porus™
molecules and beyond

Ref.: PLPL-IV/MoEF&CC/ToR/JAN-2016
Date: 25-01-2016

To
The Director and Member Secretary (Industry-2)
Impact Assessment Division
Ministry of Environment & Forests and Climate Change,
Govt. of India, Indira Paryavaran Bhawan,
Aliganj, Jor Bagh Road,
New Delhi-110 003

Sub: Proposed Expansion of APIs and API Intermediates manufacturing Unit with 3 MW Captive Power Plant at Sy. Nos.: 87, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2, Akkireddigudem (V), Musunuru (M), Krishna District, Andhra Pradesh - Submission of Additional Details Sought by MoEF&CC for issue of Terms of Reference (ToR) – Reg.

Ref: 1. Additional Details Sought by MS displayed on MoEF&CC website on 25-01-2016
2. Minutes for 2nd EAC Meeting for Industry-2 held during 16th–17th December 2015

Sir,

This is in continuation to the above subject and reference, we had presented our proposal to expand the existing APIs & API Intermediates manufacturing unit & R&D facility with 3 MW Captive Power Plant for M/s. Porus Laboratories Pvt. Ltd., Unit-IV in the 2nd Expert Appraisal Committee Meeting held on 16-12-2015 for ToR. Following is the Additional Details sought by MS through online vide dated 25-1-2016.

"Capacity expansion has been planned to be carried out adjacent to the agricultural plot which fall in between of existing process and new land for the expansion. It was noted that land is purchased in patches on either side of existing plot. The committee felt that the storage of raw material including its processing may pose environmental threat and risk to the farmers and agricultural land. The committee did not agree with proposal and suggested to carry out the process and raw material handling within the same plot or other safer side which may not affect agricultural/crop. The Committee recommended to revise the proposal with adequate site plan and with full details of expansion in comparison to existing products through online."

- **Revised Proposal of Form1, Pre-Feasibility Report with revised Plant layout consisting existing and proposed production blocks, raw materials handling along with 3 MW Captive Power Plant with green belt in Single Plot is enclosed.**

Kindly acknowledge the receipt of the same and process our application and arrange to issue Terms of Reference for our proposed expansion project.

Thanking you,

For Porus Laboratories Pvt. Ltd., Unit-IV

N. Srinivasan
Director

Encl: As referred above

CONTENTS OF FORM I

FORM-I APPLICATION

(Proposed Expansion of APIs & API Intermediates Manufacturing Unit with R&D Unit)

of

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

Sy. Nos. 87, 98/2, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2,
Akkireddigudem (V),
Musunuru (M), Krishna District,
Andhra Pradesh

January 2016

APPENDIX I
(See paragraph – 6)
FORM 1

(I) Basic Information

S. No.	Item	Details
1.	Name of the Project	Porus Laboratories Pvt. Ltd., Unit-IV Expansion of Active Pharmaceutical Ingredients (APIs) & API Intermediates manufacturing and R&D facility with 3 MW coal/husk/pellets Captive Power Plant.
2.	S.No. in the Schedule	5 (f)
3.	Proposed capacity / area / length / tonnage to be handled / command area / lease area / number of wells to be drilled	Proposed project with total production capacity: 11601 TPA. List of Products & byproducts with their production capacity are given in Pre-Feasibility Report. **Please refer in Page No. 9 of Pre-Feasibility Report (PFR).** Total 18 products at any point of time. Total Area: 10.23 Ha
4.	New/ Expansion / Modernization	Expansion
5.	Existing Capacity / Area etc.	Existing Capacity: 2940 TPA Total 3 products at a time Existing Area: 6.48 Ha
6.	Category of Project i.e., 'A' or 'B'	Category 'A'
7.	Does it attract the general Condition? If Yes, Please specify	No.
8.	Does it attract the specific condition? If Yes, Please specify	No.
9.	Location	
	Plot/Survey/Khasra No.	Sy. Nos.: 87, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2
	Village	Akkireddigudem - 521213
	Tehsil	Musunuru
	District	Krishna
	State	Andhra Pradesh
10.	Nearest railway station / airport along with distance in km.	Railway station at Nuzividu is 27 km (S), at Vijayawada is 45 km (SSW) (aerial distance). Gannavaram Airport - 41 km (S) (aerial distance)
11.	Nearest Town, City, District Headquarters along with distance in km.	Akkireddigudem Village: 0.35 km (E) Musunuru: 7 km (SSE) Nuzividu: 11 km (SSW) Vijayawada: 45 km (SSW)

12.	Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (complete postal addresses with telephone nos. to be given)	**Village Panchayat Address (Local Body):** Gram Panchayat Office, Akkireddigudem - 521213, Musunuru Mandal, Krishna District, Andhra Pradesh.
13.	Name of the applicant	M/s. Porus Laboratories Pvt. Ltd., Unit-IV Shri. N. Purushottama Rao, Managing Director **Authorised Signatory:** Mr. N. Srinivasan, Director
14.	Registered Address	M/s. Porus Laboratories Pvt. Ltd. KKR Square, Flat No. 402 & 403, Plot No. 5,6,15 &16, Kavuri Hills, Road No. 36, Jubilee Hills, Hyderabad – 500 033
15.	Address for correspondence:	Porus Laboratories Pvt. Ltd., Unit-IV
	Name	Mr. N. Srinivasan
	Designation(Owner/Partner/ CEO)	Director
	Address	M/s. Porus Laboratories Pvt. Ltd. KKR Square, Flat No. 402 & 403, Plot No. 5,6,15 &16, Kavuri Hills, Road No. 36, Jubilee Hills, Hyderabad
	Pin Code	500 033
	E-mail	torakg@poruslabs.com
	Telephone No.	9849596624
	Fax No.	040-40118099
16.	Details of Alternative Sites examined, if any, Location of these sites should be shown on a top sheet.	Not Applicable as this is Expansion project in the Existing land.
17.	Interlined projects	Nil
18.	Whether separate application of interlined project has been submitted	Not Applicable
19.	If yes, date of submission	Not Applicable
20.	If no, reason	Proposed project is for expansion of APIs and API Intermediates manufacturing
21.	Whether the proposal involves approval/clearance under: if yes, details of the same and their status to be given (a) The Forest (Conservation)Act, 1980 (b) The Wildlife (Protection) Act, 1972 (c) The C.R.Z Notification, Act, 1991	Nil
22.	Whether there is any Government Order/Policy relevant/relating to the site	Nil
23.	Forest land involved (hectares)	Nil
24.	Whether there is any litigation pending against the project and / or land in which the project is propose to be set up (a) Name of the Court	Nil

	(b) Case No. (c) Orders / directions of the Court, if any and its relevance with the proposed project.	

**Capacity corresponding to sectoral activity (such as production capacity for manufacturing, mining lease area and production capacity for mineral production, area for mineral exploration, length for linear transport infrastructure, generation capacity for power generation etc.,)*

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	**Yes**	Existing Industry and proposed for expansion in the existing and additional land. Please refer **Annexure-X in Pre-Feasibility Report (PFR)** for Plant Layout.
1.2	Clearance of existing land, vegetation and buildings?	**No**	Not Envisaged. Existing Industry having EC, CFE, CFE-CPM & latest CFO are presented in **Annexure – II, III, IV & V of PFR.**
1.3	Creation of new land uses?	**Yes**	**Please refer** Annexure-X in PFR **for Plant Layout.**
1.4	Pre-construction investigations e.g. bore houses, soil testing?	**Yes**	Groundwater analysis results are enclosed at **Annexure-XIV in PFR.** Please refer **Annexure-XVIII in PFR** for current Soil Analysis Report**.**
1.5	Construction works?	**Yes**	Additional Production blocks and warehouse, 3 MW CPP will be constructed. Please refer **Annexure-X in PFR** for Plant Layout.
1.6	Demolition works?	**No**	Not envisaged
1.7	Temporary sites used for construction works or housing of construction workers?	**No**	Construction workers are employed from the nearby villages. No accommodation envisaged for the construction workers.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	**Yes**	Please refer **Annexure-X in PFR** for Plant Layout.
1.9	Underground works including mining or tunneling?	**No**	Not envisaged.

1.10	Reclamation works?	**No**	Not envisaged.
1.11	Dredging?	**No**	Not envisaged
1.12	Offshore structures?	**No**	Not envisaged.
1.13	Production and manufacturing processes?	**Yes**	Please refer **Annexure – XI in PFR** for manufacturing process.
1.14	Facilities for storage of goods or materials?	**Yes**	Storage yard facility available.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	**Yes**	Existing facilities will be upgraded. Please refer **Annexure - XV in PFR** for Flow chart for treatment of liquid effluents. Please refer **Table 8 of PFR** for details of solid waste disposal.
1.16	Facilities for long term housing of operational workers?	**No**	Most of the workers are locals and nearby villages.
1.17	New road, rail or sea traffic during construction or operation?	**No**	Not envisaged.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	**No**	Not envisaged.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	**No**	Not envisaged.
1.20	New or diverted transmission lines or pipelines?	**No**	Not envisaged
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	**No**	Not envisaged
1.22	Stream crossings?	**No**	-
1.23	Abstraction or transfers of water from ground or surface waters?	**Yes**	Water requirement for the industry will be met from the ground water through pipelines.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	**No**	Not envisaged.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	**Yes**	The construction material will be procured locally and will be transported through roads. The sources of raw materials and machinery for operation will vary based on market driven forces, which will be transported via roads.
1.26	Long-term dismantling or decommissioning or restoration works?	**No**	Not envisaged
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	**Yes**	Temporary and short time.
1.28	Influx of people to an area in either temporarily or permanently?	**Yes**	Workers / employees will be increased and the working hours are in shifts /

			general.
1.29	Introduction of alien species?	**No**	Not envisaged.
1.30	Loss of native species or genetic diversity?	**No**	Not envisaged.
1.31	Any other actions?	**No**	-

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S. No.	Information/checklist confirmation	Yes/ No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	**Yes**	Proposed expansion will be in the existing and additional land.
2.2	Water (expected source & competing users) unit: KLD	**Yes**	Water will be used from Bore Well Quantity 758 KLD. Please refer **Table 5 of PFR** for Water Balance.
2.3	Minerals (MT)	**No**	Not applicable.
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	**Yes**	Construction materials are procured from the local market and construction is based on the plant layout. Please refer **Annexure-X in PFR** for Plant Layout.
2.5	Forests and timber (source – MT)	**No**	Not applicable.
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	**Yes**	Permitted existing - 700 KVA and after expansion will be 950 KVA power (electricity). Coal of about 140 TPD / husk of about 200 TPD/ pellets of about 175 TPD will be used for proposed 30 TPH of 3 MW Captive Power Plant, 10 TPH coal/husk/pellets fired boilers. Proposed 8 TPH coal/husk/pellets fired boiler along with existing 1 lakh Kcal./hr Thermic Fluid Heater will be standby and existing 5 TPH boiler will be dismantled. About 850 lit/hr diesel will be used for proposed 2 x 1000 KVA DG sets and 3 x 500 KVA along with existing DG sets of 320 KVA and 380 KVA.
2.7	Any other natural resources (use appropriate standard units)	**No**	**-**

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

S.No.	Information / Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	**Yes**	List of Hazardous Chemicals used in the proposed products are enclosed in **Annexure-XIII in PFR.**
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	**No**	Effluent will be sent to ETP-ZLD system. Treated water will be reused in cooling towers. All solid waste will be stored in the covered platform with leachate collection system and sent to TSDF / Authorized agencies. Process emissions will be scrubbed in the scrubbers.
3.3	Affect the welfare of people e.g. by changing living conditions?	**Yes**	The welfare of the people will have positive effects as the proposed expansion project will give the additional employment to the locals and industry will continue to participate in the village welfare measures. Developing the greenbelt in and around the plant site and along with the Industry area roads and vacant places of industry.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	**No**	Plant boundary is more than 0.35 km away from the nearest habitation.
3.5	Any other causes	**No**	**-**

4. Production of solid wastes during construction or operation or decommissioning (MT/month)

S.No.	Information/Checklist confirmation	Yes/ No	Details thereof (with Approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	**No**	Not envisaged.
4.2	Municipal waste (domestic and or commercial wastes)	**No**	The commercial waste from the administration building is generated and is sent to scrap vendors.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	**Yes**	Please refer **Table 8 of PFR** for details of Hazardous wastes generated from the proposed products.
4.4	Other industrial process wastes	**Yes**	Please refer **Table 8 of PFR** for details of other industrial process wastes from the proposed products**.**
4.5	Surplus product	**No**	Production will be based on the market demand. Hence No surplus production will be generated.

4.6	Sewage sludge or other sludge from effluent treatment	**Yes**	Domestic wastewater is sent to Septic tank and over flow to ETP. Please refer **Table 8 of PFR** for ETP Sludge generation details.
4.7	Construction or demolition wastes	**Yes**	Construction is as per plant layout and ensures to reduce the construction or demolition waste.
4.8	Redundant machinery or equipment	**No**	Not envisaged.
4.9	Contaminated soils or other materials	**No**	Not envisaged.
4.10	Agricultural wastes	**No**	Nil
4.11	Other solid wastes	**Yes**	Please refer Table 8 of PFR for details of other Industrial process wastes from the proposed products

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

S. No.	Information / Checklist confirmation	Yes / No	Details thereof (with Approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	**Yes**	About 140 TPD coal/ 200 TPD Husk/ 175 TPD Pellets will be used in proposed & existing boilers and about 850 lit/hr diesel will be used in proposed and existing DG Sets. Please refer **Table 13 of PFR** for Emission details.
5.2	Emissions from production processes	**Yes**	Please refer **Table 12 of PFR** for Emissions from process reactions of the proposed products.
5.3	Emissions from materials handling including storage or transport	**Yes**	Pumps will be used for handling liquid raw materials and trolleys will be used for Solid / Powder type raw materials. Vent condensers will be provided for all storage tanks, Centrifuges, catch pots.
5.4	Emissions from construction activities including plant and equipment	**Yes**	It will be temporary and insignificant during the construction phase of project.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	**Yes**	Dust will be generated due to construction activities and transportation of goods and materials. It will be reduced by water spray at construction waste and on roads.
5.6	Emissions from incineration of waste	**No**	Provision of incinerator not envisaged. Proposed to send all Incinerable Hazardous waste to TSDF for incineration / SPCB Authorized Cement Industries.
5.7	Emissions from burning of waste in open air (e.g. slash materials,	**No**	Not envisaged. All construction debris will be used as filling material for roads

	construction debris)		and other waste materials are sold as scrap.
5.8	Emissions from any other sources	**No**	Not envisaged.

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

S.No.	Information/Checklist confirmation	Yes/ No	Details thereof (with Approximate quantities/rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	**Yes**	Noise will be generated from the utilities section. Silencers will be provided for DG Sets and other utilities equipment and these will be installed in separate room.
6.2	From industrial or similar processes	**Yes**	Noise will be generated from the pumps, motors, centrifuges etc., which will be controlled by proper maintenance and procuring the sound proof equipments.
6.3	From construction or demolition.	**Yes**	Noise will be generated during construction phase, which will be temporary and for short time.
6.4	From blasting or piling	**No**	Not envisaged.
6.5	From construction or operational traffic	**Yes**	Noise will be generated from the transportation vehicles.
6.6	From lighting or cooling systems	**No**	Nil
6.7	From any other sources	**No**	Nil

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S.No.	Information / Checklist confirmation	Yes/ No	Details thereof (with Approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	**Yes**	Accidental spillages may be occurred. Spillages such as wastewater / solid wastes / raw materials are possible and the risk of this would be limited to within the premises of the manufacturing facility. Precautionary measures are implementing in the existing industry and will continue for proposed expansion. Suggestions from the safety consultants will be followed to avoid the risk and prevent accidents.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	**Yes**	Process effluents will be pumped to the above ground level R.C.C lined tanks for storage and neutralization then sent to ETP – ZLD.

			In-house treatment (ZLD) with primary treatment, secondary treatment and Tertiary treatment. Domestic wastewater will be sent to septic tank and the overflow to ETP-ZLD.
7.3	By deposition of pollutants emitted to air into the land or into water	**Yes**	Possibility of deposition of pollutants emitted to air into the land or into water cannot be ruled out and the precautions taken by the industry to control such emissions by adopting the suitable controlling equipment will be provided such as multi cyclone separators, bag filters, scrubbers etc.
7.4	From any other sources	**No**	Nil
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	**No**	Not envisaged.

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S.No.	Information/Checklist confirmation	Yes/ No	Details thereof (with Approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc. from storage, handling, use or production of hazardous substances	**Yes**	All safety precautions will be taken by the industry to avoid such accidents.
8.2	From any other causes	**Yes**	Static Electricity
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	**No**	Not envisaged.

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with Approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:		

	• Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)	**Yes**	Supporting infrastructure such as Roads, Power supply, waste or wastewater treatment etc., may have impacts on the project activities. However the impact from such activities will be limited.
	• housing development	**No**	All employees will be coming from nearby villages.
	• extractive industries	**No**	Not envisaged.
	• supply industries	**Yes**	Raw material supplies will be increased.
	• other	**No**	Not envisaged.
9.2	Lead to after-use of the site, which could have an impact on the environment	**No**	Not envisaged.
9.3	Set a precedent for later developments	**No**	Not envisaged.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	**No**	Not envisaged

(III) Environmental Sensitivity

S. No.	Areas	Name/ Identity	Aerial distance (within 15 km) Proposed project location boundary
1.	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	**Yes**	• Ramanakkapeta R.F. (Dense Scrub) at 1 km (W) and Ramanakkapeta R.F. (Fairly Dense Scrub) at 2.5 km (NW) • Somavaram R.F. (Dense Scrub) at 2.6 km (NE), • Lopudi R.F. at 3.4 km (E) • Tummagudem R.F. at 3.5 km (NNW) and Tummagudem R.F. (Open Scrub) at 7.2 km (NNW) • Arugolanupeta R.F. at 8 km (NW) • Annavaram R.F. at 8.5 km (SW)
2.	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	**No**	Not envisaged.
3.	Areas used by protected, important or sensitive Species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	**No**	Not envisaged.
4.	Inland, coastal, marine or underground waters	**Yes**	Vempadu Major Canal – 0.23 km (W) Tammileru river – 8.4 km (E)

			Pond near Akkireddigudem – 0.4 km (E) Pond near Ramanakkapeta – 1.15 km (W) Ramlinga Cheruvu – 4 km (SE) Pappana Cheruvu – 5 km (SW) Nalla Cheruvu – 6 km (SE) Pedda Cheruvu – 3.3 km (E)
5.	State, National boundaries	**No**	Nil
6.	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	**Yes**	Vissannapeta - Nuzividu connecting road at 7.5 km (W) Chintalpudi – Eluru road at 10 km (E) which connects to NH-5
7.	Defence installations	**No**	Nil
8.	Densely populated or built-up area	**Yes**	Akkireddigudem village is at a distance of 0.35 km from the industry.
9.	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	**No**	Hospitals, schools, temples and other general community facilities exist in the settlements in the study area.
10.	Areas containing important, high quality or scarce resources *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	**No**	Not applicable
11.	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*	**No**	Not applicable.
12.	Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*)	**Yes**	The project area falls under seismic zone II as per IS: 1893 (Part1):2002.

(IV). Proposed Terms of Reference for EIA studies:
Please refer to attachment for Draft ToR in Online Submission In MoEF&CC Website

I hereby given undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost.

For PORUS LABORATORIES PVT. LTD

N. Srinivasan
Director

Date: 25-1-2016
Place: Hyderabad

M/s. Porus Laboratories Pvt. Ltd., Unit-IV
Sy. Nos.: 87, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2
Akkiredigudem (V), Musunuru (M),
Krishna District, Andhra Pradesh

Signature of the applicant
Designation: Managing Director

NOTE:

1. The projects involving clearance under Coastal Regulation Zone Notification, 1991 shall submit with the application a C.R.Z map duly demarcated by one of the authorized agencies, showing the project activities, w.r.t C.R.Z (at the stage of TOR) and the recommendations of the State Coastal Zone Management Authority (at the stage of EC). Simultaneous action shall also be taken to obtain the requisite clearance under the previous of the C.R.Z Notification, 1991 for the activities to be located in the C.R.Z.

2. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-a-vis the project location and the recommendations or comments of the Chief Wildlife Warden thereon (at the stage of EC).

3. All correspondence with the Ministry of Environment & Forests including submission of application for TOR/Environmental Clearance, subsequent clarifications, as may be required from time to time, participation in the EAC Meeting on behalf of the project proponent shall be made by the authorized signatory only. The authorized signatory should also submit a document in support of his claim of being an authorized signatory for the specific project".

PRE-FEASIBILITY REPORT

(Proposed Expansion of APIs & API Intermediates Manufacturing Unit with R&D Facility)

of

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

Sy. Nos. 87, 98/2, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2,
Akkireddigudem (V),
Musunuru (M), Krishna District,
Andhra Pradesh

January 2016

Contents

List of Tables

LIST of Annexures

Pre-Feasibility Report for Expansion of APIs and API Intermediates Manufacturing Unit and R&D Facility

1.0 Executive Summary

M/s. Porus Laboratories Pvt. Ltd., Unit-IV (Formerly known as M/s. Porus Drugs and Intermediates Pvt. Ltd.), proposes to expand its Active Pharmaceutical Ingredients (APIs) and API Intermediates manufacturing unit with R&D facility and 3 MW Coal/ Husk/ Pellets fired Captive Power Plant at Sy. Nos.: 87, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2, at Akkireddigudem (V), Musunuru (M), Krishna District, Andhra Pradesh with a total investment of Rs. 80.25 Crores including the existing investment of Rs. 24.96 Crores.

The proposed expansion project falls under the Category 'A', project or activity 5(f) according to the EIA Notification 2006.

1.1 Salient Features of the Project:

- The present unit was originally established in 1983. In 2008 M/s. Porus Drugs & Intermediates Pvt. Ltd., Unit IV changed its name to M/s Porus Laboratories Pvt. Ltd.
- Proposing expansion is in the existing area with extended land from 6.48 Ha to 10.23 Ha (25.28 Acres).
- The proposed project is to manufacture 18 APIs and API intermediates with a production capacity of 11601 TPA (existing 2940 TPA) on campaign basis i.e., 18 products at a time & R&D activity and 3 MW coal/husk/pellets Captive power plant (CPP).
- Total Greenbelt area is 4.72 Ha (46.2 %).
- Industry obtained Environmental Clearance for existing activity vide order no. J-11011/1101/2007-IA II (I) dated 02-02-2009 in the name of M/s. Porus Drugs & Intermediates Pvt. Ltd., Unit-IV and CFE vide No. APPCB/VJA/VJA/508/CFE/HO/2009-578 dated 31-05-2010 in the name of M/s. Porus Laboratories Pvt. Ltd., Unit-IV.
- Industry obtaining regular consent renewals from APPCB and obtained CFE for change of product mix with no increase in pollution load issued by APPCB vide order no. 508/PCB/CFE/RO-VJA/HO/2014 dated 29-11-2014. Latest CFO was issued by APPCB vide order no. APPCB/VJA/VJA/13734/CFO/HO/2015-2116 dated 13-03-2015.
- This proposed expansion project site is located at an aerial distance of
    i. Vissannapet – Nuzividu connecting Road at 7.5 km (W) and Chintalpudi – Eluru road at 10 km (E) which connects to NH-5
    ii. Akkireddigudem village at 0.35 km in E direction
    iii. Ramnakkapeta village at 1.8 km in W direction
    iv. Nuzividu at 11 km in SSW direction

v. Nuzividu railway station at 27 km in S direction
vi. Musunuru (Mandal Headquarters) at 7km in SSE
vii. Machilipatnam (District Headquarters) at 80km in SSE direction
viii. Vijayawada at 45 km in SSW direction
ix. Gannavaram Airport at 41 km in S direction.

- Total cost of the expansion is Rs. 80.25 Crores. Total capital cost allocated towards environmental pollution control measures is Rs. 31 crores including existing investment of Rs. 4.3 Crores. Recurring cost after expansion will be about Rs. 38 crores per annum.
- Total water requirement will be about 1587 KLD of which fresh water requirement will be 758 KLD and balance 829 KLD will be recycled water from ETP. Fresh water will be met from Groundwater from existing Bore wells.
- The proposed power requirement of the plant is 950 KVA including existing 700 KVA. DG sets are used as standby during power failure.
- Total 300 employees including existing project will be benefitted due to the proposed expansion project. Out of which direct 200 and indirect 100 employees.
- Coal of about 140 TPD (with 5000 Kcal) / husk of about 200 TPD (with 3600 Kcal)/ pellets of about 175 TPD (with 4000 Kcal) will be used in the proposed boilers for 30 TPH of 3 MW Captive Power Plant, 10 TPH coal/husk/pellets fired boilers and proposed 8 TPH boiler along with 1 lakh Kcal./hr Thermic Fluid Heater will be standby. Existing 5 TPH coal fired boiler will be dismantled.
- Diesel of about 850 lit/hr will be used in the proposed 2 x 1000 KVA DG sets and 3 x 500 KVA along with existing DG sets of 320 KVA and 380 KVA.
- Industry will provide additional dual scrubbers based on the characteristics of process emissions. Boilers will be provided with economizer/ electrostatic precipitator/ multi-cyclone separator & bag filter to reduce the particulate emissions into atmosphere.
- The wastewater generated from the plant will be about 938 KLD from process, washing, utilities, DM regeneration, scrubber, Q.C, R&D and domestic wastewater.
- The effluent will be pumped to the above ground level R.C.C lined tanks for storage and neutralization then sent to proposed upgraded ETP-ZLD of 1200 KLD capacity within the premises.
- Domestic wastewater will be sent to septic tank and the overflow to ETP - ZLD.
- Hazardous waste will be segregated and collected in the HDPE drums / bags as appropriate and will be stored in the covered and raised platform with provision of leachate collection system.

- Solid waste like boiler ash will be continued to send to cement brick manufacturers.
- Compressors, Boilers and DG sets will be the major noise generating units in the plant. Out of these, the generator will be functioning at the time of power failure. Acoustic enclosures provided at each generator unit to minimize the noise levels. However the workers in this area will be provided with ear muffs.

Industry has uploaded for Form-I along with draft Terms of Reference (ToR) in MoEF&CC website, in the process of obtaining ToR for preparation of EIA, in line with issue of Environmental Clearance. Hence, a technical pre-feasibility report highlighting the expansion project and the various operations including waste generation and mitigation measures are prepared & submitted to the Environmental Appraisal Committee (EAC) for issuing ToR.

2.0 Introduction

2.1 Identification of the Project and Project Proponent

The present unit was originally established in 1983. M/s. Porus Drugs & Intermediates Pvt. Ltd., Unit IV changed its name to M/s Porus Laboratories Pvt. Ltd in 2008, ROC copy for Change in Name is enclosed as **Annexure-I.** Industry proposed to expand its Active Pharmaceuticals Ingredients (APIs) and API Intermediates manufacturing facility with R&D facility in the total area of 10.23 Ha (incl. 6.48 Ha) located at Akkireddigudem Village, Musunuru Mandal, Krishna District, Andhra Pradesh. The proposal is to obtain Environmental Clearance from the Ministry of Environment, Forests and Climate Change (MoEF&CC) and Consent for Establishment from APPCB.

- Industry's first Environmental Clearance was obtained vide order no. J-11011/1101/2007-IA II (I) dated 02-02-2009 **(Annexure-II)** and obtained CFE vide No. APPCB/VJA/VJA/508/CFE/HO/2009-578 dated 31-05-2010 **(Annexure-III).**
- Industry has CFE for change of product mix with no increase in pollution load issued by APPCB vides order no. 508/PCB/CFE/RO-VJA/HO/2014-568 dated 29-11-2014 **(Annexure-IV)**. Latest CFO was issued by APPCB vide order no. APPCB/VJA/VJA/13734/ CFO/HO/2015 – 2116 dated 13-03-2015 valid upto 30-11-2015 **(Annexure-V).**
- Total investment for the proposed project is about Rs. 80.25 Crores including existing investment of Rs. 24.96 Crores as per CA certificate **(Annexure-VI)**.
- Total production capacity is 11601 TPA (existing 2940 TPA) from proposed 18 APIs and API intermediates at a time with R&D will be manufactured.

Project Proponent:

- The Porus Laboratories is promoted by Shri N. Purushothama Rao, Managing Director having more than 30 years of experience in the field of APIs.

- He is the founder of Porus Laboratories Pvt. Ltd., and has successfully expanded the company from a small unit in Jeedimetla in 1994 to five units by 2013.
- His vision and hard work were the key factors for the growth of the company. He has Bachelor's degree in chemistry.
- Mr. N. Srinivasan, a director joined the industry in 2003. He has B. Pharm (hons) from BITS Pilani and M.S (Pharmaceutics) from Northeastern University, USA and has over 10 years of experience in varied aspects of business including technology transfer, SCM, Business Development and Finance.
- He has worked with Ohm Laboratories, a subsidiary of Ranbaxy at New Jersey prior to joining the business in 2003.

2.2 Brief Description of Nature of the Project

The project proponent proposed to expand existing API manufacturing unit. As per EIA Notification 2006, the project is 5 (f) Synthetic Organic Chemical Industry (Bulk Drug (API) & Intermediates). The products manufactured are used in API formulation industry and the therapeutic category of the products is Anti-migraine, Antibacterial, Anti-diabetic, Anti-depressant, Anti-obsessional, Anti-Inflammatory, Anti-thrombotic, Anti-bacterial, Anti-convulsant etc., which are applicable for human consumption around the world after formulation activity.

The manufacturing process of APIs consists of chemical synthesis and multiple stage of processing extending to maximum of six stages involving different types of chemical reactions. The entire process operations are operated by various technical, skilled and unskilled persons with due care to be met various standards prescribed by authorities.

Technology for manufacturing the products listed under proposed expansion is available from in-house R&D & private consultants and proposes to adopt new technologies and techniques that are continuously refined in every stage of manufacturing to meet global standards. Industry will implement the proven technologies in the R&D for the cost effective & environment friendly practices.

2.3 Need for the Project and its Importance to the Country and or Region

- The Indian pharmaceutical industry valued at $16 billion has portrayed tremendous progress with reference to infrastructure development, technology base creation and a wide range of production. India has achieved an eminent global position in pharma sector. The Indian pharmaceuticals market is third largest in terms of volume and thirteen largest in terms of value, as per a pharmaceuticals sector analysis report by equity master.
- The market is dominated majorly by branded generics which constitute nearly 70% to 80% of the market. The Indian pharmaceutical industry is estimated to grow at 20% compound

annual growth rate (CAGR) over the next five years, as per India Ratings. The domestic pharma growth rate was 11.9% in October 2014.

- It is estimated that by the year 2015, the Indian pharmaceutical industry has the potential to achieve over Rs.2,00,000 Crore in formulations and bulk drug production. The industry now produces bulk drugs belonging to all major therapeutic groups requiring complicated manufacturing process and has also developed Good Manufacturing Practices (GMP) facilities for the production of different dosage forms.
- The pharma industry exports APIs and pharmaceuticals worth over $ 14.9 billion in 2013-14. It ranks 17th in terms of export value of bulk activities and dosage. Indian exports cover more than 200 countries including the highly regulated markets of USA, Europe, Japan and Australia.
- At a growth rate of 7% per year, the pharmaceutical industry in India is well set for rapid expansion. As a result of the expansion, the Indian pharmaceutical and healthcare market is undergoing a spurt of growth in its coverage, services, and spending in the public and private sectors.

2.4 Demand and Supply Gap

The products manufacture by the proponent has demand from China, Japan, Middle East, Latin American countries and other Asian countries etc. In addition, the products are consumed in domestic market by Dr. Reddy labs, NATCO, Matrix etc. It is reported that there is increase in the consumption of these products by about 5-6% every year. As Indian industries are importing from neighbouring countries and western countries, indicates the gap in the demand and supply of the products in the domestic markets.

2.5 Imports vs. Indigenous production, Export Possibility, Domestic/Export Markets

Presently China is dominating in the API (bulk drug) market the world over. India is importing all major intermediate chemicals required for manufacturing lifesaving drugs i.e., Anti-Cancer Drugs, Anti ulcerative, etc. We are importing from China – the Third generation Antibiotics mainly Cephalosporin intermediates that are of very high value. Most of our imports are from Chinese companies and thus we are losing our valuable foreign reserves to China. As mentioned above the imports have gone up from $ 2.9 billion in 2011 to about $ 4.6 billion in 2012 on account of APIs, Pharmaceuticals and fine chemicals. During the same period the imports of formulations has also doubled. The Chinese, American and European markets play a very vital role in the supply of these products to our country. This clearly indicates that there is tremendous scope for developing the indigenous products by reducing the imports and thus saving the foreign exchange reserves of the country. This potential can be utilized to the fullest extent possible by increasing

the production capacity of the existing industries or by establishing new industries to meet the market demand of the products.

As it is a well known fact that Indian products are well accepted abroad for its quality and marketing flexibility. The exports from the Indian companies to other foreign countries such as Europe, America, Japan and other African countries has been increasing from Rs.8007 in 2005 to Rs.16565 Crores in 2009. This shows the acceptability of the products produced in India. The formulations market has shown a tremendous increase in the exports from about Rs.9500 to Rs.23700 Crores during the same period. However, the basic raw material for formulations is APIs. Hence, this sector has a tremendous potential of indigenous market as well as export market and the promotion of such projects will not only help by way of generation of employment but also by generation of foreign currency reserves for the country. The figures mentioned above are sourced from BDMA.

2.6 Employment Generation due to the Proposed Project

The following Table shows the manpower requirement after expansion of the proposed project:

Type	Existing (No. of persons)	Proposed (No. of persons)	Total after Expansion
Direct	100	100	200
Indirect	50	50	100
Total	**150**	**150**	**300**

3.0 Project Description

3.1 Type of the project

Proposed expansion project of APIs & API intermediates falls under category ‘A’ as per EIA Notification 2006 under the item No. 5 (f). There are no interlinked projects.

3.2 Location

The unit is located at Sy. 87, 92/10, 106/1c, 106/2c, 107/2a, 107/2b, 107/3, 108/1b and 108/2 Akkireddigudem (V), Musunuru (M), Krishna District, Andhra Pradesh. The proposed project expansion site has coordinates of all corners is presented in **Table 1.** The study area represents Rural Environment.

Table 1: Coordinates of all corners of the Project site

Sl. No.	Latitude	Longitude	Sl. No.	Latitude	Longitude
1	16°53'27"N	80°53'41"E	6	16°53'14"N	80°53'44"E
2	16°53'23"N	80°53'54"E	7	16°53'20"N	80°53'45"E
3	16°53'20"N	80°53'53"E	8	16°53'25"N	80°53'46"E
4	16°53'20"N	80°53'55"E	9	16°53'27"N	80°53'41"E
5	16°53'10"N	80°53'54"E			

The map showing general location, specific location, Google map showing the Coordinates and plant layout of the Total Project and existing project is enclosed at **Annexures VII, VIII, IX, X** respectively.

3.3 Alternate sites

This proposed expansion project is in the existing and additional plant area at Akkireddigudem village. Hence no alternate sites were considered.

Environmental considerations of this expansion project site.

- ✓ This expansion site is in existing industry with additional plain land.
- ✓ > 0.3 km away from human habitation,
- ✓ 0.23 km (W) away from Vempadu major canal,
- ✓ 8.4 km (E) away from Tammileru river.
- ✓ There are 8 reserve forests.
    - Ramanakkapeta R.F. (Dense Scrub) at 1 km (W) and Ramanakkapeta R.F. (Fairly Dense Scrub) at 2.5 km (NW)
    - Somavaram R.F. (Dense Scrub) at 2.6 km (NE),
    - Lopudi R.F. at 3.4 km (E)
    - Tummagudem R.F. at 3.5 km (NNW) and Tummagudem R.F. (Open Scrub) at 7.2 km (NNW)
    - Arugolanupeta R.F. at 8 km (NW)
    - Annavaram R.F. at 8.5 km (SW)
- ✓ Exist Transportation and Communication network
- ✓ There are no rare or endangered or endemic or threatened (REET) species of animals or birds.

