole	1	103577-45-3	Anti ulcerative
3	Pentaprazole Sodium	9	138786-67-1	Antiulcerative
4	Duloxetine Hydrochloride	2	136434-34-9	Antidepressant
5	Sumatriptan Succinate	1	103628-48-4	Anti migraine
6	Almotriptan Malate	1	181183-52-8	Anti migraine
7	Zolmitriptan	1	139264-17-8	Anti migraine
8	Ketorolac tromethamine	5	74103-07-4	Analgesic
9	Rosuvastatin	4	147098-20-2	Antilipemic
10	Mesalamine (or) Mesalazine	4	89-57-6	Anti-inflammatory
11	Imatinib Mesylate	2	220127-57-1	Anti neoplastic
12	Celecoxib	4	169590-42-5	Arthritis
13	Sitagliptin Phosphate Monohydrate	2	654671-77-9	Hypoglycemic
14	Dabigatran	2	211915-06-9	Anticoagulant
15	Velpatasvir	2	1377049-84-7	Antiviral
16	Emtricitabine	4	143491-57-0	Antiretroviral
17	Olmesartan medoxomil	4	144689-63-4	Anti hypertensive

S No	Product name	Quantity in TPM	CAS NO	Therapeutic category
18	Pregabalin	4	148553-50-8	Anticonvulsant
19	2,4- Dihydro-4-(4-hydroxy phenyl )-1-piperazinyl ) -2-(1-methyl propyl )-3H-1,2,4-Triazole-3-one(Itraconazole intermediate)	10	-	Drug intermediate
20	Cis -2-[2,4-Di Chloro Phenyl] -2-[1H-1,2,4-Triazole -1-yl Methyl ]-1,3 Dioxalane -4 yl Methanol(Itraconazole intermediate)	4	-	Drug intermediate
21	Cis -2-[2,4-Di chloro Phenyl]-2-[1H-1,2,4-Triazole -1-yl methyl]-1,3 Dioxalane-4yl Methyl ] Methane Sulfonate (Itraconazole intermediate)	5	-	Drug intermediate
22	2-[3-methyl -4-(2,2,2-trifluoroethoxy)-2-pyridinyl ] 5methylthio -1H-benzimidazole(Lansoprazole Sulfide Intermediate )	5	-	Drug intermediate
23	Pentaprazole chloro compound (2-Chloromethyl-3,4-Dimethoxy-Pyridine)	10	72830-09-02	Drug intermediate
24	(S)-(-)-3-(Dimethyl amino )-1-(2-Thienyl)-1-praponal	10	13233-44-5	Drug intermediate
25	4-Chloro-1 hydroxy butane sulphonic acid sodium salt	5	54322-20-2	Drug intermediate
26	4-Chloro Butyralde Diethyl acetal	5	6139-83-9	Drug intermediate
27	4-Dimethyl amino butyralde diethyl acetal	5	1116-77-4	Drug intermediate
	<b>Total</b>	<b>115</b>		

## 2.1 RESOURCE REQUIREMENT & INFRASTRUCTURE FACILITIES

### A) Land Use Details:

The proposed unit is in an existing area of **11.62 Acres (47024.47 SQM)**, the usage details are given table 3.

**TABLE- 3: PROPOSED LAND USE DETAILS**

S. No.	DESCRIPTION	AREA IN SQM	AREA IN ACRES	AREA IN %
1	Total Built up Area	11536.00	2.85	24.5
2	Green Belt Area	17287.11	4.27	36.8
3	Roads & Open Area	18201.36	4.50	38.7
	<b>TOTAL</b>	<b>47024.47</b>	<b>11.62</b>	<b>100</b>

➤ **36.8 % of Land is allotted For Green Belt Development**

## B) Proposed Water Consumption Details

**TABLE- 4: PROPOSED WATER CONSUMPTION DETAILS**

S.No	Purpose	Water input KLD
1	Process	59
2	Washings	10
3	Boiler make up	71
4	Cooling towers make up	104
5	Scrubbing system	5
6	Domestic	4
7	Gardening	6
	<b>Total</b>	<b>259</b>

The fresh water of **175 KLD** will be met from Ground Water source.

➤ Recovered water **84 KLD** from ZLD system is reused.

The permission to draw ground water for industrial and drinking water purpose was obtained for **269 KLD** from AP Ground Water & Water Audit Department and the same has been enclosed.

## C) Energy Requirement

Power requirement of proposed project will be made available through Andhra Pradesh Southern Power Distribution Corporation Limited [APSPDCL]. The power requirement of project will be 2000 KVA.

## D) Utilities:

For generation of Steam, the industry proposed to install 8 TPH & 4 TPH coal fired boilers. The coal requirement will be met from government allocation or from local authorized sources.

The unit is proposing a 500 KVA & 1000 KVA DG set, for usage during the power failures.

The emission details are presented in table No.6, 7 & 8.

