

**Environmental Impact Assessment
of Proposed Expansion of
Active Pharmaceutical Ingredients (APIs) &
API Intermediates Manufacturing (11601TPA) Unit
with R&D facility and 3 MW Captive Power plant at
Akkireddigudem (V), Musunuru (M),
Krishna District, Andhra Pradesh**

Executive Summary

Submitted to:

**Andhra Pradesh Pollution Control Board
Regional Office, Eluru**

Sponsor :

M/s. Porus Laboratories Pvt. Ltd., Unit-IV, Hyderabad

EIA Consultant:

**KKB Envirocare Consultants Pvt. Ltd.,
Tarun Plaza, NFC Main Road, Krishna Nagar Colony,
Moula-Ali, Hyderabad-500 040**

May 2017

1.0 Introduction

M/s. Porus Laboratories Pvt. Ltd., Unit-IV proposes to expand Active Pharmaceutical Ingredients (APIs) & API Intermediates manufacturing unit with R&D facility and 3 MW Coal/ Husk/ Pellets fired Captive Power Plant in the existing plant premises with extended land from 6.48 ha to 10.23 Ha at Sy.project Nos.: 87, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2, located at Akkireddigudem Village, Musunuru Mandal, Krishna District, Andhra Pradesh with a total investment of Rs. 80.25 Crores including the existing investment of Rs.24.96 Crores. The proposal is to expand the manufacturing facility from 2940 TPA to 11601TPA. Total land of 10.23 Ha is in possession of project proponent.

Total 18 APIs & API intermediates products at a time will be manufactured along with R&D activity with a total production capacity of 11601 TPA and 3 MW captive power plant. The industry has allocated an amount of about Rs. 31 crores including the existing Rs.4.3 Crores for environmental protection measures (pollution control equipment) and recurring cost (operation and maintenance) after expansion will be Rs.38.12 Crores/annum. Draft EIA report is prepared considering the MoEF&CC approved Terms of Reference (ToR) vide No. J-11011/265/2015-IA-II (I) dated 23-01-2017. The draft EIA report is prepared and submitted to APPCB for conducting public hearing. On obtaining the minutes of the public hearing, final EIA report will be prepared incorporating the response to the issues raised in public hearing and submitted to the MoEF&CC for its appraisal.

2.0 Project Description

Porus Laboratories manufactures Active Pharmaceutical ingredients (APIs) and API intermediates for both domestic and international markets were established in the year 1983 at Akkireddigudem of Krishna District. All the drugs manufactured meets international standards, which bear testimony to its commitment to adopt strict quality standards set by international quality agencies.

1.	Name & Address	M/s Porus Laboratories Pvt. Limited. Post: Akkireddigudem Village, Musunuru Mandal, Krishna District, Andhra Pradesh.
2.	Area of the project	10.23 Ha
3.	Latitude and Longitude	16°53'15.18"N and 80°53'51.59"E
4.	Elevation	107 m
5.	Products	18 APIs and API Intermediates products with R&D activity and 3 MW captive power
6.	Production capacity	11601 MT/Year & 3 MW Captive Power Plant
7.	Capacity of Boilers	Existing: 5 TPH coal fired boiler (will be dismantled), diesel fired 1.0 lakh K.Cal /hr Thermic Fluid Heater (Standby). Proposed: 30 TPH for 3 MW captive power plant &

		10 TPH and 8 TPH coal fired boilers. 8 TPH will be standby.
8.	Capacity of DG sets	Existing: 320 and 380 KVA. Proposed: 2x1000 KVA and 3x500 KVA DG sets are used as standby during power failure.
9.	Water requirement	1587 KLD (Fresh water 758 KLD and Reuse water 829 KLD)
10.	Power requirement	950 KVA including existing 700 KVA
11.	Fuel requirement	Coal consumption of about 140 TPD (with 5000 Kcal/kg) / husk of about 200 TPD (with 3600 Kcal/kg) / pellets of about 175 TPD (with 4000 Kcal/kg) HSD-850 lph for TFH and DG sets
12.	Manpower including Existing	300 nos. (200 nos. Direct & 100 nos. Indirect)
13.	Capital cost of expansion	Rs.80.25 Crores including existing investment of Rs. 24.96 Crores
	EMP Budget for EHS	Rs. 31 Crores including existing investment of Rs.4.3 Crores
	EMP Recurring cost	Rs. 38.12 Crores per annum
14	CSR Budget	Rs. 1.38 Crores