3.4 Size or magnitude of operation

Project Area: 10.23 Ha. (incl the existing 6.48 Ha)

Production Capacity: 11601 TPA from 18 APIs & API intermediates and R&D activity at a time.

Products: The permitted and proposed products along with its production capacities are presented in **Tables 2 and 3** respectively.

Table 2: Permitted (Existing) and their Capacities

Sl. No.	Product	Existing Products Quantity	
Group - A Products		**(kg/day)**	**(TPA)**
1.	4,4-Cyclohexylidene di-o-cresol	500	180
2.	Bisphenol Acetophenone	333.3	119.9
3.	P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis [4-Hydroxy Phenyl] Phthalimide (PPPBP)	6666.7	2400
4.	1,5-Bis-[2,6-dimethyl]-4-[2-methyl-2-popenoxy]phenyl}-penta-(2,6-dimethyl]-1,4-phenyleneoxide [MX-9000]	550	198
5.	Tetramethyl bisphenol acetone [TMBPA]	276.7	99.6
6.	[1,1,1-Tri-(4-hydroxy phenyl)] ethane [THPE]	276. 7	99.6
7.	4-Hydroxybenzonitrile [HBN]	276.7	99.6
8.	4-Nitro-N-methyl phthalimide [4-NP]	950	342
9.	Sumatriptan Succinate	16.7	6
Group - B Products			
10.	Ciprofloxacin Hydrochloride	1666.7	600
11.	Metformin Hydrochloride	666.7	240
12.	Venlafaxine Hydrochloride	33.3	11.9
13.	Sertraline Hydrochloride	33.3	11.9
14.	Celecoxib	166.7	60
15.	Clopidogrel Hydrogen Bisulfate	100	36
16.	Enrofloxacin	1000	360
17.	Pioglitazone Hydrochloride	33.3	11.9
18.	Gabapentin	66.7	24
Total Production Capacity (any three products at a time).		**8166.7**	**2940**

Sl. No	Name of the By-Product	Quantity (kg/day)	Quantity (TPA)	Name of the Product
1.	Piperazine ML's	9756.67	3512.40	Ciprofloxacin Hydrochloride
2.	N-Ethyl Piperazine ML's	6066	2183.76	Enrofloxacin
3.	Spent Sulfuric Acid	6924	2492.6	4-Nitro-N-Methyl Pthalimide

Table 3: Proposed Products, their 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-Hydroxybenzonitrile (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 Pthalimide

3.5 Project Description with Process Details

The manufacturing process of APIs consists of chemical synthesis extending to maximum of six stages of processing involving different types of chemical reactions. Typical process

description with process details is enclosed at **Annexure-XI**. These drugs are mainly used for human Medication after Formulation activity for various diseases. Industry will implement the proven technologies in the R&D for the cost effective & environment friendly practices. The plant layout showing existing and proposed components of the project is enclosed at Annexure-X.

3.6 Raw Materials

The raw materials required for the manufacture of proposed products are the chemicals and the fuel.

- The APIs & API Intermediates manufacturing involve the use of various chemicals and organic solvents either directly as reactant or for extraction of a product of interest from the reaction mixture.
- Coal / Husk / Pellets consumption will be 140 / 200 / 175 TPD for the proposed 30 TPH for 3MW Captive Power Plant and 10 coal/husk/pellets fired boilers. Existing 1 lakh Kcal/hr Thermic fluid heater and proposed 8 TPH coal/husk/pellets fired boiler will be used as standby. Existing 5 TPH coal fired boiler will be dismantled.
- About 850 lit/hr diesel will be used at full operation load in the proposed 2 x 1000 KVA & 3 x 500 KVA DG sets along with the existing 320 KVA and 380 KVA DG sets.
- The total power requirement of the proposed plant is 950 KVA including existing 700 KVA. DG sets are used as standby during power failure.
- Mode of transportation of all raw materials and finished products from the project site is by road to local markets and by road / rail / sea if exported.

The chemicals (raw materials) required for the manufacture of proposed products is presented at **Annexure – XII** and Hazardous chemicals list is presented at **Annexure – XIII.**

3.7 Resources Optimization / Recycling and Reuse

R&D facility in the unit is taking all efforts to recycle the wastes / reuse wherever possible. However, R&D is a continuous process, where improvements in the processes adopted by the industry, waste minimization etc. will be worked out as the project progresses. Following are some of the recycle options proposed by the industry.

- Industry is proposing to upgrade Zero liquid discharge plant to reuse all treated effluents as makeup water for utilities like Cooling Tower and Boiler. This will reduce the fresh water consumption.
- Industry is proposing dedicated reactors for few products there by reducing the reactor washings.
- All solvents are recovered to the extent possible and reused in the process.
- Organic residue and spent carbon will be sent to Authorized Cement industries to burn in

Cement Kiln as an alternate fuel.

- Boiler ash will be sent to Cement Brick manufacturing units.
- Waste / Used oil will be sent to Authorized Waste / Used oil Reprocessing units.
- Container & container liners of hazardous chemicals, Polythene / HDPE Bags, broken plastic drums shall be disposed of to outside agencies after complete detoxification.
- Waste Lead acid batteries will be sent back to suppliers on buy back basis.
- Optimum utilization of solar energy.

Recycling and reuse of by-products, solvents generated during the process will also be planned properly thereby implementing the clean manufacturing techniques.

3.8 Availability of Water and Energy

The total fresh water requirement is about 758 KLD which will be met from Groundwater from existing bore wells The proposal is to minimize the effect on the level of water table by practicing reuse / recycling of the treated water wherever possible thereby reducing the fresh water requirement. Water analysis report of the raw water at project is enclosed as **Annexure – XIV.**

The total power requirement will be met from Andhra Pradesh State Power Distribution Corporation Limited (APSPDCL). Coal and Diesel will be procured from the distribution sources closer to the project site.

3.9 Quantity of Wastes Generation and their Management/ Disposal

3.9.1 Water requirement and Wastewater Generation and their Management/ Disposal

The permitted and proposed water requirement and wastewater generation and its proposed treatment is presented in **Tables 4 & 5** respectively**.** The sources of wastewater generation are from the process, floor & reactor washes, utilities, Q.C, R&D, scrubber and plant domestic waste. Total proposed wastewater will be 938 KLD, which will be segregated into HTDS/HCOD & LTDS/LCOD and collected by gravity into a collection tank separately. This individual effluent will be pumped to the above ground level R.C.C lined tanks for storage and neutralization then sent to ETP-ZLD. The effluents segregated quantity, characteristics and treatment flow is briefly presented in **Table 6.**

Table 4: Existing Water Requirement, Wastewater Generation and its Treatment

Description	Water Requirement (KLD)	Wastewater Generation (KLD)	Treatment Method
High TDS Effluents			
Process & Washings	29.74	32.67	• Stripper condensate for recovery of organic compounds followed by disposal to cement plant. • Stripped bottom effluents to forced evaporation in MEE & VTFD. • Condensate from MEE & VTFD to ETP. • Salts from VTFD to TSDF. • RO permeate for boiler makeup. RO reject to MEE, VTFD.
LTDS Effluents			
Washings	3.0	3.0	• ETP • RO permeate for boiler makeup. • RO rejects to MEE, VTFD.
Boiler Blow Down & Cooling bleed off (LTDS)	70.0	5.0	
Scrubbing, QC and R&D	1.0	1.0	
DM Plant	0.5	0.5	
Domestic	9.0	8.0	Septic tank followed by soak pit.
Total	**113.24**	**50.17**	

Table 5: Proposed Water Balance, Segregation and Treatment Method

Description	Input (KLD)		Output (KLD)		Segregation type of Wastewater
	Fresh Water	Recycled Water	Evaporation / Handling Loss	Total Wastewater	
Process (18 products at a time)	579	--	(-69)	648 (709.9 Tons)	HTDS/HCOD
Washings (reactor, containers, floor, etc.,)	20	-	--	20	LTDS/LCOD
Boiler (30 TPH for 3MW CPP & 10 TPH)	43 (35 % Makeup)	289	160 (17% loss)	32 (3% Blow down)	Utilities (LTDS/LCOD)
				140 (15 % MEE-Steam condensate)	
Cooling Tower 9000 TR	--	540	495	45 (Bleed)	
DM Regeneration	16	--	-	16	HTDS / LCOD

Scrubber	20	-	-	20	HTDS / LCOD
Q.C and R&D	5	--	-	5	LTDS/LCOD
Domestic (300 nos @50 lpcd)	15	--	3	12	LTDS/LCOD
Greenbelt (12 acres)	60	--	60	-	--
Total	**758**	**829**	**649**	**938**	Reuse: Stripper condensate 4 KLD; Moisture in salt and ETP sludge is 12 KLD, Water loss in ETP 93 KLD (Total water loss is 109 KLD = 12 %)
	1587		**1587**		

Note: 648 KLD is 709.9 Tons consists of 648.3 KLD water and 61.6 Tons of salts (Max. on various combinations) as per material balance.

Table 6: Effluent Treatment Flow for as per Segregation

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 (septic tank overflow) → Pressure Sand Filter → Activated Carbon Filter → R.O → R.O rejects to MEE. R.O Permeate & Condensate to cooling tower 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	Septic tank → Overflow to ETP (Biological Treatment)

Existing treatment system will be enhanced to meet the proposed effluent quantities and proposed ETP facility is enclosed as **Annexure-XV.** All the treatment tanks etc., will be constructed / installed above the ground with water proof lining. This individual effluent will be continue to be pumped to the above ground level R.C.C lined tanks for storage and neutralization then sent to proposed ETP-ZLD of 1200 KLD capacity within the premises.

ETP – ZLD facility with primary (equalization and neutralization), secondary (stripper with MEE, ATFD & biological) and tertiary treatment (PSF, ACF & R.O) will be provided. Domestic wastewater will be sent to septic tank and the overflow to ETP (biological treatment). Concentrate from MEE system will be sent to ATFD / VTFD and the salts from the evaporation system will be collected and sent to TSDF for safe disposal.

3.9.2 Hazardous / Solid Waste Generation, Handling and their Disposal

Hazardous/ Solid waste 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. The existing and proposed solid waste and other waste generated, handling and disposal method from the various stages of APIs & API intermediates manufacturing plant is presented in the **Table 7 & 8** respectively**.** Spillages such as wastewater / solid wastes / raw material are possible and the risk of this would be limited to within the premises of the manufacturing facility. A precautionary measure like spillage control management is practiced in the industry.

Table 7: Solid Waste Generation from the Existing Products

Sl. No.	Source	Permitted Quantity (kg/day)	Disposal Option
Hazardous Wastes with disposal option			
1.	Organic residue	1247	TSDF, Parwada, Visakhapatnam District for incineration/ Authorised cement plants for co-processing.
2.	Spent Carbon	209	
3.	Inorganic & Evaporation salt	3223	TSDF, Parwada, Visakhapatnam District for secured land filling.
4.	ETP Sludge	600	
Hazardous Wastes with Recycling Option			
1.	Used oil/ Waste lubricant oil	300 Kg/annum	Authorized Reprocessors/ Recyclers
2.	Detoxified containers & Container liners a) HDPE Drums b) Plastic Bags c) Carboys	 300 Nos./annum 50 Nos./annum 20 Nos./annum	After complete detoxification, it shall be disposed of to outside agencies.

Table 8: Solid Waste Generation from the Proposed Products

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 Brick Manufacturers
Other Hazardous Waste generation from the Plant				
8.	a) Detoxified Container / Liners drums b) HDPE Carboys c) Fiber Drums d) PP Bags	1000 Nos./ month 200 Kg/month	Designated covered area	Disposed to SPCB Authorized agencies after complete detoxification
9.	Spent solvents (with moisture) (solvents 178+water 7)	185 KLD	Stored in Drums / Tanks	Sent to Inhouse 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.

** Solid waste quantities maximum on 18 products at a point of time*

3.10 Schematic Flow Sheet for EIA Procedure

The schematic flow sheet for EIA procedure is depicted as **Annexure -.XVI.**

4.0 Site Analysis

4.1 Connectivity

The proposed expansion project site is connected to Vissannapet-Nuzividu at 7.5 km (W) and Chintalpudi-Eluru road (E) at 10 km which further connects to NH-5; Akkireddigudem village at 0.35 km (E); Ramankkapeta village at 1.8 km (W); Nuzividu at 11 km (S); Musunuru at 7 km (SSE); Machilipatnam (District Headquarters) at 80km (SSE); Vijayawada at 44 km (SSW); Nuzividu railway station at 27 km (SE) and Gannavaram Airport at 41 km (S).

4.2 Land Form, Land use and Land Ownership

Total land is 10.23 Ha. is in possession of Project Proponent.

4.3 Topography

The Topography map with a 10 km radius is enclosed as **Annexure-XVII.**

4.4 Existing Land Use Pattern

The existing and proposed land use pattern of project area (core area) 10.23 Ha. Industrial land and shortest distance of environmental components in buffer area from the project periphery is given in **Table 9**.

Table 9: Environmental Components Shortest distance from Project Periphery

S.No.	Particulars	Details (Distance & Direction w.r.t. site)
1.	Water bodies	• Vempadu Major Canal – 0.23 km (W) • Tammilery river – 8.4 km (E) • Pond near Akkireddigudem – 0.4 km (E) • Pond near Ramanakkapeta – 1.15 km (W) • Ramlinga Cheruvu – 4 km (SE) • Pappana Cheruvu – 5 km (SW) • Nalla Cheruvu – 6 km (SE) • Pedda Cheruvu – 3.3 km (E)
2.	Reserve Forests	No high quality or scarce resources are present in the buffer zone. Following Reserved forest blocks are present such as • Ramanakkapeta R.F. (Dense Scrub) at 1 km (W) and Ramanakkapeta R.F. (Fairly Dense Scrub) at 2.5 km (NW) • Somavaram R.F. (Dense Scrub) at 2.6 km (NE), • Lopudi R.F. at 3.4 km (E) • Tummagudem R.F. at 3.5 km (NNW) and Tummagudem R.F. (Open Scrub) at 7.2 km (NNW) • Arugolanupeta R.F. at 8 km (NW) • Annavaram R.F. at 8.5 km (SW)
3.	National Parks / Wild Life Sanctuaries/ Eco sensitive areas	Nil
4.	Agricultural land	Adjacent
5.	Non-Agricultural land	Adjacent
6.	Habitation	Akkireddigudem Village

4.5 Existing Infrastructure

Internal CC roads, 1 approach road connecting to Vissannapet – Nuzividu connecting road and another approach road connecting to Chintalpudi-Eluru road which further connects to NH-5, Transportation facilities, water supply, Inhouse ETP facility, Power supply, Occupation Health Centre, Conference halls, Telecommunication facility etc., are available.

4.6 Soil Classification

The soil in the project site is Red and in the study area is mostly red in colour, containing 25.22% sand, 36.86% silt and 37.92% clay, . The soil analysis report of the project site is enclosed as **Annexure-XVIII.**

4.7 Climate Data from Secondary Sources

The tropical climate conditions with extreme hot summer and cold winter prevail in this district. April to June are the hottest months with high temperature in May. The monsoon usually breaks in the middle of June and brings good rains upto middle of October. The normal rainfall of this district is 1034 mm. the average rainfall recorded during the year 2008-09 is 11188 mm in 2009-10 it is 839 mm (Source: District Hand Book 2010)

The climate of the district is moderate and characterized by tropical rainy climate with aggressive summer. The period from December to middle of February is generally the season of fine weather. The summer season is from March to May. This is followed by monsoon period from June to September, the post monsoon from October to December and the winter season from January to February.

The average annual rainfall of the district is 1011.2 mm, which ranges from nil rainfall in January and March to 216.8 mm in July. The mean seasonal rainfall distribution is 700 mm in southwest monsoon (June-September), 241 mm in northeast monsoon (Oct-Dec), 6.3 mm rainfall in Winter (Jan-Feb) and 64 mm in summer (March – May). The percentage distribution of rainfall, season-wise, is 69.25% in southwest monsoon, 23.82 % in northeast monsoon, 0.62 percentage in winter and 6.31 % in summer (Fig. 2). In general, the amount of rainfall increases from west to east. The mean daily maximum temperature in the district is about 38°C in May and the mean daily minimum temperature is about 20°C in December / January. Temperature in the district begins to rise from the middle of February till May. With the onset of southwest monsoon in June, the temperature decreases to about 20°C and is more or less uniform during the monsoon period. The relative humidity in the district is of the order of 80% in the mornings throughout the year, whereas in the evenings the relative humidity varies from about 70 to more than 80%. The annual rainfall during 2012 is 1510mm. (Source: Central Ground Water Board, Ministry of Water Resources, GoI, Ground Water Brochure, Krishna District, A.P.- September 2013).

4.8 Social Infrastructure

National Highway no. 5 (Chennai – Kolkata) is at 27 km (SE), road network, transportation facilities, power supply, fire station and other basic amenities such as telecommunication facility, education centre, hospitals, community halls are available at Nuzividu at 11 km (S) and Musunuru at 7 km (SSE).

5.0 Planning

5.1 Planning Concept

Type of Industry: The proposed expansion project is of APIs & API Intermediates manufacturing industry with R&D facility.

Facilities: Industry proposed for expansion at existing and additional land and facilities required for the project will be provided as per requirement.

Transportation: Transportation of raw material and final products is done via roads as the proposed project is well connected with roads, rail and airways.

Town and Country Planning Classification: This is existing industry land and additional land is private land, converted to industrial use and is in possession of project proponent.

5.2 Population Projection

There is a scope for increase in the population from the proposed expansion project. Skilled workers prefer to stay in the nearby locations to avoid travelling from long distances. Local Non-technical villagers will be preferred for the unskilled jobs such as gardening, movement of materials, etc. Local / Non local educated youth will be employed as semi-skilled workers and training will be provided. Hence, there is a possibility of increase in population of the skilled and semi-skilled. However, on the whole there is a possibility of little increase in population of the area.

5.3 Land use Planning

The expansion unit has been proposed in the existing and additional land. Land use pattern of the Project area is given in **Table 10**.

Table 10 : Break up of proposed land use pattern

S. No.	Purpose	Existing Area	Additional Area	Total After Expansion	%
		Sq.m	Sq.m	Sq.m	
1.	Built up area	17000	24199	41199	40.29
2.	Roads		5170.26	5170.26	5.06
3.	ETP	2232	1571.25	3803.25	3.72
4.	Open area	14286	4830.26	4830.26	4.72
5.	Green belt	31300	15948.64	47248.64	46.21
	Total	**64818**	**37433.41**	**102251.41**	**100**

5.4 Assessment of Infrastructure Demand

On assessment of infrastructure demand near the project area Hospital with Ambulance facility and Fire station is requirement for the nearby villages of project area.

5.5 Amenities/Facilities

Industry will continue to provide and upgrade the following amenities / facilities in the proposed expansion project.

- Canteen
- Potable drinking water
- Training block
- Laying of Black top / Concrete internal roads
- Fire hydrant facility
- Eye/body wash showers
- First Aid kits at all prominent places.
- Head nurse for emergency medication.
- Rest Room for employees
- Seating facilities for those employees who do their work standing and ergonomically designed sitting facilities for those who do their work sitting
- Pre-employment and routine medical examinations and the necessary follow up actions
- Communication systems like Phone, Internet with safety measures, etc.
- Security system at the entrance etc.

6.0 Proposed Infrastructure

6.1 Industrial Area

Additional production blocks, administration facilities, utility area, ETP area are been proposed in the expansion area.

6.2 Residential Area :

There will be no residential area within the project site.

6.3 Greenbelt

The expansion unit has been proposed in existing with extension area about 10.23 Ha i.e., 102251.41 sq.m. Out of which about 4.72 Ha i.e. 47248.64 sq.m for Greenbelt area which is equivalent to 46.21 % of the total area.

6.4 Social Infrastructure

As a Corporate / Entrepreneur Social Responsibility (ESR), Industry will contribute for development of village social infrastructure.

6.5 Connectivity

There is no change in connectivity compare to existing facility.

6.6 Drinking Water Management

Potable drinking water will continue to be provided to all employees. The source of drinking water is Groundwater.

6.7 Sewerage System

Sewage will be generated from the Canteen and Toilets, which will be collected into sewage collection tank through pipelines and septic tank respectively. Overflow of these tanks will be sent to ETP – ZLD system which needs to be upgraded to meet the expansion project demand.

6.8 Industrial Waste Management

Existing storage system needs to enhance to meet the expansion project demand. The management of these wastes is to be handled very sensitively and by adopting proper segregation techniques.

Liquid Waste Management: The liquid wastes from the various industrial activities will continue to be segregated and send to ETP-ZLD.

Process Emissions Management:

Manufacturing of APIs and API intermediates will result in gaseous emissions. Maximum Process emissions from existing and proposed products are given in **Table 11 & 12** respectively**.** Proposed gaseous emissions will be scrubbed in two stage scrubbers with water or other liquid based on the characteristics of gases.

Table 11: Maximum Quantity of Process Emission for Existing Products

Sl. No.	Process Emission	Maximum Quantity on various combinations (kg/day)	Treatment Method
1.	HCl	88.03	Scrubber with water / caustic sol.
2.	CO_2	58.43	Dispersed into atmosphere
3.	H_2	1.17	Diffused with flame arrestor
4	SO_2	50	Scrubber using caustic sol.

Table 12: Maximum Quantity of Process Emission for Proposed Products

Sl. No.	Process Emission	Maximum Quantity on various combinations (kg/day)	Treatment Method
1.	HCl	871.93	Scrubber with water / caustic sol.
2.	Monomethylamine	230.97	Scrubbed by using water
3.	H_2	91.42	Diffused with flame arrestor
4.	CO_2	1407.71	Dispersed into atmosphere
5.	SO_2	500	Scrubber using caustic sol.

Fugitive emissions Management:

- Solvents used in the APIs & API intermediates manufacturing process will be stored in drums and bulk quantities will be stored in underground/ above ground storage tanks.
- Solvents are handled in closed conditions thereby reducing the losses in the form of evaporation.
- Proper earthing will be provided to all the electrical equipment and the joints / connections wherever solvent handling is done.
- Reactor and solvent handling pump will have mechanical seals to prevent leakage.
- The industry will take measures for reduction of fugitive emissions and for further reduction industry will provide vent condensers to the tanks.
- Chilled brine circulation will be carried out to condensate the solvent vapour and to the receivers of the solvent vapors which ensures the maximum recovery.
- Solvent vapours from the Centrifuge and Catch pots will be connect to vent condensers.
- The height of the solvent receiver tank vent is above production block roof level and the diameter is 20 mm.
- Flame proof fitting / equipments / pumps / lighting will continue to be used wherever solvents are used. The solvent storage tanks will be provided with breather valve to prevent losses.

Solvent Input	Solvent Loss in Effluent	Solvent Loss in Org. residue	Solvent Loss (Handling)	Solvent Recovery	Solvent Recovery
(KLD)	(KLD)	(KLD)	(KLD)	(KLD)	(%)
194.4	1.9	1.6	9.1	177.5	91.3

Emissions from Utilities Management:

Boilers and DG sets are the two main sources contributing to emissions from the plant. The proposed coal/ husk/ pellets fired boilers will be 30 TPH for 3MW Captive Power Plant, 10 TPH used for steam requirements. Proposed 8 TPH boiler along with 1 lakh Kcal./hr TFH will be standby and the existing 5 TPH coal fired boiler will be dismantled. Proposed 2 x 1000 KVA and 3 x 500 DG Sets, existing 320 KVA and 380 KVA DG Sets will be used as standby power during power failures. The emissions from the boiler are given in **Table 13**.

Table 13: Stack Emission Details

Source	Stack Height (m)	Diameter (m)	Temperature (^{o}C)	Flue Gas Flow rate (m^3/hr)	Exit Gas Velocity (m/sec)	PM	SO_2	NOx
						kg/hr		
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	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
Existing								
1 lakh Kcal/hr TFH	30	0.1	150	434	15.35	0.002	0.004	0.05
320 KVA DG Sets	8	0.25	150	1807	10.23	0.02	0.4	0.43
380 KVA DG Sets	8	0.25	150	2145	12.14	0.024	0.48	0.51

The various measures proposed to minimize the pollution from the boiler are as follows:

- Electrostatic Precipitator/ Multi-cyclone separator followed by Bag filter will be installed to control the particulate (PM) emissions within statutory limit of 115 mg/Nm^3. To facilitate wider dispersion of pollutants, 55/ 40/ 30m height stack each will be installed.
- The NOx emissions from the boilers will be controlled by controlling combustion measures, which will be approached by way of low NOx burners or by air stagging in boiler. The NOx emissions will be restricted to below 500 mg/Nm^3.
- Stacks will be provided to proposed D.G sets as per CPCB / SPCB Guidelines.

- Fugitive dust will be controlled by adopting dust extraction and dust suppression measures and development of greenbelt along the periphery of the proposed Boiler area.

Noise Management:

- Compressors, Boilers and DG sets will be the major noise generating units in the plant.
- The noise levels of the DG sets will be well within the limits as these will be installed with acoustic enclosures. Workers will always be provided with ear muffs.
- All the equipment in the plant would be designed to have a total noise level not exceeding 85-90 dB(A) as per the requirement of OSHA (Occupational Safety and Health Administration) standards.

6.9 Hazardous / Solid Waste Management

- Solid waste mainly segregated into process organic residues, inorganic salts, boiler ash spent mixed unrecoverable solvents and spent carbon.
- The organic residues, Spent carbon & Spent mixed unrecoverable solvents can be disposed off to Cement plants as recommended by CPCB for use as alternate fuels either in the solid or liquid form.
- Boiler ash will be sold to brick manufacturers.
- Inorganic salts are to be sent for landfill at HWMP – TSDF.

Solid waste will be segregated, stored and disposed as mentioned in the Table 8

6.10 Power Requirement & Supply / Source

Power supply of 950 KVA will be drawn from the nearby sub-station of APPDC. Proposed 2 x 1000 KVA & 3 x 500 KVA D.G. sets in addition to the existing 320 KVA and 380 KVA DG sets. D.G. set will be used as alternate arrangement in case of failure in power supply.

7.0 Rehabilitation and Resettlement (R&R) Plan

The proposed additional land is in possession of project proponent. Therefore Rehabilitation and Resettlement plan is not applicable to this expansion project site. The nearest habitation is away from 0.35 km away from the project site.

8.0 Project Schedule & Cost Estimates

8.1 Time Schedule for the project construction

The timelines for commencement of proposed construction activity will be from June 2016 as it is expected that the expansion project will be in a position to obtain Environmental Clearance & Consent for Establishment for the project. In 2016-17 the commercial production is expected to be commenced.

8.2 Estimated project cost

Overall estimated cost involved in the total project (existing and proposed) like land, building, plant & machinery is Rs. 80.25 Crores. Total capital cost allocated towards environmental pollution control measures is Rs. 31 Crores and the Recurring cost will be about Rs. 38 crores per annum.

9.0 Analysis of proposal (Final Recommendations)

- The proposed expansion project will result in growth of surrounding area by generating direct and indirect employment to local people. Around 300 members will be benefitted due to the expansion project (incl. existing 150 nos.).
- Under the Corporate Social Responsibility the Industry will continue to develop a policy of developing the villages in the vicinity by identifying the requirements.
- No adverse effect on environment is envisaged as proper mitigation measures will be taken up.
- Industry will strengthen the existing Safety, Health & Environment Department and also continue to engage recognized laboratories to carry out all necessary monitoring parameters for its activities.
- The segregated (HTDS / LTDS) wastewater will regularly analyzed before and after treatment in ETP-ZLD.
- Qualified staff will be appointed for the purpose of Operation and Maintenance of the pollution control facilities.
- Stand-by facilities will be provided to all the pumps so as to ensure fail proof treatment, handling and disposal.

9.1 Budgetary allocation for Pollution Control Measures

The management will set aside adequate funds in its budget to fully meet the stated objectives of the environmental policy. The existing and proposed capital equipment for environmental management include up-gradation of effluent treatment plants, pipelines and channels for wastewater discharge, greenbelt development and the environment laboratory. The break-up of budgetary allocation for various control measures is presented in **Table 14**.

Table 14: Budgetary allocation for Pollution Control Measures

S. No.	Description	Existing cost (in lakhs)	Proposed cost (in lakhs)	
		Capital	Capital	*Recurring
	Air Pollution Control			
1.	Multicyclone& Bag filter with Stacks	30	250	15
2.	Scrubbers	25	120	
3.	Vent condensers	25	250	
	Water Pollution Control			
3.	ETP Civil works, Steam stripper, MEE, ATFD, R.O. and mechanical equipment	250	2000	3200
	Noise Pollution Control			
4.	Silencers / acoustic enclosures	2	10	2
	Solid Waste Management			
5.	Covered Platform with leachate collection system	5	20	500
6.	Greenbelt Development	10	30	10
7.	Occupation Health and Safety	10	100	30
8.	Fire Management	30	140	10
9.	Dyke walls and Storm water drains	10	40	5
10.	Environmental Laboratory	9	30	10
11.	Misc.	24	110	30
Total		**430**	**3100**	**3812**

*Recurring cost includes manpower, consumables, maintenance, energy charges per annum

ANNEXURES

भारत सरकार–कॉर्पोरेट कार्य मंत्रालय
कम्पनी रजिस्ट्रार कार्यालय, ऑंध्र प्रदेश

नाम परिवर्तन के पश्चात नया निगमन प्रमाण–पत्र

कॉर्पोरेट पहचान संख्या : U24230AP1996PTC025914

मैसर्स PORUS DRUGS AND INTERMEDIATES PRIVATE LIMITED

के मामले मे, मैं एतद्वारा सत्यापित करता हूँ कि मैसर्स
PORUS DRUGS AND INTERMEDIATES PRIVATE LIMITED

जो मूल रुप में दिनांक नौ दिसम्बर उन्नीस सौ छियानवे को कम्पनी अधिनियम, 1956 (1956 का 1) के अंतर्गत मैसर्स
PORUS DRUGS AND INTERMEDIATES PRIVATE LIMITED

के रुप में निगमित की गई थी, ने कम्पनी अधिनियम, 1956 की धारा 21 की शर्तों के अनुसार विधिवत आवश्यक विनिश्चय पारित करके तथा लिखित रुप में यह सूचित करके की उसे भारत का अनुमोदन, कम्पनी अधिनियम, 1956 की धारा 21 के साथ पठित, भारत सरकार, कम्पनी कार्य विभाग, नई दिल्ली की अधिसूचना सं.सा.का.नि 507 (अ) दिनांक 24.6.1985 एस.आर.एन A41278110 दिनांक 05/08/2008 के द्वारा प्राप्त हो गया है, उक्त कम्पनी का नाम आज परिवर्तित रुप में मैसर्स
PORUS LABORATORIES PRIVATE LIMITED

हो गया है और यह प्रमाण–पत्र, कथित अधिनियम की धारा 23(1) के अनुसरण में जारी किया जाता है।

यह प्रमाण–पत्र, मेरे हस्ताक्षर द्वारा हैदराबाद में आज दिनांक पांच अगस्त दो हजार आठ को जारी किया जाता है।

GOVERNMENT OF INDIA - MINISTRY OF CORPORATE AFFAIRS
Registrar of Companies, Andhra Pradesh

Fresh Certificate of Incorporation Consequent upon Change of Name

Corporate Identity Number : U24230AP1996PTC025914

In the matter of M/s PORUS DRUGS AND INTERMEDIATES PRIVATE LIMITED

I hereby certify that PORUS DRUGS AND INTERMEDIATES PRIVATE LIMITED which was originally incorporated on Nineth day of December Nineteen Hundred Ninety Six under the Companies Act, 1956 (No. 1 of 1956) as PORUS DRUGS AND INTERMEDIATES PRIVATE LIMITED having duly passed the necessary resolution in terms of Section 21 of the Companies Act, 1956 and the approval of the Central Government signified in writing having been accorded thereto under Section 21 of the Companies Act, 1956, read with Government of India, Department of Company Affairs, New Delhi, Notification No. G.S.R 507 (E) dated 24/06/1985 vide SRN A41278110 dated 05/08/2008 the name of the said company is this day changed to PORUS LABORATORIES PRIVATE LIMITED and this Certificate is issued pursuant to Section 23(1) of the said Act.

Given under my hand at Hyderabad this Fifth day of August Two Thousand Eight.

(LAKSHMI PRASAD K)

सहायक कम्पनी रजिस्ट्रार / Assistant Registrar of Companies

ऑंध्र प्रदेश

Andhra Pradesh

कम्पनी रजिस्ट्रार के कार्यालय अभिलेख में उपलब्ध पत्राचार का पता :
Mailing Address as per record available in Registrar of Companies office:

PORUS LABORATORIES PRIVATE LIMITED
PLOT NO. 21, BALAJISWANURI COLONY, ERRAGADDA,
HYDERABAD - 500018,
Andhra Pradesh, INDIA

By speed post

Baart sarkar
Payaa-varNa evaM vana maM~alaya
Government of India
Ministry of Environment & Forests
(IA Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi – 110 003
E-mail: hsmalviya@gmail.com
Telephone: 011: 24367076

F. No. J-11011/1101/2007-IA-II (I) Dated: February 2, 2009

To

M/s Porus Drugs & Intermediates Pvt. Ltd. Unit-IV
Survey No. 106,107/1&2, Akkireddigudem Village,
Musunuru Mandal, Krishna Distt.
Andhra Pradesh

info@porusdrugs.com

Sub: Expansion Bulk Drugs manufacturing Unit at Survey No. 106,107/1&2, Akkireddigudem Village, Musunuru Mandal, Krishna Distt. Andhra Pradesh by M/s Porus Drugs & Intermediates Pvt. Ltd. Unit-IV - environmental clearance reg.

Sir,

This has reference to your letter PDIPL/MOEF/EC-08 dated 29th November, 2008 along with EIA/EMP report and public hearing proceedings seeking environmental clearance for the above project under the Environment Impact Assessment Notification, 2006.

2.0 The Ministry of Environment and Forests has examined the proposal and noted that the proposal is for environmental clearance for expansion of Bulk Drugs manufacturing Unit at Survey No. 106,107/1&2, Akkireddigudem Village, Musunuru Mandal, Krishna Distt. Andhra Pradesh by M/s Porus Drugs & Intermediates Pvt. Ltd. Unit-IV). The total land acquired by the PAs after the expansion will be 6.4818 ha The total cost of the project for the expansion will be Rs. 8.14 Crores. The details of the existing and proposed products are as given below:

Sl. No	Name of product	Production Capacity (TPA*)	Remark
1	Ibuprofen	1200	-
2	Ciprofloxacin Hydrochloride	600	-
3	Celecoxib	60	-
4	Sumatriptan Succinate,	6	-
5	Metformin Hydrochloride	600	-
6	Venlafaxine Hydrochloride	12	-
7	Sertaline Hydrochloride	24	-
8	Clopidogrel Hydrogen Bisulplhate	60	-
9	Enrofloxacin,	360	-
10	Pioglitazone	12	-
11	Gabapentin	24	-
12	Paracetamol.	1200	Existing

*The infrastructure will be designed to manufacture all the above products on campaign basis i.e. any three drug products at a time.

Byproducts

Sl. No.	Name of byproduct	Production Capacity (TPA)	Byproduct from the manufacturing of bulk drug
1	Hydrochloric acid (25%)	3960	Ibuprofen
2	Aluminium hydroxide gel	5255.5	Ibuprofen
3	Cromic Sulphate solution	2501.7	Ibuprofen
4	Piperazine HCl MI's	3512.4	Ciprofloxin Hydrochloride
5	N-Ethyl Piperazine HCl MI's	2183.8	Enrofloxacin

3.0 The emissions from boiler will be controlled by installing cyclone separator and wet scrubber. Process gaseous emissions will be in the form of Ammonia, hydrogen chloride and sulpher dioxide will be controlled by installing scrubbers. The water requirement for the plant will be 145.75 KLD and sourced from bore well. The total waste water generated from the plant will be 50.74 KLD. The industrial waste water (33.24 KLD) from process will be forced evaporated and condensate will be reused in cooling towers. The other waste from washing boiler and cooing blow down, DM regeneration and scrubber will be treated in full-fledged effluent treatment plant. The treated wastewater will be subjected to RO and permeates will be recycled and reject will be evaporated. The wastewater will be steam stripped before sending it to ETP. The domestic waste water (8 KLD) generated will be treated in the ETP and will be used for greenbelt development. The company will maintain the zero discharge condition.