**TABLE- 5: DETAILS OF UTILITIES**

S. No	Description	Capacity
1	Coal fired boiler	8 TPH & 4 TPH
2	Thermic Fluid Heater	200000 kcal/hr
3	D.G. Set	500 KVA & 1000 KVA
4	Cooling Towers	2x200 TR, 250 TR & 300 TR
5	Electricity supply from APSPDCL.	2000 KVA
<b>Fuel</b>		
6	Coal	48 TPD
7	Diesel	300 Liters/Day

**TABLE- 6: EMISSION CHARACTERISTIC DETAILS OF PROPOSED BOILER**

Particulars	Units	8.0 TPH Coal fired Boiler	4.0 TPH Coal fired Boiler
Type of Fuel	--	Indian Coal with CV of 4000 kcal/kg to 5000 kcal/kg	Indian Coal with CV of 4000 kcal/kg to 5000 kcal/kg
Coal Consumption	TPD	32	16
Ash Content	%	35	35
Sulphur Content	%	0.4	0.4
No. of Stacks	No	1	1
Height of stack	M	34	30
Diameter of Stack	M	0.50	0.40
Temperature of Flue Gas	°C	200	180
Velocity of Flue Gas	m/s	16	14
Particulate Matter	gm/sec	0.26	0.13
Sulphur dioxide emission	gm/sec	2.95	1.48
Oxides of Nitrogen emission	gm/sec	9.70	4.86

**Note: 5 TPH Coal fired Boiler is kept as standby.**

**TABLE- 7: Stack Emission Details for Thermic Fluid Heater**

Particulars	Units	2,00,000 kcal/hr. Thermic fluid heater
Thermo pack Boiler Capacity	Kcal/hr.	2,00,000
Type of Fuel	--	Diesel
Stack Temperature Before Air preheater	°C	200
Stack Temperature After Air preheater	°C	130
Stack Height	m	15

Fuel Consumption per Day	TPD	0.57
Diameter	m	0.3

**TABLE- 8: STACK EMISSION DETAILS OF PROPOSED DG SET**

Capacity In KVA	Emission of SPM in mg/Nm <sup>3</sup>	Emission Of SO <sub>2</sub> in mg/Nm <sup>3</sup>	Emission of NO <sub>x</sub> in mg/Nm <sup>3</sup>	Stack dia. in m	Flue Gas Temp. in °C	Stack Height in m	Flue gas Velocity in m/sec.
500 KVA (Proposed)	80	150	180	0.30	220	10	16
1000 KVA (Proposed)	120	170	200	0.35	280	10	18

**E) Pollution Control Equipment:**

**i) Cyclone separator:** The denser particles which are carried away by boiler flue gases will get separated in the cyclone separator and collected in the bottom of the cyclone separator at a definite interval.

**ii) Bag Filter:** The boiler flue gases from cyclone separator enter into pack of bag filters, where particulate matter will be separated leaving as cake on bags surface. They are cleared by shaking or vibrating by pulse jet causing the filter cake to be loosened and to fall in the Hopper.

**iii) Boiler Stack:** The adequate stacks of height 34 mtrs & 30 mtrs will be provided for pollutants (SO<sub>2</sub>, NO<sub>x</sub>, PM & CO) dispersed in a very large area so that ground level concentration is within CPCB permissible limits.

**iv) Scrubbers:** Two scrubbers of 2-Stage are proposed to scrub the HCl & SO<sub>2</sub>. The packing media in the scrubber is 25mm poly propylene rings.

**3. BASELINE ENVIRONMENTAL STATUS****3.1 Study Area Included In Environmental Setting**

Studies were carried out in about 10 km radius area from the site with respect to meteorology, flora, fauna, land and socio-economies of the area. Further sampling and analysis of air quality, water quality, noise level and soil quality were carried out. The air quality, water quality, noise level and soil quality in the study area is evaluated based on this physical sampling and analysis.

The base line data were monitored during the study period of **March 2018 – May 2018**. The study team conducted site surveys and field experiments for gathering the information on air quality, water quality, noise quality and soil quality.

## 3.2 CLIMATE OF THE STUDY AREA

### A. Temperature:

During the study period the minimum and maximum temperatures were recorded as 22.1°C and 45.2°C respectively.

### B. Relative Humidity:

During study period at project site during study period, the relative humidity was recorded as 79.1%

### C. Wind Pattern during Study Period

Dispersion of different air pollutants released into the atmosphere has significant impacts on neighborhood air environment. The dispersion/dilution of the released pollutant over a large area will result in considerable reduction of the concentration of a pollutant. The dispersion in turn depends on the weather conditions like the wind speed, wind direction, temperature, relative humidity, mixing height, cloud cover and also the rainfall in the area.