2.1 Process Description

The manufacturing process consists of chemical synthesis extending to a maximum of six stages and minimum of one stage of processing involving different types of chemical reactions. These drugs are mainly used for human medication after formulation activity for various diseases. Industry is proposing to increase 7 and reduce 2 products out of 18 permitted product production capacities. Hence, Technology for manufacturing proposed products are available with industry. Industry will continue to implement the improved technologies developed in the in-house R&D for the cost effective & environmental friendly practices. The process description, flow chart, route of synthesis and material balance etc. for the manufacturing of proposed products are presented in Chapter-2 of EIA report. In the manufacturing process various kinds of solvents will be used, so the quantity of different solvents used, recovered, lost and solvent balance cycle is described in EIA report.

Proposed products with their production capacity and Therapeutic Category

Sl. No.	Product	Quantity (kg/day)	Quantity (TPA)	Therapeutic Category / Intermediate / Chemical
1	Bisphenol Acetophenone	333.3	120	Chemical
2	P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)	10000	3600	Chemical
3	1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy) phenyl]-penta-(2,6-dimethyl-1,4-phenyleneoxide (MX-9000)	1389	500	Chemical
4	Tetramethyl bisphenol acetone (TMBPA)	276.7	99.6	Chemical
5	[1,1,1-Tri-(4-hydroxyphenyl)] ethane (THPE)	276.7	99.6	Chemical
6	4-Hydroxybenzotrile (HBN)	276.7	99.6	Chemical
7	4-Nitro-N-Methyl Phthalimide (4-NPI)	13889	5000	Chemical
8	Sumatriptan Succinate	16.7	6	Anti-Migraine
9	3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide	366.7	132	Sumatriptan Intermediate
10	Ciprofloxacin Hydrochloride	1666.7	600	Anti-infective
11	Metformin Hydrochloride	666.7	240	Anti-Diabetic
12	Venlafaxine Hydrochloride	33.3	12	Antidepressant
13	Sertraline Hydrochloride	166.7	60	Antidepressant
14	Celecoxib	100	36	Antirheumatic
15	Clopidogrel Hydrogen Bisulfate	1000	360	Antithrombotic, Antiplatelet agent
16.	Enrofloxacin	33.3	12	Antibiotic
17	Pioglitazone Hydrochloride	66.7	24	Anti-Diabetic
18	Gabapentin	1666.7	600	Anticonvulsant
Total Production Capacity (18 products at a time).		32224.7	11600.8	
R&D activity		0.55	0.2	
Total Production Capacity (18 products at a time and R&D).		32225.3	11601	

List of By-products

Sl. No.	Name of the By-Product	Quantity (Kg/day)	Quantity (TPA)	Name of the Product
1.	Piperazine ML's	9756.7	3512.4	Ciprofloxacin Hydrochloride
2.	N-Ethyl Piperazine ML's	202.2	72.8	Enrofloxacin
3.	Spent Sulfuric Acid	245126	88243	4-Nitro-N-Methyl Phthalimide

Source: Porus Laboratories Pvt. Limited –Unit-IV

3.0 Description of the Environment

3.1 Topography

The project study area (10 km) is having slightly undulating topography with isolated hill. The proposed project site is connected to Vissannapet – Nuzividu connecting Road at 7.5 km (W) and Chintalpudi – Eluru road at 10 km (E) which connects to NH-5, Akkireddigudem village at 0.3 km in E direction, Ramnakkapeta village at 1.8 km in W direction, Nuzividu at 11 km in SSW direction, Nuzividu railway station at 27 km in S direction, Musunuru (Mandal Headquarters) at 7km in SSE, Machilipatnam (District Headquarters) at 80km in SSE direction, Vijayawada at 45 km in SSW direction and Gannavaram Airport at 41 km in S direction.