4.0 The project activity is listed at S.N. 5(f) under Category 'A' hence the proposal was considered and appraised at central level in 89th meeting of the Expert Appraisal Committee (Industry) held during 22nd – 23rd December, 2008. The Public hearing meeting was held on 1st October 2008.

5.0 Based on the information submitted by the Project Authorities, the Ministry of Environment and Forests hereby accords the environmental clearance to the above project under the provisions of EIA Notification dated 14th September, 2006 subject to compliance of the following specific and general conditions:

A SPECIFIC CONDITIONS:

i) The project authorities shall install full fledge effluent treatment plant to treat the wastewater up the industry specific standards as notified in EPA or laid down by the Andhra Pradesh Pollution Control Board (APPCB)whichever is stringent.

ii) The water requirement and waste water generation shall not exceed 145.75 KLD and 50.74 KLD respectively.

iii) The company shall install two stage scrubbers for control of NH_3, SO_2 and HCl. The scrubbed solutions shall be sold to actual users. The company shall keep the record of disposal of all such by-products and shall submit to the Ministry's Regional Office at Bangalore.

iv) The company shall provide the monitoring arrangement with stacks/vents and regular monitoring shall be carried out and reports submitted to the SPCB, CPCB and Ministry's Regional Office at Bangalore.

v) The project authorities shall provide the chilled brine solution in secondary condenser for condensation of the VOCs. The project authority shall ensure that the solvent recovery shall not be less than 98%.

vi) Fugitive emissions in the work zone environment, product, raw materials storage area etc. shall be regularly monitored. The emissions shall conform to the limits imposed by APPCB.

vii) Solvent management shall be as follows :

A. Reactor shall be connected to chilled brine condenser system.
B. Reactor and solvent handling pump shall have mechanical seals to prevent leakages.
C. The condensers shall be provided with sufficient HTA and residence time so as to achieve more than 98% recovery
D. Solvents shall be stored in a separate space specified with all safety measures.
E. Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done.
F. Entire plant shall be flame proof. The solvent storage tanks shall be provided with breather valve to prevent losses.

viii) Fugitive emissions in the work zone environment, product, raw materials storage area etc. shall be regularly monitored. The emissions shall conform to the limits imposed by APPCB.

ix) For control of fugitive emission and VOCs following steps shall be followed :

A. Closed handling system shall be provided for chemicals.
B. Reflux condenser shall be provided over reactors.
C. Solvent handling pump shall be provided with mechanical seals to prevent leakages.
D. System of leak detection and repair of pump/pipeline based on preventive maintenance.
E. Solvent shall be taken from underground storage tanks to reactors through closed pipeline. Storage tanks shall be vented through trap receiver and condenser operated on chilled water.

x) The process emissions and particulate matter from various units shall conform to the standards prescribed by the concerned authorities from time to time. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency has been achieved.

xi) The project authorities shall sale spent oil shall be sold to approved recycler. The empty containers and bags shall be sold to APPCB registered dealers. ETP waste and spent residue shall be sent to Common TSDF.

xii) During transfer of materials, spillages shall be avoided and garland drains be constructed to avoid mixing of accidental spillages with domestic waste and storm drains.

xiii) The project authorities shall develop greenbelt in 31300 m^2 of project area as per the guidelines of CPCB to mitigate the effect of fugitive emission.

xiv) Adequate financial provision shall be made in the budget of the project for implementation of the above suggested environmental safeguards. Fund so earmarked shall not be diverted for any other purposes.

xv) Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.

xvi) The company shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling.

xvii) The company shall obtain permission for drawl of ground water from the central Ground Water Authority/State Ground Water Board.

xviii) The company shall comply with all the commitments made during public hearing meeting held on 1st October 2008.

xix) Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

GENERAL CONDITIONS

i. The project authorities shall strictly adhere to the stipulations of the SPCB/state government or any statutory body.

ii. No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.

iii. The project authorities shall strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 as amended. Authorization from the SPCB shall be obtained for collection, treatment, storage, and disposal of hazardous wastes.

iv. Ambient air quality monitoring stations shall be set up in the downwind direction as well as where maximum ground level concentration are anticipated in consultation with the State Pollution Control Board.

v. For control of process emissions, stacks of appropriate height as per the Central Pollution Control Board guidelines shall be provided. The scrubbed water shall be sent to ETP for further treatment.

vi. The company shall undertake following Waste Minimization measures :-
- Metering of quantities of active ingredients to minimize waste.

- Reuse of by-products from the process as raw materials or as raw material substitutes in other processes.
- Maximizing recoveries
- Use of automated material transfer system to minimize spillage.
- Use of "Closed Feed" system into batch reactors.

vii) The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the SPCB shall be obtained for collections/treatment/ storage/disposal of hazardous wastes.

viii. The overall noise levels in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).

ix. A separate Environmental Management Cell equipped with full fledged laboratory facilities shall be set up to carry out the environmental management and monitoring functions.

x. The project authorities shall provide rainwater harvesting system and ground water recharge.

xi. The implementation of the project vis-à-vis environmental action plans shall be monitored by Ministry's Regional Office /SPCB / CPCB. A six monthly compliance status report shall be submitted to monitoring agencies.

xii. The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry at http://envfor.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the Ministry's Regional Office.

xiii. The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.

6.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

7.0 The Ministry reserves the right to stipulate additional conditions, if found necessary. The company in a time bound manner shall implement these conditions.

8.0 Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Authority Act, 1997.

9.0 The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Wastes (Management and Handling) Rules, 2003 and the Public Liability Insurance Act, 1991 alongwith their amendments and rules.

(H.S. Malviya)
Joint Director

Copy to : -

1. The Secretary, Department of Environment and Forests, Govt. of A.P., Secretariat Hyderabad, A.P.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, New Delhi – 110032.
3. The Chairman, Andra Pradesh Pollution Control Board, Paryavaran Bhavan, A-3 Industrial Estate, Sanathnagar, Hyderabad- 500018, A.P.
4. The Chief Conservator of Forests (Central), Ministry of Environment & Forests, Regional Office (SZ), Kendriya Sadan, IVth Floor, E&F wings 17th Main Road,Koramangala II Block, Bangalore-560034, Karnataka.
5. Monitoring Cell, Ministry of Environment and Forests, Paryavaran Bhavan, CGO Complex, New Delhi-110003.
6. Guard file.
7. Record file
8. Monitoring file.

(H.S. Malviya)
Joint Director

ANDHRA PRADESH POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN, A - 3, INDUSTRIAL ESTATE,
SANATHNAGAR, HYDERABAD - 500 018

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CONSENT ORDER FOR ESTABLISHMENT

Order No. APPCB/VJA/VJA/508/CFE/HO/2009 578 **Dt.31.05.2010**

Sub: PCB – CFE - **M/s. Porus Laboratories Pvt. Ltd., Unit-IV, Sy.no.106, 107/1&2, 108/1&2, Akkireddygudem (V), Musunuru (M), Krishna District** – Consent for Establishment (Expansion) of the Board under Sec.25 of Water (P & C of P) Act, 1974 and Under Sec.21 of Air (P&C of P) Act, 1981 - Issued - Reg.

Ref:
1) CFE order No. PCB/VJA/VJA/508/CFE/HO/2009-398, dt. 8.5.08
2) Public Hearing was held on 1.10.2008 at Akkireddygudem (V), Musunuru (M), Krishna District.
3) Environmental Clearance dt. 2.2.2009 issued by MOE&F, GOI.
4) Industry's application received through SWCC on 6.3.2009 and addl. information received 9.4.2009,14.5.2009, 28.5.2009 & 12.6.2009.
5) R.O's inspection report dt. 24.6.2009
6) CFE Committee meeting held on 20.10.2009.
7) T.O. Lr.dt.7.12.2009
8) Industry's lr.dt. 11.1.2010
9) CFO order No. PCB/VJA/VJA/508/CFO/HO/2010- dt. 12.1.2010
10) CFE Committee meeting held on 10.2.2010
11) Industry's Lr.dt. 10.3.2010
12) T.O. E-mail dt. 27.4.2010
13) Industry's lr.dt. 28.4.2010

1. In the reference 4th cited, an application was submitted to the Board seeking Consent for Establishment (CFE) for expansion to produce the following products with installed capacities as mentioned below, with an additional investment of Rs. 8.14 crores.

Products :

Sl. No.	Products	Consented capacity	Proposed capacity	Total capacity
1.	Ibuprofen	90 TPM	10 TPM	1200 TPA (100 TPM)
2.	Phenolphthalein – single stage (purification of phenolphthalein crude)	10 TPM	—	Dropped
3.	Ciprofloxacin Hydrochloride	—	600 TPA	600 TPA
4.	Sumatriptan Succinate	—	6 TPA	6 TPA
5.	Metformin Hydrochloride	—	600 TPA	600 TPA
6.	Venlafaxine Hydrochloride	—	12 TPA	12 TPA
7.	Sertaline Hydrochloride	—	24 TPA	24 TPA
8	Celecoxib	—	60 TPA	60 TPA
9	Clopidogrel Hydrogen Bisulphate	—	60 TPA	60 TPA
10	Enrofloxacin	—	360 TPA	360 TPA
11	Pioglitazone	—	12 TPA	12 TPA
12	Gabapentin	—	24 TPA	24 TPA
13	Paracetamol	—	1200 TPA	1200 TPA

The infrastructure will be designed to manufacture any three products at a time from all the above products on campaign basis.

By-Products:

Sl. No.	Name of By-product	Consent capacity	Proposed capacity (TPA)	Total capacity (TPA)	By-product source bulk drug
1	Hydrochloric Acid (25%)	----	3960.0	3960.0	Ibuprofen
2	Aluminum Hydroxide Gel	----	5255.5	5255.5	Ibuprofen
3	Chromic Sulphate Solution	----	2501.7	2501.7	Ibuprofen
4	Piperazine HCl Ml's	----	3512.4	3512.4	Ciprofloxacin Hydrochloride
5.	N-Ethyl Piperazine HCl Ml's	----	2183.8	2183.8	Enrofloxacin

2. As per the application, the above expansion activity is to be located within the existing plant premises located at Sy.no.106,107/1&2, 108/1&2, Akkireddygudem (V), Musunuru (M), Krishna District in an area of 6.484 ha.

3. The above site was inspected by the Environmental Engineer, Regional office, Vijayawada A.P Pollution Control Board on 9.6.2009 and found that the site is surrounded by

North : Agricultural lands
South : Agricultural lands
East : R&B road
West : Agricultural lands

4. The Board, after careful scrutiny of the application and verification report of Regional Officer, hereby issues **CONSENT FOR ESTABLISHMENT for Expansion** to your unit Under Section 25 of Water (Prevention & Control of Pollution) Act 1974 and Section 21 of Air (Prevention & Control of Pollution) Act, 1981 and the rules made there under. **This order is issued to manufacture the products as mentioned at para (1) only.**

5. This Consent Order now issued is subject to the conditions mentioned in Schedule 'A' and Schedule 'B'.

6. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.

Encl: Schedule 'A'
Schedule 'B'

Sd/-
MEMBER SECRETARY

To,
M/s. Porus Laboratories (P) Ltd.,
(formerly M/s. Porus Drugs & Intermediates Pvt. Ltd.)
Unit-IV, Akkireddygudem (V), Musunuru (M),
Krishna District

/// T.C.F.B.O///

JOINT CHIEF ENVIRONMENTAL ENGINEER(CFE)
24/6/10

SCHEDULE - A

1. Progress on implementation of the project shall be reported to the concerned Regional Office, A.P. Pollution Control Board once in six months.

2. Separate energy meters shall be provided for Effluent Treatment Plant (ETP) and Air pollution Control equipments to record energy consumed.

3. The proponent shall obtain Consents for Operation (CFO) from APPCB, as required Under Sec.25/26 of the Water (P&C of P) Act, 1974 and under sec. 21/22 of the Air (P&C of P) Act, 1981, before commencement of the activity.

4. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec.27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional conditions by the Board.

5. The consent of the Board shall be exhibited in the factory premises at a conspicuous place for the information of the inspecting officers of different departments.

6. Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.

7. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas. The industry shall maintain a good housekeeping. All pipe valves, sewers, drains shall be leak proof. Dyke walls shall constructed around storage of chemicals.

8. Rain Water Harvesting (RWH) structure (s) shall be established on the plant site. The proponent shall ensure that effluent shall not enter the Rain Water harvesting structure.

9. The rules and regulations notified by Ministry of Law and Justice, GOI, regarding the Public Liability Insurance Act, 1991 shall be followed.

10. This order is valid for period of 5 years from the date of issue.

SCHEDULE – B

Water:

1. The source of water is Bore well (3 nos) and the maximum permitted water consumption after expansion is 145.75 KLD.

	Purpose	Existing	After expansion
a)	Process & washings	37.54 KLD	65.25 KLD* (Process – 62.25, Wash – 3)
b)	Scrubber, Q.C. and R&D	-	1.0 KLD
c)	Boiler Feed & Cooling makeup	7 KLD	70.00 KLD
d)	DM Plant	—	0.50 KLD
e)	Domestic	10 KLD	9.00 KLD
	Total	**54.54 KLD**	**145.75 KLD**

* Quantities for worst combination of three products i.e. Paracetamol + Ibuprofen + Ciprofloxacin Hydrochloride.

2. The maximum Waste Water Generation (KLD) shall not exceed the following:

	Source	Existing As per CFO	Total after expansion
a)	Process High TDS effluents	27.85 KLD	33.24 KLD*
b)	Washings (floor & reactor)		3.0 KLD
c)	Scrubber, Q.C., R&D (HTDS)	-	1.0 KLD
d)	Low TDS effluents (cooling blow down, boiler blow down)	5.50 KLD	5.00 KLD
e)	DM regeneration	---	0.50 KLD
f)	Domestic	8.00 KLD	8.00 KLD
	Total	**41.35 KLD**	**50.74 KLD**

* Quantities for worst combination of three products i.e. Paracetamol + Ibuprofen + Celecoxib

Existing :

Effluent source	Treatment proposed	Mode of final disposal
HTDS (Process and Washings)	Collection tanks, Neutralization tank, sand filters, Neutralized effluent collection tanks (2x20 KL capacity above ground), Triple effect evaporator (50 KLD capacity) along with Single effect Forced circulation evaporator (Drier).	Condensate for reuse
Low TDS (process effluents, Boiler & cooling blow down.)	HDPE collection & Neutralization tank, 3x20 KL above ground HDPE storage tank, 3 nos. of forced evaporation reactors (2 x 8 KL & 5 KL) and 1.6 KL reactor for vacuum drying of the concentrate and a condensate collection tank.	Utilized on land for gardening / plantation
Domestic	Septic tank followed by soak pit.	

Proposed:

Effluent source	Treatment	Mode of final disposal
High TDS & High COD effluents Process (34.24 KLD) + RO rejects (8.0 KLD)	Equalization cum Neutralization, Steam Stripper column (2.5 KL/h) – MEE (3-effect, 50 KLD) – VTFD (1 TPH) Existing forced evaporators (2 x 8 KL, 5 KL) for standby use	Solvent collected from steam stripper (1 KLD) shall be sent to Authorised preprocessors . Condensate (26 KLD)shall be sent to ETP and salts to TSDF.
Low TDS & Low COD Utilities (8.5 KLD) + MEE condensate 26 KLD	Combined Wastewater Treatment Plant (CWTP)(40 KLD capacity) Consisting of: Collection cum equalization & neutralisation tank – Aeration tank – Clarifier – pressure Sand filter – Activated carbon filter	Treated effluent (15 KLD) shall be reused in cooling tower. Remaining shall be sent to RO system. RO permeate (11.5 KLD) shall be used as boiler feed and rejects (8 KLD) shall be routed to HTDS collection tank for evaporation.
Domestic (8.0 KLD)	Septic tank	Overflow to CWTP

3. The Effluent Treatment Plant (ETP) shall be operated regularly. All the units of the ETP shall be impervious to prevent ground water pollution. The ETP units shall be constructed above the ground level.

4. The proponent shall segregate the effluent into High TDS and Low TDS streams and shall be treated and reused as mentioned above.

5. Effluents shall not be discharge onland or into any water bodies under any circumstances and zero liquid discharge system shall be adopted. Provisions shall be made for storage of primary treated trade effluents (HTDS & LTDS) for one day in separate collection tanks constructed above ground level in case of any emergency and shall be treated within one day. The collection tank shall be impervious with proper lining to prevent ground water pollution.

6. The effluents shall be treated to the on land for irrigation standards, stipulated under Environment (Protection) Rules, 1986, notified and published by Ministry of Environment and Forests, Government of India as specified in Schedule VI vide G.S.R.422 (E), dt.19.05.1993 and its amendments thereof, and additional standards / conditions stipulated by APPCB.

7. During transfer of materials, spillages shall be avoided and garland drains shall be constructed to avoid mixing of accidental spillages with domestic waste and storm drains.

8. Separate meters with necessary pipe-line shall be provided for assessing the quantity of water used for each of the purposes mentioned below.

   a) Industrial cooling, boiler feed.

   b) Domestic purposes.

   c) Processing, whereby water gets polluted and pollutants are easily bio-degradable.

   d) Processing, whereby water gets polluted and the pollutants are not easily bio-degradable.

Air:

9. The Air pollution Control equipment shall be installed along with the commissioning of the activity and shall comply with the following for controlling air pollution.

Existing:

Sl. No	Details of stack	Stack 1	Stack 2	Stack 3
1.	Attached to :	Coal fired boiler	DG set	DG sets
2.	Capacity	5 TPH	225 KVA	2x75 KVA
3.	Fuel quantity	Coal – 8 TPD	Diesel	Diesel
4.	Stack height (above GL)	27 m	8 m	5 m
5.	Diameter	0.6 m	0.2 m	0.2 m
6.	Control Equipment	Cyclone Dust collectors	Acoustic enclosures	Acoustic enclosure

After Expansion:

Sl. No	Details of stack	Stack 1	Stack 2	Stack 3	Stack 4	Stack 5
1.	Attached to :	Coal fired boiler	DG set	DG sets	Thermic fluid heater	DG set
2.	Capacity	5 TPH	225 KVA	2x75 KVA	1 lac kilo cal	250 KVA
3.	Fuel quantity	Coal – 8 TPD	Diesel	Diesel	Diesel - 10 lits/hr	Diesel
4.	Stack height	27 m	8 m	5 m	20 m	8 m
5.	Diameter	0.6 m	0.2 m	0.2 m	0.5 m	0.2 m
6.	Control Equipment	Cyclone Dust collectors	Acoustic enclosures	Acoustic enclosure	Cyclone separator	Acoustic enclosures

10. The proponent shall provide dedicated scrubbers to the process units to control the process emissions.

11. The industry shall install two stage scrubbers for control of NH_3,SO_2, HCl. The scrubbed solutions shall be sold to actual users. The industry shall keep the record of disposal of all such by-products and shall submit to the concerned Regional Officer.

12. The industry shall provide the monitoring arrangement with stacks / vents and regular monitoring shall be carried out and report shall be submit to the Regional officer.

13. Industry shall control fugitive emissions by providing chilled brine circulation, closed room operations and condensers with receivers.

14. Regular monitoring of vents of the storage tanks and work room concentration shall be carried out using sensors.

15. The proponent shall not use odour causing substances or cause odour nuisance in the surroundings.

16. The proponent shall not send the used /spent solvents to the recyclers and shall process them at their own solvent recovery plant within the plant premises. Solvents shall be recovered to the maximum extent possible and shall be reused. The residue shall be sent to incinerator in the pharmacity.

17. The evaporation losses in solvents shall be controlled by taking the following measures:

    i) Chilled brine circulation shall be carried out to effectively reduce the solvent losses into the atmosphere.
    ii) Transfer of solvents using pumps instead of manual handling.
    iii) Closed centrifuges shall be used due to which solvent losses will be reduced drastically.
    iv) The reactor vents shall be connected with primary & secondary condensers to catch the solvent vapours.
    v) All the solvent storage tanks shall be connected with vent condensers to prevent solvent vapours.

7.	Detoxified Containers & Container Liners of HW & Hazardous chemicals. (a) HDPE Drums (b) Plastic Bags (c) Carbouys	 300 Nos. 50 Nos. 20 Nos.	To out side agencies after complete detoxification.
8.	Used lead acid batteries	3 Nos.	Return to dealer / manufacturer on buy back basis.

* For worst combination Ibuprofen + Metformin Hydrochloride + Setraline Hydrochloride
** For worst combination of Ibuprofen + Celecoxib + Gabepentin
*** For worst combination of Paracetamol + Ciprofloxacin Hydrochloride + Enrofloxacin

23. The proponent shall place the chemical drums and / or any drums in the concrete platform only. The Platform shall be provided with sufficient dyke wall and effluent collection system.

24. Container & Container liners shall be detoxified at the specified covered platform with dyke walls and the wash wastewater shall be routed to low TDS collection tank.

25. The following rules and regulations notified by the MOE&F, GOI shall be implemented.

    a) Hazardous waste (Management, Handling and Transboundary Movement), Rules,2008.
    b) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.

Other Conditions:

26. Existing green belt shall be augmented to cover minimum area of 33% of total area. Existing Green belt shall not be distributed in the proposed expansion / construction activity.

27. System of leak detection and repair of pump / pipeline shall be installed in the plant and immediate response team shall be identified for preventive maintenance.

28. The recommendations / commitments made during the Public Hearing held on 1.10.2008 at Akkireddygudem (V), Musunuru (M), Krishna District shall explicitly be followed from pollution control point of view.

29. The industry shall comply with all the conditions stipulated in the Environmental Clearance issued vide order dt. 2.2.2009 issued by MOE&F, GOI.

Sd/-
MEMBER SECRETARY

To,
M/s. Porus Laboratories (P) Ltd.,
(formerly M/s. Porus Drugs & Intermediates Pvt. Ltd.)
Unit-IV, Akkireddygudem (V), Musunuru (M),
Krishna District

/// T.C.F.B.O///

3/5 JOINT CHIEF ENVIRONMENTAL ENGINEER/GEE) 2/6/10

18. Solvent shall be taken from under ground storage tanks to reactors through closed pipeline. Storage tanks shall be vented through trap receiver and condenser operated on chilled water.

19. Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done. Entire plant shall be flame proof.

20. A sampling port with removable dummy of not less than 15 cm diameter shall be provided in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform.

21. The generator shall be installed in a closed area with a silencer and suitable noise absorption systems. The ambient noise level shall not exceed 75 dB(A) during day time and 70 dB(A) during night time.

Solid Waste:

22. The proponent shall comply with the following:

Existing :

Sl. No.	Solid waste generated from	Quantity	Method of disposal
1.	Organic residue	128.75 kg/day	TSDF for incineration.
2.	Spent Carbon.	142.8 kg/day	Authorized cement plants.
3.	ETP Sludge & evaporation salts (inorganic)	1238.08 kg/day	TSDF, Dundigal for landfill.
4.	Used Oil / Waste Lubricating Oil	0.3 TPA	Authorized re-processors / recyclers
5.	Detoxified Containers & Container Liners of HW & Hazardous chemicals. (a) HDPE Drums (b) Plastic Bags (c) Carbouys	 300 Nos./yr 50 Nos./yr 20 Nos./yr	To out side agencies after complete detoxification.
6.	Used lead acid batteries	3 Nos.	Return to dealer / manufacturer on buy back basis.

Proposed : Total quantities after expansion:

Sl. No.	Solid waste generated from	Quantity (kg/day)	Method of disposal
1.	Organic residue	1320 kg/day*	TSDF, Dundigal
2.	Inorganic & Evaporation Salt	3560 kg/day**	TSDF, Dundigal
3.	Spent Carbon	220 kg/day***	TSDF, Dundigal
4.	ETP Sludge	600 kg/day	TSDF, Dundigal
5.	Boiler Ash	2 TPD	Sold out to brick manufacturers
6.	Used Oil / Waste Lubricating Oil	0.3 TPA	Authorized re-processors / recyclers

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REGD.POST WITH ACK.DUE

CONSENT ORDER FOR ESTABLISHMENT

Order No.508/PCB/CFE/RO-VJA/HO/2014 568. **Dt. 29.11.2014**

Sub: PCB – CFE - **M/s. Porus Laboratories Pvt. Ltd., Unit-IV, Sy. No. 106, 107/1 & 2, 108/1 & 2, Akkireddygudem (V), Musunuru (M), Krishna District** – Consent for Establishment of the Board **for change of product mix** under Sec.25 of Water (P & C of P) Act, 1974 and Under Sec.21 of Air (P & C of P) Act, 1981 - Issued - Reg.

Ref: 1) Industry's application dt.10.02.2014 & Addl. Information dt.08.05.2014.
2) R.O's inspection report dt. 31.05.2014.
3) CFE Committee meeting held on 12.11.2014.

1. In the reference 1st cited, an application was submitted to the Board seeking Consent for Establishment (CFE) for change of product mix without increase in pollution load to produce the following products with installed capacities as mentioned below:

Existing:

Sl. No.	Products	Consented capacity as per CFE order dt.11.09.2012 & CFO Dt. 25-11-2013 (Kg/day)
1.	Ciprofloxacin Hydrochloride	1666.67
2.	Sumatriptan Succinate	16.67
3.	Metformin Hydrochloride	666.67
4.	Venlafaxin Hydrochloride	33.33
5.	Sertraline Hydrochloride	33.33
6.	Celecoxib	166.67
7.	Clopidogrel Hydrogen Bisulfate	100.00
8.	Enrofloxacin	1000.0
9.	Pioglitazone	33.33
10.	Gabapentin	66.67
11.	4,4- Cyclohexylidene di-ocresol	1000 .0
12.	Bisphenol Acetophenone	3333.33
13.	P-Phenolphthalein bisphenol	3166.67
14.	1, 5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy)phenyl]-ponta-(2,6-dimethyl-1, 4-phenyleneoxide (MX-9000)	550
15.	Tetra methyl bisphenol acetone (TMBPA)	276.67
16.	[1,1,1-Tri-(4-hydroxy phenyl)] ethane (THPE)	276.67
17.	4-Hydroxybenzonitrile (HBN)	276.67
	Total production capacity (Any three products at a time)	**8166.67 kg / day**

After change of product mix:

Sl. No.	Name of the Product	Quantity (Kg/Day)	No. of Stages	Starting Raw Materials	Quantity (Kg/Day)
Group-A Products					
1	4,4'-Cyclohexylidene di-o-cresol	500.00	1	Cyclohexanone, C6H10O	185.2

2	Bisphenol Acetophenone	333.33	1	Acetophenone, C8H8O	151.5
3	P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxy Phenyl) Phthalimide (PPPBP)	6666.67	2	Phthalic anhydride, C8H4O3	3018.9
4	1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy) phenyl]-penta-(2,6-dimethyl-1,4-phenyleneoxide (MX-9000)	550.00	1	1,5-Bis-(2,6-dimethyl-4-hydroxyphenyl)-penta-(2,6-dimethyl-1,4-phenyleneoxide), C99H104O12	550
5	Tetramethyl bisphenol acetone (TMBPA)	276.67	1	Acetone, C3H6O	63.9
6	[1,1,1-Tri-(4-hydroxy phenyl)] ethane (THPE)	276.67	1	4-Hydroxyacetophenone, C8H8O2	138.3
7	4-Hydroxybenzonitrile (HBN)	276.67	1	4-Hydroxybenzaldehyde, C7H6O2	301.8
8	4-Nitro-N-methyl phthalimide (4-NP)	950.00	2	Phthalic anhydride, C8H4O3	814.3
9	Sumatriptan Succinate	16.67	3	4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride, $C_8H_{13}N_3O_2S.HCl$	20
Group-B Products					
10	Ciprofloxacin Hydrochloride	1666.67	2	Q.Acid, $C_{13}H_9ClFNO_3$	1566.7
11	Metformin Hydrochloride	666.67	1	Dicyanodiamide, $C_2H_4N_4$	420
12	Venlafaxine Hydrochloride	33.33	1	1-[-Amino-1-(4-methoxy Phenyl) ethyl] Cyclohexanol, $C_{15}H_{23}NO_2$	31.7
13	Sertraline Hydrochloride	33.33	4	Tetralone, $C_{16}H_{12}Cl_2O$	160
14	Celecoxib	166.67	5	4-Acetamidobenzene Sulfonyl Chloride, $C_9H_8ClNO_3S$	216.7
15	Clopidogrel Hydrogen Bisulfate	100.00	5	Thiophene Ethanol, C6H8OS	100
16	Enrofloxacin	1000.00	2	Q.Acid, C13H9ClFNO3	940
17	Pioglitazone Hydrochloride	33.33	6	5-Ethyl-2-methyl Pyridine, C8H11N	21.7
18	Gabapentin	66.67	4	1,1-Cyclohexane diacetic acid, C10H16O4	126.7
		8166.67			

Maximum Three Products from Group-A (or) Group-B at any point of time shall be manufactured.

2. As per the application, the above activity is to be located within the existing premises located at Sy. No. 106, 107/1 & 2, 108/1 & 2, Akkireddygudem (V), Musunuru (M), Krishna District in an area of 64818 sq. m. (16 Acres).

3. The above site was inspected by the Asst. Environmental Engineer, Regional Office, Vijayawada, A.P Pollution Control Board on 03.05.2014 and observed that the site is surrounded by:

North	:	Agricultural lands
South	:	Agricultural lands
East	:	R&B road
West	:	Agricultural lands

4. The Board, after careful scrutiny of the application and verification report of Regional Officer, hereby issues **CONSENT FOR ESTABLISHMENT for change of product mix without increase in pollution load** to your unit Under Section 25 of Water (Prevention & Control of Pollution) Act 1974 and Section 21 of Air (Prevention & Control of Pollution) Act, 1981 and the rules made there under. **This order is issued to manufacture the products as mentioned at para (1) only.**

5. This Consent Order now issued is subject to the conditions mentioned in Schedule 'A' and Schedule 'B'.

6. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.

Encl: Schedule 'A'
Schedule 'B'

Sd/-
MEMBER SECRETARY

To
M/s. Porus Laboratories Pvt. Ltd., Unit-IV,
Sy. No. 106, 107/1 & 2, 108/1 & 2,
Akkireddygudem (V), Musunuru (M),
Krishna District.
Amurthy@poruslabs.com

// T.C.F.B.O. //

JOINT CHIEF ENVIRONMENTAL ENGINEER (UH-I)

SCHEDULE - A

1. Progress on implementation of the project shall be reported to the concerned Regional Office, A.P. Pollution Control Board once in six months.

2. Separate energy meters shall be provided for Effluent Treatment Plant (ETP) and Air pollution Control equipments to record energy consumed.

3. The proponent shall obtain Consents for Operation (CFO) from APPCB, as required Under Sec.25/26 of the Water (P&C of P) Act, 1974 and under sec. 21/22 of the Air (P&C of P) Act, 1981, before commencement of the activity.

4. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power Under Sec.27(2) of Water (Prevention and Control of Pollution) Act, 1974 and Under Sec.21(4) of Air (Prevention and Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional conditions by the Board.

5. The consent of the Board shall be exhibited in the factory premises at a conspicuous place for the information of the inspecting officers of different departments.

6. Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.

7. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas. The industry shall maintain a good housekeeping. All pipe valves, sewers, drains shall be leak proof. Dyke walls shall be constructed around storage of chemicals.

8. Rain Water Harvesting (RWH) structure (s) shall be established on the plant site. The proponent shall be ensure that effluent shall not enter the Rain Water harvesting structure.

9. The rules and regulations notified by Ministry of Law and Justice, GOI, regarding the Public Liability Insurance Act, 1991 shall be followed.

10. **This order is valid for period of 5 years from the date of issue.**

SCHEDULE – B

Water:

1. The source of water is bore well and the maximum permitted water consumption after change of product mix is **113.24 KLD.**

Purpose	Quantity (KLD)
a) Process	29.74
b) Scrubber, Q.C. and R&D	1.00
Sub Total HTDS	30.74
c) Washings	3.00
d) Boiler & Cooling makeup	70.00
e) DM Plant	0.50
f) Domestic	9.00
Sub Total LTDS	82.50
Total	**113.24**

2. The maximum waste water generation shall not exceed the following after change of product mix:

Source	Quantity (KLD)
a) Process	32.67
b) Scrubber, Q.C. and R&D	1.00
Sub Total HTDS	**33.67**
c) Washings	3.00
d) Boiler & Cooling makeup	5.00
e) DM Plant	0.50
f) Domestic	8.00
Sub Total LTDS	**16.50**
Total	**50.17**

Treatment & Disposal :

Effluent source	Treatment proposed	Mode of final disposal
HTDS Process and Washings	Collection tanks, Neutralization tank, sand filters, Neutralized effluent collection tanks (2x20 KL capacity), Steam stripper column (2.5 Kl/hr cap), MEE (3-effect – 50 KLD cap), Vertical Thin Film Evaporator (VTFD) (1 TPH cap @ 50 KLD feed), R.O. Plant(3Kl/Hr cap), FE reactors – 2x8 KL and 1x5 KL	• Stripper condensate for recovery of organic compounds followed by disposal to cement plant. • Stripped bottom effluents to forced evaporation in MEE & VTFD. • Condensate from MEE & VTFD to ETP. • Salts from VTFD to TSDF. • RO permeate for boiler makeup. RO reject to MEE, VTFD.
Low TDS process effluents, Boiler & cooling blow down.	Combined waste water treatment plant (CWTP) (40 KLD capacity), Consisting of collection cum equalization cum neutralization tank, Aeration tank with floating aerators –2 No.s, Pressure sand filter, Activated carbon filter and RO system.	• ETP • RO permeate for boiler makeup. • RO reject to MEE, VTFD.
Domestic	--	Septic tank followed by soak pit

3. The proponent shall segregate the effluent into High TDS and Low TDS streams and shall be treated and reused as mentioned above.

4. The industry shall achieve zero liquid discharge (ZLD). The ZLD system consisting of stripper, MEE & VTFD and RO plant and Effluent Treatment Plant (ETP) shall be operated regularly. All the units of the ZLD system shall be impervious to prevent ground water pollution.

5. The industry shall strictly maintain ZLD system in closed circuit system. There shall not be any discharge / spillages of effluent within or outside the premises.

6. **The industry shall provide magnetic digital flow meters with totalisers at the inlet and outlet of stripper, MEE and RO plant.**

7. The industry shall segregate cyanide bearing and heavy metal bearing effluents at source and shall adopt treatment separately. The details of hydraulic load of these streams and provisions for treatment shall be furnished to R.O., Vijayawada.

8. During transfer of materials, spillages shall be avoided and garland drains shall be constructed to avoid mixing of accidental spillages with domestic waste and storm drains.

9. Separate meters with necessary pipe-line shall be provided for assessing the quantity of water used for each of the purposes mentioned below:
   a) Industrial cooling, boiler feed.
   b) Domestic purposes.
   c) Processing, whereby water gets polluted and pollutants are easily bio-degradable.
   d) Processing, whereby water gets polluted and the pollutants are not easily bio-degradable.

10. The industry shall construct above ground level effluent collection tanks with in a month.

Air:

11. There shall not be any additional installation of Boiler from proposed change of product mix activity. The existing air pollution control equipment shall be operated effectively to ensure compliance of stipulated emission standards.

12. The proponent shall maintain the multistage scrubbers provided to the process vents to control the process emissions. The industry shall maintain the online pH monitoring system provided to the scrubbers to treat the process emissions.

13. The industry shall provide the monitoring system to all the stacks / vents in the plant. Regular monitoring shall be carried out and report shall be submitted to the Regional officer.

14. Industry shall control fugitive emissions by providing chilled brine circulation, closed room operations and condensers with receivers.