Wind speed and direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the area. Wind roses on sixteen sector basis have been drawn. Wind directions and wind speed frequency observed during study period is given in Table 3.5 and wind rose diagrams are given in Figure 3.7

The following observations can be made from the collected data;

- Calm period is observed to be 16.9 % during the time of monitoring.
- The predominant wind direction is S & SSW.
- Other than predominant wind directions wind was blowing in ESE direction.
- Average wind speed 3.7 m/s.
- Mostly the wind speeds are observed to be in the range of 5.7 – 8.8 m/sec, 0.5 – 2.1 m/Sec, 3.6 - 5.7 m/Sec, with frequency of distribution percentages ranges from 27.5, 21.1, & 16.2.

### D. Rainfall

No rainfall during the Study Period at the Project Site. Average annual rainfall is 982 mm. (*Source: IMD Climatological Normals, Nandigama 1981 - 2010*)



### 3.3 SAMPLING LOCATION DETAILS

Total eight locations were selected for Base line status. Air, Water & Noise results are presented in Table 10, 11 & 12 respectively.

### 3.4 AMBIENT AIR QUALITY

The ambient air monitoring was carried out for 24 hours a day, twice a week for 12 week per location in the study area. Ambient Air Quality Monitoring (AAQM) was carried out at eight locations during period of **March 2018 – May 2018**.

#### 1. Particulate Matter (PM<sub>10</sub>)

The maximum and minimum concentrations for PM<sub>10</sub> were recorded in the study area showed 98<sup>th</sup> percentile values in the range of 55.46 – 68.88 µg/ m<sup>3</sup>. The maximum concentration 68.88 µg/ m<sup>3</sup> were recorded at sampling locations at Dhramavarappadu Tanda. The concentrations of PM<sub>10</sub> are well below the CPCB standard of 100 µg/ m<sup>3</sup>.

#### 2. Particulate Matter (PM<sub>2.5</sub>)

The CPCB Standard for concentration of PM<sub>2.5</sub> is 60 µg/ m<sup>3</sup>. The maximum and minimum 98<sup>th</sup> percentile concentrations for Particulate Matter (PM<sub>2.5</sub>) monitored in the study area were 18.02 – 28.92 µg/m<sup>3</sup> respectively. Highest value of 28.92 µg/ m<sup>3</sup> was at Dhramavarappadu Tanda. The concentration of PM<sub>2.5</sub> is well below the prescribed limit of 60 µg/ m<sup>3</sup>

#### 3. Sulphur Dioxide (SO<sub>2</sub>)

98<sup>th</sup> percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 11.44 – 15.15 µg/ m<sup>3</sup>. Maximum value of Sulphur dioxide of 15.15 µg/ m<sup>3</sup> obtained at Dhramavarappadu Tanda. The concentration of SO<sub>2</sub> is well below the prescribed limit of 80 µg/ m<sup>3</sup>

#### 4. Oxides of Nitrogen (NO<sub>x</sub>)

Ambient air quality status monitored for oxides of nitrogen in the study area were in the range with 98<sup>th</sup> percentile values between 17.10 – 22.33 µg/ m<sup>3</sup>. A maximum value of 22.33 µg/ m<sup>3</sup> was prevailing at the time of sampling at Bhimavaram. The concentration of NO<sub>x</sub> is well below the prescribed limit of 80 µg/ m<sup>3</sup>

### 5. Carbon Monoxide (CO)

The maximum and minimum 98<sup>th</sup> percentile concentrations for Carbon Monoxide (CO) monitored in the study area were 0.34 – 0.74 mg/m<sup>3</sup> respectively. Highest value of 0.74 mg/ m<sup>3</sup> was at the Dhramavarappadu Tanda. The concentration of CO is well below the prescribed limit of 2 mg/ m<sup>3</sup>

### 6. Ammonia (NH<sub>3</sub>)

The maximum and minimum 98<sup>th</sup> percentile concentrations for Ammonia (NH<sub>3</sub>) monitored in the study area were 12.91 – 32.75 µg/m<sup>3</sup> respectively. Highest value of 32.75 µg/ m<sup>3</sup> was at Dhramavarappadu Tanda. The concentration of NH<sub>3</sub> is well below the prescribed limit of 400 µg/ m<sup>3</sup>

### 7. Volatile Organic Compounds (VOCs)

Volatile Organic Compounds (VOCs) concentration in study area was found to be Below Detectable Limit of 1 ppm.

The ambient air quality monitoring results indicates that the overall air quality in the study area is within permissible standards prescribed by NAAQ Standards.