3.2 Study period

Baseline environmental data generation of study area was carried out during March-May 2016. Data has been generated by following the approved procedures of the Ministry of Environment, Forests and Climate Change and the Central Pollution Control Board guidelines. Study area of 10 km radial distance around the site has been considered for the EIA study.

3.3 Meteorology

Meteorological data for summer season 2016 have been generated near the plant site. The predominant wind direction during the study period is S & SE directions. The wind speed ranges from 0 to 8.2 m/s. The coldest season is during December and January, where the temperature touches a minimum of 18.8°C and warmest period is during the month of April to May when the Mercury shoots up to 42.6°C.

3.4 Ambient Air Quality

The National Ambient Air Quality Standards (NAAQS) parameters & VOC were monitored at nine locations during the study period. The maximum 24 hourly PM₁₀ and PM_{2.5} concentrations at all locations varied from 36-49 µg/m³ and 15-24 µg/m³ respectively. The maximum concentrations of SO₂ were observed in the range from 9.6-14.6 µg/m³. The NO_x concentration was in the range from 10.2-15.8 µg/m³. The Volatile Organic Compounds monitored at difference locations in the study area were found in the range of BDL-1.2 ppm, the highest being at plant site. Other parameters CO, NH₃, HC of ambient air quality in the study area are found below detectable limit.

3.5 Ambient Noise Levels

Ambient noise levels were monitored at nine locations within study area. The observed noise level in the study area ranges from 51.8-55.9 dB (A) during day time and

41.3 to 43.8 dB (A) during the night time. The noise levels at all the locations in study area were observed well within the permissible limits prescribed by CPCB during day as well as night times.

3.6 Water Quality

Four samples of surface water and eleven samples of groundwater were collected in the study area. All the surveyed villages are having water supply through Gram Panchayat bore wells. The ground water analysis results show that TDS, alkalinity, hardness, chlorides are marginally higher than permissible limits as per IS 10500-2012. However results indicate permissible limits in the absence of alternate source.

3.7 Soil Quality

Eleven soil samples were collected and analyzed. The predominant soil texture is silty clay and silty loam type. Potassium availability is good in neutral and alkaline soil. The pH varied from 6.8 to 8.1 showing neutral to moderately alkaline during study period. Organic carbon present in soil samples collected show adequate at plant site, low to medium to sufficient at other places. Nitrogen presence is good, whereas phosphorus present is less to medium. Potassium present is average to better.

3.8 Sensitive Ecosystem

There are no ecologically sensitive areas like national park, wildlife sanctuary, wetland, and archaeological monuments present within 10 km radius of the project site. There are six blocks of reserved forest in buffer zone; they are in the form of small and isolated patches. None of the plant species and animals present in the study area belongs to threatened or endangered categories.

3.9 Biological Environment

There are no biosphere reserves within 10km radius of the study area. As there are no rare or endangered or endemic or threatened (REET) species of plants and animals, the proposed project is not going to pose any threat to local flora and fauna.

3.9.1 Flora

The plant resources in core area consisted of 74 species belonging to 54 genera and 28 families. The predominant life forms include Trees (21sp), followed by Herbs (18sp), Shrubs (28sp) & Climbers (7sp). The plant resources of the buffer are 238 plants species belonging to 198 genera and 81 families. The predominant life forms includes Trees (77sp), Herbs (691sp), Shrubs (39sp), Climbers (19sp) and Hydrophytes (12sp) of which Leguminosae (44sp) was the most specious family followed by Malvaceae (14sp), Apocynaceae (13sp) & Poaceae (11sp).

3.9.2 Fauna

In the core zone 3 species of mammals were recorded namely Little Indian field mouse, House rat & Three striped squirrel. Where as in birds 4 species were recorded, species such as Red vented bulbul, Plain prinia, Purple sun bird & Common Babbler are the common species which are encountered during the survey period

In the buffer zone a total of 101 species of fauna were recorded of which Mammals 11 sp, Birds 51 sp, Herpeto-fauna 11 sp, Invertebrates 23 sp & Fishes 5 sp. Mammals includes Indian hare, Common Mongoose, Rhesus Monkey & Wild boar are the key stone species of the area. Among the birds, 48 species belonging to 10 orders and 30 families were recorded.