15. Regular monitoring of vents of the storage tanks and work room concentration shall be carried out using sensors.

16. The proponent shall not use or generate odour causing substances or Mercaptans and cause odour nuisance in the surroundings.

17. The proponent shall not send the spent / mixed solvents to the recyclers. They shall process the same at solvent recovery plant within the plant premises. Solvents shall be recovered to the maximum extent possible and shall be reused.

18. The evaporation losses in solvents shall be controlled by taking the following measures:
   i) Chilled brine circulation shall be carried out to effectively reduce the solvent losses into the atmosphere.
   ii) Transfer of solvents shall be done by using pump instead of manual handling.
   iii) Closed centrifuges shall be used due to which solvent losses will be reduced drastically.
   iv) The reactor vents shall be connected with primary & secondary condensers to catch the solvent vapours.
   v) All the solvent storage tanks shall be connected with vent condensers to prevent solvent vapours.

19. Solvent shall be taken from under ground storage tanks to reactors through closed pipeline. Storage tanks shall be vented through trap receiver and condenser operated on chilled water.

20. Proper earthing shall be provided in all the electrical equipment wherever solvent handling is done.

21. A sampling port with removable dummy of not less than 15 cm diameter shall be provided in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform.

22. The generator shall be installed in a closed area with a silencer and suitable noise absorption systems. The ambient noise level shall not exceed 75 dB(A) during day time and 70 dB(A) during night time.

Solid Waste:

23. The proponent has furnished the list of the following by-products from the proposed list of products. There shall not be any pollution load at on-site of the premises result in from reception, handling and disposal of these by-products / waste streams at source of the industry. The proponent shall maintain log registers on quantity of waste generation and details of end use of the waste disposed.

S. No.	By-product	Quantity (kg/day)
1.	Piperzine MLs	9756.67
2.	N-Ethyl Piperzine MLs	6066.00
3.	Spent Sulphuric Acid	6924.00

24. The proponent shall comply with the following:

S. No	Type of waste	Quantity	Mode of disposal
1.	Organic residue	1247 kg/day	TSDF for incineration / Authorised cement plants for co-processing.
2.	Spent carbon	209 Kg/day	
3.	Inorganic & Evaporation salt	3223 kg/day	TSDF for secured land filling
4.	ETP Sludge	600 Kg/day	
5.	Used oil	300 Kg/annum	Disposed to Authorized re-processors.
6.	Detoxified containers a) HDPE Drums b) Plastic Bags c) Carbouys	 300 Nos/ annum 50 Nos/ annum 20 Nos/ annum	Sent to outside agencies after complete detoxification
7.	Boiler Ash	2.5 TPD	To brick manufacturers.

25. The proponent shall place the chemical drums and / any drums in the concrete platform only. The Platform shall be provided with sufficient dyke wall and effluent collection system.

26. Container & Container liners shall be detoxified at the specified covered platform with dyke walls and the wash wastewater shall be routed to effluent collection tank.

27. The following rules and regulations notified by the MoE&F, GoI shall be implemented.

a) Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.
b) Hazardous waste (Management, Handling and Transboundary Movement) Rules, 2008.
c) Batteries (Management & Handling) Rules, 2010.
d) E-Waste (Management & Handling) Rules, 2011.

Other Conditions:

28. Existing Green belt shall not be disturbed in the proposed change of product mix activity.

29. System of leak detection and repair of pump / pipeline shall be installed in the plant and immediate response team shall be identified for preventive maintenance.

30. The proponent shall isolate the storage of highly flammable chemicals, solvents & other raw materials from the rest of facilities in the plant premises.

31. The proponent shall ensure that there shall not be any change in the process technology, source of raw material and scope of working without prior approval from the Board.

32. The proponent shall comply with all the directions issued by the Board from time to time.

33. Concealing the factual data or submission of false information/ fabricated data and failure to comply with any of the conditions mentioned in this order and attract action under the provisions of relevant pollution control Acts.

34. The Board reserves its right to modify above conditions or stipulate new / additional conditions and to take action including revoke of this order in the interest of environment protection.

35. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules,1982, to such authority (hereinafter referred to as the Appellate Authority) constituted under Section 28 of Water (Prevention and Control of Pollution)Act,1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

Sd/-
MEMBER SECRETARY

To
M/s. Porus Laboratories Pvt. Ltd., Unit-IV,
Sy. No. 106, 107/1 & 2, 108/1 & 2,
Akkireddygudem (V), Musunuru (M),
Krishna District.

// T.C.F.B.O. //

JOINT CHIEF ENVIRONMENTAL ENGINEER (UH-I)

ANDHRA PRADESH POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN, A-3, INDUSTRIAL ESTATE,
SANATHNAGAR, HYDERABAD - 500 018.

Phone: 040-23887500
Fax: 040- 23815631
Grams : Kalusya Nivarana
Website : appcb.ap.nic.in

BY REGD. POST WITH ACKN. DUE
CONSENT & AUTHORISATION ORDER

Consent Order No : APPCB/VJA/VJA/13734/CFO/HO/2015- 2116. Date :13.03.2015

(Consent Order for Existing/New or altered discharge of sewage and/or trade effluents/outlet under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof, Operation of the plant under section 21 of Air (Prevention & Control of Pollution) Act 1981 and amendments thereof and Authorisation under Rule 5 of the Hazardous Wastes (Management, Handling & Transboundary, Movement) Rules 2008 & Amendments thereof.

CONSENT is hereby granted under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974, under section 21 of Air (Prevention & Control of Pollution) Act 1981 and Authorisation under the provisions of HW (MH & TM) Rules, 2008 (hereinafter referred to as 'the Acts', 'the Rules') and the rules and orders made thereunder to

M/s. Porus Laboratories Pvt. Ltd.,
(Change of product mix)
Akkireddigudem (V),
Musunuru (M),
Krishna District.
E-mail: info@prousdrugs.com

(Hereinafter referred to as 'the Applicant') authorizing to operate the industrial plant to discharge the effluents from the outlets and the quantity of emissions per hour from the chimneys as detailed below:

i) Out lets for discharge of effluents:

Outlet No.	Outlet Description	Max Daily Discharge (KLD)	Point of Disposal
1.	High TDS effluents (Process - 32.67 KLD + Scrubber, Q.C. and R&D – 1.00 KLD)	33.67	• Stripper condensate for recovery of organic compounds followed by disposal to cement plant. • Stripped bottom effluents to forced evaporation in MEE & VTFD. • Condensate from MEE & VTFD to ETP. • Salts from VTFD to TSDF. • RO permeate for boiler makeup. RO reject to MEE, VTFD.
2.	Low TDS effluents: (Washings – 3.0 KLD + Boiler & Cooling makeup – 5.0 KLD + DM Plant – 0.5 KLD)	8.5	• ETP • RO permeate for boiler makeup. • RO rejects to MEE, VTFD
3.	Domestic effluents	8.0	Septic tank followed by soak pit.

ii) Emissions from chimneys:

Chimney No.	Description of Chimney
1.	Attached to 5 TPH Coal fired Boiler
2.	Attached to 1 lakh K.cal/hr Thermic fluid heater
3.	Attached to 1 x 320 KVA D.G. Set
4.	Attached to 1 x 380 KVA D.G. Set

iii) HAZARDOUS WASTE AUTHORISATION (FORM – II) [See Rule 5 (4)]:

M/s. The Porus Laboratories Pvt. Ltd., Sy. No. 106, 107/1 & 2, 108/1 & 2, Akkireddigudem (V), Musunuru (M), Krishna District, is hereby granted an authorization to operate a facility for collection, reception, storage, treatment, transport and disposal of Hazardous Wastes namely:

- **HAZARDOUS WASTES WITH DISPOSAL OPTION:**

S. No.	Name of hazardous waste	Stream	Quantity (After the change of product mix)	Disposal Option
1.	Organic residue	28.1 of Schedule – I	1247 Kg/day	TSDF, Parawada, Visakhapatnam District for incineration / Authorized cement plants for co-processing.
2.	Spent carbon	28.2 of Schedule – I	209 Kg/day	
3.	Inorganic & Evaporation salt	28.1 of Schedule – I	3223 Kg/day	TSDF, Parawada, Visakhapatnam District for secured land filling
4.	ETP Sludge	34.3 of Schedule – I	600 Kg/day	

- **HAZARDOUS WASTES WITH RECYCLING OPTION:**

S. No.	Name of hazardous waste	Stream	Quantity (After the change of product mix)	Disposal Option
1.	Used oil / Waste lubricant oil	5.1 of schedule – I	300 Kg/annum	Authorised Reprocessors / Recyclers.
2.	Detoxified Containers & Container Liners a) HDPE Drums b) Plastic Bags c) Carboys	33.3 of Schedule – I	300 Nos./ annum 50 Nos./ annum 20 Nos./ annum	After complete detoxification, it shall be disposed of to outside agencies.

Boiler Ash 2.5 TPD (As per) To Brick Mfg.

This consent order is valid to manufacture maximum three products from Group – A (or) Group – B at any point of time:

Group-A Products					
S. No.	Name of the Product	Quantity (Kg/day)	No. of Stages	Starting Raw Materials	Quantity (Kg/day)
1	4,4'-Cyclohexylidene di-o-cresol	500.00	1	Cyclohexanone, C6H10O	185.2
2	Bisphenol Acetophenone	333.33	1	Acetophenone, C8H8O	151.5
3	P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxy Phenyl) Phthalimide (PPPBP)	6666.67	2	Phthalic anhydride, C8H4O3	3018.9
4	1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy) phenyl}-penta-(2,6-dimethyl-1,4-phenyleneoxide (MX-9000]	550.00	1	1,5-Bis-(2,6-dimethyl-4-hydroxyphenyl)-penta-(2,6-dimethyl-1,4-phenyleneoxide), C99H104O12	550
5	Tetramethyl bisphenol acetone (TMBPA)	276.67	1	Acetone, C3H6O	63.9
6	[1,1,1-Tri-(4-hydroxy phenyl)] ethane (THPE)	276.67	1	4-Hydroxyacetophenone, C8H8O2	138.3

7	4-Hydroxybenzonitrile (HBN)	276.67	1	4-Hydroxybenzaldehyde, C7H6O2	301.8
8	4-Nitro-N-methyl phthalimide (4-NP)	950.00	2	Phthalic anhydride, C8H4O3	814.3
9	Sumatriptan Succinate	16.67	3	4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride, $C_9H_{13}N_3O_2S.HCl$	20
Group-B Products					
10	Ciprofloxacin Hydrochloride	1666.67	2	Q.Acid, $C_{13}H_9ClFNO_3$	1566.7
11	Metformin Hydrochloride	666.67	1	Dicyanodiamide, $C_2H_4N_4$	420
12	Venlafaxine Hydrochloride	33.33	1	1-[-Amino-1-(4-methoxy Phenyl) ethyl] Cyclohexanol, $C_{15}H_{23}NO_2$	31.7
13	Sertraline Hydrochloride	33.33	4	Tetralone, $C_{16}H_{12}Cl_2O$	160
14	Celecoxib	166.67	5	4-Acetamidobenzene Sulfonyl Chloride, $C_8H_8ClNO_3S$	216.7
15	Clopidogrel Hydrogen Bisulfate	100.00	5	Thiophene Ethanol, C6H8OS	100
16	Enrofloxacin	1000.00	2	Q.Acid, C13H9ClFNO3	940
17	Pioglitazone Hydrochloride	33.33	6	5-Ethyl-2-methyl Pyridine, C8H11N	21.7
18	Gabapentin	66.67	4	1,1-Cyclohexane diacetic acid, C10H16O4	126.7
Total production capacity (any three products at a time) - 8166.67 Kg/day					

This order is subject to the provisions of 'the Acts' and the Rules' and orders made thereunder and further subject to the terms and conditions incorporated in the schedule A, B & C enclosed to this order.

This combined order of consent & Hazardous Waste Authorisation shall be valid for a period ending with the **30th day of November, 2015.**

Sd/-
MEMBER SECRETARY

To
M/s. Porus Laboratories Pvt. Ltd.,
(Change of product mix)
Akkireddigudem (V),
Musunuru (M),
Krishna District – 521 213

Copy to:
1. The JCEE, Zonal Office, Vijayawada for information and necessary action.
2. The JCEE (Cess), APPCB, Hyderabad for information.
3. The Environmental Engineer, Regional Office, Vijayawada for information and necessary action.

//T.C.F.B.O//

18/9/15

JOINT CHIEF ENVIRONMENTAL ENGINEER (UH-IV)

A3

SCHEDULE – A

1. The applicant shall make applications through Online for renewal of Consent (under Water and Air Acts) and Authorization under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts for obtaining Consent & HW Authorization of the Board and detailed compliance of CFO conditions.
2. All the conditions stipulated in the Schedule – A of the earlier combined CFO & HWA order No: APPCB/VJA/VJA/13734/CFO/HO/2013-5055 dt.25.11.2013 remains same. The industry should ensure consistent compliance of each condition of Schedule-A.

SCHEDULE - B

1. The industry shall handover the original Consent order No. APPCB /VJA/VJA/13734 /CFO /HO /2013-5055 dt.25.11.2013, having validity upto dt.30.11.2015, to the RO, Vijayawada after receipt of this order. The earlier CFO order dt.05.09.2012 stands cancelled from the date of receipt of this order.
2. The industry shall take steps to reduce water consumption to the extent possible and consumption shall NOT exceed the quantities mentioned below:

S. No.	Purpose	Quantity
1.	Process	29.74 KLD
2.	Scrubber, QC and R&D	1.00 KLD
3.	Washings	3.00 KLD
4.	Boiler & Cooling makeup	70.00 KLD
5.	DM Plant	0.50 KLD
6.	Domestic	9.00 KLD
	Total	**113.24 KLD**

3. Separate meters with necessary pipe-line shall be maintained for assessing the quantity of water used for each of the purposes mentioned below.
   a. Industrial cooling, boiler feed.
   b. Domestic purposes.
   c. Process, whereby water gets polluted and pollutants are easily bio degradable.
   d. Processing, whereby water gets polluted and the pollutants are not easily bio – degradable.
4. The industry shall file the water Cess returns in Form-I as required under section (5) of Water (Prevention and Control of Pollution) Cess Act, 1977 on or before the **5th of every calendar month**, showing the quantity of water consumed in the previous month along with water meter readings. The industry shall remit water Cess as per the assessment orders as and when issued by Board.
5. **The industry shall submit water balance for all the processes regularly to the Board.**
6. The proponent shall segregate the effluent into High TDS and Low TDS streams at source and shall be treated and reused as per the point of disposal mentioned in this consent order.
7. The industry shall achieve and maintain zero liquid discharge. All the units of the ZLD system shall be impervious to prevent ground water pollution. The ZLD system shall be operated regularly.
8. The industry shall strictly maintain ZLD system in closed circuit system. There shall not be any discharge / spillages of effluent within in or outside the premises.
9. The industry shall provide digital flow meters with totalisers at inlet of collection tank, Stripper feed, MEE feed, RO feed and RO flux separately for measuring effluent generation, treatment and recycled.
10. The permeate from the RO Plant shall be recycled in the process and there shall not be any discharge of treated or untreated effluents on land.
11. **The industry shall provide piezometer wells around ETP & greenbelt area where LTDS effluents are stored within three months in consultation with RO, Vijayawada & shall regularly monitor the ground water quantity.**
12. Separate meters with necessary pipe-line shall be maintained for assessing the quantity of water used for each of the purposes mentioned below.
    e. Industrial cooling, boiler feed.
    f. Domestic purposes.
    g. Process, whereby water gets polluted and pollutants are easily bio degradable.
    h. Processing, whereby water gets polluted and the pollutants are not easily bio – degradable.
13. The industry shall provide garland drain around the Plant area to ensure that storm water do not mix with effluents.

14. Rain water shall not be allowed to mix with either trade or domestic effluents. Industry shall provide storm water drains immediately.
15. All the collection and storage tanks shall be made with imperious lining.
16. The emissions shall not contain constituents in excess of the prescribed limits mentioned below.

Chimney No.	Parameter	Emission Standards
1 & 2	Particulate Matter	115 mg/Nm³

17. The industry shall comply with emission limits for DG sets of capacity upto 800 KW as per the Notification G.S.R.520 (E), dated 01.07.2003 under the Environment (Protection) Amendment Rules, 2003 and G.S.R.448(E), dated 12.07.2004 under the Environment (Protection) Second Amendment Rules, 2004. In case of DG sets of capacity more than 800 KW shall comply with emission limits as per the Notification G.S.R.489 (E), dated 09.07.2002 at serial no.96, under the Environment (Protection) Act, 1986.
18. The industry shall comply with ambient air quality standards of PM_{10}(Particulate Matter size less than 10μm) - 100 μg/ m³; $PM_{2.5}$(Particulate Matter size less than 2.5 μm) - 60 μg/ m³; SO_2 - 80 μg/ m³; NO_x - 80 μg/m³, NH_3 – 400 μg/m³ outside the factory premises at the periphery of the industry.

    Standards for other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI-I, dated 18.11.2009

    Noise Levels: Day time - (6 AM to 10 PM) - 75 dB (A)
    Night time - (10 PM to 6 AM) - 70 dB (A)
19. The industry shall provide continuous online stack monitoring system for the stack attached to 5 TPH boiler, by 31.03.2015 as per the CPCB directions and connect the stack monitoring data to the website of APPCB.
20. The industry shall not manufacture any product, other than those mentioned in this order, without CFE & CFO of the Board. The industry shall not increase the capacity beyond the permitted capacity mentioned in this order, without obtaining CFE & CFO of the Board.
21. The industry shall connect VOC analyzers with recording facility at all the strategic locations and connect to APPCB website.
22. The industry shall dispose hazardous waste and submit manifest copies to Regional Office-Vijayawada.
23. There shall not be any spillages / discharges of chemicals / effluents on ground. The drums containing chemicals & wastes shall be stored on elevated platform under shed provided with leachate/spillages collection pit. In no case the drums shall be stored on naked ground.
24. The industry shall maintain two stage scrubbers to the process vents to control the process emissions. The industry shall maintain online pH measuring facility with auto recording system to the scrubbers provided to treat the process emissions. Scrubbed liquid shall be recycled as far as possible and finally sent for further treatment as stipulated.
25. Regular monitoring of vents for the storage tanks and work room concentration shall be carried out using sensors.
26. Container & Container liners shall be detoxified at the specified covered platform with dyke walls and the wash wastewater shall be routed to effluent collection tank.
27. The industry shall ensure implementation of requisite measures to prevent air pollution, fugitive emissions and & odour nuisance in the surrounding area. If it is found any activity of the industry is causing odour nuisance & air pollution, this consent order now issued will be revoked without further intimation.
28. The industry shall maintain the following records and the same shall be made available to the inspecting officers of the Board:
    i. Daily production details, RG-I records and Central Excise Returns.
    ii. Quantity of Effluents generated and disposed.
    iii. Log Books for pollution control systems.
    iv. Daily solid waste generated and disposed.
29. The evaporation losses in solvents shall be controlled by taking the suitable measures, which includes:
    i. Chilled brine circulation to effectively reduce the solvent losses into the atmosphere.
    ii. Transfer of solvents by using pumps and closed conveyance instead of manual handling.
    iii. Closed centrifuges be used due to which solvent losses are reduced drastically.
    iv. The reactor vents connected with primary & secondary condensers to catch the solvent vapours.
    v. All the solvent storage tanks are connected with vent condensers to prevent solvent vapours.

30. Proper earthling shall be provided in all the electrical equipment wherever solvent handling is done.
31. The industry shall take all safety measures and provide fire lighting equipment in the plant.
32. System of leak detection and repair of pump / pipeline shall be installed in the plant and immediate response team shall be identified for preventive maintenance.
33. Solvent shall be taken from under ground storage tanks to reactors through closed pipeline. Storage tanks shall be vented through trap receiver and condenser operated on chilled water.
34. Green belt of adequate width and density shall be developed and maintained long the boundary of the industry with minimum area of 33% of total area.
35. The industry shall monitor odorous compounds and shall submit action plan to the Board within three months.
36. The industry shall regularly carryout the monitoring of environmental parameters, audit them & shall submit report to the Board twice in a calendar year.
37. The industry shall implement the waste minimization measures and shall submit progress achieved for substantial reduction of waste generation to the Board for every six months.
38. Under no circumstances, the Hazardous Waste shall be burnt in the boiler.
39. There shall not be any new pollution load at on-site of the premises resulting from reception, handling and disposal of these by-products / waste streams at source of the industry. The proponent shall maintain log registers on quantity of waste generation and details of end use of the waste disposed.

S. No.	Name of the By-Product	Capacity (Kg/Day)
1.	Piperzine MLs	9756.67
2.	N-Ethyl Piperzine MLs	6066.00
3.	Spent Sulphuric Acid	6924.00

40. The industry shall comply with all the conditions stipulated in the CFE order dt.29.11.2014 issue to the industry.
41. The applicant shall submit Environment statement in Form V before 30th September of every year as per Rule No.14 of E (P) Rules, 1986 & amendments thereof.
42. The conditions stipulated are without prejudice to the rights and contentions of this Board in any Hon'ble Court of Law.

SCHEDULE - C
[see rule 5(4)]
[CONDITIONS OF AUTHORISATION FOR OCCUPIER OR OPERATOR HANDLING HAZARDOUS WASTES]

1. The industry shall give top priority for waste minimization and cleaner production practices.
2. The industry shall not store hazardous waste for more than 90 days as per the Hazardous Wastes (Management. Handling and Transboundary Movement) Rules, 2008 and amendments thereof.
3. The industry shall store Used / Waste Oil and Used Lead Acid Batteries in a secured way in their premises till its disposal.
4. The industry shall not dispose Waste oils to the traders and the same shall be disposed to the authorized Reprocessors/ Recyclers.
5. The industry shall dispose Used Lead Acid Batteries to the manufacturers / dealers on buyback basis.
6. The industry shall take necessary practical steps for prevention of oil spillages and carry over of oil from the premises.
7. The industry shall maintain 6 copy manifest system for transportation of waste generated and a copy shall be submitted to Board Office and concerned Regional Office.
8. The industry shall maintain good house keeping & maintain proper records for Hazardous Wastes stated in Authorisation.
9. The industry shall maintain proper records for Hazardous Wastes stated in Authorisation in FORM-3 i.e., quantity of Incinerable waste, land disposal waste, recyclable waste etc., and file annual returns in Form- 4 as per Rule 22(2) of the Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, 2008 and amendments thereof.
10. The industry shall submit the condition wise compliance report of the conditions stipulated in Schedule a, B & C of this Order on half yearly basis to Board Office, Hyderabad and concerned Regional Office.

11. The industry shall dispose of e-waste to the authorised recyclers only.
12. The industry shall conform to the co-processing guidelines of CPCB in sending wastes to co-processing for cement plants.

Sd/-
MEMBER SECRETARY

To
M/s. Porus Laboratories Pvt., Ltd.,
Akkireddigudem (V), Musunuru (M),
Krishna District - 521 213.

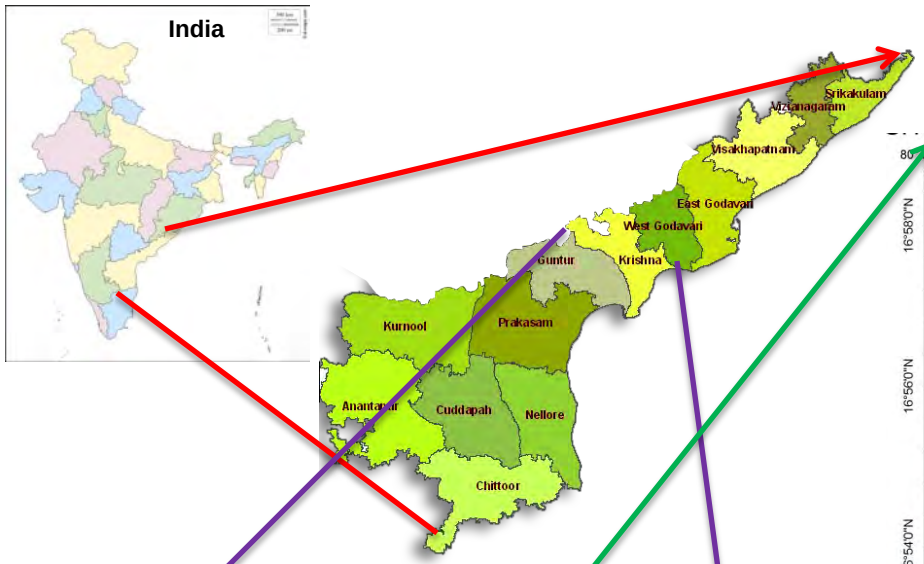
//T.C.F.B.O//

18/3/15

JOINT CHIEF ENVIRONMENTAL ENGINEER
(UH-IV)

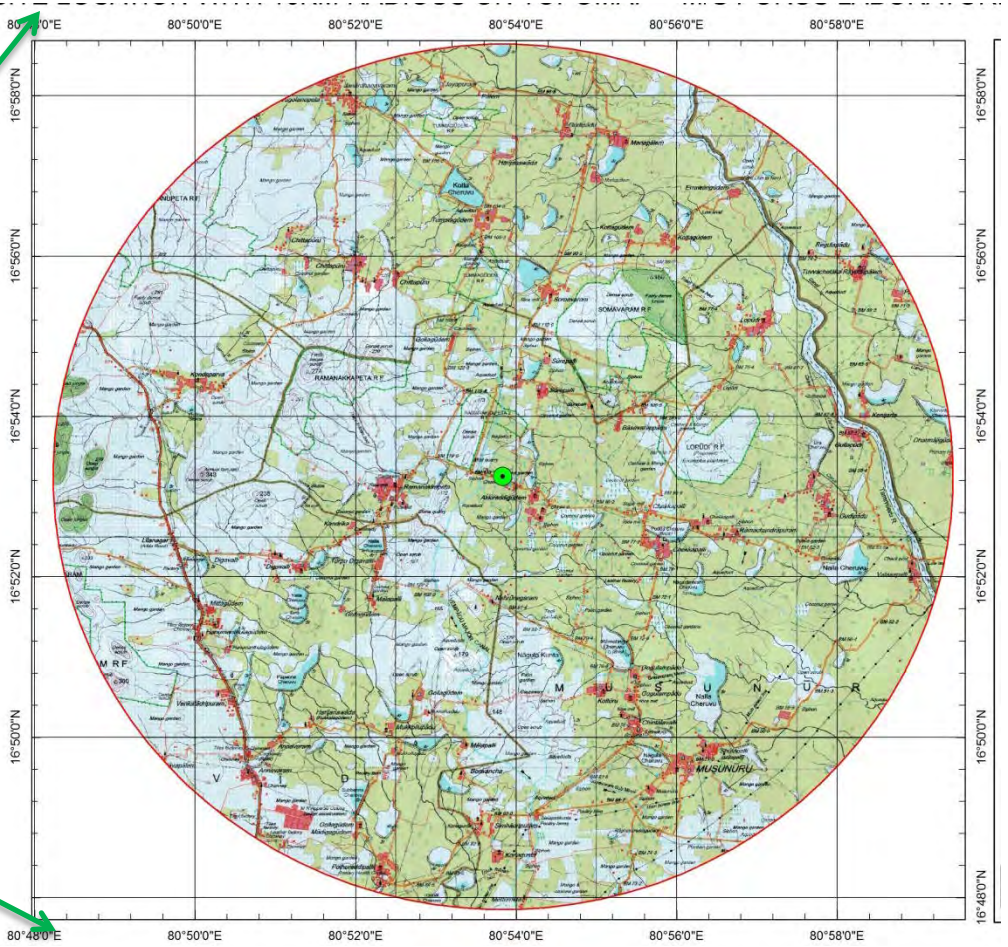
General Location Map

ANNEXURE - VII



Andhra Pradesh State

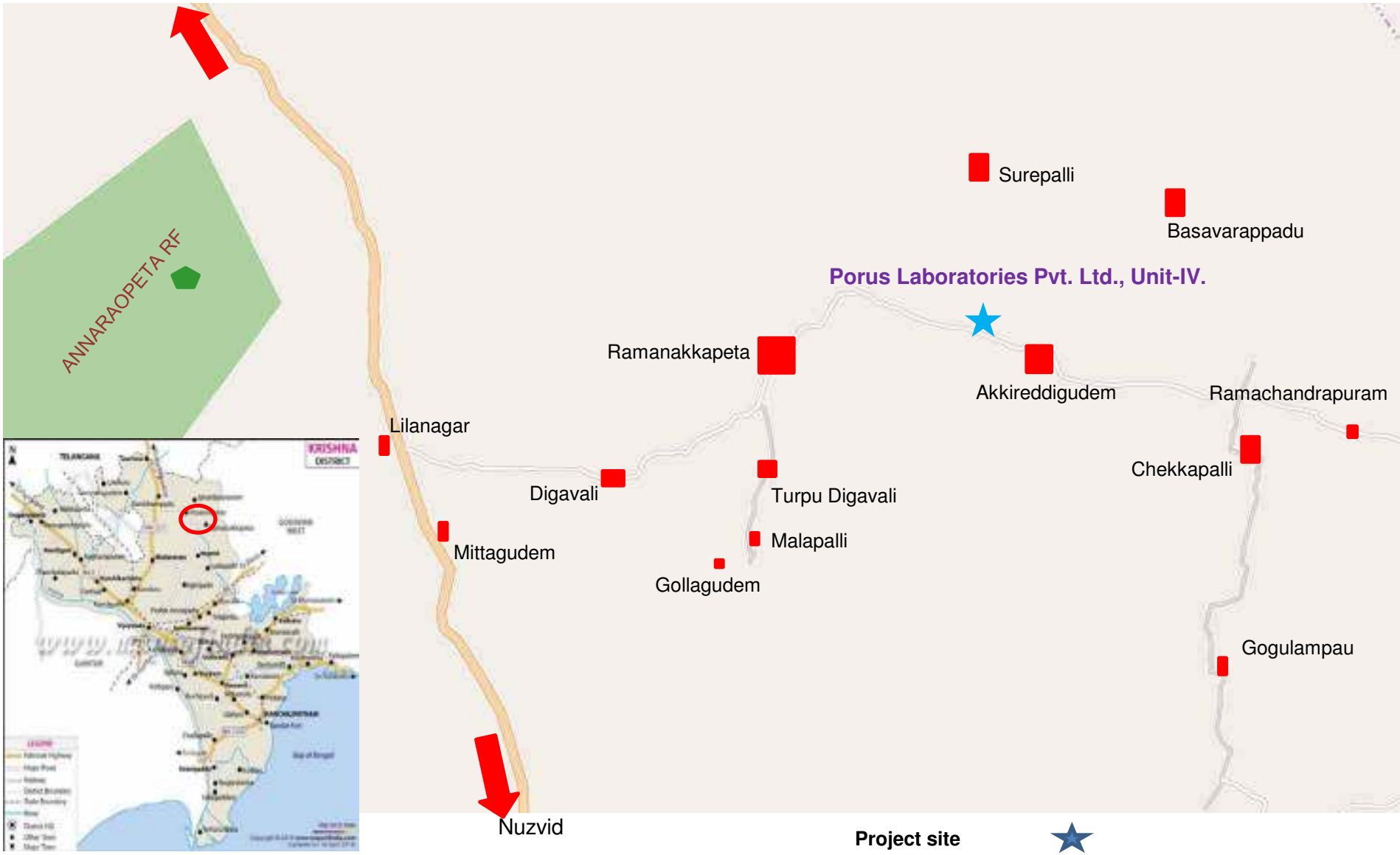
Musunuru Mandal (25), Krishna District



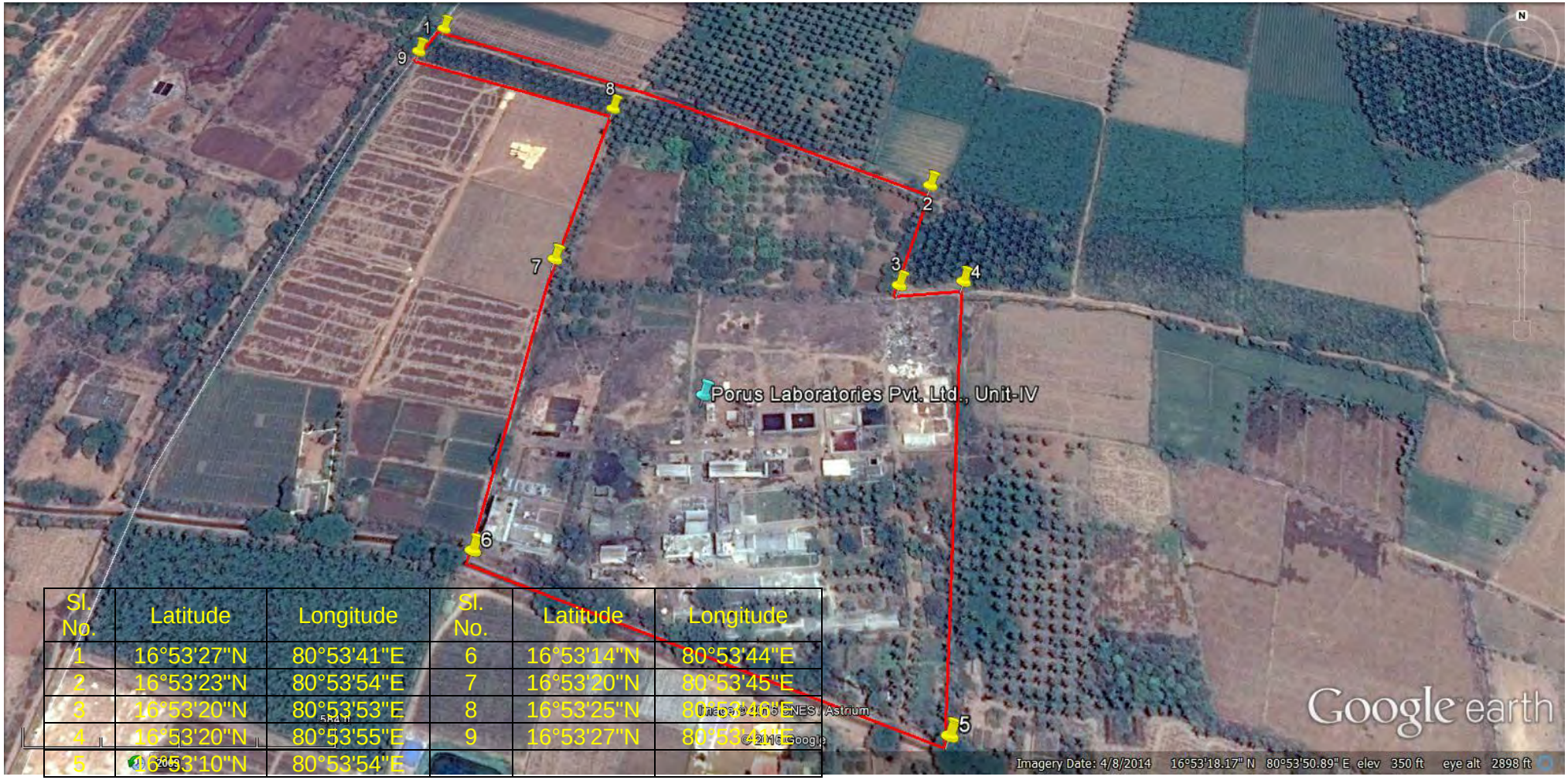
Project Site

Specific Location (Route map)

ANNEXURE - VIII



Google Map Showing Proposed Project Coordinates



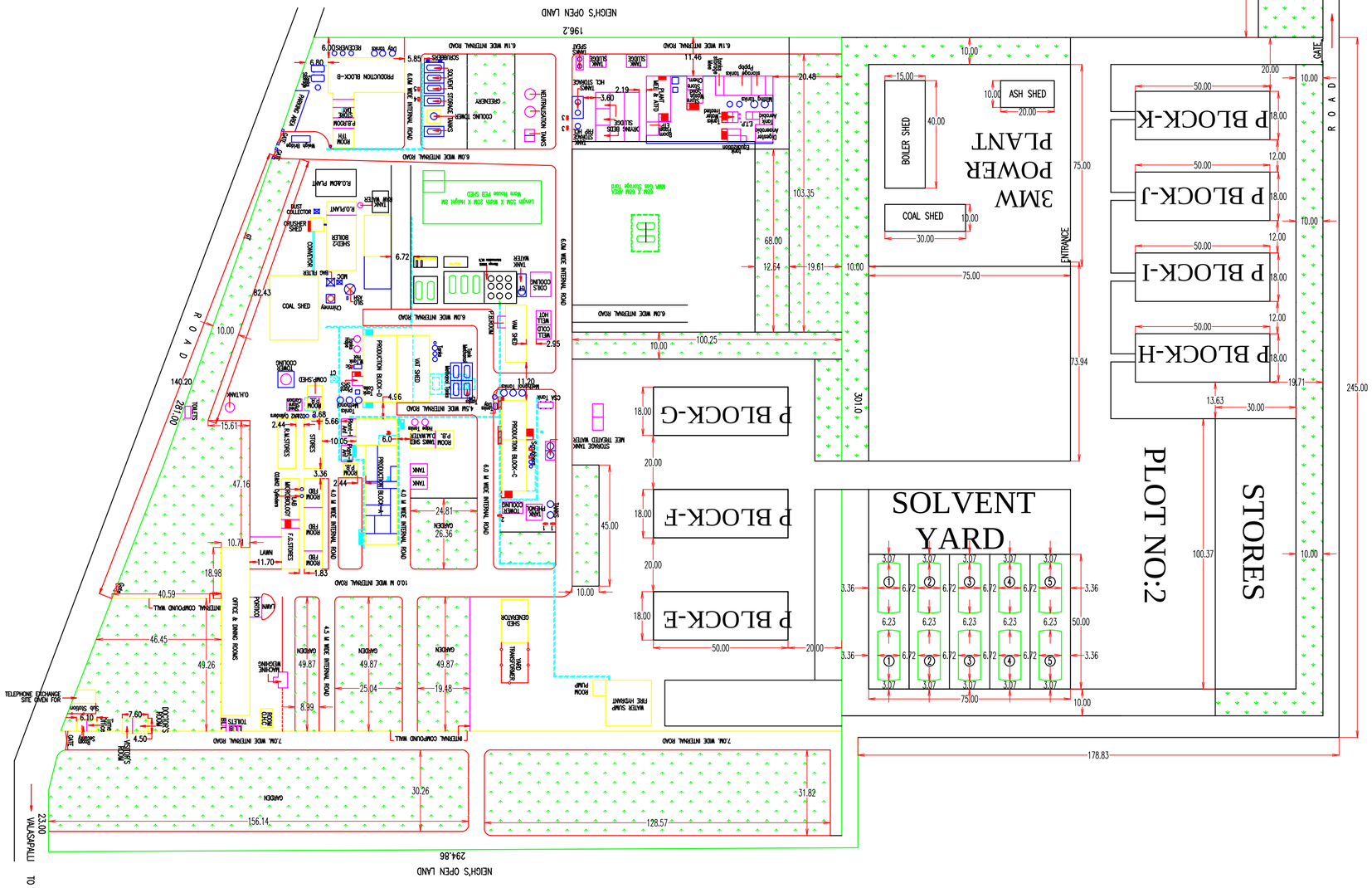
Sl. No.	Latitude	Longitude	Sl. No.	Latitude	Longitude
1	16°53'27"N	80°53'41"E	6	16°53'14"N	80°53'44"E
2	16°53'23"N	80°53'54"E	7	16°53'20"N	80°53'45"E
3	16°53'20"N	80°53'53"E	8	16°53'25"N	80°53'46"E
4	16°53'20"N	80°53'55"E	9	16°53'27"N	80°53'41"E
5	16°53'10"N	80°53'54"E			

N

AREA:-	
DESCRIPTION	AREA
PLOT NO:1&2 TOTAL AREA:	Acre25.25Cents 102,183.12 Sq.Mts.