**TABLE- 9: THE MAXIMUM, MINIMUM & 98<sup>TH</sup> PERCENTILE VALUES FOR ALL THE SAMPLING LOCATIONS**

Code	Name of Sampling Location	PM <sub>10</sub> (µg/M <sup>3</sup> )			PM <sub>2.5</sub> (µg/M <sup>3</sup> )			SO <sub>2</sub> (µg/M <sup>3</sup> )			NO <sub>x</sub> (µg/M <sup>3</sup> )			CO (mg/M <sup>3</sup> )			NH <sub>3</sub> (µg/M <sup>3</sup> )		
		Min	Max	98 <sup>th</sup>	Min	Max	98 <sup>th</sup>	Min	Max	98 <sup>th</sup>	Min	Max	98 <sup>th</sup>	Min	Max	98 <sup>th</sup>	Min	Max	98 <sup>th</sup>
A1	Project Site	53.69	62.35	61.68	18.62	22.60	22.17	10.50	14.31	13.93	13.78	21.93	20.84	0.22	0.41	0.40	20.98	30.25	29.97
A2	Jayanthipuram	56.51	61.44	60.93	17.05	21.31	20.97	11.21	16.30	15.07	15.42	22.51	20.79	0.42	0.67	0.65	20.49	27.63	27.61
A3	Dhramavarappadu Tanda	59.89	70.15	68.88	18.07	30.59	28.92	11.29	15.19	15.15	15.93	19.46	19.45	0.45	0.76	0.74	28.35	32.87	32.75
A4	Bhimavaram	56.29	64.29	62.46	19.42	25.18	25.18	12.37	15.06	15.04	15.49	23.19	22.33	0.24	0.45	0.44	18.29	22.46	22.33
A5	Gauravaram	58.09	60.31	60.24	18.09	21.47	21.45	11.04	14.83	14.26	15.89	20.18	19.94	0.24	0.41	0.40	12.58	15.73	15.59
A6	Pochampalli	55.19	60.39	60.34	17.42	24.87	24.85	10.34	13.84	13.74	14.25	19.27	19.00	0.23	0.39	0.38	10.23	13.31	12.91
A7	Vedadri Tanda	49.30	55.73	55.46	14.52	18.06	18.02	10.08	12.89	12.85	15.24	17.39	17.36	0.20	0.34	0.34	12.38	15.09	15.05
A8	Ravirala	48.23	59.68	58.13	15.00	19.63	19.10	9.58	11.49	11.44	13.82	17.25	17.10	0.19	0.35	0.35	10.48	14.00	13.97
<b>NAAQ Standards'</b>		<b>100</b>			<b>60</b>			<b>80</b>			<b>80</b>			<b>2</b>			<b>400</b>		

### 3.5 WATER QUALITY

Water sampling and subsequent analysis was carried out to determine both the groundwater and surface water quality of the study area.

Ground water & Surface water samples were collected at 8 locations in the study area. These samples were analyzed for physical and chemical parameters to ascertain the Baseline status in the existing surface water and ground water bodies.

**TABLE-10: WATER ANALYSIS RESULTS**

S. No	Parameters	Ground water		Surface water	
		Min	Max	Min	Max
1	pH	7.32	8.37	7.54	8.51
2	Total dissolved solids (mg/l)	467.5	983.4	401	905
3	Total hardness (mg/l)	295	670	210	455
4	Chlorides (mg/l)	94.2	310	34	148
5	Fluoride (mg/l)	<0.5	<0.5	<0.5	<0.5
6	Sulphates (mg/l)	25	96	2.5	64.2

- Ground water samples collected was analyzed as per the Standard methods and the water quality of the study area is found to be above the acceptable limits of IS-10500, for parameters TDS, Total hardness, Total Alkalinity, Calcium, Magnesium and Chloride.

### 3.6 NOISE ENVIRONMENT

Noise level monitoring was carried out at eight locations during the period of **March 2018 – May 2018**.

#### Daytime Noise Levels (Lday)

**Industrial Zone:** The day time noise level at the Project site was 55.0 dB(A), which is well below the permissible limits of 75 dB(A).

**Commercial Zone:** The daytime noise levels in all the commercial locations were observed to be in the range of 59.5 dB (A) to 62.3 dB(A). The noise levels at all the locations were below the permissible limits of 65 dB(A).

**Residential Zone:** The daytime noise levels in all the residential locations were observed to be in the range of 46.5 dB (A) to 53.2 dB(A). The noise levels at all the locations were below the permissible limits of 55 dB(A).

### Night time Noise Levels (L<sub>night</sub>)

**Industrial Zone:** The night time noise level in the Project site was observed be 43.8 dB(A), which is well below the permissible limits of 70 dB (A).

**Commercial Zone:** The night time noise levels in all the commercial locations were observed to be in the range of 46.2 dB (A) to 52.1 dB(A). The noise levels at all the locations were below the permissible limits of 55 dB(A).

**Residential Zone:** The nighttime noise levels in all the residential locations were observed to be in the range of 38.9 dB(A) to 42.6 dB(A). The noise levels were below the permissible limits of 45 dB(A) in nighttime at all the locations.

**TABLE-11: NOISE LEVELS OF THE STUDY AREA**

S.No	Name of the Location	Category of Area/zone	Day Time in Leq dB (A)	CPCB Standard Day Time	Night Time in Leq dB (A)	CPCB Standard Night time
1.	Project site	Industrial	55.0	75dB (A)	43.8	70dB (A)
2.	Jayanthipuram	Residential	53.2	55dB (A)	40.4	45dB (A)
3.	Chillakallu	Commercial	62.3	65dB (A)	52.1	55dB (A)
4.	Bhimavaram	Residential	50.6	55dB (A)	42.6	45dB (A)
5.	Konakanchi	Residential	48.7	55dB (A)	39.2	45dB (A)
6.	Vedadri Tanda	Residential	50.0	55dB (A)	38.9	45dB (A)
7.	Mukteswarapuram	Residential	46.5	55dB (A)	39.1	45dB (A)
8.	Jaggayyapeta	Commercial	59.5	65dB (A)	46.2	55dB (A)

### 3.7 SOIL ENVIRONMENT

On data obtained, the soil quality at around the site is appropriate and normal in terms of soil contaminants.