4.0 Impact Assessment and Mitigation Measures

4.1 Air Environment

4.1.1 Process emissions

Manufacturing of APIs and API intermediates will result in gaseous emissions like HCl, CO₂, H₂, SO₂, and Monomethylamine emissions are liberated from the process. HCl, Monomethylamine and SO₂ emissions from the reactor will be connected to dual scrubber with suitable chilled or room temperature liquid to scrub the gases effectively with water / caustic based on the nature of the gas. H₂ will be diffused with flame arrestor. CO₂ will be dispersed into atmosphere. The scrubbed solutions are sent to ETP for further treatment and reuse. The vents of the scrubber's gases will be dispersed into atmosphere through a stack above the production block.

4.1.2 Fugitive emissions

The solvents used for the process will be stored in drums and bulk quantities will be stored in under / above ground storage tanks of suitable capacities. Solvents are handled in closed conditions and closed operations thereby reducing the losses in the form of evaporation. The industry will take measures for reduction of fugitive emissions by providing Chilled brine / water / cooling water circulation to condensate the solvent vapor from the reactor, receiver and Tank vents which ensures the maximum recovery.

Good ventilation will be provided to reduce the workroom concentrations. Solvent vapors from the Centrifuge and Catch pots will be connected to vent condensers. The height of the solvent receiver tank vent is above production block roof level and diameter is 20 mm. Industry is proposing to upgrade the existing solvent recovery unit from 2 columns having a 50 KLD distillation capacity with additional 50 KLD distillation capacity with a column height of 13.8m with Primary and Secondary condenser facility.

4.1.3 Emissions – Utilities

Boilers, thermic fluid heater and DG sets are the sources of point source emissions from the proposed expansion project. Coal is being used for steam generation, Particulate Matter (PM), Sulphur dioxide (SO₂) and Oxides of Nitrogen (NO_x) will be the major pollutants. Electrostatic Precipitator with a suitable stack height of 55 m will be installed for 30 TPH boiler and Multi-cyclone separators and bag filters with a suitable stack height of 40m for 10 & 30 m for 8 TPH boiler will be installed for controlling the Particulate emissions and effective dispersion of flue gases within statutory limit of 115 mg/Nm³. Existing diesel fired 1.0 lakh K.cal/hr Thermic fluid heater (TFH) with 30m stack & proposed 8 TPH boiler will be standby in proposed expansion. Existing 5 TPH coal fired boiler will be dismantled. Stacks will be provided to the proposed DG sets of 2x1000 KVA and 3x500 KVA. These are in addition to the existing DG sets of 320 and 380 KVA. DG sets will be used as standby during power failure. Greenbelt development within the plant premises will help in attenuating the pollutants emitted by the plant.

Coal of about 140 TPD (with 5000 Kcal/kg) / husk of about 200 TPD (with 3600 Kcal/kg) / pellets of about 175 TPD (with 4000 Kcal/kg) for boilers of 30 TPH, 10 TPH and 8 TPH, wherein diesel consumption will be 850 lph for TFH and DG sets will be consumed. The stack details and flue gas characteristics along with emission rate for individual pollutants used for prediction of air quality impacts including existing emissions are given below.

Source	Stack Height (m)	Diameter (m)	Temperature (°C)	Flue Gas Flow rate (m ³ /hr)	Exit Gas Velocity (m/sec)	PM	SO ₂	NO _x
						kg/hr		
Coal fired boilers - Proposed								
30 TPH	55	1.3	150	82400	17.3	4.32	56.23	39.38
10 TPH	40	0.9	150	21960	12.8	1.6	14.98	10.51
8 TPH (standby)	30	0.8	150	13190	12.9	1.19	11.95	8.35
1000 KVA DG Sets	11	0.4	150	5650	12.5	0.063	1.25	1.34
500 KVA DG Sets	9	0.3	150	2820	11.1	0.032	0.63	0.67
Thermic Fluid Heater (HSD fired)- Existing								
1 lakh Kcal/hr TFH (standby)	30	0.1	150	434	15.35	0.002	0.004	0.05
DG Sets – Existing								
320 KVA	8	0.25	150	1807	10.23	0.02	0.4	0.43
380 KVA	8	0.25	150	2145	12.14	0.024	0.48	0.51

To minimize the SO₂ emissions, available low sulfur coal (0.5%) / husk / pellets will be utilized for proposed boilers, so that emissions will be limited to 500 mg/Nm³. The NO_x emissions from the boilers will be controlled by controlling combustion measures, which will be approached by way of low NO_x burners and by air staging in boiler. The NO_x emissions will be restricted to less than 400 mg/Nm³.