LAND BREAKUP

S.NO.	DESCRIPTION	EXISTING AREA Sq.Mts.	ADDITIONAL AREA Sq.Mts.	TOTAL AFTER EXPANSION Sq.Mts.	%
1.	BUILT-UP AREA	17000.00	24199.00	41199.00	40.29
2.	ROADS		5170.26	5170.26	5.06
3.	ETP	2232.00	1571.25	3803.25	3.72
4.	OPEN AREA	14286.00	4830.26	4830.26	4.72
5.	GREEN BELT	31300.00	15948.64	47248.64	46.21
	TOTAL	64818.00	37433.41	102251.41	



AREA:-					
S.NO.	DESCRIPTION	AREA			
1.	SECURITY ROOM	21.96	Sq.Mts.		
2.	VISITOR'S ROOM & DOCTOR'S ROOM	34.20	Sq.Mts.	32. SLUDGE TANK	36.48 Sq.Mts.
3.	ADMIN BUILDING	167.44	Sq.Mts.	33. SLUDGE DRYING BEDS	296.46 Sq.Mts.
4.	O.H.C.ROOM	31.44	Sq.Mts.	34. VAM SHED	165.05 Sq.Mts.
5.	TOILETS	9.48	Sq.Mts.	35. HOT WELL & COLD WELL	58.30 Sq.Mts.
6.	TOILETS	8.70	Sq.Mts.	36. COOLING COILS	69.16 Sq.Mts.
7.	OFFICE & DINING ROOMS	668.41	Sq.Mts.	37. MEE TREATED WATER STORAGE TANK	39.04 Sq.Mts.
8.	PORTICO	32.71	Sq.Mts.	38. PRODUCTION BLOCK-C	316.48 Sq.Mts.
9.	TOILETS	9.65	Sq.Mts.	39. SOLID WASTED SHED	10.08 Sq.Mts.
10.	F.G.STORES & Q.C.LAB	224.51	Sq.Mts.	40. R.O.PLANT-I	15.00 Sq.Mts.
11.	FBD ROOMS	224.51	Sq.Mts.	41. FIRE HYDRANT WATER SUMP	289.00 Sq.Mts.
12.	R.M.STORES	123.65	Sq.Mts.	42. PUMP ROOM	27.43 Sq.Mts.
13.	STORES	124.76	Sq.Mts.	43. CANTEEN & REST ROOMS	115.82 Sq.Mts.
14.	CARBON STORE SHED	24.64	Sq.Mts.	44. STORES	96.72 Sq.Mts.
15.	P.B.ROOM & COMPRESSOR SHED	48.77	Sq.Mts.	45. WARE HOUSE-I	1,800.00 Sq.Mts.
16.	PRODUCTION BLOCK-A	575.66	Sq.Mts.	46. GENERATOR SHED-I	160.00 Sq.Mts.
17.	P.B.ROOM	24.30	Sq.Mts.	47. GENERATOR SHED-II	96.00 Sq.Mts.
18.	ANF PLANT-I	35.75	Sq.Mts.	48. FABRICATION SHED	200.00 Sq.Mts.
19.	ANF PLANT-II	25.62	Sq.Mts.	49. MMA GAS STORAGE YARD	4624.00 Sq.Mts.
20.	D.M.WATER TANKS SHED & P.B.ROOM	104.55	Sq.Mts.	50. VAT SHED	303.71 Sq.Mts.
21.	COAL SHED	432.00	Sq.Mts.	51. PRODUCTION BLOCK-D	319.27 Sq.Mts.
22.	CRUSHER SHED	25.00	Sq.Mts.	52. SRS PLANT	13.40 Sq.Mts.
23.	BOILER SHED-II	225.50	Sq.Mts.	53. VACUUM BELT FILTER ROOM	114.80 Sq.Mts.
24.	BOILER SHED-I	154.00	Sq.Mts.	54. NITRIC ACID TANKS	132.00 Sq.Mts.
25.	R.O.PLANT-II	55.00	Sq.Mts.	55. SULPHURIC ACID TANKS	180.00 Sq.Mts.
26.	TOILETS	21.28	Sq.Mts.	56. ELECT.PANEL ROOM & N2 PLANT	110.00 Sq.Mts.
27.	TFH ROOM,P.B.ROOM & DAY STORE	161.23	Sq.Mts.	57. R.O. & D.M.PLANT SHED	180.00 Sq.Mts.
28.	PRODUCTION BLOCK-B	365.66	Sq.Mts.	58. WARE HOUSE-II	1,100.00 Sq.Mts.
29.	SOLVENT STORAGE TANKS AREA	200.75	Sq.Mts.	59. FINISHED MATERIAL PACKING ROOM	60.00 Sq.Mts.
30.	SPEAT TANK	14.56	Sq.Mts.	60. MEE & ATFD PLANT & E.T.P.	1,175.00 Sq.Mts.
31.	SLUDGE TANK	28.80	Sq.Mts.	TOTAL GROUND BUILTUP AREA	16,307.69 Sq.Mts.

	PROPOSED		
01.	PRODUCTION BLOCK-E	900.00	Sq.Mts.
02.	PRODUCTION BLOCK-F	900.00	Sq.Mts.
03.	PRODUCTION BLOCK-G	900.00	Sq.Mts.
04.	PRODUCTION BLOCK-H	900.00	Sq.Mts.
05.	PRODUCTION BLOCK-I	900.00	Sq.Mts.
06.	PRODUCTION BLOCK-J	900.00	Sq.Mts.
07.	PRODUCTION BLOCK-K	900.00	Sq.Mts.
08.	PRODUCTION BLOCK-L	900.00	Sq.Mts.
09.	POWER PLANT 3MW	5625.00	Sq.Mts.
10.	STORES	3000.00	Sq.Mts.
11.	SOLVENT YARD	3750.00	Sq.Mts.
	TOTAL AREA	24,199.00	Sq.Mts.

STORAGE TANKS LEGEND

S.NO.	MATERIAL	CAPICITY	Nos
1.	METHANOL STORAGE TANK	20.0K.L.Cap.	2
2.	TOLUENE STORAGE TANKS	20.0K.L.Cap.	2
3.	ACETONE STORAGE TANK	20.0K.L.Cap.	2
4.	MDC STORAGE TANK	20.0K.L.Cap.	2
5.	EDC STORAGE TANK	20.0K.L.Cap.	2

M/S.PORUS LABORATORIES PVT LTD
(UNIT-IV)
AKKIREDDYGUDEM, MUSUNUR MANDAL,
KRISHNA DISTRICT-521213, ANDHRA PRADESH

TITLE:- TOTAL SITE LAYOUT

SCALE	NOTE:- ALL DIMENSIONS ARE IN METERS
1:1000.	

DRAWING NO:- 01

PRODUCT : Bisphenol Acetophenone

Stage : 1
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Acetophenone	1	120
Phenol	2	188
Total Input	=	308

OUTPUT	No. of moles	Mol. Wt.
Bisphenol Acetophenone	1	290
Water	1	18
Total Output	=	308

Material Balance:

INPUT		Kg
Acetophenone	=	500
Phenol	=	790
3-Mercaptopropionic acid	=	10
Sulfuric acid	=	14
Toluene	=	1000
Methanol	=	1500
Activated Carbon	=	15
Water	=	2500
Total Input	=	6329

OUTPUT		Kg
Product		
Bisphenol Acetophenone	**=**	1100
Recovery		
Toluene	=	950
Toluene Loss	=	40
Methanol	=	1395
Methanol Loss	=	75
Aqueous		
Effluent	=	2612
(Methanol 30, Toluene 3, Sulfuric acid 4, gen.water 75, Water 2500)		
Organic Residue		
Unreacted Organic Impurities	=	142
(Oragnic Impurities 108.33, Sulfuric acid 10, Phenol 6.67, 3-Mercaptopropionic acid 10, Toluene 7)		
Spent Carbon		
Spent Carbon	=	15
(Carbon)		
Total Output	=	6329

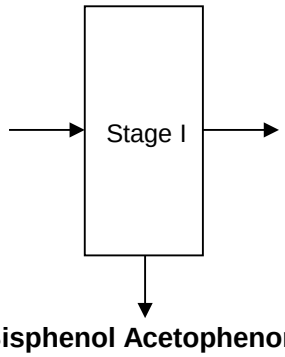
PRODUCT : Bisphenol Acetophenone

Description :

Stage-1 : Acetophenone is condensed with 2 moles of Phenol in presence of 3-Mercaptopropionic acid as promoter and Sulfuric acid as catalyst to to get crude Bisphenol Acetophenone (BPAP), isolated by addition of Toluene and centrifugation. Crude Bisphenol Acetophenone (BPAP) is dissolved in Methanol and treated with Carbon. Precipitation of carbon treated Methanol solution gives pure Bisphenol Acetophenone (BPAP).

Flow Chart

Acetophenone
Phenol
3-Mercaptopropionic acid
Sulfuric acid
Toluene
Methanol
Activated Carbon
Water



Sol.Recovery
Evaporation Loss
Effluent
Organic Residue
Spent Carbon

Bisphenol Acetophenone

PRODUCT : P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Phthalic anhydride	1	148
Phenol	2	188
Total Input	=	336

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	318
Water	1	18
Total Output	=	336

Material Balance:

INPUT		Kg
Phthalic anhydride	=	540
Phenol	=	805
Zinc Chloride	=	292
Chlorosulfonic acid	=	86
Methanol	=	880
Water	=	2620
Total Input	=	5223

OUTPUT		Kg
Product		
Stage-1	=	918
Recovery		
Methanol	=	818
Methanol Loss	=	44
Aqueous		
Effluent	=	3045.73
(Zinc Chloride 292, Sulfuric acid 72.34, Methanol 9, gen.water 65.68, Water 2606.71)		
Organic Residue		
Unreacted Organic Impurities	=	370.32
(Organic Impurities 242.27, Phenol 119.05, Methanol 9)		
Process Emissions		
Process Emissions	=	26.95
(Hydrogen Chloride)		
Total Output	=	5223

PRODUCT : P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)

Stage : 2

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	318
Aniline	1	93
Total Input	=	411

OUTPUT	No. of moles	Mol. Wt.
P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)	1	393
Water	1	18
Total Output	=	411

Material Balance:

INPUT		Kg
Stage-1	=	918
Aniline	=	1042
Sodium Hydroxide (48%)	=	1194
Hydrochloric acid (35%)	=	1831
Methanol	=	6400
Sodium Bisulfite	=	27
Activated Carbon	=	324
Water	=	25570
Total Input	=	37306

OUTPUT		Kg
Product		
P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)	=	1000
Recovery		
Aniline	=	727
Aniline Loss	=	42
Methanol	=	5952
Methanol Loss	=	320
Aqueous		
Effluent	=	28731.49
(Sodium Chloride 838.19, Hydrochloric acid 117.88, Methanol 80, Aniline 4.53, Water from Hydrochloric acid 1190.15, Water from Sodium Hydroxide 620.88, gen.water 309.86, Water 25570)		
Organic Residue		
Unreacted Organic Impurities	=	182.51
(Organic Impurities 134.51, Methanol 48)		
Inorganic Solid Waste		
Inorgainc Solid Waste	=	27
(Sodium Bisulfite)		
Spent Carbon		
Spent Carbon	=	324
(Carbon)		
Total Output	=	37306

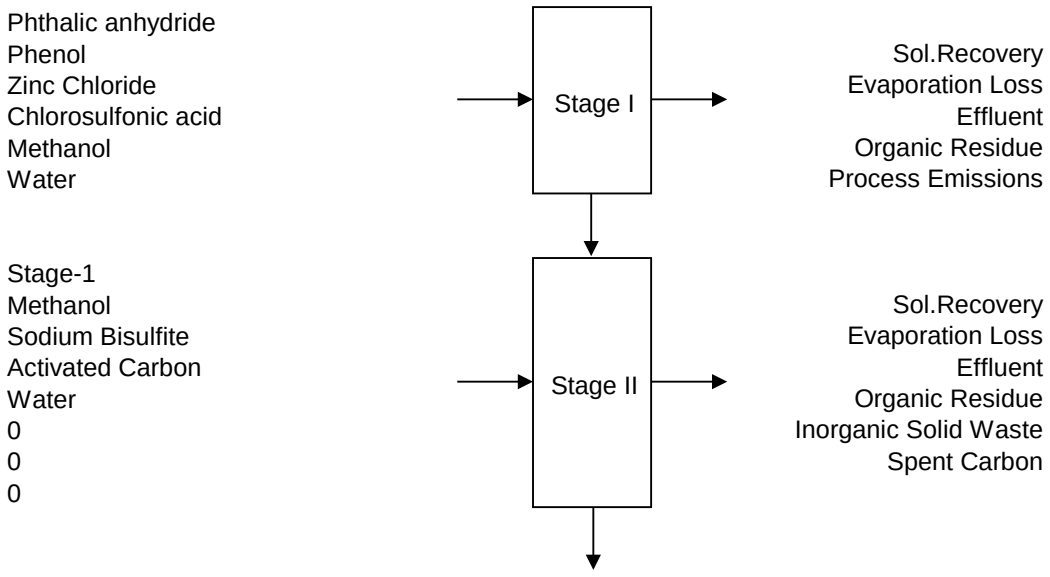
PRODUCT : P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)

Description :

Stage-1 : Phthalic anhydride and Phenol are condensed in presence of anhydrous Zinc Chloride and Chlorosulfonic acid. Crude Phenolphthalein is obtained by adding DM water to the reaction mass and centrifuging the precipitated material. Crude Phenolphthalein, thus obtained, is dissolved in Methanol U/reflux. Distillation of Methanol gives pure Phenolphthalein.

Stage-2 : Aniline is reacted with Phenolphthalein from Stage-1 in presence of Hydrochloric acid to get crude P-Phenolphthalein bisphenol (PPPBP) which is dissolved in Sodium Hydroxide solution and treated with Carbon and reprecipitated with Hydrochloric acid to get white P-Phenolphthalein bisphenol (PPPBP) which on Methanol tritration gives purified P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP).

Flow Chart



P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)

PRODUCT : 1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy) phenyl}-penta-(2,6-dimethyl-1,4-phenyleneoxide (MX-9000)

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
1,5-Bis-(2,6-dimethyl-4-hydroxyphenyl)-penta-(2,6-dimethyl-1,4-phenyleneoxide)	1	1484
Methacrylic anhydride	2	308
Total Input	=	1792

OUTPUT	No. of moles	Mol. Wt.
1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy)phenyl}-penta-(2,6-dimethyl-1,4-phenyleneoxide	1	1620
Methacrylic acid	2	172
Total Output	=	1792

Material Balance:

INPUT		Kg
1,5-Bis-(2,6-dimethyl-4-hydroxyphenyl)-penta-(2,6-dimethyl-1,4-phenyleneoxide)	=	250
Toluene	=	350
Methacrylic anhydride	=	56
Dimethylaminopyridine	=	3
Methanol	=	2920
Total Input	=	3579

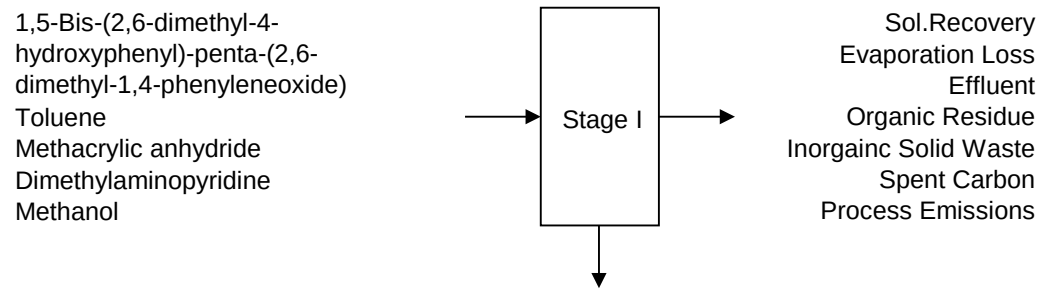
OUTPUT		Kg
Product		
1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy)phenyl}-penta-(2,6-dimethyl-1,4-phenyleneoxide	=	250
Recovery		
Toluene	=	329
Toluene Loss	=	14
Methanol	=	2716
Methanol Loss	=	146
Organic Residue		
Unreacted Organic Impurities	=	124
(Oragnic Impurities 22.91, Methacrylic acid 28.98, Methacrylic anhydride 4.11, Toluene 7, Methanol 58, Dimethylaminopyridine 3)		
Total Output	=	3579

PRODUCT : 1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy) phenyl}-penta-(2,6-dimethyl-1,4-phenyleneoxide (MX-9000)

Description :

Stage-1 : 2,2-Bis[4-(2,6-dimethyl-4-hydroxy) phenoxy-2,6-dimethyl phenyl] propane (SA-90) is dissolved in Toluene and Dimethylaminopyridine is added to it. The resulting solution is heated to 80-85oC and Methacrylic anhydride is added during 1-2 hrs, maintaining the temperature 80-85oC. After addition is over, reaction mass is heated to reflux and maintained for 6-7 hrs for completion of the reaction. Toluene is distilled off completely and Methanol is charged for complete precepitation of 2,2-Bis[4-{2,6-dimethyl-4-(2-methyl-2-propenoxy)phenoxy}-2,6-dimethyl phenyl] propane (MX-9000). The sperated solid is centrifuged, washed with Methanol ans dried.

Flow Chart



1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy) phenyl}-penta-(2,6-dimethyl-1,4-phenyleneoxide

PRODUCT : Tetramethyl bisphenol acetone (TMBPA)

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Acetone	1	58
2,6-Xylenol	2	244
Total Input	=	302

OUTPUT	No. of moles	Mol. Wt.
Tetramethyl bisphenol acetone	1	284
Water	1	18
Total Output	=	302

Material Balance:

INPUT		Kg
Acetone	=	300
2,6-Xylenol	=	1583
3-Mercaptopropionic acid	=	100
Dodecylbenzenesulfonic acid	=	360
Toluene	=	2600
Total Input	=	4943

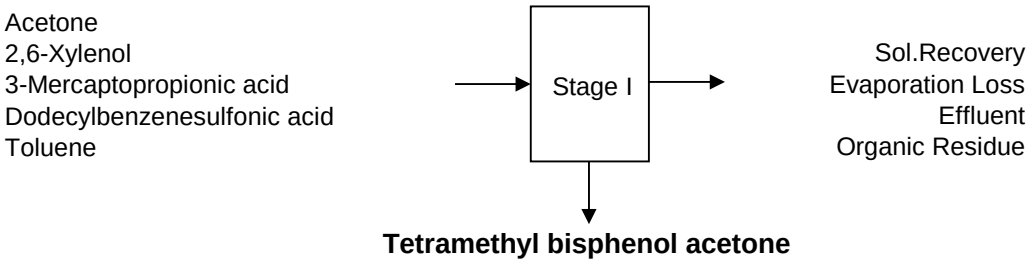
OUTPUT		Kg
Product		
Tetramethyl bisphenol acetone	=	1300
Recovery		
Toluene	=	2470
Toluene Loss	=	104
Aqueous		
Effluent	=	99.17
(Toluene 0.1, Dodecylbenzenesulfonic acid 1, 2,6-Xylenol 1, Organic compound 3.97, gen.water 93.1)		
Organic Residue		
Unreacted Organic Impurities	=	969.83
(Oragnic Impurities 165, 3-Mercaptopropionic acid 100, Dodecylbenzenesulfonic acid 359, 2,6-Xylenol 319.93, Toluene 25.9)		
Total Output	=	4943

PRODUCT : Tetramethyl bisphenol acetone (TMBPA)

Description :

Stage-1 : Acetone, 2,6-Xylenol and 3-Mercaptopropionic acid are charged into the reactor at room temperature. Dodecylbenzenesulfonic acid is added slowly during 1-2 hr. After addition is over, temperature of reaction mass is raised to 70-75oC and maintained at this temperature for 24 hrs during which it turns to redish brown thick slurry. Toluene is added for complete precipitation of Tetramethyl bisphenol acetone (TMBPA) as a solid which was isolated by centrifugation, follwed by washing with Toluene and finally dried

Flow Chart



PRODUCT : [1,1,1-Tri-(4-hydroxyphenyl)] ethane (THPE)

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
4-Hydroxyacetophenone	1	136
Phenol	2	188
Total Input	=	324

OUTPUT	No. of moles	Mol. Wt.
[1,1,1-Tri-(4-hydroxyphenyl) ethane	1	306
Water	1	18
Total Output	=	324

Material Balance:

INPUT		Kg
4-Hydroxyacetophenone	=	150
Phenol	=	260
3-Mercaptopropionic acid	=	24.5
Methanesulfonic acid	=	65.5
Ethylene Dichloride	=	2100
Methanol	=	765
Activated carbon	=	4
Water	=	2400
Total Input	=	5769

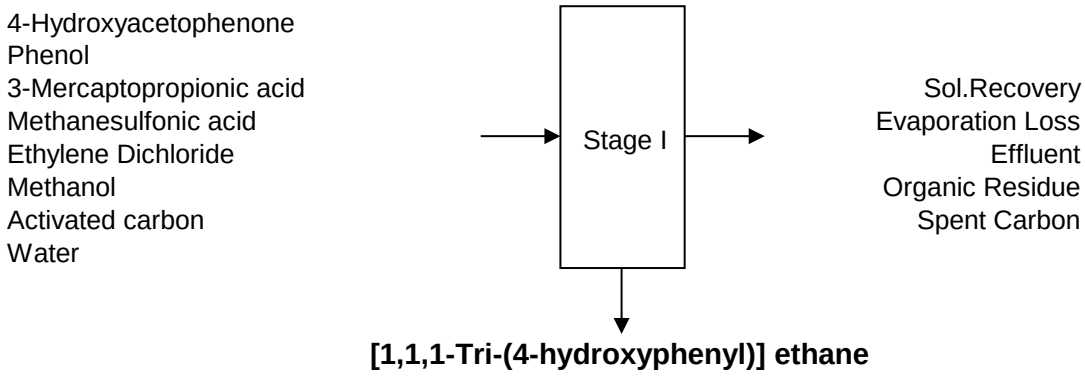
OUTPUT		Kg
Product		
[1,1,1-Tri-(4-hydroxyphenyl) ethane	=	300
Recovery		
Ethylene Dichloride	=	1974
Ethylene Dichloride Loss	=	105
Methanol	=	712
Methanol Loss	=	38
Aqueous		
Effluent (Methanesulfonic acid 1.5, Phenol 1.65, Methanol 15, gen.water 19.85, Water 2400)	=	2438
Organic Residue		
Unreacted Organic Impurities (Oragnic Impurities 37.5, Methanesulfonic acid 64, Phenol 51, 3-Mercaptopropionic acid 24.5, Ethylene Dichloride 21)	=	198
Spent Carbon		
Spent Carbon (Carbon)	=	4
Total Output	=	5769

PRODUCT : [1,1,1-Tri-(4-hydroxyphenyl)] ethane (THPE)

Description :

Stage-1 : 4-Hydroxyacetophenone, Phenol and 3-Mercaptopropionic acid are charged into a reactor at rool temperature. Methanesulfonic acid is added drop wise during 1-2 hrs. After addition temperature is raised to 50 55oC and maintained for 20 hrs at this temperature. Ethylene Dichloride is added to the reaction mass to precipitate crude [1,1,1-Tri-(4-hydroxyphenyl)] ethane (THPE) which was centrifuged, washed with Ethylene Dichloride and dried. The crude [1,1,1-Tri-(4-hydroxyphenyl)] ethane (THPE) is dissolved in Methanol and treated with Activated carbon and precipitated with water centrifuged washed with Methanol/water and dried.

Flow Chart



PRODUCT : 4-Hydroxybenzonitrile (HBN)

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
4-Hydroxybenzaldehyde	2	244
Hydroxylamine sulfate	1	164
Sodium Hydroxide	2	80
Total Input	=	488

OUTPUT	No. of moles	Mol. Wt.
4-Hydroxybenzonitrile	2	238
Sodium Sulfate	1	142
Water	6	108
Total Output	=	488

Material Balance:

INPUT		Kg
4-Hydroxybenzaldehyde	=	300
Hydroxylamine sulfate	=	210
Toluene	=	1300
Methanol	=	400
Sodium Hydroxide (50%)	=	205
Carbon	=	15
Water	=	700
Total Input	=	3130

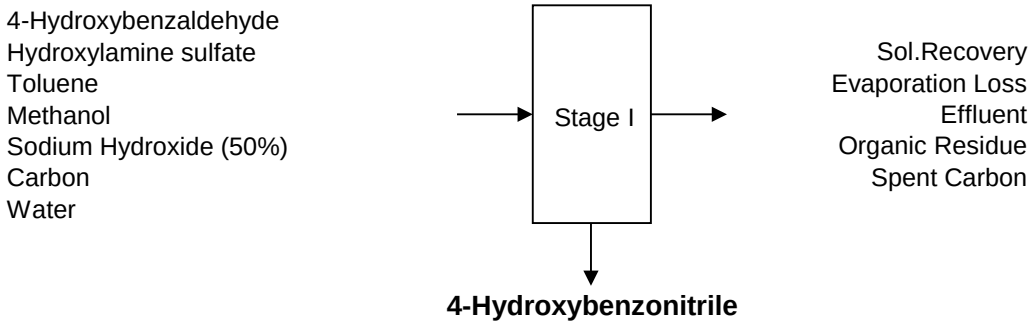
OUTPUT		Kg
Product		
4-Hydroxybenzonitrile	=	275
Recovery		
Toluene	=	1235
Toluene Loss	=	52
Methanol	=	372
Methanol Loss	=	20
Aqueous		
Effluent	=	1130.88
(Sodium Sulfate 181.83, Hydroxylamine 3.36, Sodium Hydroxide 0.06, Toluene 0.5, Methanol 8, gen.water 134.63, Water from Sodium Hydroxide 102.5, Water 700)		
Organic Residue		
Unreacted Organic Impurities	=	30.12
(Oragnic Impurities 17.62, Toluene 12.5)		
Spent Carbon		
Spent Carbon	=	15
(Carbon)		
Total Output	=	3130

PROD+B42:H70UCT : 4-Hydroxybenzonitrile (HBN)

Description :

Stage-1 : 4-Hydroxybenzaldehyde, Hydroxylamine sulfate and Toluene are added to the reactor. Reaction mass is subjected to azo distillation which continious removal of water. After complete azo distillation, reaction mass is cooled to room temperature, and sodium hydroxide solution is added layers were separated and organic layer is taken for distillation 4-Hydroxybenzonitrile (HBN) crude is separated as solid which was centrifuged and dried. The crude is dissolved in Methanol and treated with carbon. Water is added to carbon treated Methanol ML's for precipitation of 4-Hydroxybenzonitrile (HBN). The separated solid washed with Methanol/water and dried.

Flow Chart



PRODUCT : 4-Nitro-N-Methyl Phthalimide (4-NPI)

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Phthallic Anhydride	1	148
Monomethylamine	1	31
Total Input	=	179

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	161
Water	1	18
Total Output	=	179

Material Balance:

INPUT		Kg
Phthallic Anhydride	=	780
Monomethylamine	=	180
Total Input	=	960

OUTPUT		Kg
Product		
Stage-1	=	832
Aqueous		
Effluent	=	111.37
(Organic Compound 16.51, gen.water 94.86)		
Process Emissions		
Process Emissions	=	16.63
(Monomethylamine)		
Total Output	=	960

PRODUCT : 4-Nitro-N-Methyl Phthalimide (4-NPI)

Stage : 2

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	161
Nitric acid	1	63
Total Input	=	224

OUTPUT	No. of moles	Mol. Wt.
4-Nitro-N-Methyl Phthalimide	1	206
Water	1	18
Total Output	=	224

Material Balance:

INPUT		Kg
Stage-1	=	832
Nitric acid	=	500
Sulfuric acid	=	2327
Water	=	14990
Total Input	=	18649

OUTPUT		Kg
Product		
4-Nitro-N-Methyl Phthalimide	=	1000
Spent Sulfuric Acid (by-product)		
Spent Sulfuric Acid	=	17649
(Nitric acid 174.43, Sulfuric acid 2327, Organic Compound 64.55, gen.water 93.02, Water 14990)		
Total Output	=	18649

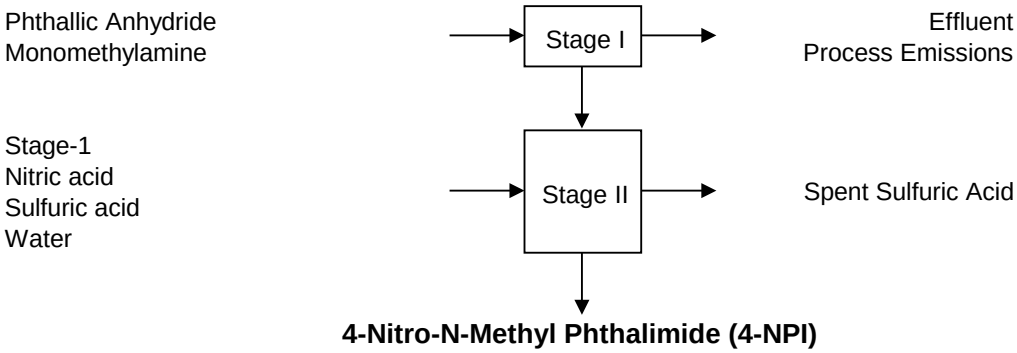
PRODUCT : 4-Nitro-N-Methyl Phthalimide (4-NPI)

Description :

Stage-1 : Phthallic Anhydride is reacted with Monomethylamine to get Stage-1 Compound.

Stage-2 : Stage-1 Compound undergoes nitration with Nitric acid in presence of Sulfuric acid. The Product 4-Nitro-N-Methyl Phthalimide (4-NPI) is isolated by quenching the reaction mass in water.