### 3.8 LAND USE/ LAND COVER OF THE STUDY AREA

Land use / Land cover map is prepared by visual interpretation of high-resolution satellite data (Satellite Imagery Acquisition: 11-Nov-2016) and with the help of Survey of India Topographic maps on 1: 50,000 scale. Two seasons' data (Rabi year 2017) is used for the delineation of different units. The units are confirmed by the ground truth/field visits.

**TABLE-12: LAND USE / LAND COVER OF THE STUDY AREA**

S. No	LANDUSE	Area in SQ.KM	Area in Percentage (%)
1	Built Up Land	22.3	7.1
2	Water Bodies	23.2	7.4
3	Forest	36.4	11.6
4	Crop Land	172.1	54.8
5	Waste Lands	60.0	19.1
	<b>Total</b>	<b>314</b>	<b>100</b>

### 3.9 DEMOGRAPHIC AND SOCIO-ECONOMIC PROFILE

- The total population of the study area is 2,04,510 in which male and female population constitutes about 49.75 % and 50.25 % in the study area respectively.
- The literate male and female in the study area are 68,273 and 55,524 which implies that the percentage of literacy rate is 67.06% with male and 54.06% with female respectively.
- In the study area the main and marginal workers are 86,663 (42.3%) and 13,633 (6.7%) respectively of the total population while the remaining 1,04,214 (51.0%) constitutes non-workers

All the Villages, in the study area, are electrified – both for Domestic Purpose and common facilities like, Street Lights, Public Water Pumping, etc. and also are provided with Domestic Water.

### 4.0 IDENTIFICATION, PREDICTION & MITIGATION MEASURES

#### 4.1 Expected Air Environment

##### A. PROCESS EMISSIONS DETAILS

The Predicted Process emissions are O<sub>2</sub>, CO<sub>2</sub>, (CH<sub>3</sub>)<sub>2</sub>NH, HF, CH<sub>4</sub>, H<sub>2</sub>, NH<sub>3</sub> & HCl which are liberated from manufacturing process of proposed products.

**TABLE-13: PROCESS EMISSION DETAILS**

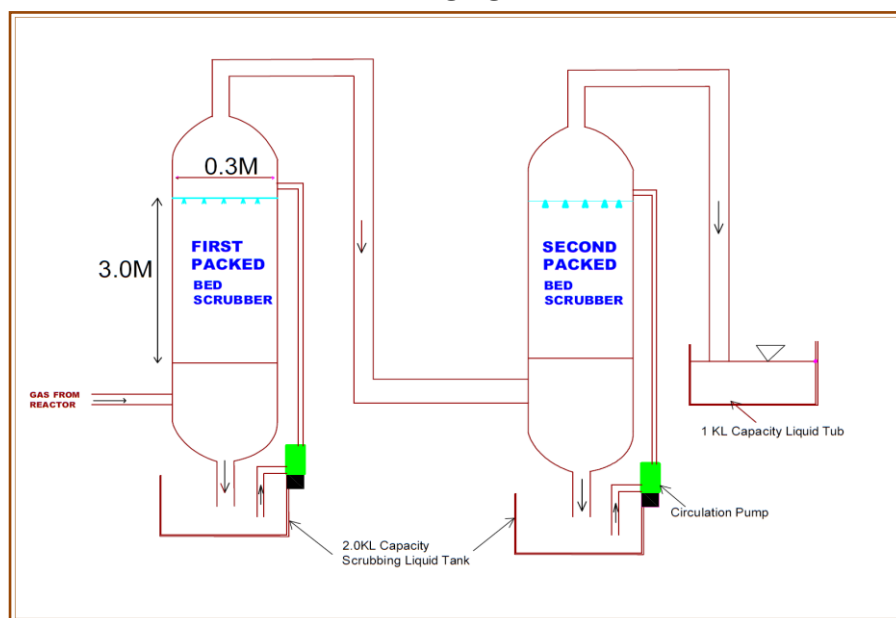
S. No	Name of the Gas	Quantity in Kg/Day	Treatment Method
1	Carbon dioxide	270	Dispersed into the atmosphere
2	Oxygen	224	Dispersed into the atmosphere
3	Ammonia	9	Scrubbed by using Chilled water media
4	Hydrogen chloride	426	Scrubbed by using Chilled water media
5	Sulfur dioxide	312	Scrubbed by using C.S.Lye Solution

6	Dimethylamine	8	Scrubbed by using chilled water media
7	Hydrogen fluoride	5	Scrubbed by using C.S.Lye Solution
8	Hydrogen	35	Diffused by using Nitrogen through Flame arrestor
9	Methane	15	Dispersed into the atmosphere

#### 4.2 PROPOSED PROCESS EMISSION CONTROL SYSTEM

Scrubbers with 300 mm (Diameter) X 3 meters (Height) & 300mm (Diameter) X 3 meters (Height) capacities will be installed for control of process emissions. The Schematic diagram of emission control system is given below.