The GLC predictions

Pollutant	Maximum Incremental Level ($\mu\text{g}/\text{m}^3$)	Maximum Baseline ($\mu\text{g}/\text{m}^3$)	Maximum Resultant ($\mu\text{g}/\text{m}^3$)	NAAQ Standard (24 hrs) ($\mu\text{g}/\text{m}^3$)
PM ₁₀	0.82	49	49.82	100
SO ₂	9.47	14.6	24.07	80
NO _x	6.65	15.8	22.45	80

From the above prediction for proposed APIs and API intermediates unit, it is clear that maximum ground level concentrations of PM₁₀, SO₂ and NO_x emissions from the proposed plant emissions will be 49.82 $\mu\text{g}/\text{m}^3$, 24.07 $\mu\text{g}/\text{m}^3$, 22.45 $\mu\text{g}/\text{m}^3$ respectively, which are within standards. Also, the maximum impact zone for all the pollutants is within 1.1 km radial zone from the proposed stacks.

The nearest village Akkireddigudem in E direction to the proposed plant and at a distance of 0.3 km from the plant boundary but is not in prevalent wind direction. Hence, the expected impact can be termed as of insignificant. Besides, GLC's prediction on the location of baseline monitoring stations also shows insignificant increment as a result of proposed expansion project over the existing ambient air quality.

4.2 Noise Environment

The only noise generating sources are steam turbines, power generators, DG sets, motors and rotating machinery like pumps / blowers / compressors etc. Steam turbine and power generator will be installed in separate sheds with Acoustic cabins for operators and DG sets will be installed with inbuilt acoustic enclosures. DG sets will be functioning only at the time of power failure. There is no need for the workers to be near this unit continuously. However the workers in this area will always provided with ear muffs. The nearest habitation is Akkireddigudem village which is at a distance of 0.3 km, from the plant boundary with a 20 m width greenbelt. Hence no impact of noise will be felt at this village. Under the general health check up scheme as per factory act, the workers will be examined for any noise induced Hearing Loss (NIHL) by a trained ENT Doctor.

4.3 Water Environment

The wastewater generated from the plant will be from process, floor & reactor washes, utilities, scrubber, R&D, Q.C and plant domestic wastewater. Total effluent expected from the production process, washings, utilities and domestic will be about 938 KLD for ETP with Zero Liquid Discharge. The treated effluent is reused in cooling towers & boilers. Effluent Treatment Flow as per Segregation is given below.

Effluent Characteristics	Quantity (KLD)	Treatment Flow
Process, DM & Scrubber HTDS/HCOD & (HTDS) HTDS > 5000 mg/l HCOD > 5000 mg/l	684	Collection → Equalization → Neutralization → Settling → Holding → Steam stripper → MEE along with HTDS effluent → Condensate to ETP (biological treatment) → Concentrate to ATFD/VTFD ATFD / VTFD Condensate to ETP (Biological Treatment) along with domestic wastewater → Pressure Sand Filter → Activated Carbon Filter → RO → RO rejects to MEE. R.O Permeate & Condensate to cooling tower & boilers. ATFD Salts to TSDF and stripped solvents to SPCB authorized cement industries
Washings, Boiler, Cooling Tower, QC & R&D LTDS / LCOD LTDS < 5000 mg/l LCOD < 5000 mg/l	242	Collection → Equalization → Neutralization → ETP (Biological Treatment) along with MEE Condensate
Domestic	12	Collection Tank → Aeration Tank (Biological Treatment)

4.4 Land Environment

The proposed expansion project site (10.23 Ha) is plain existing plant premises along with extended land as there is no crop development in this project site. Therefore, the Porus Laboratories plant activities are unlikely to alter the agricultural and land-use pattern in the study region.