Flow Chart



PRODUCT : Sumatriptan Succinate

Stage : 1
Mole Balance:

INPUT	No. of moles	Mol.Wt.
4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride	1	251.5
4-Chloro Butyraldehyde Sodium Bisulphite Adduct	1	210.5
Sodium Carbonate	1	106
Total Input	=	568

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	286.5
Sodium Bicarbonate	1	84
Sodium Bisulfite	1	104
Sodium Chloride	1	58.5
Ammonium Hydroxide	1	35
Total Output	=	568

Material Balance:

INPUT		Kg
4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride	=	60
4-Chloro Butyraldehyde Sodium Bisulphite Adduct	=	50
Sodium Carbonate	=	30
Methylene Dichloride	=	500
Vacum Salt	=	25
Sodium Bicarbonate	=	30
Carbon	=	3
Ethyl Acetate	=	325
Water	=	1500
Total Input	=	2523

OUTPUT		Kg
Product		
Stage-1	=	50
Recovery		
Methylene Dichloride	=	470
Methylene Dichloride Loss	=	25
Ethyl Acetate	=	300
Ethyl Acetate Loss	=	17
Aqueous		
Effluent	=	1623.6
(Sodium Bicarbonate 44.7, Sodium Bisulfite 18.1, Sodium Chloride 10.2, Ammonium Hydroxide 6.1, Sodium Carbonate 11.5, Ethyl Acetate 8, Vacum Salt 25, Water 1500)		
Organic Residue		
Unreacted Organic Impurities	=	34.4
(Organic Impurities 29.4, Methylene Dichloride 5)		
Spent Carbon		
Spent Carbon	=	3
(Carbon)		
Total Output	=	2523

PRODUCT : Sumatriptan Succinate

Stage : 2

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	286.5
Dimethylamine	1	45
Sodium Carbonate	1	106
Total Input	=	437.5

OUTPUT	No. of moles	Mol. Wt.
Stage-2	1	295
Sodium Chloride	1	58.5
Sodium Bicarbonate	1	84
Total Output	=	437.5

Material Balance:

INPUT		Kg
Stage-1	=	50
Dimethylamine (40%)	=	25
Potassium Iodide	=	30
Ethyl Acetate	=	300
Sodium Carbonate	=	20
Vacum Salt	=	25
Carbon	=	2
Acetone	=	500
Water	=	1000
Total Input	=	1952

OUTPUT		Kg
Product		
Stage-2	=	42
Recovery		
Ethyl Acetate	=	280
Ethyl Acetate Loss	=	14
Acetone	=	465
Acetone Loss	=	20
Aqueous		
Effluent	=	1114.8
(Sodium Chloride 8.3, Sodium Bicarbonate 12, Sodium Carbonate 4.9, Vacum Salt 25, Potassium Iodide 30, Dimethylamine 3.6, Acetone 10, Ethyl Acetate 6, Water from Dimethylamine 15, Water 1000)		
Organic Residue		
Unreacted Organic Impurities	=	14.2
(Organic Impurities 9.2, Acetone 5)		
Spent Carbon		
Spent Carbon	=	2
(Carbon)		
Total Output	=	1952

PRODUCT : Sumatriptan Succinate

Stage : 3
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-2	1	295
Succinic Acid	1	118
Total Input	=	413

OUTPUT	No. of moles	Mol. Wt.
Sumatriptan Succinate	1	413
Total Output	=	413

Material Balance:

INPUT		Kg
Stage-2	=	42
Methanol	=	300
Succinic Acid	=	17
Isopropyl Alcohol	=	350
Total Input	=	709

OUTPUT		Kg
Product		
Sumatriptan Succinate	=	50
Recovery		
Methanol	=	282
Methanol Loss	=	15
Isopropyl Alcohol	=	330
Isopropyl Alcohol Loss	=	17
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 9, Methanol 3, Isopropyl Alcohol 3)	=	15
Total Output	=	709

PRODUCT : Sumatriptan Succinate

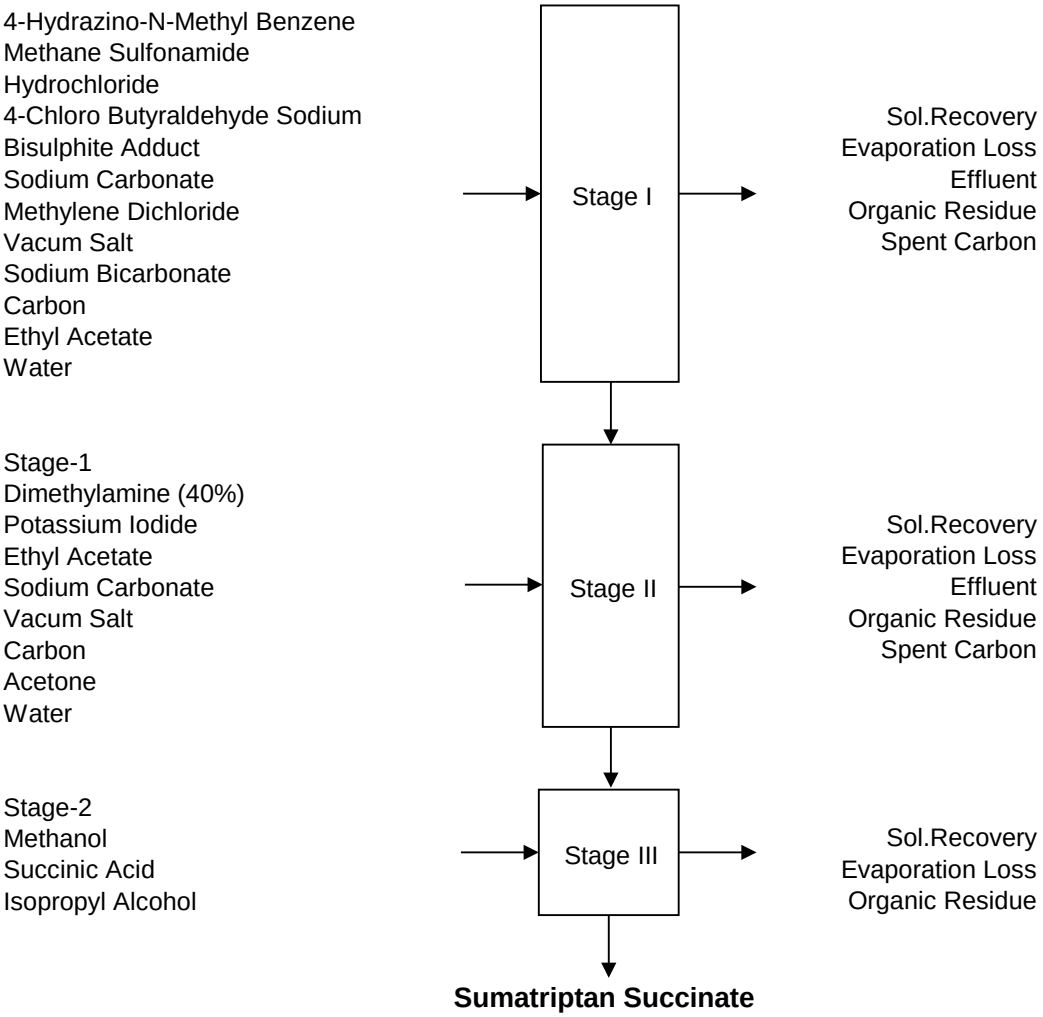
Description :

Stage-1 : First stage is the condensation of 4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride with 4-Chloro Butyraldehyde Sodium Bisulphite Adduct in presence of Sodium Carbonate in Methylene Dichloride and Ethyl Acetate as solvent media to get Stage-1 Compound.

Stage-2 : Second stage is the reaction of Stage-1 Compound with Dimethylamine solution in presence of Sodium Carbonate and Ethyl Acetate as solvent media to give Sumatriptan.

Stage-3 : Third stage is the reaction of Sumatriptan with Succinic Acid in presence of Methanol and Isopropyl Alcohol solvent media to give Sumatriptan Succinate.

Flow Chart



PRODUCT : 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride	1	251.5
4-Chloro Butyraldehyde Sodium Bisulphite Adduct	1	210.5
Sodium Hydroxide	3	120
Total Input	=	582

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	267
Sodium Chloride	2	117
Sodium Sulfate	1	142
Water	3	54
Hydrogen	1	2
Total Output	=	582

Material Balance:

INPUT		Kg
4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride	=	2428
4-Chloro Butyraldehyde Sodium Bisulphite Adduct	=	2112
S-139	=	340
Hyflo	=	364
Isopropyl Alcohol	=	18210
S-139	=	421
Sodium Hydroxide	=	1738
Methylene Dichloride	=	29860
Sodium Chloride	=	2555
Water	=	40660
Total Input	=	98688

OUTPUT		Kg
Product		
Stage-1	=	1457
Recovery		
Isopropyl Alcohol	=	16935
Isopropyl Alcohol Loss	=	910
Methylene Dichloride	=	27471
Methylene Dichloride Loss	=	1792
Aqueous		
Effluent	=	47181.24
(Sodium Chloride 3684.53, Sodium Sulfate 1370.88, Sodium Hydroxide 579.51, Isopropyl Alcohol 365, gen.water 521.32, Water 40660)		
Organic Residue		
Unreacted Organic Impurities	=	1797.46
(Organic Impurities 1200.46, Methylene Dichloride 597)		
Inorganic Solid Waste		
Inorgainc Solid Waste	=	1125
(Hyflo 364, S-139 340, S-139 421)		
Process Emissions		
Process Emissions	=	19.3
(Hydrogen)		
Total Output	=	98688

PRODUCT : 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide

Stage : 2

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	267
Formaldehyde	2	60
Sodium Borohydride	1	38
Total Input	=	365

OUTPUT	No. of moles	Mol. Wt.
3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide	1	295
Sodium Metaborate	1	66
Hydrogen	2	4
Total Output	=	365

Material Balance:

INPUT		Kg
Stage-1	=	1457
Methanol	=	14570
Formaldehyde (37%)	=	7868
Sodium Borohydride	=	1166
Potassium Carbonate	=	3610
Sodium Hydroxide (48%)	=	102
Hydrochloric acid (35%)	=	2856
Water	=	47880
Total Input	=	79509

OUTPUT		Kg
Product		
3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide (Crude)	=	1428
Recovery		
Methanol	=	13550
Methanol Loss	=	728
Aqueous		
Effluent	=	62675.98
(Sodium Metaborate 2025.17, Sodium Chloride 71.6, Potassium Chloride 1949.08, Potassium Carbonate 1804.81, Formaldehyde 2583.74, Methanol 146, gen. water 257.49, Water from Sodium Hydroxide 53.04, Water from Hydrochloric acid 1856.4, Water from Formaldehyde 4956.84, Water 46971.81)		
Organic Residue		
Unreacted Organic Impurities	=	327.79
(Organic Impurities 181.79, Methanol 146)		
Process Emissions		
Process Emissions	=	799.23
(Hydrogen 223.65, Carbon Dioxide 575.58)		
Total Output	=	79509

PRODUCT : 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide

Stage : 3 (Purification)
Material Balance:

INPUT		Kg
3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide (Crude)	=	1428
Acetone	=	14280
Carbon	=	857
Hyflo	=	114
Total Input	=	16679

OUTPUT		Kg
Product		
3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide (Pure)	=	1000
Recovery		
Acetone	=	13280
Acetone Loss	=	714
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 428, Acetone 286)	=	714
Spent Carbon		
Spent Carbon (Carbon 857, Hyflo 114)	=	971
Total Output	=	16679

PRODUCT : 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide

Description :

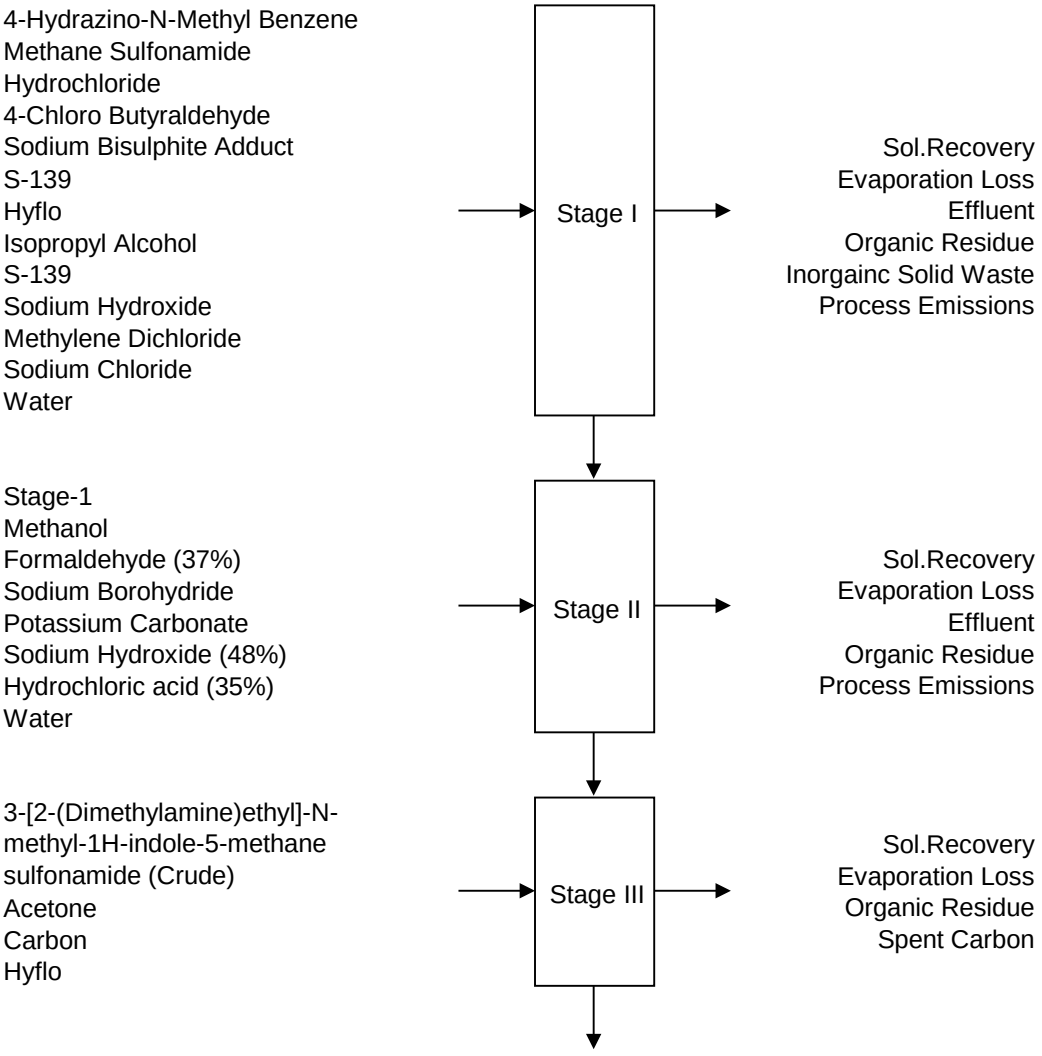
Stage-1 : 4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride is condensed with 4-Chloro Butyraldehyde Sodium Bisulphite Adduct in Isopropyl Alcohol/water under reflux. After completion of reaction, Isopropyl Alcohol/water mixture is distilled off and pH is adjusted with Potassium Carbonate and filtered through hyflo to remove salts. The filtrate is extracted twice with Methylene Dichloride and Methylene Dichloride layer is separated. To the aqueous layer, Sodium Chloride is added to precipitate the Stage-1 Material which is centrifuged and dried.

Stage-2 : Stage-1 Material is dissolved in Methanol and treated with Formaldehyde solution and Sodium Borohydride solution. After completion of the reaction, pH is adjusted to 7-7.5 with Hydrochloric acid and Methanol/water is distilled off. Potassium Carbonate is added where the Crude form of 3-[2-(Dimethylamine) ethyl]-N-methyl-1H-indole-5-methane sulfonamide is precipitated, centrifuged and dried.

Stage-3 : The Crude 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide produced in the second stage is treated with Carbon in Acetone medium and filtered. The Acetone is distilled off and reaction mass is cooled and the product is isolated in a centrifuge. Again the wet cake is taken in Acetone and the process is repeated. The wet cake is dried to produce Pure 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide.

PRODUCT : 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide

Flow Chart



PRODUCT : Ciprofloxacin Hydrochloride

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Q.Acid	1	281.5
Piperazine	2	172
Total Input	=	453.5

OUTPUT	No. of moles	Mol. Wt.
Ciprofloxacin	1	331
Piperazine Hydrochloride	1	122.5
Total Output	=	453.5

Material Balance:

INPUT		Kg
Q.Acid	=	470
Piperazine	=	327.5
Hydrochloric Acid (35%)	=	48.5
Acetic acid	=	107.5
Ammonium Hydroxide (25%)	=	250
Carbon	=	16
EDTA	=	1
Hyflo	=	4.5
Water	=	2562.5
Methanol	=	120
Total Input	=	3907.5

OUTPUT		Kg
Product		
Ciprofloxacin Base Pure (470 + 370)	=	840
Recovery		
Methanol	=	111.5
Methanol Loss	=	8.5
Aqueous Send to Auth.Party		
Aqueous Send to Auth.Party	=	2927
(Piperazine Hydrochloride 262, Ammonium Acetate 138, gen.water 32, EDTA 1, Water from Ammonium Hydroxide 187.5, Organic Compound 82.5, Water from Hydrochloric Acid 31.5, Water 2192.5)		
Spent Carbon		
Spent Carbon (Carbon 16, Hyflo 4.5)	=	20.5
Total Output	=	3907.5

PRODUCT : Ciprofloxacin Hydrochloride

Stage : 2
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Ciprofloxacin	1	331
Hydrochloric acid	1	36.5
Water	1	18
Total Input	=	385.5

OUTPUT	No. of moles	Mol. Wt.
Ciprofloxacin Hydrochloride	1	385.5
Total Output	=	385.5

Material Balance:

INPUT		Kg
Ciprofloxacin Base Pure (470 + 370)	=	840
Hydrochloric acid (36%)	=	180
Methanol	=	1777.5
Water	=	416
Total Input	=	3213.5

OUTPUT		Kg
Product		
Ciprofloxacin Hydrochloride	=	500
Recovery		
Methanol	=	1653.5
Methanol Loss	=	88.5
Aqueous		
Effluent	=	924
(Hydrochloric Acid 13, Methanol 35.5, Water from Hydrochloric Acid 115, Water from Base pure 370, Water 390.5)		
Organic Residue		
Unreacted Organic Impurities (Organic Impurities)	=	47.5
Total Output	=	3213.5

PRODUCT : Ciprofloxacin Hydrochloride

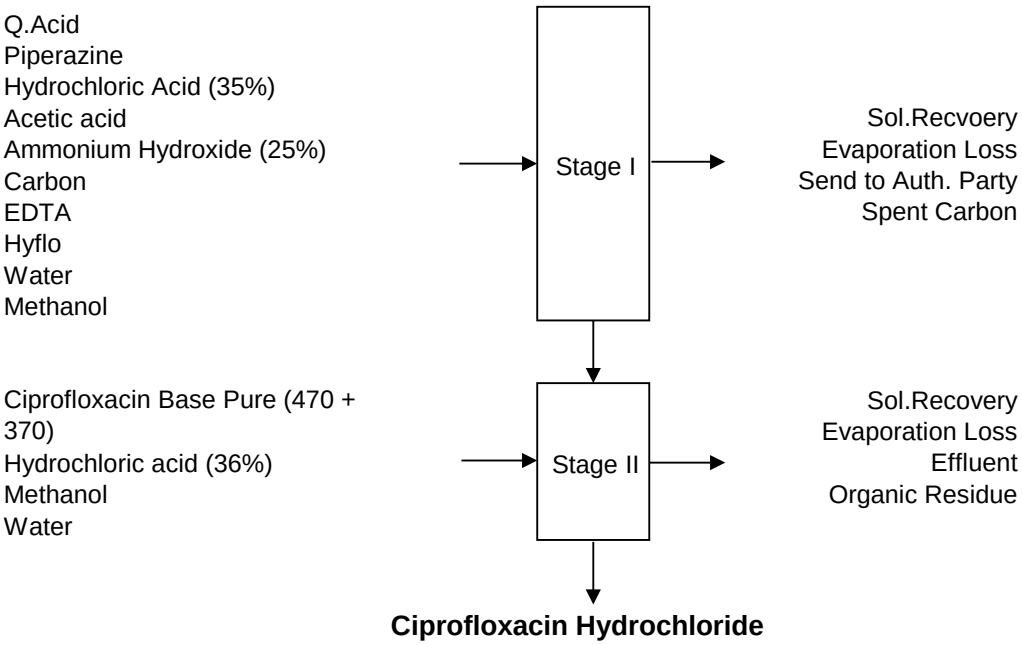
Description :

Stage-1 : Methanol was used as a solvent. Initially solvent was taken into the reactor, piperazine and Q-Acid material added. Then heated to 120-125^{o}C.Reaction mass was maintained 15hrs at 125-130^{o}C. Completion of the reaction mass checked. Then Base pure ml's (as a water input) was added to the mass and distill out the solvent completely. Adjust the pH was neutral (6.9 to 7.2) by using hydrochloric acid and centrifuge the material and washed with hot water.

After that water charged into the reactor and added that material. Then adjust the pH up to 4.2 to 4.5 by using acetic acid, added carbon, EDTA, hyflo maintained 30 minutes filtered and collect the clear filtrate and adjust pH neutral (6.9 to 7.2) by using ammonia solution at 55 to 60^{o}C. Then centrifuge the mass at 55-60^{o}C and washed with hot water. Collect the material.

Stage-2 : Initially, required quantity of methanol was taken in the reactor at RT and added Stage-I material. Then adjust pH 2 to 2.5 by using cp HCl. Heated the reaction mass to 60-65^{o}C. Maintained 3 hrs with in 60-65^{o}C. Then the mass was cooled to 10-15^{o}C, maintained 1 hr at 10-15^{o}C. The mass was centrifuded to separate methanol ml's and technical grade of Ciproflaxacin Hydrochloride.

Flow Chart



PRODUCT : Metformin Hydrochloride

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Dicyanodiamide	1	84
Dimethylamine Hydrochlorde	1	81.5
Total Input	=	165.5

OUTPUT	No. of moles	Mol. Wt.
Metformin Hydrochloride	1	165.5
Total Output	=	165.5

Material Balance:

INPUT		Kg
Dicyanodiamide	=	630
Dimethylamine Hydrochlorde	=	650
Dimethylformamide	=	1470
Isopropyl Alcohol	=	1000
Total Input	=	3750

OUTPUT		Kg
Product		
Metformin Hydrochloride	=	1000
Recovery		
Dimethylformamide	=	1400
Dimethylformamide Loss	=	55
Isopropyl Alcohol	=	950
Isopropyl Alcohol Loss	=	40
Organic Residue		
Unreacted Organic Impurities	=	305
(Organic Impurities 241.25, Dimethylformamide 15, Dimethylamine Hydrochloride 38.75, Isopropyl Alcohol 10)		
Total Output	=	3750

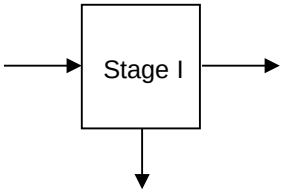
PRODUCT : Metformin Hydrochloride

Description :

Stage-1 : This product is obtained in a single step by condensing Dicyanodiamide with Dimethylamine Hydrochloride in Dimethylformamide and Isopropyl Alcohol as a solvent at 150^{o}C to get Metformin Hydrochloride.

Flow Chart

Dicyanodiamide
Dimethylamine Hydrochlorde
Dimethylformamide
Isopropyl Alcohol



Sol.Recovery
Evaporation Loss
Organic Residue

Metformin Hydrochloride

PRODUCT : Venlafaxine Hydrochloride

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
1-[-Amino-1-(4-methoxy Phenyl) ethyl] Cyclohexanol	1	249
Formic Acid	2	92
Formaldehyde	2	60
Hydrochloric Acid	1	36.5
Total Input	=	437.5

OUTPUT	No. of moles	Mol. Wt.
Venlafaxine Hydrochloride	1	313.5
Carbon Dioxide	2	88
Water	2	36
Total Output	=	437.5

Material Balance:

INPUT		Kg
1-[-Amino-1-(4-methoxy Phenyl) ethyl] Cyclohexanol	=	95
Formaldehyde (40%)	=	58
Formic Acid	=	58
Ethyl Acetate	=	950
Sodium Sulfate	=	10
Isopropyl Alcohol Hydrochloride (20%)	=	70
Water	=	475
Total Input	=	1716

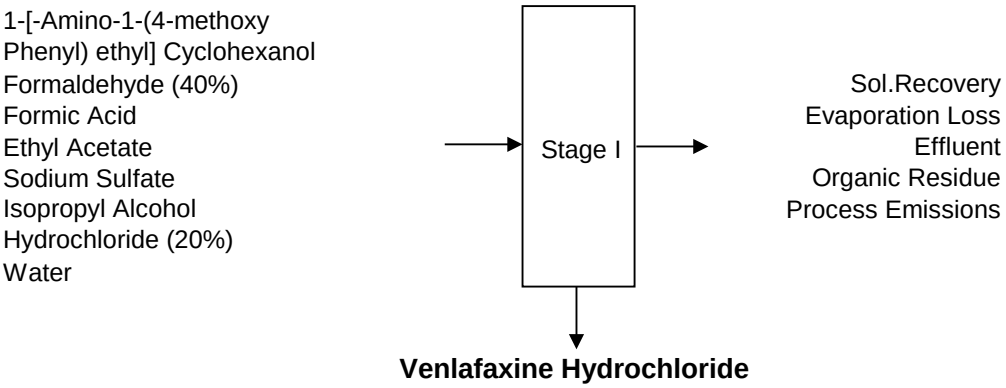
OUTPUT		Kg
Product		
Venlafaxine Hydrochloride	=	100
Recovery		
Ethyl Acetate	=	895
Ethyl Acetate Loss	=	40
Isopropyl Alcohol	=	52
Isopropyl Alcohol Loss	=	2
Aqueous		
Effluent	=	572
(Sodium Sulfate 10, Ethyl Acetate 15, Formic Acid 23, gen.water 14, Water from Formaldehyde 35, Water 475)		
Organic Residue		
Unreacted Organic Impurities	=	22
(Organic Impurities 20, Isopropyl Alcohol 2)		
Process Emissions		
Process Emissions	=	33
(Carbon Dioxide)		
Total Output	=	1716

PRODUCT : Venlafaxine Hydrochloride

Description :

Stage-1 : 1-[2-Amino-1-(4-methoxy phenyl)ethyl] cyclohexanol product is methylated using Formic acid and formaldehyde in presence of ethyl acetateat 90-95^{o}C. The resultant base is dried over sodium sulphate and finally treated with Hydrochloric Acid in Isopropyl Alcohol to get Venlafaxine Hydrochloride.

Flow Chart



PRODUCT : Sertraline Hydrochloride

Stage : 1
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Tetralone	1	291
Monomethylamine	1	31
Total Input	=	322

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	304
Water	1	18
Total Output	=	322

Material Balance:

INPUT		Kg
Tetralone	=	480
Methanol	=	1000
Monomethylamine solution (25%) in Methanol	=	850
Total Input	=	2330

OUTPUT		Kg
Product		
Stage-1	=	477
Recovery		
Methanol+Monomethylamine (1571 + 155)	=	1726
Methanol loss	=	50
Aqueous		
Effluent (Monomethylamine 0.4, Methanol 0.5, Organic Compound 0.4, gen.water 29.7)	=	31
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 24, Monomethylamine 6, Methanol 16)	=	46
Total Output	=	2330

PRODUCT : Sertraline Hydrochloride

Stage : 2
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	4	1216
Sodium Borohydride	1	38
Hydrochloric Acid	4	146
Water	4	72
Total Input	=	1472

OUTPUT	No. of moles	Mol. Wt.
Stage-2	4	1370
Sodium Hydroxide	1	40
Boric Acid	1	62
Total Output	=	1472

Material Balance:

INPUT		Kg
Stage-1	=	477
Methanol	=	3200
Sodium Borohydride	=	17.8
Hydrochloric Acid (35%)	=	166.7
Water	=	954
Total Input	=	4815.5

OUTPUT		Kg
Product		
Stage-2	=	240
Recovery		
Methanol	=	3008
Methanol loss	=	128
Aqueous		
Effluent	=	1120.1
(Sodium Hydroxide 15.7, Sodium Borohydride 2.9, Boric Acid 24.3, Methanol 42, Hydrochloric Acid 1, Water from Hydrochloric Acid 108.4, Water 925.8)		
Organic Residue		
Unreacted Organic Impurities	=	319.4
(Organic Impurities 57.4, Trans compound 240, Methanol 22)		
Total Output	=	4815.5

PRODUCT : Sertraline Hydrochloride

Stage : 3
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-2	1	342.5
Ammonia	1	17
Mandelic acid	1	152
Total Input	=	511.5

OUTPUT	No. of moles	Mol. Wt.
Stage-3	1	458
Ammonium Chloride	1	53.5
Total Output	=	511.5

Material Balance:

INPUT		Kg
Stage-2	=	240
Ethyl Acetate	=	1500
Ammonia solution (18%)	=	111
Mandelic acid	=	115
Ethanol	=	1800
Water	=	720
Total Input	=	4486

OUTPUT		Kg
Product		
Stage-3	=	145
Recovery		
Ethyl Acetate	=	1420
Ethyl Acetate loss	=	60
Ethanol	=	1721
Ethanol loss	=	72
Mandalic acid	=	8.5
Aqueous		
Effluent	=	871.6
(Ammonium Chloride 37.5, Ammonia 8.1, Ethyl Acetate 15, Water from Ammonia solution 91, Water 720)		
Organic Residue		
Unreacted Organic Impurities	=	187.9
(Organic Impurities 30.9, S-Isomer 145, Ethyl Acetate 5, Ethanol 7)		
Total Output	=	4486

PRODUCT : Sertraline Hydrochloride

Stage : 4
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-3	1	458
Sodium Hydroxide	1	40
Hydrochloric Acid	1	36.5
Total Input	=	534.5

OUTPUT	No. of moles	Mol. Wt.
Sertraline Hydrochloride	1	342.5
Mandalic Acid	1	174
Water	1	18
Total Output	=	534.5

Material Balance:

INPUT		Kg
Stage-3	=	145
Ethyl Acetate	=	1500
Sodium Hydroxide	=	25.5
Activated Carbon	=	3
Hydrochloric Acid (35%)	=	32.9
Hyflo	=	5
Water	=	667
Total Input	=	2378.4

OUTPUT		Kg
Product		
Sertraline Hydrochloride	=	100
Recovery		
Ethyl Acetate	=	1420
Ethyl Acetate loss	=	60
Sodium salt of Mandalic Acid	=	55.1
Aqueous		
Effluent	=	721.9
(Sodium Hydroxide 12.8, Ethyl Acetate 15, gen. water 5.7, Water from Hydrochloric Acid 21.4, Water 667)		
Organic Residue		
Unreacted Organic Impurities	=	13.4
(Organic Impurities 8.4, Ethyl Acetate 5)		
Spent Carbon		
Spent Carbon	=	8
(Carbon 3, Hyflo 5)		
Total Output	=	2378.4

PRODUCT : Sertraline Hydrochloride

Description :

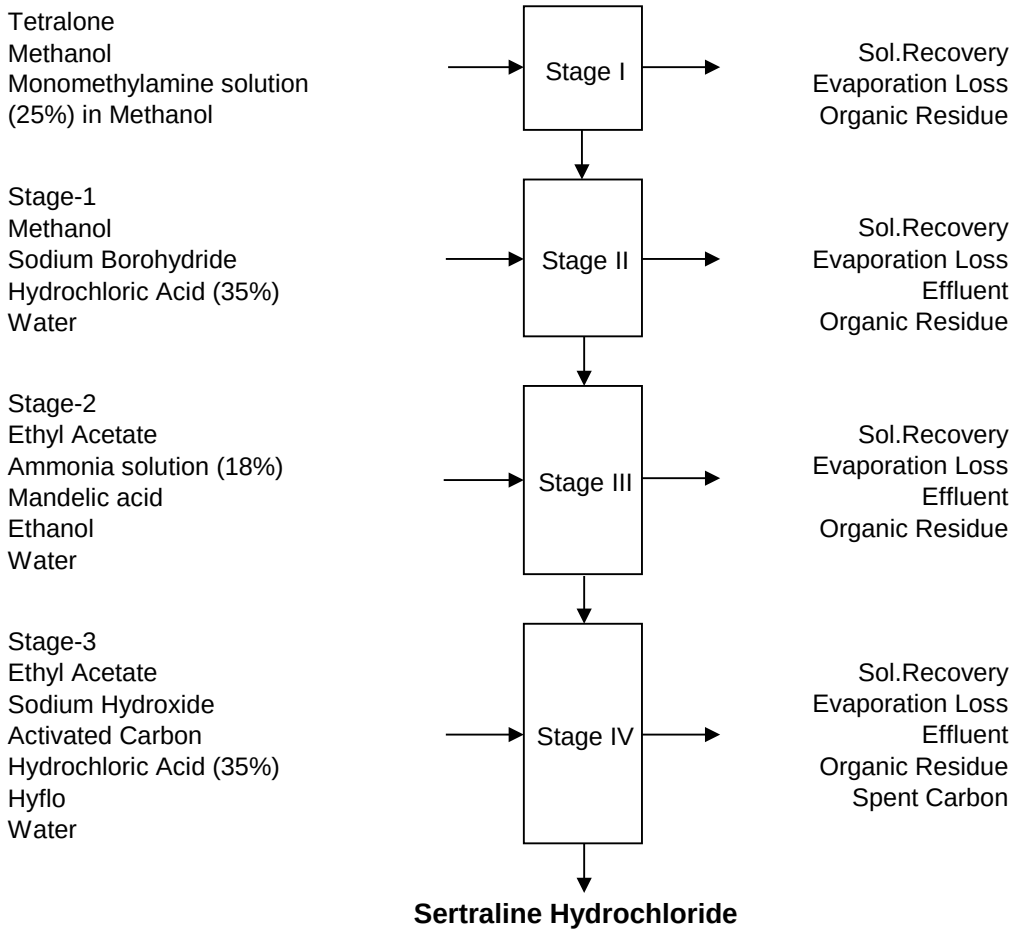
Stage-1 : Tetralone on reaction with Monomethylamine in Methanol gives Schiff Base.

Stage-2 : Schiff Base is reduced with Sodium Borohydride in Methanol media and neutralized with Hydrochloric Acid to give Cis-Racemate Hydrochloride.

Stage-3 : Cis-Racemate Hydrochloride is reacted with Mandelic acid in Ethyl Acetate solvent media to get Crude Sertraline Mandelate salt. Crude Sertraline Mandelate salt is purified with Ethanol to get Pure Sertraline Mandelate salt.

Stage-4 : The Pure Sertraline Mandelate salt is neutralized with Sodium Hydroxide and Sertraline extracted into Ethyl Acetate. Addition of Hydrochloric Acid to Ethyl Acetate extract of Sertraline gives Sertraline Hydrochloride.

Flow Chart



PRODUCT : Celecoxib

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
4-Acetamidobenzene Sulfonyl Chloride	1	233.5
Ammonia	2	34
Total Input	=	267.5

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	214
Ammonium Chloride	1	53.5
Total Output	=	267.5

Material Balance:

INPUT		Kg
4-Acetamidobenzene Sulfonyl Chloride	=	130
Ammonia Solution (20%)	=	234
Water	=	325
Total Input	=	689

OUTPUT		Kg
Product		
Stage-1	=	110
Aqueous		
Effluent	=	579
(Ammonium Chloride 29.79, Ammonia 27.87, Organic Compound 9.14, Water form Ammonia Solution 187.2, Water 325)		
Total Output	=	689

PRODUCT : Celecoxib

Stage : 2
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	214
Water	1	18
Total Input	=	232

OUTPUT	No. of moles	Mol. Wt.
Stage-2	1	172
Acetic Acid	1	60
Total Output	=	232

Material Balance:

INPUT		Kg
Stage-1	=	110
Hydrochloric Acid (35%)	=	125
Ammonia Solution (20%)	=	125
Water	=	650
Total Input	=	1010

OUTPUT		Kg
Product		
Stage-2	=	80
Aqueous		
Effluent	=	930
(Ammonium Chloride 64.13, Ammonia 4.62, Acetic Acid 30.84, Organic Compound 8.41, Water form Ammonia Solution 100, Water from Hydrochloric Acid 81.25, Water 640.75)		
Total Output	=	1010

PRODUCT : Celecoxib

Stage : 3

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-2	1	172
Sodium Nitrite	1	69
Hydrochloric Acid	6	219
Sodium Sulfite	2	252
Total Input	=	712

OUTPUT	No. of moles	Mol. Wt.
Stage-3	1	223.5
Sodium Chloride	5	292.5
Sulfuric Acid	2	196
Total Output	=	712

Material Balance:

INPUT		Kg
Stage-2	=	80
Sodium Nitrite	=	33
Hydrochloric Acid (35%)	=	320
Sodium Sulfite	=	120
Isopropyl Alcohol	=	240
Water	=	1200
Total Input	=	1993

OUTPUT		Kg
Product		
Stage-3	=	80
Recovery		
Isopropyl Alcohol	=	224
Isopropyl Alcohol Loss	=	10
Aqueous		
Effluent	=	1679
(Sodium Chloride 136.05, Sulfuric Acid 91.16, Sodium Nitrite 0.91, Hydrochloric Acid 10.14, Sodium Sulfite 2.79, Isopropyl Alcohol 6, Orgaic Compound 23.95, Water form Hydrochloric Acid 208, Water 1200)		
Total Output	=	1993

PRODUCT : Celecoxib

Stage : 4
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Methyl trifluoro acetate	1	128
4-Methyl Acetophenone	1	134
Total Input	=	262

OUTPUT	No. of moles	Mol. Wt.
Stage-4	1	230
Methanol	1	32
Total Output	=	262

Material Balance:

INPUT		Kg
Methyl trifluoro acetate	=	58
4-Methyl Acetophenone	=	61
Sodium Methoxid (25%)	=	100
Methyl Isobutyl Ketone	=	180
Hydrochloric Acid (15%)	=	175
Sodium Chloride(10%)	=	200
Sodium Sulfate	=	10
Total Input	=	784

OUTPUT		Kg
Product		
Stage-4	=	80
Recovery		
Methyl Isobutyl Ketone	=	169
Methyl Isobutyl Ketone Loss	=	7
Aqueous		
Effluent	=	501.5
(Sodium Chloride 47.08, Hydrochloric Acid 9.35, Sodium Sulfate 10, Methanol 29.32, Methyl Isobutyl Ketone 2, Water form Sodium Methoxide 75, Water form Hydrochloric Acid 148.75, Water form Sodium Chloride 180)		
Organic Residue		
Unreacted Organic Impurities	=	26.5
(Organic Impurities 24.5, Methyl Isobutyl Ketone 2)		
Total Output	=	784

PRODUCT : Celecoxib

Stage : 5

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-3	1	223.5
Stage-4	1	230
Total Input	=	453.5

OUTPUT	No. of moles	Mol. Wt.
Celecoxib	1	381
Water	2	36
Hydrogen Chloride	1	36.5
Total Output	=	453.5

Material Balance:

INPUT		Kg
Stage-3	=	80
Stage-4	=	80
Ethanol	=	800
Ethyl Acetate	=	800
Sodium Chloride (10%)	=	100
Sodium Sulfate	=	20
Water	=	200
Total Input	=	2080

OUTPUT		Kg
Product		
Celecoxib	=	100
Recovery		
Ethanol	=	760
Ethanol Loss	=	32
Ethyl Acetate	=	755
Ethyl Acetate Loss	=	32
Aqueous		
Effluent (Sodium Chloride 10, Sodium Sulfate 20, Ethyl Acetate 8, gen.water 12.52, Water from Sodium Chloride 90, Water 200)	=	340.52
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 32.52, Stage-4 2.26, Ethanol 8, Ethyl Acetate 5)	=	47.78
Process Emissions		
Process Emissions (Hydrogen Chloride)	=	12.7
Total Output	=	2080

PRODUCT : Celecoxib

Description :

Stage-1 : The first stage invloves the condensation of 4-Acetamidobenzene Sulfonyl Chloride with aquous Ammonia solution to give 4-Acetamidobenzene sulfonamide.