**FIGURE-1: SCHEMATIC DIAGRAM OF PROPOSED EMISSION CONTROL SYSTEM**



#### B. EMISSIONS FROM BOILER

The Particulate matter generated from 8 TPH & 4 TPH Boilers will be controlled by using cyclone separator followed by bag filters. The sulphur dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>) from boiler will be dispersed in to atmosphere by providing adequate stacks of height 34 mtrs & 30 mtrs for effective dispersion and dilution.

The predicted ground level concentrations when added to Baseline scenario, the overall scenario levels of PM, SO<sub>2</sub> and NO<sub>x</sub> are well within the permissible limits as specified by NAAQ Standards.

**TABLE 14: RESULTANT CONCENTRATIONS DUE TO INCREMENTAL GLC's**

Pollutant	Maximum Baseline Concentration ( $\mu\text{g}/\text{m}^3$ )	Incremental Concentrations due to Proposed Project ( $\mu\text{g}/\text{m}^3$ )	Resultant Concentration ( $\mu\text{g}/\text{m}^3$ )	NAAQ Standards ( $\mu\text{g}/\text{m}^3$ )
PM	68.88	0.759	69.639	100
SO <sub>2</sub>	15.15	4.694	19.844	80
NO <sub>x</sub>	22.33	9.47	31.80	80

**4.3 Expected Effluent Water Details**

The waste water generation will be 105.8 KLD which is from process, floor & reactor washes, cooling tower blow down, boiler blow down, scrubber, DM plant and domestic usage. The effluent generation and its HTDS & LTDS effluent details are given below.

**TABLE-15: EXPECTED EFFLUENT GENERATION DETAILS**

S.No.	Purpose	Effluent Details KLD
1	Process	66
2	Washings	10
3	Boiler Blow down	10
4	Cooling towers Blow down	12
5	Scrubbing system	5.00
6	Domestic	2.80
	<b>Total</b>	<b>105.8</b>

**TABLE-16: EXPECTED HTDS & LTDS EFFLUENT GENERATION DETAILS**

S. No	Purpose	HTDS In KLD	LTDS In KLD	Effluent In KLD	Disposal Method
1	Process	47	19	66	HTDS Effluent sent to MEE System. MEE Condensate sent to Biological treatment. LTDS Effluents along with Domestic sewage sent to ETP, treated effluent sent to RO followed by MEE &
2	Washings	0	10	10	
3	Boiler Blow down	0	10	10	
4	Cooling towers bleed off	0	12	12	



5	Scrubbing system	5	0	5.00	ATFD. RO Permeate and MEE Condensate water recovered for reuse MEE Salts collected and disposed to TSDF.
6	Domestic	0	2.8	2.80	
	<b>Total</b>	<b>52</b>	<b>53.8</b>	<b>105.8</b>	

**Effluent Treatment / Disposal:** Zero Liquid Discharge (ZLD) concept consisting of steam stripper, MEE system, ATFD, Biological Treatment and RO will be installed to treat the effluents generated from plant and to reuse the treated water.

The MEE System with 85 KLD Capacity & RO system with 100 KLD Capacity will be installed for treatment of effluents generated from plant operations.

#### 4.4 Noise Environment

The main sources of noise pollution in the plant operations are Boiler, Reactors, DG Set, compressors and other Noise generating units. Vehicular movements during operation phase for loading / unloading of raw materials and finished products and transporting activity may also increase the noise levels.

All the noise generating equipments like motors, gear boxes and compressors will be regularly maintained with lubricating material to avoid noise generation. DG set will be provided with acoustic enclosures. A thick greenbelt will be developed along the periphery of the plant boundaries to minimize the noise pollution from the source.

#### 4.5 Land Environment

The plant activities are unlikely to alter the land-use pattern in the project site. The unit will take adequate measures for storage, handling and disposal of hazardous waste. Hence, there will be no significant adverse impact on land environment.

#### 4.6 Ecological Environment

Detailed flora and fauna studies were carried in the study area. As per baseline studies, there are no endangered, threatened & protected plants and animal species were recorded in the study area. Hence, no significant adverse impact is envisaged on ecology.

#### 4.7 Expected Hazardous and Solid Waste Details

The Hazardous / Solid waste generated and disposal methods from proposed project are given below.