4.4.1 Hazardous / Solid Waste

Hazardous / Solid waste generated from the various stages of proposed expansion of APIs and API intermediates manufacturing plant including handling and disposal is given as under.

Sl. No.	Source	Proposed Quantity (TPD)	Handling Method	Disposal
1.	Organic residue	11.2	HDPE Drums	Sent to SPCB Authorized Cement industries / TSDF
2.	Spent Carbon	3.7		
3.	Distillation Bottom Residue (1% of spent solvents)	1.8		
4.	Inorganic & Evaporation salt (Process)	62.4	HDPE Bags	
5.	Evaporation salt (Non-Process)	3.5		
6.	ETP Sludge	10		
7.	Boiler Ash	42	Stored in covered area	Sold to Cement industries/ Brick Manufacturers
Other Hazardous Waste generation from the Plant				
8.	a) Detoxified Container / Liners drums, HDPE Carboys, Fiber Drums	1000 Nos./ month	Designated covered area	Disposed to SPCB Authorized agencies after complete detoxification
	b) PP Bags	200 Kg/month		
9.	Spent solvents (with moisture) (solvents 178+water 7)	185 KLD	Stored in Drums / Tanks	Sent to In-house Solvent Recovery System
10.	Recovered Solvents from spent solvents	165 KLD	Stored in Drums / Tanks	Recovery within the premises duly sending the residue to Authorized agencies
11.	Spent Mixed solvents (13 from SRS + 4 from ETP)	17 KLD	Stored in Drums / Tanks	Recovery within the premises / Sent to SPCB Authorized agencies
12.	Waste oils & Grease	3 KL/A	Stored in Drums	Sent to SPCB Authorized agencies for reprocessing / recycling.
13.	Used Lead acid Batteries	100 Nos. / annum	Designated covered area	Sent to suppliers on buy-back basis.
14.	Misc. Waste (spill control waste)	24 TPA	Stored in Drums	TSDF
15.	Spent Catalyst	8.4 TPA	Stored in Drums	Sold to suppliers on buy-back basis.

Non-Hazardous Waste Generation, Handling and Disposal

Sl. No.	Name of the waste	Quantity (TPD)	Quantity (TPA)	Handling	Disposal option
1.	Used Insulation waste, PVC Scrap, HDPE & PP scrap, Paper waste, Used Thermocouple waste, Glass scrap, Iron scrap, SS scrap, Aluminium & other Metal Scrap, Cotton waste (used aprons/ uniforms, etc.), Packing wood etc.,	1	360	Storage yard	Sent to outside agencies for recycling
2.	Kitchen waste from canteen	0.2	72	HDPE Drums	Composted on site and reused for green belt

Biomedical Waste and E- Waste Generation, Handling & Disposal

Sl. No.	Name of the waste	Quantity (kg/day)	Quantity (TPA)	Disposal option
1.	Category : Yellow (h) Decontaminated media from Microbiology Lab	20	7.2	Pre-treat to sterilize with non-chlorinated chemicals on-site as per BMW Rules and sent to PCB authorized agency for incineration.
2.	Category: White Waste sharps from OHC (Needles, syringes, scalpels, blades, glass, etc.)	0.10	0.036	Autoclaving and sent to PCB authorized agency.
3.	Category : Yellow (c) Soiled Waste from OHC (cotton, dressings, soiled plaster casts, other material)	0.30	0.108	Sent to PCB authorized agency for incineration.
4.	E – waste	10	3.6	Sent to authorized E-waste collection centres/ registered dismantlers / authorized recyclers/ return back to manufacturers.

Other Solid waste mentioned above will be segregated, detoxified and collected in the HDPE Drums / Bags and will be stored in the covered and raised platform with Leachate collection system.

4.5 Socio-Economic Environment

Population in the study area as per 2011 census is 1,72,931 persons. Literacy pattern of the study area was reported to be around 71.03% of the total population of the study area. Total work force in the area was reported to be around 41.56%.