Stage-2 : In this stage 4-Acetamidobenzene sulfonamide is hydrolysed by water in the presence of Hydrochloric Acid to give 4-Aminobenzene sulfonamide.

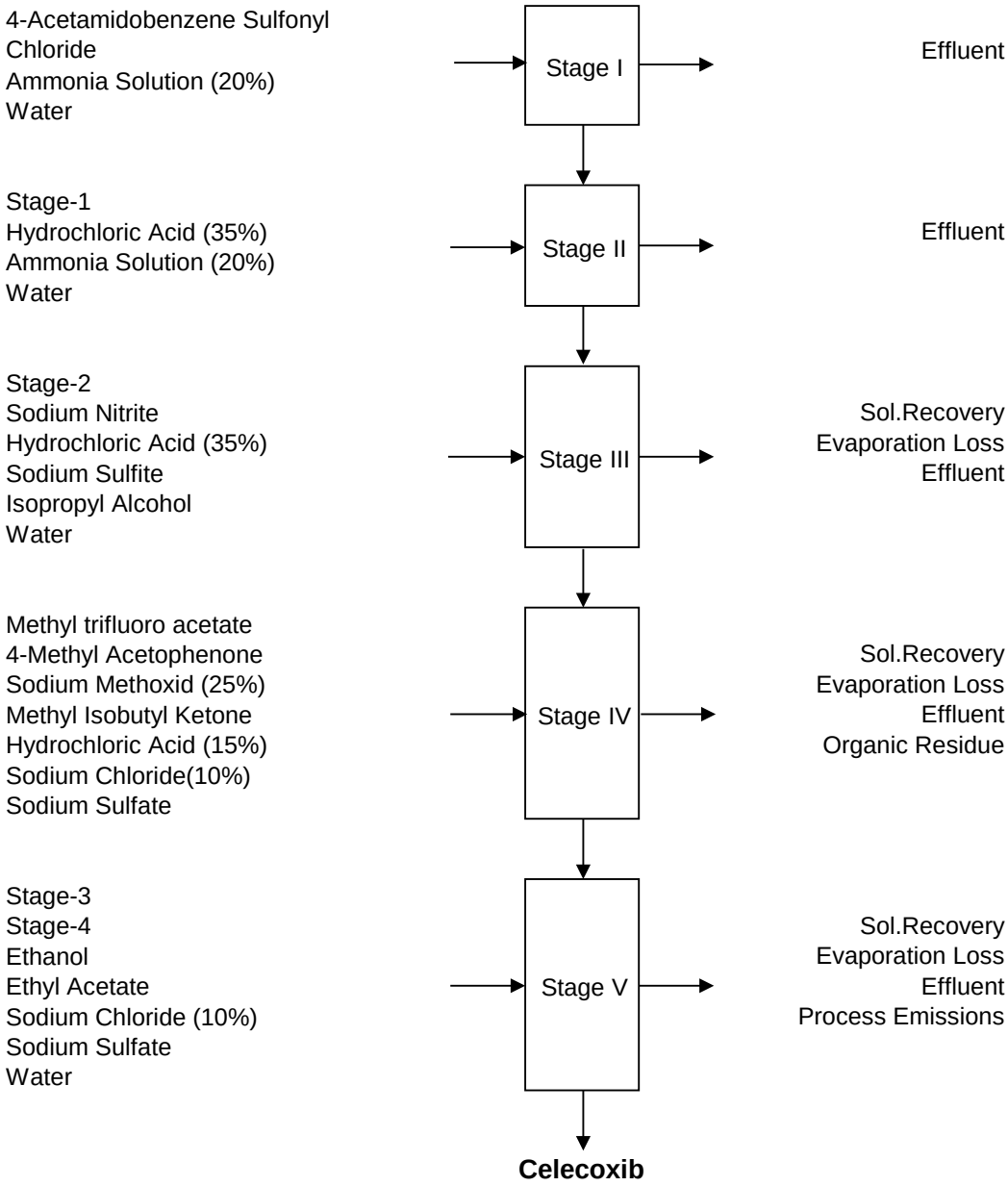
Stage-3: 4-Aminobenzene sulfonamide is diazotised using Hydrochloric Acid and Sodium Nitrite to get 4-Sulfonamide benzene diazonium chloride. This solution is added to a solution of Sodium Sulfite under reflux where by diazonicam chloride is reduced to 4-Sulfonamido Phenyl Hydrazine Hydrochlroide.

Stage-4 : The fourth Stage is the preparation of 4,4,4-Trifluoro-1-(4-methyl phenyl) butane-1,3-dione by the condensation of Methyl trifluoro acetate and 4-Methyl Acetophenone in the presence of Sodium Methoxide and using Methyl Isobutyl Ketone as solvent.

Stage-5 : 4-Sulfonamido Phenyl Hydrazine Hydrochlroide and 4,4,4-Trifluoro-1-(4-methyl phenyl) butane-1,3-dione are condensed in Ethanol and aqueous Sodium Chloride to get Celecoxib.

PRODUCT : Celecoxib

Flow Chart



PRODUCT : Clopidogrel Hydrogen Bisulfate

Stage : 1
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Thiophene Ethanol	1	128
Thionyl Chloride	1	119
Ammonia	1	17
Total Input	=	264

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	127
Sulfur Dioxide	1	64
Hydrogen Chloride	2	73
Total Output	=	264

Material Balance:

INPUT		Kg
Thiophene Ethanol	=	200
Thionyl Chloride	=	186
Toluene	=	1000
Ammonia (25%) solution	=	200
Water	=	2000
Total Input	=	3586

OUTPUT		Kg
Product		
Stage-1	=	180
Recovery		
Toluene	**=**	940
Toluene Loss	**=**	40
Aqueous		
Effluent	=	2175
(Ammonia 24, Toluene 1, Water from Ammonia solution 150, Water 2000)		
Organic Residue		
Unreacted Organic Impurities	=	37
(Organic Impurities 18, Toluene 19)		
Process Emissions		
Process Emissions	=	214
(Sulfur Dioxide 100, Hydrogen Chloride 114)		
Total Output	=	3586

PRODUCT : Clopidogrel Hydrogen Bisulfate

Stage : 2

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	127
Methyl-2-Bromo-O-Chloro Phenyl Acetate	1	263.5
Sodium Hydroxide	1	40
Total Input	=	430.5

OUTPUT	No. of moles	Mol. Wt.
Stage-2	1	309.5
Sodium Bromide	1	103
Water	1	18
Total Output	=	430.5

Material Balance:

INPUT		Kg
Stage-1	=	180
Methyl-2-Bromo-O-Chloro Phenyl Acetate	=	374
Sodium Hydroxide	=	60
Methanol	=	900
Water	=	900
Total Input	=	2414

OUTPUT		Kg
Product		
Stage-2	=	400
Recovery		
Methanol	=	846
Methanol Loss	=	36
Aqueous		
Effluent	=	1094
(Sodium Bromide 146, Sodium Hydroxide 4, gen. water 26, Methanol 18, Water 900)		
Organic Residue		
Unreacted Organic Impurities (Orgnaic Impurities)	=	38
Total Output	=	2414

PRODUCT : Clopidogrel Hydrogen Bisulfate

Stage : 3
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-2	1	309.5
Formaldehyde	1	30
Total Input	=	339.5

OUTPUT	No. of moles	Mol. Wt.
DL-Clopidogrel Base	1	321.5
Water	1	18
Total Output	=	339.5

Material Balance:

INPUT		Kg
Stage-2	=	400
Formaldehyde (37%)	=	140
Hydrochloric Acid (35%)	=	140
Methanol	=	720
Sodium Hydroxide	=	54
Water	=	720
Total Input	=	2174

OUTPUT		Kg
Product		
DL-Clopidogrel Base	=	360
Recovery		
Methanol	**=**	676
Methanol Loss	**=**	30
Aqueous		
Effluent	=	1052
(Sodium Chloride 78, Formaldehyde 14, Methanol 14, gen.water 46, Water from Formaldehyde 88, Water from Hydrochloric Acid 92, Water 720)		
Organic Residue		
Unreacted Organic Impurities (Organic Impurities)	=	56
Total Output	=	2174

PRODUCT : Clopidogrel Hydrogen Bisulfate

Stage : 4

Mole Balance:

INPUT	No. of moles	Mol.Wt.
DL-Clopidogrel Base	2	643
Total Input	=	643

OUTPUT	No. of moles	Mol. Wt.
S(+) Clopidogrel	2	643
Total Output	=	643

Material Balance:

INPUT		Kg
DL-Clopidogrel Base	=	360
Camphor Sulfonic Acid	=	260
Sodium Hydroxide	=	44
Methanol	=	1560
Hydrochloric Acid (35%)	=	114
Water	=	1130
Total Input	=	3468

OUTPUT		Kg
Product		
S(+) Clopidogrel	=	170
Recovery		
Methanol	**=**	1480
Methanol Loss	**=**	50
Camphor Sulfonic Acid	=	260
Aqueous		
Effluent	=	1318
(Sodium Chloride 64, Methanol 30, gen.water 20, Water from Hydrochloric Acid 74, Water 1130)		
Organic Residue		
Unreacted Organic Impurities	=	190
(Organic Impurities 20, R(-) Clopidogrel 170)		
Total Output	=	3468

PRODUCT : Clopidogrel Hydrogen Bisulfate

Stage : 5

Mole Balance:

INPUT	No. of moles	Mol.Wt.
S(+) Clopidogrel	1	321.5
Sulfuric Acid	1	98
Total Input	=	419.5

OUTPUT	No. of moles	Mol. Wt.
Clopidogrel Hydrogen Bisulfate	1	419.5
Total Output	=	419.5

Material Balance:

INPUT		Kg
S(+) Clopidogrel	=	170
Acetone	=	920
Sulfuric Acid	=	52
Total Input	=	1142

OUTPUT		Kg
Product		
Clopidogrel Hydrogen Bisulfate	=	200
Recovery		
Acetone	=	864
Acetone Loss	=	40
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 22, Acetone 16)	=	38
Total Output	=	1142

PRODUCT : Clopidogrel Hydrogen Bisulfate

Description :

Stage-1 : Thiophene Ethanol is reacted with Thionyl Chloride and Ammonia in presence of Toluene to get Stage-1 Compound.

Stage-2 : Stage 1 compound is reacted with Methyl-2-Bromo-O-Chloro Phenyl Acetate and Sodoium Hydroxide in presence of Methanol to get (Stage-2) Compound.

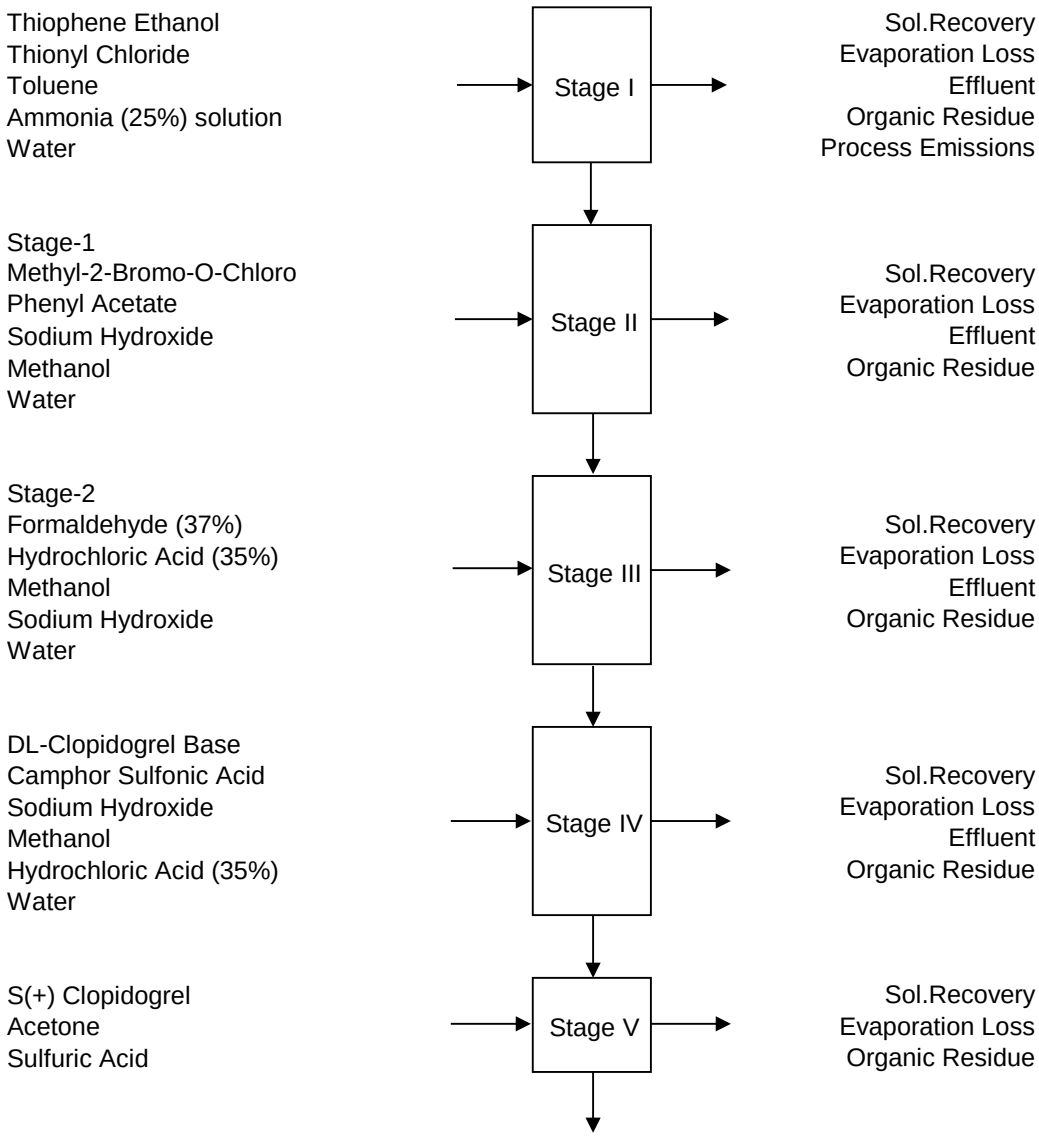
Stage-3 : Stage 2 compound is reacted with Formaldehyde in presence of Methanol to get DL-Clopidogrel Base.

Stage-4 : DL-Clopidogrel Base is isomerised with Camphor Sulfonic Acid in presence of Methanol to get S(+) Clopidogrel.

Stage-5 : S(+) Clopidogrel is reacted with Sulfuric acid in presence of Acetone to get Clopidogrel Hydrogen Bisulfate.

PRODUCT : Clopidogrel Hydrogen Bisulfate

Flow Chart



PRODUCT : Enrofloxacin

Stage : 1
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Q-Acid	1	281.5
N-Ethyl Piperazine	2	228
Total Input	=	509.5

OUTPUT	No. of moles	Mol. Wt.
Enrofloxacin	1	359
N-Ethyl Piperazine Hydrochloride	1	150.5
Total Output	=	509.5

Material Balance:

INPUT		Kg
Q-Acid	=	470
N-Ethyl Piperazine	=	433.5
Acetic acid	=	107.5
Hydrochloric Acid (35%)	=	48.5
Ammonium Hydroxide (25%)	=	250
Carbon	=	16
EDTA	=	1
Hyflo	=	4.5
Methanol	=	120
Water	=	2562.5
Total Input	=	4013.5

OUTPUT		Kg
Product		
Enrofloxacin (541.5 + 298.5)	=	840
Recovery		
Methanol	=	111.5
Methanol Loss	=	8.5
Send to Auth.Party (Aqueous)		
Send to Auth.Party	=	3033
(N-Ethyl Piperazine Hydrochloride 321, Ammonium Acetate 138, EDTA 1, Organic Compound 58, gen. water 32, Water from Hydrochloric Acid 31.5, Water from Ammonium Hydroxide 187.5, Water 2264)		
Spent Carbon		
Spent Carbon	=	20.5
(Carbon 16, Hyflo 4.5)		
Total Output	=	4013.5

PRODUCT : Enrofloxacin

Stage : 2 (Purification)
Material Balance:

INPUT		Kg
Enrofloxacin (541.5 + 298.5)	=	840
Methanol	=	1777.5
Total Input	=	2617.5

OUTPUT		Kg
Product		
Enrofloxacin	=	500
Recovery		
Methanol	=	1653.5
Methanol Loss	=	88.5
Aqueous		
Effluent (Methanol 35.5, OrganicCompound 1.5, Water from Base 298.5,)	=	335.5
Organic Residue		
Unreacted Organic Impurities (Organic Impurities)	=	40
Total Output	=	2617.5

PRODUCT : Enrofloxacin

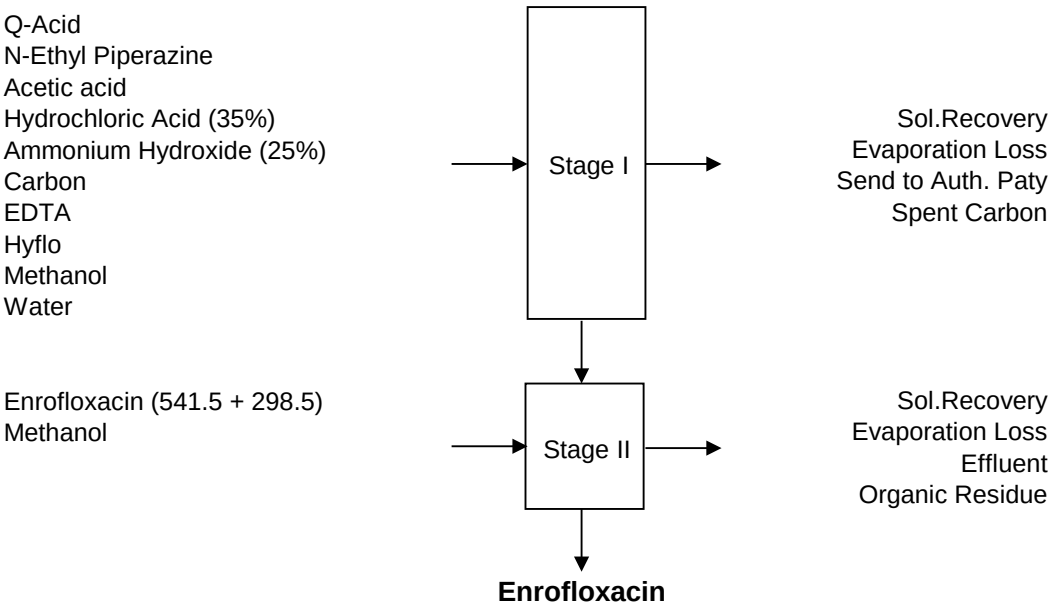
Description :

Stage-1 : Methanol was used as a solvent. Initially solvent was taken into the reactor, N-Ethyl Piperazine and Q-Acid added. Then heated to 120-125^{o}C. Reaction mass was maintained 15hrs at 125-130^{o}C. Completion of the reaction distill out the solvent completely. Adjust the pH was neutral (6.9 to 7.2) by using Hydrochloric acid and centrifuge the material and washed with hot water.

After that water charged in to the reactor and added that material. Then adjust the pH up to 4.2 to 4.5 by using Acetic acid, added carbon, EDTA, hyflo maintained 30 minutes filtered and collect the clear filtrate and adjust pH neutral (6.9 to 7.2) by using ammonia solution at 55 to 60^{o}C. Then centrifuge the mass at 55 - 60^{o}C and washed with hot water. Collect the material for next stage.

Stage-2 : Initially, required quantity of Methanol was taken in the reactor at RT and added Stage-1 material. Then heated the mass to 60-65^{o}C, maintained 1hr at 10-15^{o}C. The mass was centrifuged to separate Methanol ml's and technical grade of Enrofloxacin.

Flow Chart



PRODUCT : Pioglitazone Hydrochloride

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
5-Ethyl-2-methyl Pyridine	1	121
Formaldehyde	2	60
Water	1	18
Total Input	=	199

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	151
Formic Acid	1	46
Hydrogen	1	2
Total Output	=	199

Material Balance:

INPUT		Kg
5-Ethyl-2-methyl Pyridine	=	65
Aq.Formaldehyde (40%)	=	90
Methanol	=	195
Total Input	=	350

OUTPUT		Kg
Product		
Stage-1	=	72
Recovery		
Methanol	=	183
Methanol Loss	=	8
Aqueous		
Effluent	=	73.9
(Formic Acid 24.7, Formaldehyde 3.8, Organic Compound 0.1, Methanol 1, Water from Formaldehyde 44.3)		
Organic Residue		
Unreacted Organic Impurities	=	12
(Organic Impurities 9, Methanol 3)		
Process Emissions		
Process Emissions	=	1.1
(Hydrogen)		
Total Output	=	350

PRODUCT : Pioglitazone Hydrochloride

Stage : 2
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	151
Methanesulfonyl chloride	1	114.5
Total Input	=	265.5

OUTPUT	No. of moles	Mol. Wt.
Stage-2	1	229
Hydrogen Chloride	1	36.5
Total Output	=	265.5

Material Balance:

INPUT		Kg
Stage-1	=	72
Methanesulfonyl chloride	=	60
Toluene	=	216
Total Input	=	348

OUTPUT		Kg
Product		
Stage-2	=	95
Recovery		
Toluene	=	205
Toluene Loss	=	7.5
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 14.2, Methanesulfonyl chloride 5.4, Toluene 3.5)	=	23.1
Process Emissions		
Process Emissions (Hydrogen Chloride)	=	17.4
Total Output	=	348

PRODUCT : Pioglitazone Hydrochloride

Stage : 3

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-2	1	229
P-Hydroxy Benzaldehyde	1	122
Potassium Carbonate	1	138
Total Input	=	489

OUTPUT	No. of moles	Mol. Wt.
Stage-3	1	255
Potassium Methane Sulfonate	1	134
Potassium Bicarbonate	1	100
Total Output	=	489

Material Balance:

INPUT		Kg
Stage-2	=	95
P-Hydroxy Benzaldehyde	=	55
Potassium Carbonate	=	65
Toluene	=	285
Total Input	=	500

OUTPUT		Kg
Product		
Stage-3	=	90
Recovery		
Toluene	=	270
Toluene Loss	=	10
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 15.8, Toluene 5, P-Hydroxy Benzaldehyde 4.4)	=	25.2
Inorganic Solid Waste		
Inorganic Solid Waste (Potassium Methane Sulfonate 55.6, Potassium Bicarbonate 41.5, Potassium Carbonate 7.7)	=	104.8
Total Output	=	500

PRODUCT : Pioglitazone Hydrochloride

Stage : 4
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-3	1	255
2,4-thiazolidine dione	1	117
Total Input	=	372

OUTPUT	No. of moles	Mol. Wt.
Stage-4	1	354
Water	1	18
Total Output	=	372

Material Balance:

INPUT		Kg
Stage-3	=	90
2,4-thiazolidine dione	=	45
Methanol	=	270
Piperidine	=	30
Total Input	=	435

OUTPUT		Kg
Product		
Stage-4	=	110
Recovery		
Methanol	=	254
Methanol Loss	=	11
Piperidine	=	28.2
Piperidine Loss	=	1.2
Aqueous		
Effluent	=	6.9
(Piperidine 0.1, Organic Compound 0.4, gen.water 6.4)		
Organic Residue		
Unreacted Organic Impurities	=	23.7
(Organic Impuriites 14.5, 2,4-Thiazolidinedione 3.7, Piperidine 0.5, Methanol 5)		
Total Output	=	435

PRODUCT : Pioglitazone Hydrochloride

Stage : 5
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-4	1	354
Hydrogen	1	2
Total Input	=	356

OUTPUT	No. of moles	Mol. Wt.
Pioglitazone	1	356
Total Output	=	356

Material Balance:

INPUT		Kg
Stage-4	=	110
Palladium Carbon	=	35
Hydrogen	=	3
Methanol	=	330
Total Input	=	478

OUTPUT		Kg
Product		
Pioglitazone	=	100
Recovery		
Methanol	=	310
Methanol Loss	=	13.5
Palladium Carbon	=	35
Organic Residue		
Unreacted Organic Impurities (Organic Impurities 10.6, Methanol 6.5)	=	17.1
Process Emissions		
Process Emissions (Hydrogen)	=	2.4
Total Output	=	478

PRODUCT : Pioglitazone Hydrochloride

Stage : 6
Mole Balance:

INPUT	No. of moles	Mol.Wt.
Pioglitazone	1	356
Hydrochloric Acid	1	36.5
Total Input	=	392.5

OUTPUT	No. of moles	Mol. Wt.
Pioglitazone Hydrochloride	1	392.5
Total Output	=	392.5

Material Balance:

INPUT		Kg
Pioglitazone	=	100
Isopropyl Alcohol	=	225
Hydrochloride (10%)		
Total Input	=	325

OUTPUT		Kg
Product		
Pioglitazone Hydrochloride	=	100
Recovery		
Isopropyl Alcohol	=	192
Isopropyl Alcohol Loss	=	8
Organic Residue		
Unreacted Organic Impurities	=	12.8
(Organic Impurites 10.3, Isopropyl Alcohol 2.5)		
Process Emissions		
Process Emissions	=	12.2
(Hydrogen Chloride)		
Total Output	=	325

PRODUCT : Pioglitazone Hydrochloride

Description :

Stage-1 : 5-Ethyl-2-methyl Pyridine reaction with Aq.Formaldehyde to get 2-(5-Ethyl-2-pyridyl) ethanol and Formic acid is byproduct release of Hydrogen gas.

Stage-2 : 2-(5-Ethyl-2-pyridyl) ethanol reaction with Methanesulfonyl chloride in presence of Toluene solvent at 0-5^{o}C temperature to get 2-(5-Ethyl-2-pyridyl) ethyl methane sulfonate and Hydrogen Chloride is byproduct.

Stage-3 : 2-(5-Ethyl-2-pyridyl) ethyl methane sulfonate reaction with *p* -Hydroxy benzaldehyde in presence of Potassium carbonate and Toluene to get 4[2-(5-Ethyl-2-pyridyl) ethoxy] benzaldehyde and by product is Potassium methane sulfonate and Potassium bicarbonate.

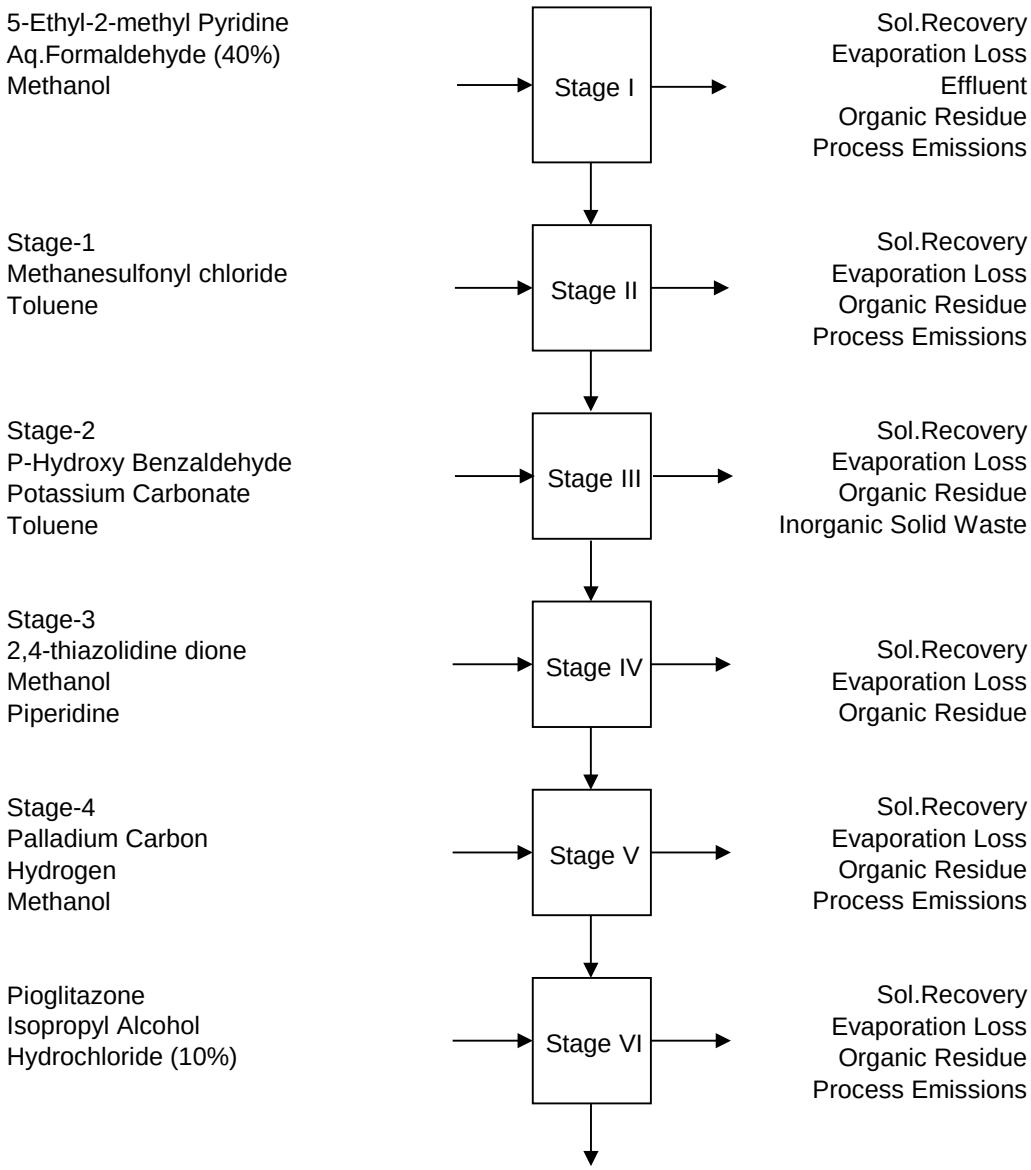
Stage-4 : 4-[2-(5-Ethyl-2-pyridyl)ethoxy] benzaldehyde reaction with 2,4-Thiazolidinedione inpresence of Methanol and Piperidine at 65-70^{o}C Temperature to get 5[4-2-(5-Ethyl-2-pyridyl)ethoxy]benzilidine-2,4-thiazolidinedione and water is byproduct.

Stage-5 : 5[4-2-(5-Ethyl-2-pyridyl) ethoxy] benzilidine-2,4-Thiazolidinedione undergoes catalytic hydrogenation in presence of Palladium catalyst to form 5-[4-2-(5-Ethyl-2-pyridyl) ethoxy] benzyl-2,4-Thiazolidinedione or Pioglitazone.

Stage-6 : Pioglitazone in presence of Isopropyl alochol Hydrochloride to form Pioglitazone Hydrochloride.