**TABLE- 17: EXPECTED HAZARDOUS/SOLID WASTE GENERATION, DISPOSAL DETAILS**

S. No	Name of the Hazardous Waste	Quantity	Disposal Method
1	Organic Solid Waste	3757 Kg/Day	Sent to Cement Industries
2	Spent Carbon	108 Kg/Day	
3	Solvent distillation residue	1174 Kg/Day	
4	Organic Evaporate liquid from MEE stripper	1040 Kg/Day	
5	Mixed Solvents	3933 Kg/Day	
6	ETP Sludge	1000 Kg/Day	Sent to TSDF
7	Inorganic solid waste	366 Kg/Day	
8	MEE Salts	4954 Kg/Day	
9	Used Oils	1000 Ltrs/Annum	SPCB Authorized Agencies for Reprocessing/Recycling
10	Detoxified Containers	1000 No's/Month	After Detoxification sent back to suppliers/sent to outside Parties
11	Used Lead Acid Batteries	9 No's/Year	Send back to suppliers for buyback of New Batteries
Solid Waste Details			
12	Ash from boiler	16800 Kg/Day	Sent to Brick Manufacturers

#### 4.8. Risk Assessment and Disaster Management Plan

The Risk assessment studies have been conducted for identification of hazards, to calculate damage distances and to spell out risk mitigation measures. The details are discussed in detail in Chapter – 7 of EIA Report.

### 5.0 ENVIRONMENTAL MANAGEMENT PLAN

#### 5.1 ENVIRONMENT MANAGEMENT PLAN FOR CONSTRUCTION PHASE

Adequate and effective environment protection measures will be planned and designed to minimize the impacts due to activities related to pre-construction (preparatory phase) of the project, machinery installation and commissioning stages and end with the induction of manpower and start up. The impacts identified during the construction phase are mainly due to site preparation, foundation work, material handling, and construction of buildings and installation of the machinery.

All possible care will be taken to reduce the noise levels due to construction activity. Also, noise prone activities shall be restricted to the extent possible during night

particularly during the period of 10 PM to 6 AM in order to have minimum environmental impact.

## 5.2 ENVIRONMENT MANAGEMENT PLAN FOR OPERATIONAL PHASE

### A) Air Pollution Management

- The industry will take measures for reduction of fugitive emissions emanating out of process reactions by providing vent condensers.
- Good ventilation will be provided to reduce the workroom concentrations.
- Fugitive emissions will be reduced by providing vent condensers to the all the reactors.
- Adequate stacks of height of 34 Mtrs & 30 Mtrs will be provided to the 8 TPH & 4 TPH coal fired boilers.
- Stack monitoring facilities for the periodic monitoring of the stack to verify the compliance of the stipulated norms. Apart from this Cyclone Separator, Bag filters will be provided to the boiler.
- In order to minimize the air pollution, unit will develop greenbelt in and around its premises.

### B) Water Pollution Management

- Effluent generated in the plant will be treated in Proposed ZLD system.
- The industry is proposing to install a MEE System with 85 KLD capacity, Biological Treatment system of 110 KLD and RO system with 100 KLD capacities for treatment of 105.8 KLD effluents generated from plant operations.
- Total Water requirement is **259 KLD** out of which **84 KLD** recycled water recovered from ZLD system. The fresh water of **175 KLD** will be met from Ground Water source.
- Unit is proposed to recharge ground water through roof water harvesting pits in the project area and rain water harvesting pits outside plant area wherever possible to balance the water table.
- Use of high-pressure hoses for cleaning the floor and process equipment to reduce the amount of wastewater generated during washings.

**C) Noise Pollution Management**

- Noise suppression measures such as enclosures, buffers and / or protective measures will be provided, if required.
- Extensive oiling, lubrication and preventive maintenance will be carried out for the machineries and equipments to reduce noise generation.
- Greenbelt Development.

**D) Hazardous & Solid Waste Management**

To reduce the quantity of solid / hazardous waste generation as well as possible contamination of land (soil) due to spillages / leaks from the plant operations, following Mitigation measures are proposed:

- There will not be any leakages / spillage from the raw-materials storage.
- The generated Hazardous waste will be stored on floor with suitable packing and this dedicated area will be covered with the roof.
- The records on quantity of hazardous waste generation and disposal will be maintained for each category and possibilities will be explored for minimization and reuse.

**E) Green Belt**

Greenbelt will be developed in an area of 4.27 Acres (17287.11 Sq.m). The industry will spend 4 Lakhs as capital cost for planting of samplings. Lists of plants suitable for greenbelt as per the local agro climatic conditions are given in the EIA Report.

**F) Solvent Recovery**

Solvents will be recovered upto 95% using distillation column and necessary cooling condensers.

**5.3 ENVIRONMENT MANAGEMENT CELL**

**Archimedis Laboratories Pvt. Ltd.** will have a dedicated Environmental Management Cell with experienced staff to look after the proper environmental management of the plant including operation & maintenance of all pollution control facilities.

**5.4 ENVIRONMENT MONITORING PROGRAM**

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. The regular monitoring will be carried out with the MoEF&CC Registration / NABL Accredited Laboratory.