Operation phase of proposed expansion project will require workforce of direct (200) and Indirect (100) persons including the existing staff. Preference will be given to local people. Migration of persons with better education and professional experience will result in increase in literacy and betterment of the surrounding villages. Under the Corporate Social Responsibility the Industry will develop a policy of developing the villages in the vicinity by identifying the requirements.

5.0 Handling of Hazardous Chemicals, Waste and Risk Assessment

The APIs and API intermediates manufacturing industry has to handle many such chemicals that are hazardous in nature. Once these chemicals are used for some reactions, some hazardous wastes are generated. The industry will continue to provide special training to the workers handling Hazardous chemicals / wastes. Only highly trained personnel with

personal protective equipment's (PPE's) will be allowed to handle such chemicals or wastes under strict supervision.

6.0 Occupational Health Hazards

The principle of occupational health hazards posing danger to the health of personnel are coal handling area (for boiler feed), reactors area, boiler area, loading and unloading sections in the store area, solvent storage area, acid and alkali handling/storage areas, oil storage areas, Handling, storage and disposal of Hazardous wastes etc., EHS cell will ensure employees in these areas to use PPEs with proper precautions. First aid boxes are placed in all activity areas. Occupational Health Center facility is available at the plant.

7.0 Greenbelt Development

Industry developed the Greenbelt in and around the plant boundary to extent of 4.72Ha (46.2%). The green cover proved beneficial such as retention of soil moisture, prevention of soil erosion, recharge of ground water, noise attenuation, dust control and moderation of the micro-climate of the area.

8.0 Post- Project Environmental, Health & Safety Monitoring

The existing environmental management cell will be upgraded with necessary infrastructure, experienced and qualified personnel reporting to the Vice President regarding regular monitoring and environmental performance of project area. Industry allocated of Rs.38.12 crores as recurring cost for Environmental, Health and Safety Monitoring.

8.1 Construction Phase

The proposed expansion project envisages construction of production blocks, 3MW captive power plant, up- gradation of ETP, setting up of machinery, storage facilities etc., are expected to last for about 2 years. Environmental monitoring measures during construction stage are given below.

- Ambient air quality parameters viz., PM₁₀, PM_{2.5}, SO₂, NO₂ & VOC will be monitored to ensure that ambient air quality standards would be met all the time.
- Basic amenities such as drinking water, sanitation & lighting will be provided to the construction workers.

8.2 Operation Phase

Air emissions from process areas, Boilers, DG sets, Utilities, wastewater reuse, hazardous and non- hazardous waste generation are envisaged. The attributes which merit regular monitoring based on the environmental setting and nature of project activities are listed below:

- Source emissions and ambient air quality
- Groundwater levels and ground water quality in surrounding bore wells
- ETP effluent quality before and after treatment
- Hazardous and solid waste characterization (process hazardous waste, ash, oily wastes, ETP sludge, used and waste oil)
- Soil quality
- Noise levels (Ambient, machinery noise levels, occupational exposures)
- Ecological preservation and afforestation.
- Health checkup (every year) will be made as per the guidelines prescribed by the statutory body

9.0 Project Benefits

Expansion of APIs and API intermediates manufacturing facility not only increases the market availability of therapeutic drugs but also reduces the import burden on the country and also support the government by paying the taxes to the exchequer. In addition to this certain social contributions will help in economic growth of the area. Adequate additional plantation is proposed inside and outside the plant. The trees will maintain regional ecological balance and conform to soil and hydrological conditions. Indigenous species would be preferred. The management will continue to support the local administration and other form of assistance for the development of public amenities in this region. The social requirements will be identified such as drinking water requirement, promotions of Rain water harvesting pits, Solar street lights, Multi-facility Ambulance facility and other necessary activities as per nearby village requirements. Transport, will improve in this area due to industrialization. The health programme outlines a routine monitoring of health and safety of the work force. Project will generate direct and indirect employment preferably from the nearby villages and unavailable technical persons from outside. Total Employment will be 200 persons as direct & 100 persons indirect after expansion. Industry proposes to allocate Rs. 138 lakhs towards Corporate Social Responsibility.