PRODUCT : Pioglitazone Hydrochloride

Flow Chart



PRODUCT : Gabapentin

Stage : 1

Mole Balance:

INPUT	No. of moles	Mol.Wt.
1,1-Cyclohexane diacetic acid	1	200
Acetic Anhydride	1	102
Total Input	=	302

OUTPUT	No. of moles	Mol. Wt.
Stage-1	1	182
Acetic Acid	2	120
Total Output	=	302

Material Balance:

INPUT		Kg
1,1-Cyclohexane diacetic acid	=	190
Acetic Anhydride	=	120
Total Input	=	310

OUTPUT		Kg
Product		
Stage-1	=	165
Recovery		
Acetic Anhydride	=	19
Acetic Anhydride Loss	=	3
Acetic Acid	=	110
Organic Residue		
Unreacted Organic Impurities	=	13
(Organic Impurities 7.9, Acetic Anhydride 1.1, Acetic Acid 4)		
Total Output	=	310

PRODUCT : Gabapentin

Stage : 2

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-1	1	182
Hydroxylamine Hydrochloride	1	69.5
Sodium Carbonate	1/2	53
Total Input	=	304.5

OUTPUT	No. of moles	Mol. Wt.
Stage-2	1	197
Sodium Chloride	1	58.5
Carbon Dioxide	1/2	22
Water	1 1/2	27
Total Output	=	304.5

Material Balance:

INPUT		Kg
Stage-1	=	165
Hydroxylamine Hydrochloride	=	78
Sodium Carbonate	=	70
Water	=	500
Total Input	=	813

OUTPUT		Kg
Product		
Stage-2	=	150
Aqueous		
Effluent	=	638.32
(Sodium Chloride 65.66, Sodium Carbonate 10.52, Hydroxylamine 7.12, Organic Compound 28.6, gen water 26.42, Water 500)		
Process Emissions		
Process Emissions	=	24.68
(Carbon Dioxide)		
Total Output	=	813

PRODUCT : Gabapentin

Stage : 3

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-2	1	197
Benzene Sulfonyl Chloride	1	176.5
Sodium Carbonate	1/2	53
Total Input	=	426.5

OUTPUT	No. of moles	Mol. Wt.
Stage-3	1	337
Sodium Chloride	1	58.5
Carbon Dioxide	1/2	22
Water	1/2	9
Total Output	=	426.5

Material Balance:

INPUT		Kg
Stage-2	=	150
Sodium Carbonate (10%)	=	750
Benzene Sulfonyl Chloride	=	135
Water	=	225
Total Input	=	1260

OUTPUT		Kg
Product		
Stage-3	=	227
Aqueous		
Effluent		1016.18
(Sodium Chloride 44.74, Sodium Carbonate 34.47, Benzene Sulfonic Acid 0.55, Organic Compound 29.6, Water from Sodium Carbonate 675, gen.water 6.88, Water 224.94)		
Process Emissions		
Process Emissions	=	16.82
(Carbon Dioxide)		
Total Output	=	1260

PRODUCT : Gabapentin

Stage : 4

Mole Balance:

INPUT	No. of moles	Mol.Wt.
Stage-3	1	337
Sodium Hydroxide	2	80
Hydrochloric Acid	2	73
Total Input	=	490

OUTPUT	No. of moles	Mol. Wt.
Gabapentin	1	171
Benzene Sulfonic Acid	1	158
Carbon Dioxide	1	44
Sodium Chloride	2	117
Total Output	=	490

Material Balance:

INPUT		Kg
Stage-3	=	227
Sodium Hydroxide (10%)	=	1362
Hydrochloric Acid (35%)	=	475
Ethanol	=	200
Total Input	=	2264

OUTPUT		Kg
Product		
Gabapentin	=	100
Recovery		
Ethanol	=	185
Ethanol Loss	=	10
Aqueous		
Effluent	=	1939.36
(Sodium Chloride 199.19, Hydrochloric Acid 41.97, Ethanol 5, Benzene Sulfonic Acid 106.43, Organic Compound 15.18, Water from Sodium Hydroxide 1225.8, gen.water 37.04, Water from Hydrochloric Acid 308.75)		
Process Emissions		
Process Emissions	=	29.64
(Carbon Dioxide)		
Total Output	=	2264

PRODUCT : Gabapentin

Description :

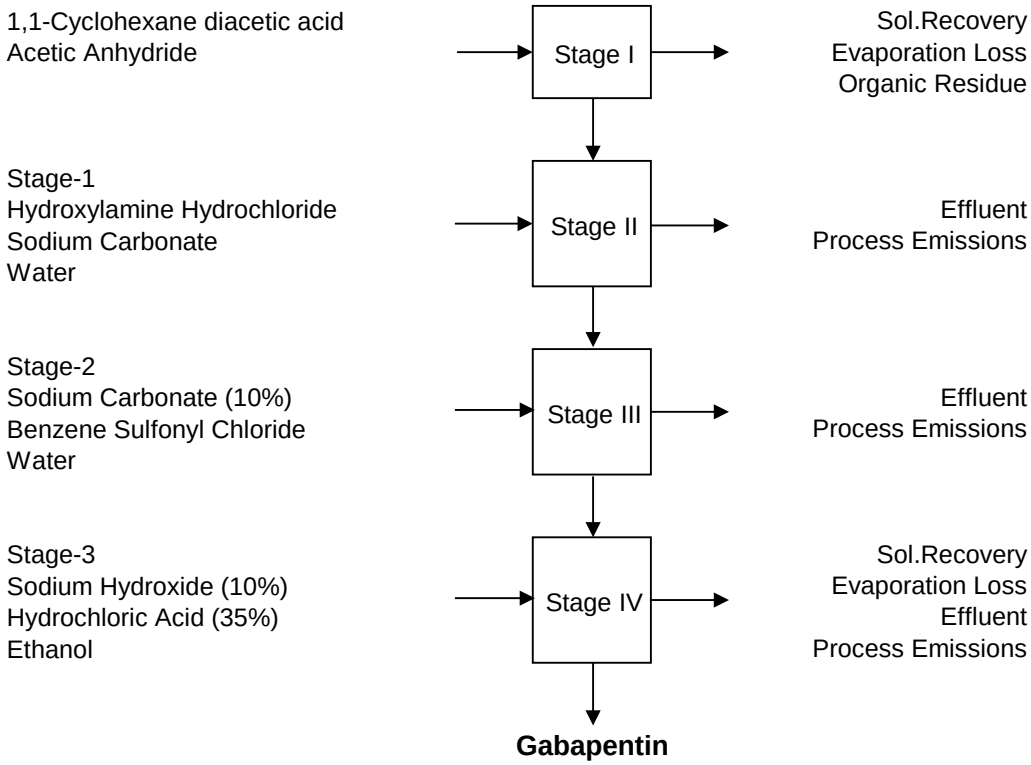
Stage-1 : This stage invloves the reaction of 1,1-Cyclohexane diacetic acid with Acetic Anhydride to give 1,1-Cyclohexane diacetic acid anhydride.

Stage-2 : 1,1-Cyclohexane diacetic acid anhydride obtained in stage-1 is treated with Hydroxylamine Hydrochloride in presence of Sodium Carbonate to get 1,1-Cyclohexane diacetic acid N-Hydroxyimide.

Stage-3 : This stage invloves the reaction of 1,1-Cyclohexane diacetic acid N-Hdyroxyimide with Benzene Sulfonyl Chloride in presence of Sodium Carbonate to give N-Benzene sulfonyloxy-1,1-Cyclohexane diacetic acid imide.

Stage-4 : The N-Benzene sulfonyloxy-1,1-Cyclohexane diacetic acid imide derivative obtained in Stage-3 is subjected to Lossen rearrangement by boiling in 10% Sodium Hydroxide solution, followed by pH adjustment with Hydrochloric Acid in presence of Ethanol to give the Gabapentin product.

Flow Chart



PRODUCT : Bisphenol Acetophenone

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
3-Mercaptopropionic acid	=	10	3.03
Acetophenone	=	500	151.52
Activated Carbon	=	15	4.55
Methanol	=	1500	454.55
Phenol	=	790	239.39
Sulfuric acid	=	14	4.24
Toluene	=	1000	303.03

PRODUCT : P-Phenolphthalein bisphenol (or) 2-Phenyl-3,3-Bis (4-Hydroxyphenyl) Phthallimide (PPPBP)

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
Activated Carbon	=	324	3240
Aniline	=	1042	10420
Chlorosulfonic acid	=	86	860
Hydrochloric acid (35%)	=	1831	18310
Methanol	=	7280	72800
Phenol	=	805	8050
Phthalic anhydride	=	540	5400
Sodium Bisulfite	=	27	270
Sodium Hydroxide (48%)	=	1194	11940
Zinc Chloride	=	292	2920

PRODUCT : 1,5-Bis-[2,6-dimethyl-4-(2-methyl-2-propenoxy) phenyl}-penta-(2,6-dimethyl-1,4-phenyleneoxide (MX-9000)

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
1,5-Bis-(2,6-dimethyl-4-hydroxyphenyl)-penta-(2,6-dimethyl-1,4-phenyleneoxide)	=	250	1389
Dimethylaminopyridine	=	3	16.67
Methacrylic anhydride	=	56	311.14
Methanol	=	2920	16223.52
Toluene	=	350	1944.6

PRODUCT : Tetramethyl bisphenol acetone (TMBPA)

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
2,6-Xylenol	=	1583	336.89
3-Mercaptopropionic acid	=	100	21.28
Acetone	=	300	63.85
Dodecylbenzenesulfonic acid	=	360	76.62
Toluene	=	2600	553.33

PRODUCT : [1,1,1-Tri-(4-hydroxyphenyl)] ethane (THPE)

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
3-Mercaptopropionic acid	=	24.5	22.59
4-Hydroxyacetophenone	=	150	138.33
Activated carbon	=	4	3.69
Ethylene Dichloride	=	2100	1936.67
Methanol	=	765	705.50
Methanesulfonic acid	=	65.5	60.41
Phenol	=	260	239.78

PRODUCT : 4-Hydroxybenzonitrile (HBN)

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
4-Hydroxybenzaldehyde	=	300	301.82
Carbon	=	15	15.09
Hydroxylamine sulfate	=	210	211.27
Methanol	=	400	402.42
Sodium Hydroxide (50%)	=	205	206.24
Toluene	=	1300	1307.88

PRODUCT : 4-Nitro-N-Methyl Phthalimide (4-NPI)

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
Monomethylamine	=	180	2500.02
Nitric acid	=	500	6944.50
Phthallic Anhydride	=	780	10833.42
Sulfuric acid	=	2327	32319.70

PRODUCT : Sumatriptan Succinate

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
4-Chloro Butyraldehyde Sodium Bisulphite Adduct	=	50	16.67
4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride	=	60	20.00
Acetone	=	500	166.67
Carbon	=	5	1.67
Dimethylamine (40%)	=	25	8.33
Ethyl Acetate	=	625	208.33
Methylene Dichloride	=	500	166.67
Potassium Iodide	=	30	10.00
Sodium Bicarbonate	=	30	10.00
Sodium Carbonate	=	50	16.67
Vacum Salt	=	50	16.67

PRODUCT : 3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
4-Hydrazino-N-Methyl Benzene Methane Sulfonamide Hydrochloride	=	2428	890.3
3-[2-(Dimethylamine)ethyl]-N-methyl-1H-indole-5-methane sulfonamide (Crude)	=	1428	523.6
4-Chloro Butyraldehyde Sodium Bisulphite Adduct	=	2112	774.4
Acetone	=	14280	5236.0
Carbon	=	857	314.2
Formaldehyde (37%)	=	7868	2884.9
Hydrochloric acid (35%)	=	2856	1047.2
Hyflo	=	239	87.6
Isopropyl Alcohol	=	18210	6677.0
Methanol	=	14570	5342.3
Methylene Dichloride	=	29860	10948.7
Potassium Carbonate	=	3610	1323.7
S-139	=	761	279.0
Sodium Borohydride	=	1166	427.5
Sodium Chloride	=	2555	936.8
Sodium Hydroxide	=	1738	637.3
Sodium Hydroxide (48%)	=	102	37.4

PRODUCT : Ciprofloxacin Hydrochloride

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
Acetic acid	=	107.5	358.33
Ammonium Hydroxide (25%)	=	250	833.33
Carbon	=	16	53.33
Ciprofloxacin Base Pure (470 + 370)	=	840	2800.00
EDTA	=	1	3.33
Hydrochloric Acid (35%)	=	288.5	961.67
Hyflo	=	4.5	15.00
Methanol	=	1898	6326.67
Piperazine	=	327.5	1091.67
Q.Acid	=	470	1566.67

PRODUCT : Metformin Hydrochloride

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
Dicyanodiamide	=	630	420.00
Dimethylamine Hydrochlorde	=	650	433.33
Dimethylformamide	=	1470	980.00
Isopropyl Alcohol	=	1000	666.67

PRODUCT : Venlafaxine Hydrochloride

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
1-[-Amino-1-(4-methoxy Phenyl) ethyl]	=	95	31.67
Ethyl Acetate	=	950	316.67
Formaldehyde (40%)	=	58	19.33
Formic Acid	=	58	19.33
Isopropyl Alcohol Hydrochloride (20%)	=	70	23.33
Sodium Sulfate	=	10	3.33

PRODUCT : Sertraline Hydrochloride

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
Activated Carbon	=	3	5
Ammonia solution (18%)	=	111	185
Ethanol	=	1800	3000
Ethyl Acetate	=	3000	5000
Hydrochloric Acid (35%)	=	199.6	332.67
Hyflo	=	5	8.33
Mandelic acid	=	115	191.67
Methanol	=	4200	7000
Monomethylamine solution (25%) in Methanol	=	850	1416.67
Sodium Borohydride	=	17.8	29.67
Sodium Hydroxide	=	25.5	42.5
Tetralone	=	480	800

PRODUCT : Celecoxib

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
4-Acetamidobenzene Sulfonyl Chloride	=	130	130.0
4-Methyl Acetophenone	=	61	61.0
Ammonia Solution (20%)	=	359	359.0
Ethyl Acetate	=	800	800.0
Hydrochloric Acid (15%)	=	175	175.0
Hydrochloric Acid (35%)	=	445	445.0
Isopropyl Alcohol	=	240	240.0
Methyl Isobutyl Ketone	=	180	180.0
Methyl trifluoro acetate	=	58	58.0
Sodium Chloride (10%)	=	300	300.0
Sodium Methoxid (25%)	=	100	100.0
Sodium Nitrite	=	33	33.0
Sodium Sulfate	=	30	30.0
Sodium Sulfate	=	20	20.0
Sodium Sulfite	=	120	120.0

PRODUCT : Clopidogrel Hydrogen Bisulfate

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
Acetone	=	920	4600
Ammonia (25%) solution	=	200	1000
Camphor Sulfonic Acid	=	260	1300
DL-Clopidogrel Base	=	360	1800
Formaldehyde (37%)	=	140	700
Hydrochloric Acid (35%)	=	254	1270
Methanol	=	3180	15900
Methyl-2-Bromo-O-Chloro Phenyl Acetate	=	374	1870
S(+) Clopidogrel	=	170	850
Sodium Hydroxide	=	158	790
Sulfuric Acid	=	52	260
Thionyl Chloride	=	186	930
Thiophene Ethanol	=	200	1000
Toluene	=	1000	5000

PRODUCT : Enrofloxacin

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
Acetic acid	=	107.5	7.17
Ammonium Hydroxide (25%)	=	250	16.67
Carbon	=	16	1.07
EDTA	=	1	0.07
Hydrochloric Acid (35%)	=	48.5	3.23
Hyflo	=	4.5	0.30
Methanol	=	120	8.00
N-Ethyl Piperazine	=	433.5	28.90
Q-Acid	=	470	31.33

PRODUCT : Pioglitazone Hydrochloride

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
2,4-thiazolidine dione	=	45	30
5-Ethyl-2-methyl Pyridine	=	65	43.33
Aq.Formaldehyde (40%)	=	90	60
Hydrogen	=	3	2
Isopropyl Alcohol Hydrochloride (10%)	=	225	150
Methanesulfonyl chloride	=	60	40
Methanol	=	795	530
Palladium Carbon	=	35	23.33
P-Hydroxy Benzaldehyde	=	55	36.67
Pioglitazone	=	100	66.67
Piperidine	=	30	20
Potassium Carbonate	=	65	43.33
Toluene	=	501	334

PRODUCT : Gabapentin

LIST OF RAW MATERIALS

Raw Material		Consumption of Raw Material / Batch of Product	Daily Consumption of Raw Material
		Kg	**Kg**
1,1-Cyclohexane diacetic acid	=	190	3166.67
Acetic Anhydride	=	120	2000
Benzene Sulfonyl Chloride	=	135	2250
Hydrochloric Acid (35%)	=	475	7916.67
Hydroxylamine Hydrochloride	=	78	1300
Sodium Carbonate	=	70	1166.67
Sodium Carbonate (10%)	=	750	12500
Sodium Hydroxide (10%)	=	1362	22700

LIST OF HAZARDOUS RAW MATERIALS

Porposed Products

Raw Material
Acetic acid
Acetic Anhydride
Acetone
Ammonia (25%) solution
Aniline
Aq.Formaldehyde (40%)
Benzene Sulfonyl Chloride
Chlorosulfonic acid
Dimethylamine (40%)
Ethanol
Ethyl Acetate
Ethylene Dichloride
Formaldehyde (37%)
Formic Acid
Hydrochloric Acid (15%)
Hydrogen
Isopropyl Alcohol
Methanol
Methyl Isobutyl Ketone
Methylene Dichloride
Monomethylamine
Phenol
Phthalic anhydride
Piperidine
Sulfuric acid
Thionyl Chloride
Toluene

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Tele : 91-040-65177107, Fax : 040-30440598, E-mail : kkb.mtlpl@gmail.com , www.kkbmicrotestinglabs.com

TEST REPORT

Report Reference Number: **KMTLPL/15-16/1113/WTR/02** Issue Date: 21.07.2015

Issued To: **POROUS LABORATORIES LTD.** Unit-IV, Sy.No. 106, 107/1 & 2, Akkireddygudem (V), Musunuru (M), Krishna District.	**Lr. Reference No. & Date**	Nil
	Sample Receipt Date	02.07.2015
	Analysis Starting Date	02.07.2015
	Analysis Completion Date	07.07.2015
Sample Name: Bore Water	**Quantity Received**	1 L x 1 No in Pet Bottle
	Sample condition on Receipt	Good
	Source / Location	Project Site
Tests Requested: As mentioned below		

TEST RESULTS

S.No	Parameter	UOM	Test Method	IS 10500: 2012 Standards	Result
1	pH	--	Cl 2 of IS 3025 : 1983 Pt 11 RA 2012	6.5 -8.5	7.45
2	Color	--	Cl 2 of IS 3025: 1983 Pt 4 RA 2012	Not Specified	Colourless
3	Odor	--	IS 3025 : 1983 Pt 5	Agreeable	Agreeable
4	Electrical Conductivity	micro mhos/cm	APHA 22nd Edition	Not Specified	2060
5	Turbidity	NTU	IS 3025 : 1984 Pt 10 RA 2012	1.0	0.3
6	Total Dissolved Solids	mg/L	APHA 22nd Edition	500	1480
7	Total Suspended Solids	mg/L	IS 3025:1998(Part-17)	Not Specified	Nil
8	Chemical Oxygen Demand	mg/L	5220 B APHA 22nd Edn 2012	Not Specified	36
9	Total Hardness as CaCO3	mg/L	APHA 22nd Edition	200	610.4
10	Non Carbonate Hardness as CaCO3	mg/L	By Calculation	Not Specified	214.44
11	Calcium as Ca	mg/L	APHA 22nd Edition	75	174.75
12	Magnesium as Mg	mg/L	APHA 22nd Edition	30	42.41
13	Total Phosphates	mg/L	IS 3025: 1988 Pt 31	Not Specified	2.0
14	Total Alkalinity	mg/L	IS 3025 : 1986 Pt 23	200	395.96
15	Chlorides as Cl	mg/L	Cl. 2 of IS 3025 : 1988 Pt 32	250	277.36
16	Sodium as Na	mg/L	Cl 5 of IS: 3025: 1993 Pt 45 RA 2009	Not Specified	210
17	Potassium as K	mg/L	Cl 5 of IS: 3025 : 1993 Pt 45 RA 2009	Not Specified	12
18	Dissolved Oxygen	mg/L	IS 3025:1989 Pt 38	Not Specified	6.2
19	Sulphates as SO4	mg/L	Cl 4 of IS: 3025: 1986 Pt 24 RA 2009	200	150
20	Nitrates as NO3	mg/L	NEERI	45	48
21	Silica as SiO2	mg/L	Cl 3 of IS: 3025 : 1988 Pt 35 RA 1999	Not Specified	32
22	Iron as Fe	mg/L	Cl 6 of IS: 3025 : 2003 Pt 53	0.3	0.2
23	Fluoride as F	mg/L	APHA 22nd Edition	1.0	1.0
24	Nickel as Ni	mg/L	3111 B APHA 22nd Edn 2012	0.02	0.10
25	Cadmium as Cd	mg/L	3111 B APHA 22nd Edn 2012	0.003	BDL
26	Chromium as Cr	mg/L	3111 B APHA 22nd Edn 2012	Not Specified	0.09
27	Lead as Pb	mg/L	3111 B APHA 22nd Edn 2012	0.01	BDL
28	Manganese as Mn	mg/L	3111 B APHA 22nd Edn 2012	0.1	0.14
29	Zinc as Zn	mg/L	3111 B APHA 22nd Edn 2012	5.0	0.16
30	Copper as Cu	mg/L	3111 B APHA 22nd Edn 2012	0.05	BDL
31	Cobalt as Co	mg/L	3111 B APHA 22nd Edn 2012	Not Specified	0.12

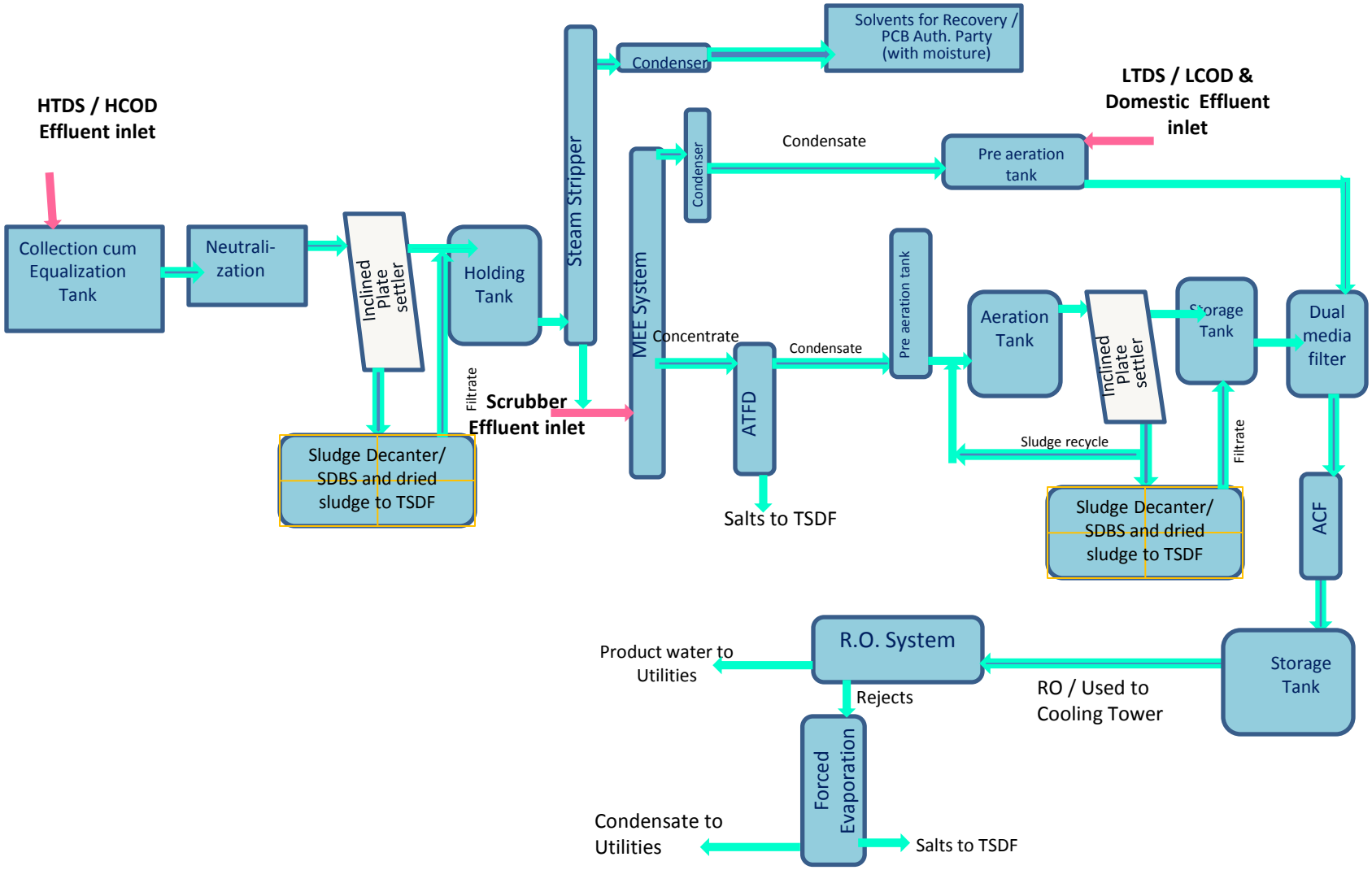
UOM : Unit of Measurement

Authorized Signatory
CH Vijaya Kumar
Lab Director

Page 1 of 1

Note : This report is subject to the Terms & Conditions mentioned Overleaf

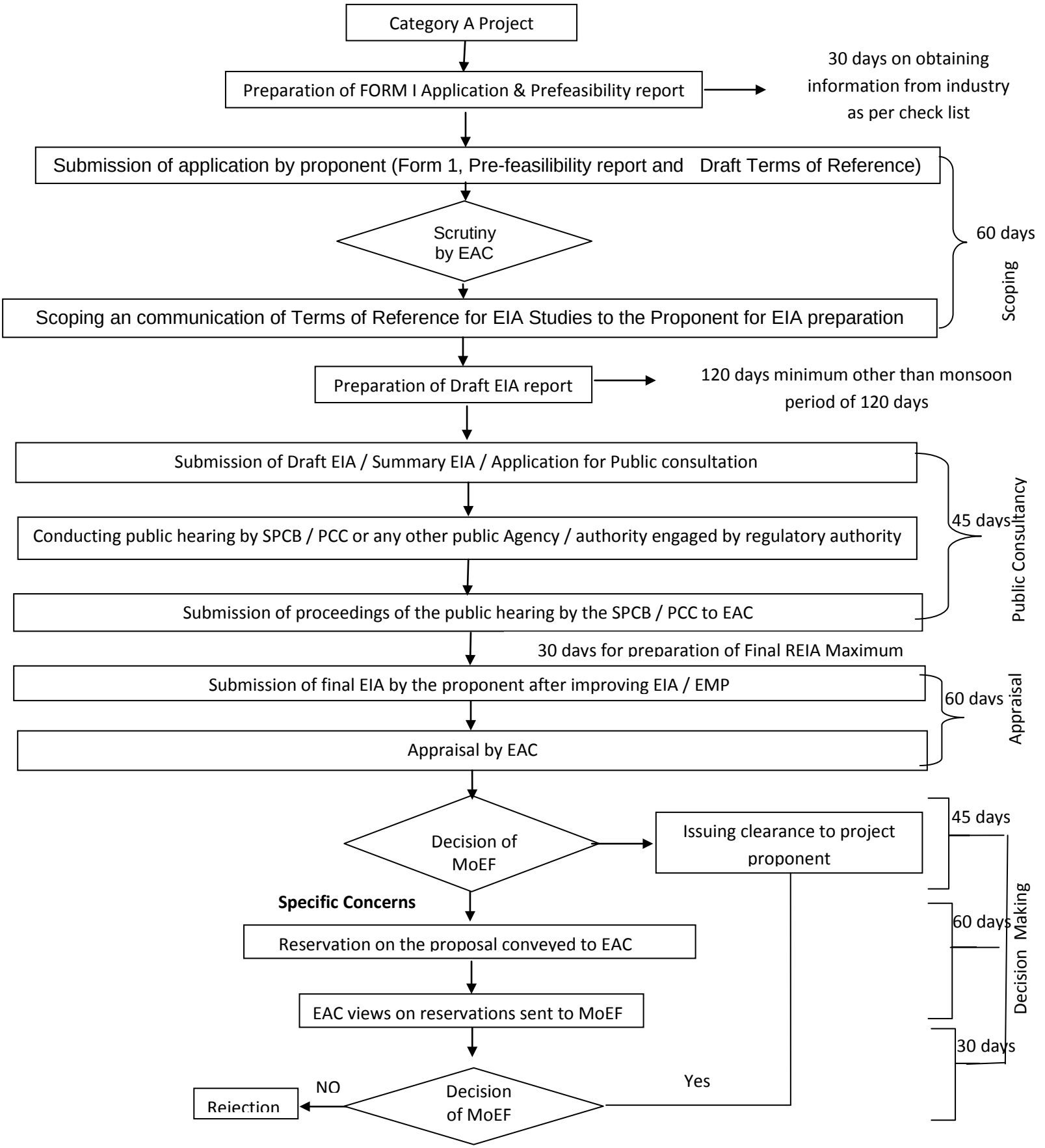
Effluent Treatment Flow Scheme



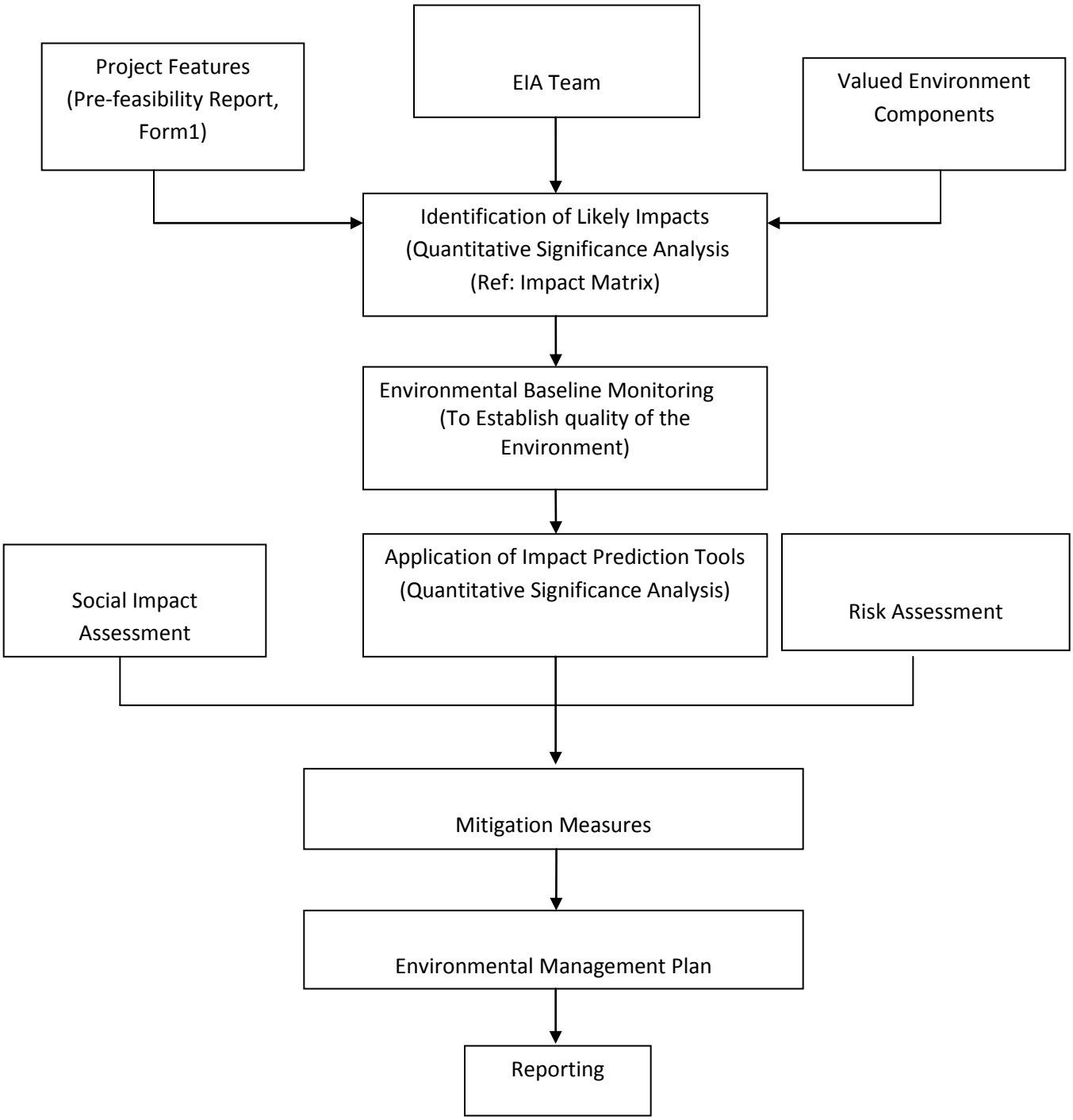
Schematic flow Sheet for EIA Procedure

ANNEXURE - XVI

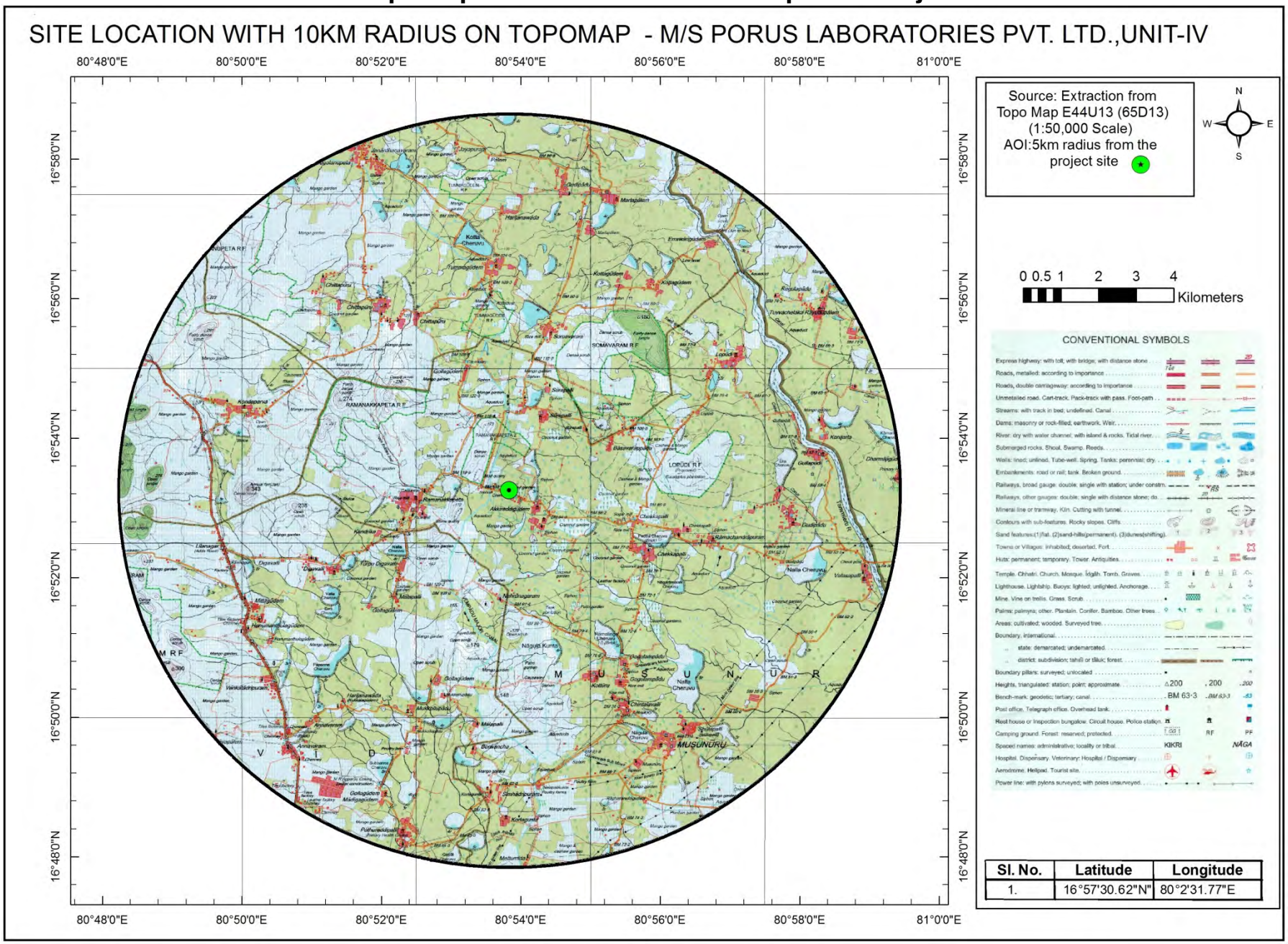
Time schedule for obtaining the EC from MOEF



Approach of EIA Study – 4 months other than monsoon period after obtaining TOR copy from MOEF



Topomap of 10 km Radius for Proposed Project



KKB
MICRO TESTING LABS PVT. LTD.
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TEST REPORT

Report Reference Number: **KMTLPL/15-16/1113/SOL/01** Issue Date: 21.07.2015

Issued To: **POROUS LABORATORIES LTD.** Unit-IV, Sy.No. 106, 107/1 & 2, Akkireddygudem (V), Musunuru (M), Krishna District.	**Lr. Reference No. & Date**	Nil
	Sample Receipt Date	02.07.2015
	Analysis Starting Date	02.07.2015
	Analysis Completion Date	*07.07.2015*
Sample Name: Soil	**Quantity Received**	3Kg x 1 No in Poly Bag
	Sample condition on Receipt	Good
	Source / Location	Project Site
Tests Requested: *As mentioned below*		

TEST RESULTS

S.No.	Parameter	UOM	Test Method	Result
1	pH	--	CPCB Method based on Soil & Solid Waste Analysis – A Laboratory Manual by P K Behra Ref. USEPA	7.59
2	Electrical Conductivity	milli mohs		2.47
3	Color	--		Red
4	Texture	--		Silty Clay Loam
5	Sand	%		25.22
6	Silt	%		36.86
7	Clay	%		37.92
8	Moisture	%		0.75
9	Organic Matter	%		2.50
10	Nitrogen	kg/ha		260.28
11	Phosphorous	kg/ha		6.00
12	Sodium	%		0.08
13	Potassium	kg/ha		120
14	Calcium	%		416
15	Magnesium	%		307.2
16	Iron	%		0.07
17	Manganese	ppm		10.2
18	Boron	ppm		3.9
19	Lead	ppm		0.36
20	Zinc	ppm		9.8
21	Bulk Density	gr/cm		1.60
22	Water Holding Capacity	%		29
23	Porosity	%		33.4
24	Cd	ppm		0.12
25	Cr	ppm		0.08
26	Co	ppm		0.16
27	Cu	ppm		0.19
28	Ni	ppm		0.10

UOM : Unit of Measurement

Authorized Signatory
CH Vijaya Kumar
Lab Director

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