**6. PROPOSED ROOF WATER HARVESTING**

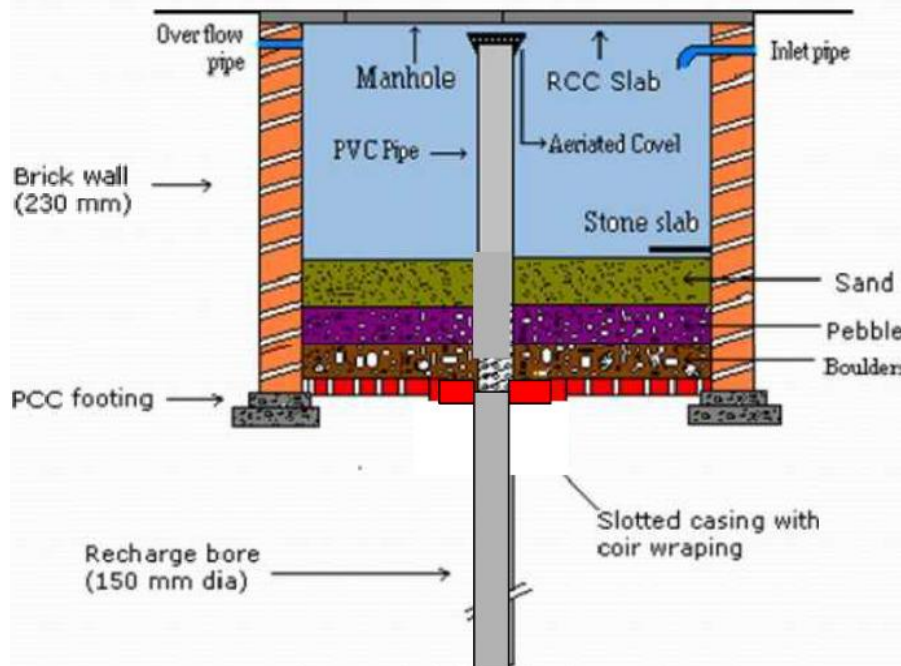
Roof top rainwater harvesting is one of the appropriate options for augmenting ground water recharge/ storage in this industry.

The following table gives expected quantity of rain water harvesting using buildings Roof top.

**TABLE- 18: AVAILABLE RAINWATER (ANNUAL) FOR HARVESTING**

Description	Area (m <sup>2</sup> )	Rainfall (m/Annum)	Runoff coefficient	Total Rainwater (m <sup>3</sup> /Annum)
Roof Area	11536	0.98	0.8	9044.224
Total available rainwater (in m <sup>3</sup> /annum)				9044

**FIGURE-2: PROPOSED ROOF WATER HARVESTING STRUCTURE**



## 7. EMP BUDGET

The unit has proposed for **110 Lakhs** as capital cost and **20 Lakhs** as recurring cost for environment pollution control measures.

**TABLE- 19: PROPOSED BUDGET FOR ENVIRONMENTAL MANAGEMENT PLAN [EMP]**

S. No	Particulars	Proposed Capital Cost (Rs. Lakhs)	Recurring Cost (Rs. Lakhs)
1	Pollution Control Equipment (Scrubbers, Cyclone separator, Bag filter, Sampling port arrangements etc.,)	30.0	2.0
2	ZLD System (MEE, RO, ETP system)	70.0	12.0
3	Rain Water Harvesting (Roof top water collection pit and Roof top water towards the rain water harvesting pit)	3.0	0.5
4	Green Belt Development (Plantation and Maintenance)	5.0	2.0
5	Health & Safety (PPEs, Medical Surveillances Expenses etc.,)	2.0	1.0
6	Environmental Monitoring (Air, Water, Noise, VOCs, Boiler Stack flue gases, DG sets stack monitoring expenses etc.,)	0.0	2.5
	<b>Total</b>	<b>110.0</b>	<b>20.0</b>

## 8.0 SOCIO-ECONOMIC DEVELOPMENT

It is predicted that socio-economic impact due to this project will positively increase the chance of more employment opportunities for local people. There are no Resettlement and Rehabilitation issues involved in this project. The project infrastructures will be of use to people of the area. The revenue of the village will be definitely increased due to the proposed project.

## 9.0 PROJECT BENEFITS

Proposed project will result in considerable growth and upliftment of local community in the nearby villages by providing the employment. The project will generate direct and indirect employment to the nearby villages and the unavailable technical persons will be recruited from outside.

## 10.0 CONCLUSION

**Archimedis laboratories Pvt. Ltd.** has committed to implement all the pollution control measures to protect the surrounding environment – adapting Zero-Liquid-Discharge System for all its Effluents, by controlling process emissions and Safe-Disposal of all Solid Wastes – generated either as process wastes or packing wastes.

The project can definitely improve the regional, state and national economy. Industrial growth is an indication of all-round Socio-Economic Development – by generating local Employment and Business Opportunities. The implementation of this project will definitely improve the physical and social infrastructure of the surrounding area.